

Exploring Pathways of Western and East Asian Students'
Persistence in Learning: The Role of Learning Beliefs, Choice, and
Internationalization of Learning Motivation

By
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Abstract

This dissertation examines the widely spread assumption that East Asian students are more persistent than their American counterparts because they are more likely to believe that success results from efforts rather than innate ability. The examination was conducted through comparing the impact of three factors—learning beliefs, preference of choice, and internalization of learning motivation—on learning persistence between East Asian and American college students (Western and East Asian). Specifically, the dissertation reports findings of two related studies. The first study was the development of a new measurement scale Internalization of Learning Motivation Scale based on Self-determination theory. The second study was discovering the different pathways for Western and East Asian students towards persistence. The difference in internalization of learning motivation, learning beliefs, preference of choice and persistence between Western and East Asian college students was address. Confirmatory factor analysis was used to test the dimensionality and reliability of the scale, and Structural equation modeling were conducted to identify the relationships among all the factors. The new internalization scale was proved to be valid and reliable. The findings also suggested different pathways to persistence in learning between Western and East Asian students.

Keywords: persistence, learning beliefs, choice, internalization

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Introduction

East Asian students have consistently outperformed American students on academic assessments, such as Trends in International Mathematics and Science Study (TIMSS) and Programme for International Student Assessment (PISA). One of the prominent factors used to explain the East Asian superior academic test performance is that East Asian students are more likely than their American peers to believe that effort, instead of innate ability, determines academic success (Stevenson, 1994; Tucker, 2011); that is, East Asian students believe that effort rather than innate ability results in greater persistence in academic tasks and ultimately higher performance on academic assessments.

The consistent outperformance of East Asian students on academic assessments has led to calls from some organizations (e.g., Organization of Economic Co-operation and Development, 2011) for Western nations to emulate an East Asia's educational system. In response, some Western nations have introduced an East Asian model, or at least parts of it, into their education system under the belief that it will result in improvements in students' learning performance on academic assessments (Leung, 2005; Tucker, 2014). For example, the British government has "imported" Chinese math teachers and teaching materials into their math classrooms (Qin, 2017). However, such wholesale adoption by Western countries of East Asian educational models may ultimately fail because this strategy ignores longstanding philosophical foundations of East Asian and Western educational systems and differences in cultural influences of learning motivation (e.g., internalized expectations).

Education systems evolved under different cultural norms and thus adopting a system that has evolved under disparate cultural norms surrounding learning motivation could ultimately result in poorer student learning and performance (Zhao, 2018). For example, there is an

assumption among some Western educators that East Asian students are more persistent in learning because the observed differences in persistence are related to the individuals' degree of autonomy for pursuing interests and how many choices over learning they have (Iyengar & Lepper, 1999). That is, the assumption is East Asian students may have been taught to believe that they have no choice in tasks and thus persist at a task, while American students may believe they have a choice and thus persistence occurs when they perceive they are choosing to work on a task. Similarly, when confronted with a task to complete, East Asian students may not automatically question the intrinsic motivational value of the task, while Western students may automatically evaluate a task's intrinsic value, applying effort if it the task is consistent with its perceived intrinsic value. Stated alternatively, when Western students do not perceive intrinsic value in the task, they may be less likely to automatically apply effort and persistence because their effort and persistence is tied the value of the task and not the value of persistence.

Western countries adoption of East Asian educational models are predicated on these assumptions about the reasons for performance differences, but these assumptionst have not yet been evaluated. The aim of this dissertation is to (1) evaluate if and in what ways the relations among choice/authority guidance, belief in effort/innate ability, intrinsic/extrinsic motivation, and persistence differ between East Asian and Western college students, and (2) to examine potentially different pathways to learning persistence that may occur for East Asian and for Western students.

Literature Review

Conceptual Framework for the Study

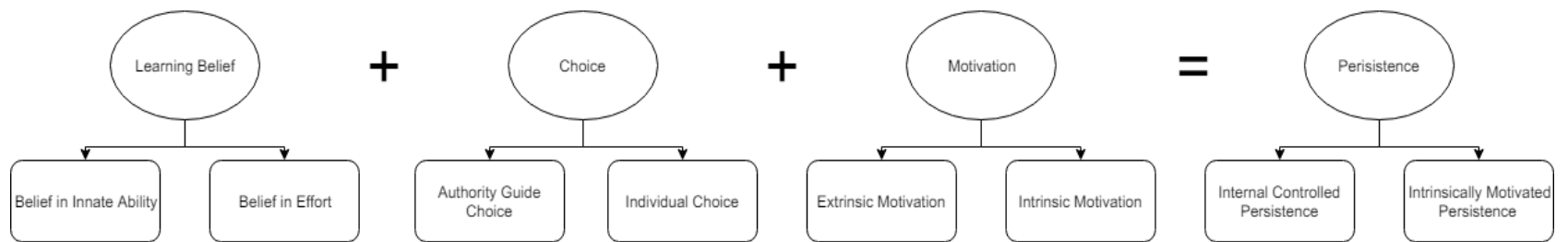
There conceptual framework for this dissertation includes are several parts. As shown in Figure 1, the framework will focus on how belief of innate ability/effort, choice/authority guidance and intrinsic/ extrinsic motivation together predict persistence. Because previous research has shown that East Asian students are influenced by authority guidance (Iyengar & Lepper, 1999), it is included in the model as the counterpart of choice.

The Widely Spread Myth

East Asian countries have ranked high for many years on international academic assessments, such as TIMSS and PISA. In the PISA 2015 results for example, seven of the top ten high-performance countries are from East Asian (Gurria, 2016). In the 2015 TIMSS, for the average mathematics scores of 4th-grade students, the top five countries were all from East Asian and for both 8th and 4th-grade science scores, and more than half of the top ten countries are from East Asia (Provasnik et al., 2016). Moreover, the performance gap, particularly in math, has remained consistent between students from Shanghai, Singapore, South Korean, Hong Kong and their counterparts in America, British, and Australia. Educational researchers have similar found differences in academic performance between East Asian students and their Western counterparts. For example, in a longitudinal study Stevenson and colleague found that American students' mathematics test scores were much lower than Japanese and Chinese students (Stevenson & Stigler, 1987; Stevenson, Lee, & Mu, 2000).

Figure 1 Theoretical Framework

Theoretical Framework



A popular explanation focused on motivational influences on performance is that cultural differences in beliefs about abilities and effort explain observed performance gaps between countries (Nicholls & Miller, 1984). The rationale for this explanation is heavily influenced by Western theory and research on how learning beliefs around effort shape motivation to learn and persistence, and how, over time, these beliefs become associated with an intrinsic/extrinsic learning motivational style (Deci & Ryan, 2008; Renaud-Dubé et al, 2015). A popular explanation is East Asian students believe in effort (Cheng & Wong, 1996; Chandler et al., 1981; Holloway, 1988; Hess et al., 1987; Lee, Ichikawa, & Stevenson, 1987), more so than ability, results in greater persistence to learn, which in turn results in higher performance on standardized academic tests (Telzer, Qu, & Lin, 2017). Similarly, some researchers have argued that American students believe that their ability, more so than effort, results in less persistence to learn for academic subjects they think do not align with innate ability, and hence leads to lower performance on standardized tests (Cheng & Wong, 1996). These lines of reasoning have contributed to an emerging and influential view that systematic difference between East Asian and Western students in test performance are due to extrinsic/intrinsic motivation for learning that is linked to beliefs in effort and ability.

The popular explanation for academic performance differences is fundamentally flawed, since students who believe in effort should be motivated intrinsically more than students who believe in ability (Renaud-Dubé et al, 2015). But this pattern has not been reflected in research findings. East Asian students, for example, were identified to be extrinsically motivated and Western students were claimed to be motivated more intrinsically (Lin, McKeachie & Kim, 2003). Yet, studies based on Western samples have found that students who were extrinsically motivated had lower performance, while intrinsically motivated associated with higher

performance (Dev, 1997; Hanus & Fox, 2015; Pintrich & De Groot, 1990; Sansone & Harackiewicz, 2000). This discrepancy between popular explanations and research findings suggests there are differing pathways that influence academic performance between East Asian and Western students.

Children in Japan and China are highly motivated by standards and a “workaholic” feature of the East Asian culture. Because of this, it is difficult to separate Western notions of extrinsic and intrinsic motivation for this cultural group as their motivation for learning can be affected heavily by social expectation (Cheng & Wong, 1996). As someone who grew up within East Asian Education system, there is generally little perception of perceive choice (e.g., autonomy) over learning. Thus, students are socialized to listen to and comply with authorities and expectations, a degree of socialization something not typical in Western societies. These differing socialization patterns are engrained each culture. When studying cultural differences between Western and East Asian students in motivation, then, specific norms for preference of choice and obedience need to be considered. Thus, the persistence that East Asian students demonstrate may not have the same cause or meaning compared to Western students.

Applying a Western learning motivation model to explain East Asian student's learning motivation and performance can lead to inaccurate conclusions at best. I suggest a Western model of learning motivation is the wrong model to apply to East Asian populations, since the East Asian and Western educational systems are rooted in very different philosophical traditions and cultural norms. At present, there is no learning motivation theory that reflects East Asian traditions and related cultural norms. This dissertation evaluates two different models based on these traditions in order to propose an East Asian learning motivation model. The difference between learning beliefs, preference of choice and obedience can trace back to different

philosophical roots of Confucianism and Socratism, both of which have shaped educational systems.

Self-determination Theory

Self-determination theory (SDT) was developed by Deci and Ryan in 1980s. During over 40 years of development, it became one of the major theory of motivation. They assumed that all people have the innate tendency to grow and to integrate. Even though this is a widely accepted view, there were also lots of critics around it (e.g., Skinner, 1953; Mischel & Shoda, 1995; Gergen, 1993). By integrating the critics, Ryan and Deci (2002) acknowledged that this tendency does not remain unchanged, as they also believed social environment could promote such tendency, as well as jeopardize it. Moreover, psychological growth and integration should be seen as dynamic potential also because it will not happen automatically that needs “proximal and distal conditions of nurturance (Ryan & Deci, 2002, p.6)”. All of these formed the basic assumptions of self-determination theory.

Based on these assumptions, two types of motivations were studied: intrinsic motivation and extrinsic motivation (Deci & Ryan, 1985). To better explain the two types of motivations, four mini-theories have been evolved within the self-determination theory framework: cognitive evaluation theory, organismic integration theory, causality orientations theory, and basic needs theory (Gagne & Deci, 2014). Cognitive evaluation theory concerns with the social effects on intrinsic motivation. Organismic integration theory is explaining the evolution of the extrinsic motivation through the internalization of the external values and regulations. Causality orientations theory is focusing on the personal difference when facing the social environment. Basic needs theory demonstrates the relationship between motivation and people’s well-being (Deci & Ryan, 1985). Within this theory, they argued that there are three kinds of basic needs

that shared by human universally: autonomy, competence, and relatedness. SDT has been applied to many domains, especially education. It was using to enlightened both teaching (e.g., Wehmegeer, Argran, & Hughes, 1998), learning (e.g., Guay, Ratelle & Chanal, 2008) and educational practice (e.g., Nieniec & Ryan, 2009). In order to build the theoretical framework of this dissertation the hierarchical model of intrinsic motivation and extrinsic motivation will be explained, the four mini-theories will be elucidated, and the application of self-determination theory in education domain will be reviewed. There should be a third kind of motivation: amotivation, but it is not relevant in this study, so it would not be mentioned in this article.

Intrinsic motivation and extrinsic motivation. Intrinsic and extrinsic motivation is one of the most used classifications of motivation. Intrinsic motivation refers to doing things out of interest and enjoyment. Extrinsic motivation, on the contrary, is conducting certain behavior because it has other consequence, such as reward or punishment (Deci & Ryan, 2008).

Deci and Ryan (1985) divided extrinsic motivation into four types basing on the degree of self-determination ranging from non-self-determined to self-determined form of extrinsic motivation. Laying on the non-self-determined end of the continuum, *external regulation* is the first type of extrinsic motivation. In this type, people finish a task completely out of the purpose of obtaining rewards or avoid punishment, but not by virtue of the task itself. The second type of extrinsic motivation is introjected regulation, which is the first phase of internalization process. Individuals start to take the environmental information and internalized it as the reason for them to do certain things. However, in this stage, the environmental information has not been fully internalized, so individuals finish the task out of their obligation to avoid shame and internal pressure. For example, some students finish their homework do not because they are interested in it, but their teachers and parents asked them to do so. They may feel finishing homework is their

obligation and they will feel ashamed if they do not finish it. As the next stage of internalization, *identified regulation* was defined by Deci and Ryan (1985) as the third kind of extrinsic motivation. In this stage, using the environmental information, individuals started to perceive the task as self-relevant and have personal importance, so they finished task out of their own choice. The fourth type of extrinsic motivation, integrated regulation, represent the full stage of internalization. In this stage, “*extrinsically motivated behaviors become truly autonomous or self-determined* (Deci & Ryan, 2008)”. The different types of extrinsic motivation and related internalization levels are demonstrated in Figure 3, which is adapted from Vansteenkiste and his Colleagues’ (2018) research.

Table 1 Internalization Continuum

Type of motivation	Extrinsic Motivation			
Internalization	Lack of internalization	Partial Internalization	Identified Internalization	Integrated Internalization
Motivational force	Commands Rewards Punishment	Guilt Shame Ego-involvement	Personal significance Value Relevance	Harmony Coherence with other values Commitments

Internalization is a very important concept in self-determination theory, which fall under the organismic integration mini-theory, so it will be elucidated in the next section. This section is focusing on understanding the model of intrinsic and extrinsic motivation.

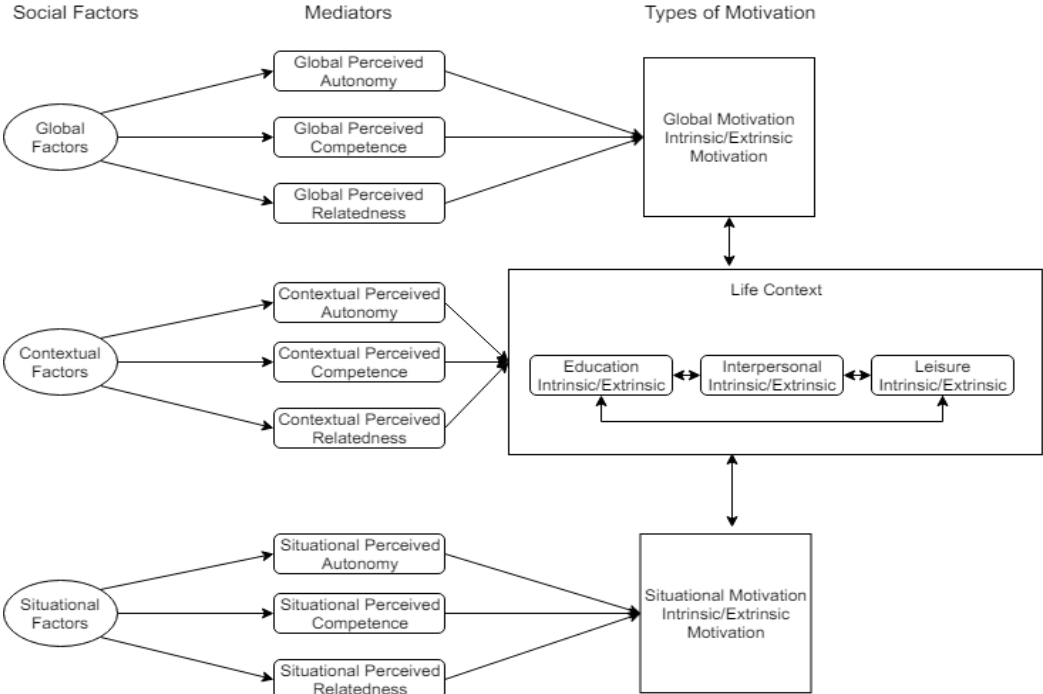
Vallerand and Ratelle (2002) established a hierarchical model of intrinsic and extrinsic motivation and argued that motivation should exist at three levels of generalization: the global, contextual, and situational levels. *The global level* of motivation describes the individual’s

general motivation orientation, and it is the most stable one. General Causality Orientation Scale (GCOS) created by Deci & Ryan (1985) and the Global Motivation Scale created by Guay, Blais, Vallerand, and Pelletier (1999) are all used to measure motivation from the global level. The contextual level represents the motivation tendency of an individual with a certain context. Blais and his colleagues (1990) discovered that there are three most important contexts for young adults: education, leisure, and interpersonal relationships (Vallerand & Ratelle, 2002). The motivation in a certain context is moderately stable but can be affected by other social factors. The Academic Motivation Scale (Vallerand et al., 1993) were used widely in the education context, and the Interpersonal Motivation Inventory (Blais et al., 1994) were used to measure the motivation in interpersonal relationships. The Leisure Motivation Scale (Pelletier et al., 1996) was used to measure motivation in leisure activities. The situational level is focusing on the motivation orientation of individual for certain task, and it is seen as the response to the environment. Deci (1971) developed free-choice situation to measure situational motivational motivation. Guay et al. (2000) developed the Situational Motivation Scale as a supplement for Deci's measure, as they think it is hard to distinguish the types of motivation in the free-choice measure. The hierarchical model of motivation that is presented in Figure 2 (Vallerand & Ratelle, 2002, p. 41).

The formation of motivation cannot be explained only by its classification, so four mini-theories come into play as the replenish to justify the development of motivation.

Figure 2 Intrinsic and Extrinsic Motivation

The Hierarchical Model of Intrinsic and Extrinsic Motivation



Mini-theories. The four mini-theories in SDT is developed for forty years, and they appeared in an inductive way. This is not to say that they have nothing to do with each other. On the contrary, they are all basing on same assumptions stated above and sharing the basic psychological needs (Ryan & Deci, 2002). Moreover, they all play different roles in self-determination theory.

Cognitive evaluation theory (CET) is the first mini-theory that has been developed, as self-determination theory in the early stage are focus more on intrinsic motivation (Deci, 1975; Deci & Ryan, 1980). In CET, two basic needs: autonomy and competence are highly associated with intrinsic motivation, and contextual factors, such as rewards, punishment, feedback, can either promote or diminish intrinsic motivation. Two changes in contextual factors will cause a change in intrinsic motivation: perceived locus of causality and perceived competence (Deci & Ryan, 1980). Perceived locus of causality involves the need for autonomy, which means when a contextual factor causes a change in the perception to an external locus, then intrinsic motivation will be decreased, while if the contextual factor causes a change towards internal locus, then intrinsic motivation will be increased. Perceived competence related to the need for competence. When the task promotes competence, intrinsic motivation will be enhanced; while when a task undermines perceived competence, intrinsic motivation will be decreased. To be more specific, if the contextual event is informational, such as positive feedback (Fisher, 1978), it promotes autonomy and competence, so intrinsic motivation will be increased. When the contextual event is controlling, such as punishment (Deci & Cascio, 1972), it will undermine autonomy and competence, so intrinsic motivation will be diminished. Relatedness, another basic need, is not seen as important as autonomy and competence to intrinsic motivation. However, in attachment theory, children have a secure attachment with their parents tend to explore unfamiliar

environment (Bowlby, 2012). This could be used as the evidence that relatedness does play a role in intrinsic motivation. However, the role of each basic needs plays in intrinsic motivation might be different from culture to culture, which we will discuss in the later part of the literature review.

Unlike CET, organismic integration theory (OIT) focuses on the extrinsic motivation. People cannot always have intrinsic motivation when handling daily activities. However, some activities have external reasons for people to do it. OIT beliefs that people have the tendency to internalize external reasons for doing a certain thing and convince themselves that it is necessary to finish it. Internalization is the center of organismic integration theory.

In SDT, internalization is “the process of transforming external regulation into internal regulations and, when the process functions optimally, integrating those regulations into one’s sense of self (Deci et al., 1994)”. Moreover, social context can influence internalization process significantly. According to Deci and his colleagues (1994), there are two kinds of internalization: introjection and integration. Introjection refers to partial internalization. People with introjected internalization absorb the external value, but do not identify it as one’s own. This will result in internally controlling regulation; such regulation will cause pressure, tension, and anxiety. On the other hand, integration refers to a more optimal state of internalization. The different types of internalization is in Table 1. People with integration internalization, will acknowledge the external value, and see it as their own. This will make the person more consistency and have few conflicts with him or herself, which is concurrent with the basic assumption of SDT, that is people need to be integrated, not separate.

They also found that three contextual factors will facilitate a more optimal type of internalization. The first one is providing a meaningful rationale. This can help people

understand why should they take certain value rather than other values. This second is acknowledging the behavior perspective. Everyone has their own inclinations, to acknowledge their perspective, they will accept the new value easier and understand their inclination do not have a conflict with the new value. The third is conveying choice rather than control. This was found as the way to minimize pressure. However, their research the conclusion basing on Western population. Chirkov, Ryan, Kim, and Kaplan (2003) tested the internalization in four different cultures. They found that their hypothesis: autonomy predict well-being across culture and gender. They measure autonomy through SDT's internalization continuum, but the role of choice was not measured directly. However, the choice may not release pressure if the research is basing on Eastern population (Iyengar & Lepper, 1999). This point of view will be addressed further in the next section on choice.

The third mini-theory, causality orientations theory, is used to describe the stable individual differences in one's motivation towards the social context. In this dissertation, the focus in on cultural differences, not individual differences, so this theory will not be reviewed in detail.

The forth mini-theory under self-determination is basic needs theory. One of the important argument of basic needs theory is only when the goal satisfies basic psychological needs, then there is a positive relationship between goal attainment and well-being. However, when the goal cannot satisfy basic psychological needs, then goal attainment predict well-being negatively. Kasser and Ryan (1996) found that goals like affiliation and personal growth which satisfy basic psychological needs directly will enhance well-being, while goals like wealth, image, and fame which depending on the external sign of worth are related anxiety, depression, and physical symptoms. Several researchers approved that this theory can be applied to different

cultures (Hayamizu, 1997, Chirkov & Ryan, 2001; Miller, 1997; Deci et al. 2001). This theory can be used as one of the assumptions of this dissertation, which is the influence of goal attainment shared by a different culture, but the path that people in each culture take might be different.

Different types of motivation and mini-theories within self-determination theory have been review above. All of them will help with building the theoretical framework of this dissertation. Moreover, there are great numbers of determinants predicts certain types of motivation and different consequences that caused by different types motivations. In this article one of the determinants: choice and one of the consequences: persistence will be reviewed in the following sections.

Choice

The belief that choice promote motivation is widely accepted (Flowerday & Schraw, 2000). To be more specific, researchers believe that choice can enhance intrinsic motivation (Becker, 1997; Hallschmid, 1977; Marinak, 2004). The underlying logic is choice can satisfy the need for autonomy which, as mentioned above, is one of the fundamental needs that determine intrinsic motivation. Moreover, within self-determination theory, Deci and Ryan (1985; 2000) found that having choose will make people more intrinsically motivated and have better performance.

However, there is also some research show that choice may have no effect or negative effect on intrinsic motivation. In a series works by Flowerday and his colleagues (2004), the choice does not have a significant effect on student engagement and performance. Students who have choices put less effort into the task. When the students were provided the rights to allot time

for their task, they performed poorly compared to the students who do not have the rights (Flowerday & Schraw, 2003). Iyenger and Lepper (2000) also found that when providing 30 essay topics for college students, they end up writing a worse essay than with only 6 essay topics. Their findings can be explained by Baumeister's theory of ego-depletion, which means if a person engages too much in a choice situation, their ability to initiate activity, decision-making, and self-relation will be diminished.

Even though, choice may have negative effect on motivation and performance, in a meta-analysis done by Patall and her colleague (2008) which included 41 studies, revealed that overall choice associated with intrinsic motivation positively, but there are certain restrictions on the type, number, and the usage of choice when making such a strong conclusion. When the choice is meaningful and relevant to the participants, it will enhance intrinsic motivation more. For example, in Zuckerman and his colleagues' (1978) research, they found that giving the participant the opportunity to allocate time, as well as provide them different types of tasks improve intrinsic motivation more than just provide participants types of the takes. Another research also supports this finding that choosing from different types or versions of tasks is meaningless and cannot arouse participants' interests or improve their performance (Reeve et al., 2004). As for the number of choices, researchers found when there are two to four options in the experiment, the positive effect of choice on intrinsic motivation is strongest, less or more choices would decrease the effect. Deci et al. (1999) also suggested when external reward involved, the positive effect of choice might be undermined, as an external reward can lessen intrinsic motivation. Above all, when making the argument about the relationship between choice and intrinsic motivations or designing an experiment, the conditions stated above should be considered.

Additionally, there is one more condition that should be considered – cultural differences. This article will elaborate the cultural difference in choice in the later section. The following part will focus on persistence, which is affected by motivations and treated as the outcome of intrinsic motivation.

Persistent

Unlike choice, persistence has not been understood thoroughly. One reason for that is persistence is really context specific, and hard to be generalized. People may persist in one field, but not in other fields. In education, Zimmerman and Risemberg (1997) defined persistence as a consistent investment in learning, even though obstacles occur. Another reason is that persistence is hard to measure. Researchers usually use time coding (Pelletier, 2001; Joesaar, 2011) to measure students' persistence. The third reason is, except for intrinsic motivation, there are many other factors can affect persistence, such as parental involvement (Ratelle, 2005) and teacher and schools' support (Vallerand, 1997).

Most importantly, Deci, Koestner, and Ryan (1991) argued that there are two different types of persistence, one is internal controlled persistence which is ego-involved and associate with negative emotion and pressures; the other is intrinsically motivated persistence which is task-involved and associate with positive emotions. In this case, if research only uses time as the indicator for persistence, then the result would not be valid, as it is not known whether the students are intrinsically motivated persistent or just ego involved internal-controlled persistent.

Within the school setting, sports persistence and academic persistence are mostly studies. For sports persistence, Pelletier and his colleagues (2001) found that students with self-determinant regulation are more persistent than those who are amotivated or with introjected

motivation. Joesaar, Hein, and Hagger (2011) uncovered that athletes' peer motivational climate affect athlete persistence indirectly through their perceived need of satisfaction of autonomy, competence, and relatedness. Calvo et al. (2010) discovered that among soccer plays, a higher level of amotivation, external regulation, introjected regulation and lower satisfaction of relatedness and autonomy needs undermine persistence significantly. All of the research above use self-report questionnaire to assess athletes' motivation and the degree of their internalization.

For academic performance, the measures are mostly questionnaire as well. Renaud-Dubé and his colleague (2015) assessed more than 600 high school students found that the four types of regulation within self-determination theory so not mediate the relationship between intelligence and persistence at school, but they find that students with an incremental theory of intelligence will have greater school persistence intentions. Moreover, academic achievement was also found to be related with persistence intention. The other research suggested that perceived parental autonomy supports predicted students' science persistence through students' autonomy (Ratelle et al., 2005). Vallerand (1997) also found that not only the parental support for autonomy is important, the autonomy support of teachers and administrators are also significant for students' persistence in learning.

Most studies assessed persistence or internalization were using questionnaire, but these two methods sometimes did not consider the ego-involved internal controlled persistence or did not evaluate the quality of such persistence. As a consequence, a more comprehensive method is in need to evaluate both of them.

Relationships among Cultural Dimensions, Motivation, Choice, and Persistence

In this section, the literature review will be around the existent concepts about cultural dimensions and how cultural beliefs affect motivation, choice, and persistence, in other words, there are some current beliefs about what the cultural differences should be in motivation, choice, and persistence.

Culture dimensions. Except one culture dimension (individualism Vs collectivism) that was mentioned previously in this article, Singelis and his colleagues (1995) raised that there should be horizontal and vertical dimensions of individualism and collectivism. Horizontal orientation emphasizes equality, and vertical orientation emphasizes hierarchy. Hofstede, Hofstede, and Minkov (2010) created another way to define culture dimensions which has some similar elements as Singelis et al. (1995)'s theory but has more dimensions. The first one is power distance which means how much people accept that power is shared by a few powerful members and unequally distributed. The second one is individualism which is to what extent a society emphasizes the role of the individual. The first two is not very different from the vertical/horizontal and individualism/collectivism. The third one is masculinity which is how much a society emphasizes traditional masculine values. The fourth one is uncertainty avoidance which is how much people fear of uncertain, unstructured situation and ambiguity. The fifth one is long-term orientation which means the emphasize on the value of future rewards. Among these five dimensions, uncertainty avoidance was found to be relevant to education. Teachers from high uncertainty avoidance countries like German and China favor structured learning situation, while teachers from low uncertainty avoidance countries like the United States and the United Kingdom prefer open-ended situation. Students from high uncertainty avoidance countries will expect teachers to know all, but students from low uncertainty avoidance countries will not. This kind of expectation is very similar to the different learning philosophy between Confucius and

Socratics that mentioned before. Another difference is that students from high uncertainty avoidance countries are more likely to attribute their achievement to circumstances and luck, such as Chinese students attribute their performance to effort. On the contrary, students from low uncertainty avoidance attribute their performance to their innate ability, such as American students (Hofstede, Hofstede & Minkov, 2010). These examples are just phenomenon observed by the researchers but have not been rigorously studied, but it does appear in line with the situation in different countries. The effect of uncertain avoidance in education still needs to be explored. It may affect motivation or the preference of choice because the choice is usually made under uncertainty.

Motivation and culture. Starting with motivation, spite of Hofstede famous theories of cultural dimensions, he also has his own understanding of cultural differences in motivation. Hofstede (1980) defined culture as “the collective mental programming of the people in an environment. . . . it compasses a number of people who were conditioned by the same education and life experience.” (p. 43) Moreover, most of the motivation theory was born in Western countries to explain why we do what we do, but the cultural difference in motivation is clear even among western countries. Freud’s and Maslow’s drive theory will be used as examples.

Theory-based differences. In Austrian, Freud (1915) first raised the term *trieb* in German, which is drive in English. He believes that drive has four characteristics: pressure, aim, object and source. Pressure is used to describe the strength of the drive. The aim of drive is satisfaction by removing stimulation. The object is the method through which that the drive is satisfied. The bodily process that activates the drive is its source. Freud claims that there are two major drives, one is life force, and the other one is death force. Although, Freud is the first one to raise drive theory, there are lots of criticism on it. Bolles (1975) criticize Freud’s drive theory lacking

empirical support and reflection on cognitive needs. However, Freud opened the door of the drive theory, and American psychologist started to develop it in the early 1900s.

In the US, Abraham Maslow opposes Freud's theory, which assumed people is preoccupied with sex, violence, and selfishness, and neglect mental health. Freud as we discussed before focused on biological motivation but have little insight into the cognitive approach. Maslow's most influential theory is his hierarchy of needs, which includes physiological, safety, love and belonging, esteem and self-actualization needs. Self-actualization is the final level of Maslow's hierarchy of needs; one needs to satisfy all other four levels of needs to reach this level of self-actualization. In this level, motivation is different from other four levels. Maslow (1942) define this new kind of needs as being needs (B-needs). These B-motivations are values, such as truth, honesty, beauty, and goodness. There are no longer deficiencies. Self-actualization individual is motivated to grow and expand their knowledge.

Why there are differences among Freud and Maslow's drive/needs theory? Hofstede (1980) explained that Austrian is a strong uncertainty avoidance country, people work hard for relieving stress that was caused by the inner urge. Moreover, as a collectivist country, Austrian people have the internalized belief of obligation to contribute to the society, and it is their life force. China is very much like Austrian with high uncertainty avoidance. On the contrary, the United States is a country with low uncertainty avoidance and high individualism, so people always do things with self-interests and to satisfy certain needs.

Empirical cultural difference. Not only theories show the cultural differences in motivation, but empirical research also reveals such disparity. Zhu and Leung (2010) found that the motivation and achievement model for East Asian students are different from students from Australia, England, the Netherlands, and the USA. Intrinsic and Extrinsic motivation contribute

to East Asian students' math performance in an addictive way. On the contrary, for students from western countries, extrinsic motivation will diminish intrinsic motivation and have a negative influence on math achievement. They also found that western students motivated more by pleasure-oriented ways of learning, while Eastern students can be motivated by both productivity and pleasure-oriented. However, it is not very clear whether productivity or pleasure-oriented learning motivates Eastern students more.

Heine and his Colleagues (2001) designed four studies to test how failure and success affect North American and Japanese's achievement motivation differently. They used measures of persistence on an achievement task to represent students' level of achievement motivation. Their results show that failure will increase Japanese students' achievement motivation while decreasing North American students' achievement motivation. Their findings are interesting, but their usage of measurement is problematic. Japanese students show more persistence may because of they feel guilt for not performing well, so the persistence is internal controlled persistent, but not intrinsically motivated persistent. As a consequence, we cannot conclude that Japan students' corrective effort after failure is because of intrinsic motivation or they called the self-improvement motivation. However, the result did in line with Zhu and Leung's research of the pleasure-oriented and productivity-oriented learning. When the learning task brings pleasure to North American students, they will work harder, while for Eastern students, it is more of being productive in the learning task.

Henderlong and Lepper (2002) suggested that although praise may enhance the motivation of students from collectivist cultures, it is rarely used in China and Japan because students take working hard as their obligation. However, students in the individualism cultures' motivation were significantly affected by praise.

The collectivist view of working hard as an obligation leads to Heine and his colleagues' (1998; 1999) theory of self-improvement and argued that East Asian students have more self-improvement motivation because they tend to self-criticize more and motivated by failures more. Heine and his colleagues (2001) also found that Japanese students work harder when facing their shortcomings, on the other hand, North Americans work harder when focusing on their strengths. They called the motivation that motivates North American students the self-enhancement motivation. They did several follow-up studies to prove that students from East Asian cultures are more like to self-criticize and lack of the self-enhancement motivation. Even though the self-improvement and self-enhancement motivation are not in the framework of self-determination, they are more cultural-specific than self-determination theory which was built mostly depend on the Western sample. Although they included cultural perspectives in later studies, the basic framework was constructed basing on Western value. These two frameworks (self-improvement Motivation Vs. self-enhancement Motivation and Intrinsic Motivation Vs. Extrinsic Motivation) are complementary because with self-determination theory looked are where does the motivation start. Whether the motivation comes from inside or outside factors. On the other hand, from a cultural perspective, the self-enhancement and self-improvement motivation looked at how the motivation continues to promote. Whether people continue because they fail or success, or whether they found the things they did are their strength or their weaknesses.

It is not hard to notice that most of the research show that East Asian students are more motivated by negative incidences like failure and shortcomings, while Western students are more motivated by positive incidences like success and strengths. This indicates Eastern and Western students may have a different motivation model. This may also related to a culture's degree of uncertainty avoidance. As stated before, in strong uncertainty avoidance country, people work

hard for relieving stress that was caused by the inner urge. They also have the internalized belief of obligation to contribute to the society, and it is their life force. In other words, sometimes they do not work for their own well-being, but they work for what is the best for the society, as a consequence, they feel the obligations and pressure to fix their failure and shortcomings which may also cause guilt and shame which are the motivational force for extrinsic motivation with partial internalization and introjected regulation. On the other hand, with low uncertainty avoidance, and pay more attention to one's own well-being, people from the US or the UK are more motivated by positive incidences. All these hypotheses about uncertainty avoidance and motivation would be tested in this dissertation.

After understanding the cultural differences in motivation, it is also necessary for this dissertation to articulate the cultural differences in both choice and persistence.

Culture differences in choice and persistence. There are not a lot of research studied the cultural differences in choice and persistence in the domain of education. For choice, Kim and Drolet (2003) argued that in the US, choice is a way to express people's individuality, which is private and internal. It is an important task and cannot be taken away by others, so the ability to make a choice has self-importance in the Western culture. In contrast, in collectivist cultures like China or Japan, people are more likely to respect and follow group norms and decision. People will compress their own opinion to keep the interest of the group, so choice is not as important as it is in the Western culture.

Iyengar and Lepper (1999) also pointed out that choice generally enhances Anglo American students' intrinsic motivation more than for Asian students. Moreover, Anglo American students' intrinsic motivation will be decreased if authority figures or peers made a choice for them. Asian American students were proved to be most intrinsically motivated when

the choice was made for them by trusted authority figures or peers. In their study, they used the willingness to finish more tasks during the free play period as the measure of intrinsic motivation. Although their ideas of measuring the cultural differences in choice and motivation are fascinating, there are still some weaknesses in the study. As it has been pointed out before, the willingness to do more during the free choice time cannot measure intrinsic motivation precisely. For example, when Asian American students find out the tasks were picked up by the authority figures, they may do the tasks out of extrinsic motivation to satisfy their parents or teachers, but not out of intrinsic motivation. The other weakness of their study is they assume different cultures share the same pathway to intrinsic motivation. They argued that people achieve intrinsic motivation through choice and self-determination, but there should be an Eastern model of motivation, which this dissertation will explore.

For the cultural differences in persistence, as mentioned before, persistence was not explicitly studied even within one culture, as it has long been used to measure intrinsic motivation and it is extremely hard to define, there are not a lot of empirical studies reveal the cultural differences of persistence. However, the general belief is that Eastern Asian students are more persistent than Western students in academic. In addition, there is recent research proved this view from the perspective of neuroscience. Telzer, Qu, and Lin (2017) used Go-NoGo task to measure American and Chinese students' cognitive persistence. They found that American students showed significant declines in the task across time, but Chinese students show effective cognitive persistence. Through the results of fMRI, they also discovered that there were increasing activation and functional coupling neural activation in inferior frontal gyrus (IFG) and ventral striatum (VS) among Chinese participants, but the activities remained low in American participants. As a consequence, they conclude Chinese students are more persistent. There are a

few misunderstands in their study. The first is they treat compliance of Chinese students as cognitive persistence. According to the self-determination theory, especially Western students, people will be more persist if the task is more self-relevant and has personal importance, so the low performance of Western students may simply because they find the Go-NoGo tasks are boring and not important. The second is they used Go-NoGo task to represent persistence, but it is more of a reaction and attention task, rather than a task to test persistence. Thirdly, they used self-improvement motivation as a mediator, and only used three items to measure it. Moreover, as reviewed before, self-improvement motivation applied more on Western students, but not suitable for Eastern students.

The Current Study

The literature showed some discrepancies. It was argued learning belief shapes motivation, and motivation affects persistence (Deci & Ryan, 2008; Pelletier, 2001; Renaud-Dubé et al, 2015). Another argument is intrinsic motivation promote persistence, while extrinsic motivation diminish persistence (Vansteenkiste et al., 2004). East Asian students was identified hold extrinsic motivation (Lin, McKeachie & Kim, 2004), then why they outperformed Western students, and claimed to be more persistent (Telzer, Qu, & Lin, 2017)? The hypothesis of this article is East Asian students do authorities ask them to do, and they have no other choice, so when comes to an academic task, they obey authorities to persist. However, Western students want to do the thing they choose, so when comes to an academic task, they seem not as persist as their East Asia counterparts, if they are not interested in the task. It is necessary to revisit self-determination theory and consider intrinsic/extrinsic motivation with the learning beliefs and ideology together, as well as how choice change the effect of motivation on persistence. East Asian students appear to be more persistent, not because they have the more intrinsic motivation,

as intrinsic motivation promotes persistence, but because they follow a different pathway to persistence. As East Asian students are affected a lot by extrinsic motivation, it can be the hypothesis that they get persistence through failure, self-criticize, and extrinsic motivation.

Higher performance in international large-scale assessments of East Asian students are not because they choose to put effort to academic tasks, but because they do not have other choice and they have the need to obey authorities. It may not appear to be a bad thing for them, or they haven't realized it yet. If the Western academic persistence model is:

$$\text{Belief of Innate ability} + \text{Choice} + \text{internalization} = \text{Persistence}$$

Then the East Asian equation might be:

$$\text{Belief of effort} + \text{Authority guidance/obey} + \text{Internalization} = \text{Persistence}$$

The type of internalization each group of students hold need to be uncovered in this dissertation. Authority guidance/obey is used here because research showed that authorities opinions were fairly significant for Asian American students' motivation. Obey was added here, because comparing authority guidance, it is more of a students' perspective. As Asian students also motivated more by negative incidences, they may not fully internalize the outside value and also do not form their own form of intrinsic motivation (Iyengar & Lepper, 1999). All of them can appear when East Asian people come across failure or facing their shortcomings. However, all of above are the hypotheses that deductive from previous research, so this dissertation will first develop a measurement for internalization. The second step will be testing to what extent (partially or fully) Western and East Asian students internalize the cultural perceptions of learning, and also whether there is a relationship among the belief of effort and innate ability and motivation, choice and authority guidance/obey to Western and East Asian students' persistence.

All of above will provide the answer whether Western and East Asian students have different motivation model and what the models should be. Based on the theories above, three research question were raised:

1. How to measure internalization?
2. How belief in effort or ability, preference of choice or authoritarian guidance/obey, and different internalization types impact Western and East Asian students' persistence?
3. What are the pathways for Western and East Asian students towards learning persistent?

To address question 1, the Internalization of Learning Motivation Scale was developed in study 1, and to uncover question 2 and question 3, the relationships among all the factors were examined in study 2.

The Significance of the Study

The study is important because it will help both East Asian and Western countries understand each other better and understand the underlining dangers of uncritically adopting/implementing education systems that have developed in very different cultural contexts. It will also reveal the long-lasting misunderstanding of hard-working East Asian students, to uncover why they persist in learning, or they just have to persist. It will confuse Western students if we try to apply the East Asian education model to the Western education system. Moreover, the creation a new measure of internalization to identify the process of internalizing learning motivation will help educational researchers to understand how well students internalize the external value from both cultures. Finally, putting learning belief, preference of choice, and internalization together will give us a better understanding of why or why not students persist in a certain learning environment.

Method Study 1

The Aim of the first study is to develop a measure which can identify the internalization process and also support that the different types of internalization can fall into a continuum.

Participants and Procedures

There were two parts of the data for Study 1. The American students' sample was collected from the Amazon's MTurk platform. MTurk has become a popular site for researchers to collect data. People that registered as "worker" on MTurk is at least eighteen years old. Only the worker ID was shown to the researchers to keep confidentiality. When workers finished answering the survey, the data were sent to Qualtrics online survey.

The Chinese sample was recruited from Wen Juan Xing, which is a Chinese survey generate engine like Qualtrics. The Chinese version of the survey was first translated by a Chinese PhD candidate major in Education who has been studied in the US for more than five years, and then the survey was back translated by two education researchers fluent in both Chinese and English.

The targeted group for the sample was college students or those who graduated from college within 5 years. Three questions were used to determine eligibility for this study: Are you currently a college student? Do you have a college degree? How many years since you graduate from college? The total number of qualified participants was 496 for the American sample and 1337 for Chinese sample.

There were also four checking items to identify whether participants were attentive in their responses throughout the survey. These checks were added since the survey contained a relatively large number of items, which could lead strain some participant's attention to items

when responding. The items were administered in random block. An example check item was “For this question, please answer disagree.” People who missed two or more checking items were removed from the research. The total number that removed in this process is 82 (16.5%) for American participants and 432 (32.3%) for Chinese participants.

Response patterns were also examined for dogmatic responses to examine data quality. I reasoned that participants using one response excessively indicates they did not adequately read or thoughtfully respond to the items. We excluded those who responded with the same response (e.g., “1”) for 70% or more of the questions. As a result of this procedure, 21 American students and 45 Chinese students were removed from the study, so the total sample size left for analysis is 393 of American students (37.48% female) and 860 for Chinese students (63.1% female).

Development of the Internalization of Learning Motivation Scale

The Internalization of Learning Motivation Scale was developed by reviewing research literature on the internalization concept, as well as by identifying existing measures, (Deci et al., 1994; Deci & Ryan, 2000b; Ryan & Deci, 2017; Vansteenkste et al., 2018), in order to establish the core constructs and dimensions of internalization. Only some of the dimensions of the internalization construct were assessed by existing measures. Thus, to create a pool of items for the new measure, we adapted existing items when appropriate but also generated new items.

Based on the literature review, there were four conceptually distinct categories of internalization: lack of, partial, identified, and integrated internalization. Items were generated for each of these domains. The Stepping Motivation Scale (SMS) (Hayamizu, 1997), the Self-Regulation Questionnaire (Ryan & Connell, 1989), and the Academic Motivation Scale

(Vallerand et al., 1992) were all used as a reference to generate items for lack of, partial and full internalization.

- Lack of internalization was conceptualized as lack of inherent appeal (of learning task), commands (e.g. orders from teachers or parents), rewards, and punishment. The Guilt and Shame Proneness Scale (GASP) (Cohen, Wolf, Panter, & Insko, 2011) was adapted to measure guilt and shame.
- Partial internalization are ego-comparison (e.g. compare performance to others), ego-personal quality (e.g. evaluate one's value basing only on performance), guilt/tension/anxiety around the use of time, and guilt/tension/anxiety/shame around academic performance. The Achievement Goal Questionnaire-Revised Scale (AGQ-R) was used to generate items concerning goal value and meaning and purpose.
- Identified internalization has three domains: personal value, goal value, and meaning and purpose. Items generated from measures listed above as well as generating new items.
- Integrated regulation has four dimensions: identity, instrumental, career, and qualities. There were no existing scales that measured the integrated internalization adequately, so the items were generated from the concept of self and personal value (Neisser, 1991).

According to the scales and theories stated above, two researchers who were familiar with the internalization construct generated a pool of 134 items (Appendix 1). The scale chosen for the items was a 7-point Likert-scale. We start with this over-representation of items to make sure all the constructs were fully represented. There are in total 15 domains (lack of inherent appeal/ personal meaning and relevance, comments, rewards, punishment, ego-comparison, ego-personal quality, guilt/tension/anxiety around use of time, guilt/tension/anxiety/shame around academic performance, personal value, goal value, meaning and purpose, identity, instrumental, career,

qualities). Each domain was assigned items base either on existing scales or on new items generated according to theories. The two researchers (one from American and one from China) made sure every item was relevant for both western and eastern cultures.

For the Chinese version of the scale, two native Chinese speakers who also spoke English translate items into Chinese, then had another native Chinses speaker who spoke English translate the items back into English to make sure the translation items and language were appropriate.

Plan of Analysis

The reliability and dimensionality of the Internalization of Learning Motivation Scale was assessed using Confirmatory Factor Analysis (CFA) with robust maximum likelihood estimation (MLR) in Mplus v. 7 (Muthén & Muthén, 1998-2017). Model fit statistics included χ^2 and its scaling factor (in which values different than 1.00 indicate deviations from normality), degrees of freedom, and p-value (in which non-significant is desirable for good fit), the Comparative Fit Index (CFI; in which values higher than .95 are desirable for good fit), and the Root Mean Square Error of Approximation (RMSEA) point estimate (< .05 indicates "good fit"; < .08 indicates "acceptable fit") with a 90% confidence interval (Browne and Cudeck's, 1993; Cudeck and Browne, 1992).

As there were over one hundred items, separate CFA's were first conducted for each of the four factors (e.g., partial internalization) to evaluate factor fit and eliminate items based on low loading, high correlated residuals, etc. Once each of the four factors satisfactorily fit the data, data were fit for the full 4-Factor model. For all CFA, modification indices (MI) were used to identify possible sources of model misspecification. The criteria for identifying a single

unequatable parameter using a modification index was $\Delta X^2 > 6$, $p < .01$ (Kline, 2015). When model misspecification was indicated, the item with the largest suggested MI was deleted and the revised model was evaluated for fit. If a single factor would not adequately fit the data, additional factors were examined based on patterns of loadings and covariances among items. This overall procedure was conducted good model fit was achieved, that is until the RMSEA was less than .05, and the CFI and TLI were above .95.

Study 1 Results

Separate CFA's were conducted for each of the four factors, starting with the lack of internalization factor. Once each factor achieved acceptable fit, a final model was evaluated that included all four factors.

Evaluation of Single Factors

Lack of internalization. Starting with lack of internalization, a one-factor model was initially posited to account for the pattern of covariance across these 44 items. Fit of this model resulted in poor fit (RSMEA = .105, CFI = .626, TLI = .607). As shown in Table 2, there were ten items eliminated (Models 1) because of low standardized loadings (i.e., < 0.50). After iteratively removing these items, all items had loadings $> .50$ (.696 to .829). However, model fit was still poor (Model 2), requiring further examination in order to achieve fit and representation of the factor.

Since the items in a factor were intentionally designed to over-represent the construct, many items with similar meanings were more related (e.g., correlated residuals) than was predicted by the single factor model. These sources of local misfit were identified using modification indices, MI, (available via the MODINDICES output option in Mplus) and

suggested additional remaining relationships among pairs of items that were not contributing to the intended construct or redundancy in two items contribution to the factor. Once identified, the item pairs with the largest MI were removed first and fit of the revised model was evaluated. As a result of this iterative process (Models 3, Table 2), the final model for lack of internalization (Model 3) included 9 items and was a good model fit of the data with a minor exception for one fit index. The RMSEA for the final model indicated "acceptable" but not good fit: $RMSEA = 0.057$ [CI: 0.0480—0.067]. Although the MI indicated a relatively high correlated residual between items 7 and 8 (27.880), both items were kept retaining the integrity of the single factor (adequate item representation across the four domains) and this correlated residual was not allowed in subsequent models. Thus, the final single-factor model had adequate fit. Table 3 provides the estimates and standard errors for the item factor loadings, intercepts, and residual variances from both the unstandardized and standardized solutions.

Partial internalization. Partial internalization was initially treated as a single factor scale, but the model fit is unacceptable (Models 1, Table 4). The pattern of factor loadings indicated a two factors model (appendix). When treated them as two factors of partial internalization, the model fit was still not ideal (Model 2, Table 4). This means partial internalization could not be defined by single factor, it seemed that guilt and ego-involvement are two different motivational sources of partial internalization. Therefore, the analysis was started over to treat them as two single factors partial-ego internalization and partial-guilt internalization (Model 3 & Model 4, Table 4). The items were removed also according to MI and redundancy of the same meanings. For partial-ego internalization, there were 6 items left with a satisfactory fit and for partial-guilt internalization, there were 5 items left (see Table 4).

Identified internalization. Starting from a single factor model with 19 items, identified internalization ended up with a poor model fit (RMSEA = 0.084, CFI = 0.836, TLI = 0.815). By removing 11 items according to the MI and redundant meaning of the items with a reasonable fit indices (RMSEA = 0.048, CFI = 0.973, TLI = 0.963).

Integrated internalization. Following the same procedure of analyzing lack of internalization and identified internalization, the single factor integrated internalization scale with 23 items had an acceptable model fit if look at RMSEA only (RMSEA = 0.046), but CFI and TLI indicated a poor fit (CFI = 0.876, TLI = 0.864). 11 items were removed according to MI, as well as the meaning of the items in order to achieve a good fit. There were 12 items left for integrated internalization with a good model fit (RMSEA = 0.028, CFI = 0.966, TLI = 0.959).

Evaluation of Full 5-Factor Model

The five-factor model with 43 items was evaluated for fit. The initial full model fit was RMSEA = 0.057, CFI = 0.935, TLI = 0.931 (Model 1, Table 5). In order to improve model fit, 11 items were ultimately removed from the scale. The final model had a good model fit (see Model 2, Table 5). Table 6 provides the estimates and their standard errors for the item factor loadings, factor covariances from both the unstandardized and standardized solutions for the final model.

Because covariance of identified and integrated internalization was very high (0.875) state, a model comparison was made between a nested four-factor model and the five-factor model to determine if these two factors could be combined into a single factor. The results showed that the nested model fit significantly worse than the five-factor model (Table 7), thus, the five-factor model was retained.

Table 2 Lack of Internalization Model Fit Indexes

Model	# Items	# Est. Par.	Chi-Square	Chi-Square Scale Factor	Chi-Square DF	Chi-Square p-value	CFI	TLI	RMSEA	RMS EA Lower CI	RMSE A Higher CI	RMSE A p-value
Model 1	44	129	12793.089*	1.574	860	<.001	.626	.607	.105	.104	.107	<.000
Model 2	33	99	6450.089*	1.822	495	<.001	0.735	0.717	0.098	0.096	0.1	<.000
Model 3	9	27	138.760*	2.2614	36	<.001	0.969	0.959	0.057	0.048	0.067	0.091

Table 3 Lack of Internalization Factor Loadings, Intercepts, and Residual Variances

Model Parameter	Unstandardized		Standardized	
	Estimate	Standard Error	Estimate	Standard Error
Lack of Internalization Factor				
Loading				
Item 7	1.213	0.050	0.839	0.014
Item 8	1.225	0.045	0.745	0.019
Item 12	1.361	0.041	0.873	0.012
Item 13	1.356	0.041	0.864	0.013
Item 14	1.285	0.045	0.886	0.013
Item 15	1.357	0.044	0.880	0.015
Item 19	1.336	0.044	0.872	0.013
Item 28	1.029	0.049	0.646	0.023
Item 37	1.151	0.045	0.697	0.020
Factor Covariance	0.956	0	1	0.060
Item Intercepts				
Item 7	1.973	0.041	1.364	0.024
Item 8	2.492	0.046	2.515	0.022
Item 12	2.235	0.044	1.433	0.021
Item 13	2.215	0.044	1.411	0.020
Item 14	2.056	0.041	1.418	0.024
Item 15	2.148	0.044	1.394	0.021
Item 19	2.155	0.043	1.405	0.021
Item 28	2.524	0.045	1.584	0.024
Item37	2.528	0.047	1.531	0.022
R-squared for Item Variances				
Item 7			0.703	0.024
Item 8			0.555	0.029
Item 12			0.762	0.021
Item 13			0.746	0.023
Item 14			0.785	0.023
Item 15			0.775	0.026
Item 19			0.76	0.023
Item 28			0.417	0.03
Item37			0.486	0.028

Table 4 Partial Internalization Model Fit Indexes

Model	# Items	# Estimated Parameters	Chi- Square Value	Chi- Square Scale Factor	Chi- Square DF	Chi- Square p- value	CFI	TLI	RMSEA Estimate	RMSEA Lower CI	RMSEA Higher CI	RMSEA p-value
1.One-Factor	44	132	15240.711*	1.4422	902	<.0000	.554	.533	.127	.111	.114	<.000
2.Two-Factor	44	133	10383.818*	1.4357	901	<.0000	.705	.691	.092	.090	0.093	<.000
3.Partial-ego	6	18	26.976*	1.5230	9	0.0014	.993	.988	.040	.023	0.058	0.811
4.Partial-guilt	5	15	10.566*	1.7033	5	0.0607	.997	.993	.030	.000	.055	.898

Correlations among latent factors. The correlation among the five latent factors are shown in Table 8. It was expected that lack of internalization would moderately correlate with partial-ego internalization, weakly correlate with partial-guilt internalization, weakly and negative correlate with identified and integrated internalization. Partial-ego internalization has a moderate correlation with partial-guilt internalization, and very weak correlation with identified and integrated internalization. Partial-guilt internalization has weak correlation with identified and integrated internalization. Identified and integrated internalization has very strong correlation ($r(106) = 0.926$, $p < .001$).

Reliability of the five factors. Omega model-based reliability was calculated for the sum scores of each factor as described in Brown (2006) as the squared sum of the factor loadings divided by the squared sum of the factor loadings plus the sum of the error variances plus twice the sum of the error covariances (although no error covariances were included here). Omega was .933 for the lack of internalization, .900 for the partial-ego internalization, .833 for the partial-guilt internalization, .861 for the identified internalization, and .932 for the integrated internalization, suggesting marginal reliability for all the five factor

Table 5 Internalization Model Fit Indexes

Model	# Items	# Estimated Parameters	Chi-Square Value	Chi-Square Scale Factor	Chi-Square DF	Chi-Square p-value	CFI	TLI	RMSEA Estimate	RMSEA Lower CI	RMSEA Higher CI	RMSEA p-value
Model 1	43	130	22.09.404*	1.4649	730	<.0000	0.935	0.931	0.040	0.038	0.042	1
Model 2	32	106	1248.558*	1.4320	454	<.0000	.954	.950	.037	.035	.040	1

Table 6 Internalization Factor Loadings and Factor Covariances

Model Parameter	Unstandardized		Standardized	
	Estimate	Standard Error	Estimate	Standard Error
Lack of internalization (INL)				
7. Studying is usually pointless.	1.201	0.05	0.830	0.015
12. I learn in school because my parents say I have to.	1.358	0.041	0.871	0.013
14. I learn in school because my teachers say I have to.	1.296	0.045	0.894	0.013
15. I would not study if my teachers did not make me to do it.	1.335	0.045	0.866	0.017
19. If my parents do not push me, I would not push myself to learn in school.	1.342	0.043	0.875	0.013
28. I study because my parents promise me, I will get presents/gifts if I do well.	1.059	0.048	0.665	0.023
37. I study hard to avoid my parents scolding me.	1.176	0.044	0.713	0.02
Partial-ego Internalization (INPE)				
47. I work hard in school, so I will look better than other students.	1.122	0.043	0.662	0.02
54. I study hard to get a better grade than other students.	1.27	0.041	0.742	0.019
58. I work hard so my teacher will think I work harder than other students.	1.39	0.036	0.816	0.014
59. I am motivated to study hard, so I will perform better than other students.	1.482	0.034	0.858	0.013
60. I study so I will not look incompetent in front of others.	1.336	0.041	0.762	0.018
61. I study to prove to others that I am smart.	1.388	0.037	0.794	0.015
Partial-guilt Internalization (INPG)				
80. I feel like I have to study or else I would feel like a failure.	1.172	0.043	0.66	0.021
84. I feel guilty if I do not learn something well.	1.309	0.041	0.791	0.018
87. I feel ashamed if I make mistakes on homework or an exam.	1.4	0.038	0.825	0.015
88. I feel guilty if I do not finish my homework.	1.151	0.049	0.704	0.023
Identified Internalization (INID)				
97. I study in school because I personally value what I learn.	0.857	0.036	0.722	0.024
101. It is important to me that I study so I can reach my goals.	0.885	0.035	0.78	0.018
102. It is important to me that I study regularly/consistently.	0.966	0.038	0.763	0.02
103. I study because I know it will get me to my goals.	0.958	0.034	0.793	0.016
108. I study because I see the purpose for learning the material.	0.846	0.034	0.669	0.022
Integrated Internalization (ININ)				
115. Learning in school helps me understand who I am.	1.032	0.034	0.786	0.016
117. Learning in school helps me define my interests.	0.951	0.034	0.738	0.017
119. I am motivated to learn because it helps me overcome challenges/obstacles.	0.923	0.033	0.748	0.019
120. Studying increases my confidence.	0.953	0.037	0.76	0.017
121. I study because it helps me figure out a purpose in life.	1.072	0.034	0.791	0.016
123. I study so I can use what I learn to help others.	0.997	0.033	0.773	0.015
126. I study because it helps me figure out the world.	0.919	0.037	0.734	0.021

129. Learning in school helps me figure out what careers fit my personality.	0.983	0.036	0.742	0.018
131. I study increases my desire to learn more.	0.969	0.035	0.78	0.016
133. Studying is important to me because I want to keep learning.	0.946	0.036	0.744	0.019
Factor Covariance	0.956	0	1	0.06
INL WITH				
INPE	0.48	0.026		
INPG	0.235	0.029		
INID	-0.333	0.032		
ININ	-0.259	0.031		
INPE WITH				
INPG	0.548	0.031		
INID	0.067	0.032		
	0.078	0.032		
INPG WITH				
INID	0.28	0.035		
ININ	0.19	0.037		
INID WITH				
ININ	0.875	0.015		

Table 7 Model Comparison between Five

Models	Model H ₀ LL	H ₀ LL Scale Factor	# Free Parms	Test of -2ΔLL Difference			DF Diff	Exact P- Value
				Diff in LL * -2	Diff Scaling Correction	Scaled Diff in -2LL		
Five-Factor Model	-61423.802	1.5414	108					
Nest ID&IN Model	-61228.728	1.5567	109					
Test of Difference				390.148	3.2091	121.57552	1	2.85908E-28

Table 8 Correlations among Latent Factors

Variable	1	2	3	4	5
1. INL	1				
2. INPE	0.513***	1			
3. INPG	0.259***	0.608***	1		
4. INID	-0.356***	0.074*	0.306***	1	
5. ININ	-0.274***	0.083*	0.213***	0.926***	1

*Note *p<.05, **<.01, ***<.001

Method Study 2

The aim of Study 2 was to identify the psychometric structure of the Internalization, Learning Belief, Preference of Choice, and Persistence scales, and to evaluate if there were differences between the Chinese and American samples on these measures in order to answer the two research questions:

- How belief in effort or ability, preference of choice or authority guidance/obey, and different internalization types relate to Western and East Asian students' persistence?
- What are the pathways for Western and East Asian students towards learning persistence?

Participants

Participants were 1302 college students or who graduate within five years from college, with 888 Chinese students and 414 American students. The Chinese sample was recruited from Wen Juan Xing (WJX) and the American sample were collected from Amazon Mechanical Turk (Mturk) like Study 1.

Descriptive Statistics

Similar to Study 1, the same strategy of data cleaning was used: dogmatic response were identified to test the quality of data. As Shown in Table 9, there were 1249 usable observations, with 377 male (30.18%) and 811 female (64.93%). The majority is female students. The age of participants range from 17 to 62 ($M = 23$, $SD = 6.6$). There were 888 college students from China and 361 from America. Around 15% of the participants were freshman, 30% were sophomore, 24% were junior, 5% were senior, and 20% were graduated from college within 5 years.

Table 9 Descriptive Statistics

	Total	Chinese	American
Age (range)	17-62	17-29	18-60
Gender	Female 811 (64.93%)	Female 651 (73.31%)	Female 169 (46.81%)
Freshman	210 (16.81%)	202 (22.75%)	8 (2.22%)
Sophomore	391 (31.3%)	364 (40.99%)	27 (7.57%)
Junior	319 (25.54%)	287 (32.32%)	32 (8.86%)
Senior	64 (5.12%)	26 (2.93%)	38 (10.53)
Graduated within 5 years	226 (18.09%)	9 (1.01%)	217 (60.12%)

Instruments

Internalization. There are 31 items in the Internalization of Learning Motivation (ILM) Scale, which was generated in Study 1. The scale originally had 32 items, but one item, “*I study in school because I personally value what I learn,*” had system error in the Chinese sample, so it was removed from Study 2. There are 7 items measuring *lack of internalization*, 6 item for *partial-ego internalization*, 4 for *partial-guilt internalization*, 5 in *identified internalization*, and 10 in *integrated internalization*. The internal reliability for *lack of internalization* was $\alpha = 0.933$, for *partial-ego internalization* was $\alpha = 0.900$, for *partial-guilt internalization* was $\alpha = 0.833$, for *identified internalization* was $\alpha = 0.861$, for *integrated internalization* was $\alpha = 0.932$.

Belief in effort. The Effort Beliefs Scale (EBS; Blackwell, 2002) contains 9 items, within which there are 5 negative items and 4 positive items. The negative items indicate that effort will not lead to a better performance (e.g. “If you are not good at a subject, working hard won’t make you good at it”), while positive items indicate effort will lead to positive outcomes (e.g., “The harder you work at something, the better you will be at it”). The measure was created to measure the Positive Effort Beliefs with $\alpha = .79$.

Belief of ability. The belief in innate ability/intelligence was assessed using an adapted version of the Self-Theory Scale (STS; Castella & Byrne, 2015), which is based on Dweck’s (1999) research about the implicit theories of intelligence. There are two subscales in STS: Entity Self Beliefs Subscale with 4 items (e.g., “I can learn new things, but I don’t have the ability to change my basic intelligence”) and the Incremental Self Beliefs Subscale (e.g. “I believe I can always substantially improve on my intelligence”). Only the Entity Self Beliefs Subscale were used because the incremental self-beliefs construct was assessed with the EBS. The reliability for the scale was $\alpha = .90$.

Preference of choice or obedience. The preference of choice measure was adapted from Perceived Choice and Awareness of Self Scale (PCASS), using the obedience items from the preference of choice subscale. This part of the scale has 9 items and assesses whether students prefer choice or prefer to listen to authorities. There are 4 items measure preference of choice (e.g., “I want to have choice when it comes to academic tasks”) and five items to assess tendency of obedience (e.g., “I prefer to choose the academic task that my teacher or parents ask me to do”). The internal reliability will be tested in the current study.

Persistence. In order to measure persistent, a persistence scale was adopted from Howard and Crayne’s (2019) study. There were 5 items in Persistence Despite of Difficulty subscale (e.g., “I keep on going when the going gets tough”). There were also 3 items in Inappropriate Persistence subscale used (e.g. “I will keep trying at something, even if I know my actions are worthless”). The reliability of these two subscales range from 0.79 to 0.87. All the items were rated on a 7-likert scale from 1 = *strongly disagree* to 7 = *strongly agree*.

Plan of Analysis

Preliminary analysis. The univariate and multivariate normality of the items and latent variables were tested, as well as the distribution of the measurement responses to identify potential scale issues (e.g., ceiling effects).

Confirmatory factor analysis. Before testing the hypotheses, confirmatory factor analysis of internalization, learning belief (effort and ability), preference of choice (choice and obey), and persistence were conducted to ensure the consistency within the latent constructs. All models were identified by setting any latent factor means to 0 and latent factor variances to 1, such that all item intercepts, item factor loadings, and item residual variances were then

estimated. Just as Study 1, the quality of the model were indicated by CFI, TLI and RMSEA values (Kline, 2015). The acceptable fit should have CFI and TLI above .90, and RMSE of 0.08 or under is also considered as acceptable. According to Kline (2015), to identify a single unequitable parameter, the criteria was $\Delta X^2 > 6$, $p < .01$. Reliability of each latent factors was estimated using coefficient omega (ω). Coefficient omega is deemed as a practical alternative to coefficient alpha in estimating measurement reliability of the factor scores.

Measurement invariance. A configural invariance model was initially specified in which single-factor models were estimated simultaneously within each group; the factor mean was fixed to 0 and the factor variance was fixed to 1 for identification within each group. If the configural invariance model hold, the metric invariance was tested to identify whether the strength of the relationships between the items and the underlying construct are the same for American and Chinese students. If metric invariance holds, the scalar invariance will be assessed to identify whether the items have the same internal consistency for both groups of student (Cheung & Rensvold, 2009).

Structure equation modeling. The hypotheses were tested using structure equation modeling. Each predictor variable (internalization, learning beliefs, and preference of choice) was measured separately to determine whether it could predict persistence significantly or not. Only the ones predicting persistence significantly were put into the final SEM model in order to understand to relationships among different variables.

Group difference. When comparing American and Chinese students, as analyzing measurement invariance, the regression for these two groups of students were freely estimated at first and then control as equal in the second model. A loglikelihood ratio test was conduct on these two model to identify whether there was regression coefficient difference between the two

groups. If the $p < .05$ that means the two groups has different regression coefficient (Asparouhov & Muthén, 2014).

Results Study 2

The univariate normality were first tested for all the items, Figure 5 below demonstrates the distribution of all the item responses. Most of the item responses are approximately normally distributed. The correlations for different scales were shown in Table 10 to Table 18. Most of the items are significantly and moderately correlated. BE6 and BE7 in Belief of Effort subscale were not correlated with some of the items, as well as P6, NP1, and NP2. These items may cause some issues in model fit, which will be addressed in the later part of this dissertation.

Confirmatory Factor Analysis

The reliability and dimensionality of 64 items assessing internalization, learning belief, preference of choice, and persistence was examined in the sample of 1,249 person with a confirmatory factor analysis using robust maximum likelihood estimation (MLR) in R 1.1.456. All models were identified by a marker variable by setting the first item's factor loading to 1 and latent factor variances to 1, such that all item intercepts, other item factor loadings, and item residual variances, and item means were then estimated. The 64 items used a 7-point response scale, and five items were reverse-coded prior to analysis such that higher values then indicated greater levels of effort belief for all items. As all the scales are well developed in the previous studies, confirmatory factor analysis were conducted separately first for each construct (internalization, learning belief, preference of choice) without any adjustment.

Figure 3 Item Response Distribution



Table 10 Lack of Internalization*Means, standard deviations, and correlations with confidence intervals*

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6
1. IL1	1.91	1.29						
2. IL2	2.68	1.58	.35** [.30, .40]					
3. IL3	2.27	1.37	.45** [.40, .49]	.50** [.45, .54]				
4. IL4	2.60	1.41	.41** [.36, .46]	.45** [.40, .49]	.53** [.49, .57]			
5. IL5	2.43	1.42	.42** [.37, .47]	.54** [.49, .58]	.55** [.51, .59]	.45** [.41, .50]		
6. IL6	2.27	1.46	.45** [.40, .50]	.50** [.45, .54]	.48** [.43, .52]	.37** [.32, .42]	.46** [.41, .50]	
7. IL7	2.48	1.52	.35** [.30, .40]	.52** [.48, .57]	.46** [.41, .51]	.40** [.35, .45]	.45** [.40, .50]	.50** [.45, .54]

Note. *M* and *SD* are used to represent mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. The confidence interval is a plausible range of population correlations that could have caused the sample correlation (Cumming, 2014). * indicates $p < .05$. ** indicates $p < .01$. IL# means items under Lack of Internalization Scale.

Table 11 Partial-Ego Internalization*Means, standard deviations, and correlations with confidence intervals*

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6
1. IE1	3.79	1.63						
2. IE2	3.97	1.70	.48** [.43, .52]					
3. IE3	3.61	1.59	.54** [.49, .58]	.41** [.36, .45]				
4. IE4	4.07	1.62	.51** [.47, .55]	.53** [.48, .57]	.45** [.40, .49]			
5. IE5	3.96	1.70	.41** [.36, .46]	.36** [.31, .41]	.33** [.27, .38]	.32** [.27, .37]		
6. IE6	3.39	1.66	.47** [.42, .51]	.44** [.39, .49]	.40** [.35, .45]	.40** [.35, .45]	.41** [.36, .46]	

Note. *M* and *SD* are used to represent mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. The confidence interval is a plausible range of population correlations that could have caused the sample correlation (Cumming, 2014). * indicates $p < .05$. ** indicates $p < .01$. IE# means items under Partial-Ego Internalization Scale.

Table 12 Partial-Guilt Internalization

Means, standard deviations, and correlations with confidence intervals

Variable	<i>M</i>	<i>SD</i>	1	2	3
1. IG1	4.44	1.61			
2. IG2	4.89	1.50	.31** [.26, .37]		
3. IG3	4.50	1.64	.32** [.27, .38]	.44** [.39, .48]	
4. IG4	5.08	1.48	.29** [.23, .34]	.39** [.34, .44]	.37** [.32, .42]

Note. *M* and *SD* are used to represent mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. The confidence interval is a plausible range of population correlations that could have caused the sample correlation (Cumming, 2014). * indicates $p < .05$. ** indicates $p < .01$. IG# means items under Partial-Guilt Internalization Scale.

Table 13 Identified Internalization*Means, standard deviations, and correlations with confidence intervals*

Variable	<i>M</i>	<i>SD</i>	1	2	3	4
1. IID1	5.35	1.28				
2. IID2	5.55	1.23	.36** [.31, .41]			
3. IID3	5.55	1.25	.35** [.30, .40]	.42** [.37, .47]		
4. IID4	5.56	1.23	.37** [.32, .42]	.56** [.51, .60]	.45** [.40, .49]	
5. IID5	5.06	1.39	.45** [.40, .50]	.41** [.36, .46]	.30** [.24, .35]	.37** [.32, .42]

Note. *M* and *SD* are used to represent mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. The confidence interval is a plausible range of population correlations that could have caused the sample correlation (Cumming, 2014). * indicates $p < .05$. ** indicates $p < .01$. IID# means items under Identified Internalization Scale.

Table 14 Integrated Internalization

Means, standard deviations, and correlations with confidence intervals

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9
1. IIN1	5.22	1.29									
2. IIN2	5.01	1.35	.43**								
			[.38, .48]								
3. IIN3	5.06	1.33	.38**	.37**							
			[.33, .43]	[.32, .42]							
4. IIN4	5.42	1.28	.37**	.34**	.45**						
			[.32, .42]	[.29, .39]	[.41, .50]						
5. IIN5	5.02	1.44	.44**	.34**	.34**	.38**					
			[.39, .49]	[.29, .39]	[.29, .39]	[.32, .42]					
6. IIN6	4.98	1.30	.36**	.28**	.33**	.29**	.32**				
			[.31, .41]	[.22, .33]	[.27, .38]	[.24, .34]	[.26, .37]				
7. IIN7	5.50	1.29	.44**	.34**	.36**	.40**	.44**	.34**			
			[.39, .49]	[.28, .39]	[.30, .41]	[.35, .45]	[.39, .49]	[.29, .39]			
8. IIN8	4.82	1.41	.38**	.47**	.38**	.31**	.34**	.23**	.31**		
			[.33, .43]	[.42, .52]	[.33, .43]	[.26, .36]	[.29, .39]	[.17, .28]	[.26, .36]		
9. IIN9	5.22	1.26	.42**	.41**	.45**	.48**	.38**	.36**	.45**	.33**	
			[.37, .47]	[.36, .45]	[.40, .50]	[.43, .52]	[.32, .42]	[.31, .41]	[.40, .49]	[.28, .38]	
10. IIN10	5.54	1.25	.44**	.41**	.46**	.44**	.37**	.34**	.42**	.33**	.48**
			[.40, .49]	[.36, .45]	[.41, .50]	[.39, .49]	[.31, .42]	[.29, .39]	[.37, .47]	[.28, .38]	[.43, .52]

Note. *M* and *SD* are used to represent mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. The confidence interval is a plausible range of population correlations that could have caused the sample correlation (Cumming, 2014). * indicates $p < .05$. ** indicates $p < .01$. IIN# means items under Integrated Internalization Scale.

Table 15 Belief of Effort*Means, standard deviations, and correlations with confidence intervals*

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8
1. BE1	5.38	1.31								
2. BE2	3.22	1.58	-.19**							
			[-.24, -.13]							
3. BE3	3.31	1.65	-.26**	.40**						
			[-.31, -.20]	[.35, .45]						
4. BE4	4.90	1.36	.27**	-.18**	-.12**					
			[.22, .33]	[-.23, -.12]	[-.18, -.06]					
5. BE5	4.29	1.50	-.15**	.29**	.31**	-.11**				
			[-.20, -.09]	[.24, .35]	[.25, .36]	[-.17, -.05]				
6. BE6	5.26	1.55	.15**	.03	.02	.17**	.09**			
			[.09, .21]	[-.03, .08]	[-.04, .07]	[.11, .23]	[.04, .15]			
7. BE7	4.30	1.73	.03	.18**	.15**	.01	.10**	.10**		
			[-.03, .09]	[.12, .23]	[.09, .20]	[-.05, .07]	[.04, .16]	[.04, .16]		
8. BE8	4.92	1.44	.31**	-.07*	-.17**	.35**	-.08**	.19**	.05	
			[.26, .36]	[-.13, -.01]	[-.23, -.12]	[.29, .40]	[-.14, -.02]	[.13, .25]	[-.01, .11]	
9. BE9	3.07	1.53	-.17**	.41**	.42**	-.18**	.32**	-.02	.20**	-.09**
			[-.22, -.11]	[.36, .46]	[.37, .47]	[-.23, -.12]	[.26, .37]	[-.08, .03]	[.14, .25]	[-.15, -.03]

Note. *M* and *SD* are used to represent mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. The confidence interval is a plausible range of population correlations that could have caused the sample correlation (Cumming, 2014). * indicates $p < .05$. ** indicates $p < .01$. BE# means items under Belief of Effort Scale.

Table 16 Belief of Ability

Means, standard deviations, and correlations with confidence intervals

Variable	<i>M</i>	<i>SD</i>	1	2	3
1. BA1	2.83	1.53			
2. BA2	3.70	1.69	.47** [.42, .51]		
3. BA3	3.50	1.68	.50** [.45, .54]	.58** [.54, .62]	
4. BA4	3.52	1.63	.48** [.43, .52]	.56** [.52, .60]	.54** [.50, .58]

Note. *M* and *SD* are used to represent mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. The confidence interval is a plausible range of population correlations that could have caused the sample correlation (Cumming, 2014). * indicates $p < .05$. ** indicates $p < .01$. BA# means items under Belief of Ability Scale.

Table 17 Preference of Choice or Obey to Authority

Means, standard deviations, and correlations with confidence intervals

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8
1. PCG1	5.69	1.15								
2. PCG2	4.77	1.54	.16**							
			[.11, .22]							
3. PCG3	3.74	1.60	-.06	.32**						
			[-.11, .00]	[.27, .37]						
4. PCG4	4.69	1.48	.24**	.08**	-.18**					
			[.19, .30]	[.02, .14]	[-.24, -.13]					
5. PCG5	5.54	1.21	.36**	.02	-.12**	.15**				
			[.31, .41]	[-.04, .08]	[-.18, -.06]	[.10, .21]				
6. PCG6	4.09	1.56	-.04	.38**	.42**	-.13**	-.07*			
			[-.10, .02]	[.33, .43]	[.37, .46]	[-.19, -.07]	[-.13, -.01]			
7. PCG7	2.90	1.58	-.15**	.23**	.32**	-.08**	-.17**	.24**		
			[-.20, -.09]	[.18, .29]	[.27, .37]	[-.14, -.02]	[-.23, -.12]	[.18, .29]		
8. PCG8	5.03	1.34	.30**	-.16**	-.15**	.23**	.26**	-.20**	-.18**	
			[.25, .35]	[-.22, -.10]	[-.21, -.09]	[.18, .29]	[.20, .31]	[-.26, -.15]	[-.24, -.12]	
9. PCG9	3.75	1.66	-.07*	.37**	.31**	-.03	-.09**	.38**	.24**	-.29**
			[-.13, -.01]	[.32, .42]	[.25, .36]	[-.09, .03]	[-.15, -.03]	[.32, .42]	[.19, .30]	[-.34, -.24]

Note. *M* and *SD* are used to represent mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. The confidence interval is a plausible range of population correlations that could have caused the sample correlation (Cumming, 2014). * indicates $p < .05$. ** indicates $p < .01$. PCG# means items under Preference of Choice or Obey to Authority scale.

Table 18 Persistence*Means, standard deviations, and correlations with confidence intervals*

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8
1. P1	5.20	1.22								
2. P2	4.86	1.35	.44**							
			[.39, .48]							
3. P3	4.52	1.47	.36**	.34**						
			[.31, .41]	[.29, .39]						
4. P4	4.51	1.52	.30**	.24**	.25**					
			[.24, .35]	[.19, .30]	[.19, .30]					
5. P5	5.24	1.24	.53**	.45**	.36**	.27**				
			[.49, .57]	[.40, .50]	[.31, .41]	[.22, .33]				
6. P6	3.28	1.53	-.06	-.08**	-.04	-.04	-.11**			
			[-.12, .00]	[-.14, -.03]	[-.10, .02]	[-.10, .02]	[-.17, -.06]			
7. NP1	4.46	1.57	.03	.06	-.05	.03	-.02	.07*		
			[-.03, .09]	[-.00, .12]	[-.11, .01]	[-.03, .08]	[-.07, .04]	[.01, .13]		
8. NP2	4.86	1.35	.05	-.02	.02	.07*	.09**	.06*	.28**	
			[-.01, .11]	[-.08, .04]	[-.04, .08]	[.01, .13]	[.03, .15]	[.00, .12]	[.23, .34]	
9. NP3	4.32	1.54	.13**	.09**	.12**	.09**	.17**	.05	.37**	.29**
			[.07, .19]	[.03, .15]	[.06, .18]	[.03, .15]	[.11, .23]	[-.01, .11]	[.32, .42]	[.24, .35]

Note. *M* and *SD* are used to represent mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. The confidence interval is a plausible range of population correlations that could have caused the sample correlation (Cumming, 2014). * indicates $p < .05$. ** indicates $p < .01$. P# means items under persistence scale.

Table 19 displays the initial result of all the model fit indexes. According to the table, only the model fit for Internalization scale is acceptable, which means all the other scales need some adjustment. Omega model-based reliability was calculated for the sum scores of each factor as described in Brown (2006) as the squared sum of the factor loadings divided by the squared sum of the factor loadings plus the sum of the error variances plus twice the sum of the error covariances (although no error covariances were included here). Omega was .898 for lack of internalization, .784 for the partial-ego internalization factor, 0.741 for partial-guilt internalization, 0.843 for the identified internalization, and 0.904 for integrated internalization suggesting marginal reliability for all the five sub-scales.

Learning Belief. In the single factor subscale of learning belief – belief of effort, there are 5 items were wording negatively, so before conducting the analysis they were reverse coded. There are 9 items in total, and after conducting CFA, the model fit was not acceptable. The factor loading were first looked at, item BE6 “If I do not work hard and put in a lot of effort, I probably won't do well” has very low standardize loading of 0.023. This indicates that item BE6 did not contribute to the latent factor consistent with the other items, therefore item BE6 were removed. After removing BE6, the model was refit. Items which had standardized factor loadings lower than .3 were removed one by one from the item had the lowest loading. The items got removed were item BE7 (SD Loading = 0.223), BE8 (SD Loading = 0.249), and BE4 (SD loading = 0.254). The model fit indexes of final single factor 5-item model appear in table 20. The final model had acceptable fit.

The belief of ability subscale were also tested the same way, however, in the initial round of CFA, the model fit indices are ideal, so no modification was required. The indices were also

presented in Table 20. The Learning belief scale was then treated as a Two factor model in CFA, which also got great model fit indices, and results were shown in Table 20. Omega was .938 for belief of effort and .818 for belief of ability.

Preference of Choice. The subscale of choice and obey were conducted CFA separately at first, and both models got acceptable model fit shown in Table 21. However, when put these two subscale together as a two-factor model for preference of choice or obey, the model fit went down, which indicated misfit. As before, the modification indices were used to identify high covariance among items. It indicated item PCG1 *“I want to have choice when it comes to academic tasks”* and PCG2 *“I want to have my teachers or parents to guide me when it comes to academic tasks”* shared high residual covariance (8.790) and the modification index (MI) is as high as 73.507. Since they represent the same construct “academic task” and PCG 1 had little bit higher standardized loading, so PCG 2 were remove from the scale. After removing PCG2, the model fit was still not acceptable, and item PCG8 *“I prefer having choice over what I do at school”* and PCG 9 *“I would not take a class or subject in school if my teachers or parents disapprove of it”* were identified had high negative residual covariance (-5.145), and MI was 44.541. Moreover, PCG8 and the factor “Obey” also had high MI of 26.91, so it was removed from the scale. The same situation happened to item PCG 3 *“I prefer to choose the academic task that my teacher or parents ask me to do”* and PCG 4 *“I do not prefer to do the academic task that my teacher or parents ask me to do, and I want to choice by myself”*, which had high negative residual covariance (-3.771) and MI is 17.417. Even though PCG 4 had lower standardized factor loading than PCG 3, there were only three items left in the factor “Choice”. Considering not making the model under-identified (not having enough degree of freedom), PCG3 were removed.

Table 19 Initial Model fit Indices

Models	Scaled χ^2	df	Model Fit Indices			
			CFI	TLI	RMSEA	SRMR
Internalization	1399.332	485	0.903	0.895	0.051	0.061
Learning Belief	360.439	64	0.896	0.873	0.069	0.061
Choice & Obey	502.537	27	0.817	0.747	0.098	0.073
Persistence	341.635	27	0.759	0.679	0.108	0.085

Notes: CFI, comparative fit index; TLI, Tucker-Lewis Index; SRMR, standardized root mean square residual; RMSEA, root mean square error of approximation.

Table 20 Learning Belief Model Fit Indices

Models	Scaled χ^2	df	Model Fit Indices			
			CFI	TLI	RMSEA	SRMR
Effort (5 items)	9.934	5	0.993	0.987	0.030	0.018
Ability (4 items)	3.507	2	0.999	0.997	0.026	0.009
Learning Belief (2-factor)	48.953	26	0.991	0.987	0.030	0.022

Notes: CFI, comparative fit index; TLI, Tucker-Lewis Index; SRMR, standardized root mean square residual; RMSEA, root mean square error of approximation.

In the final model there are 3 items in “Choice” and 3 items in “Obey”, and most of the model fit indices were acceptable (Table 21). Omega was .606 for preference of choice and .619 for belief of obey.

Persistence. I was shown in Table 19, if treated as one factor model, the model fit for persistence scale was not acceptable. The factor loading (unstandardized and standardized) of item P6 “*The goals people are working on at school are not important to me*” was negative (-0.199), which means it did not measure what the scale supposed to measure and it was removed. Moreover, the standardized factor loadings of three items for inappropriate persistent were lower than .30 suggesting a two-factor model may be preferable. The final model of persistence was a two-factor model with 8 items in total and it had acceptable model fit (Table 22). Omega was .772 for persistence and .657 for inappropriate persistence. The factor loadings are presented in Table 23.

Measurement Invariance

The extent to which a confirmatory factor model measuring internalization, learning belief, preference of choice or obey, and persistence exhibited measurement and structural invariance between Chinese and American college students was examined using R 1.1.456. This step determines whether there were any culture biases in the scales that were used. Robust maximum likelihood (MLR) estimation was used for all analyses; accordingly, nested model comparisons were conducted using the $-2LL$ rescaled difference test.

Table 21 Preference of Choice or Obey Model Fit Indices

Models	Scaled χ^2	df	Model Fit Indices			
			CFI	TLI	RMSEA	SRMR
Choice (4 items)	8.801	2	0.982	0.946	0.056	0.022
Obey (4 items)	26.381	5	0.974	0.948	0.063	0.028
Choice & Obey (2-factor; 6 items)	40.006	8	0.936	0.880	0.062	0.040

Notes: CFI, comparative fit index; TLI, Tucker-Lewis Index; SRMR, standardized root mean square residual; RMSEA, root mean square error of approximation.

Table 22 Persistence Model Fit Indices

Models	Scaled χ^2	df	Model Fit Indices			
			CFI	TLI	RMSEA	SRMR
Persistence (2-factor; 8 items)	72.985	19	0.959	0.940	0.053	0.039

Notes: CFI, comparative fit index; TLI, Tucker-Lewis Index; SRMR, standardized root mean square residual; RMSEA, root mean square error of approximation.

Table 23 Factor Loadings

Model Parameter	Unstandardized		Standardized	
	Estimate	Standard Error	Estimate	Standard Error
Internalization				
Lack of internalization (INL)				
IL1. Studying is usually pointless.	1.000	-	0.624	0.015
IL2. I learn in school because my parents say I have to.	1.368	0.085	0.731	0.013
IL3. I learn in school because my teachers say I have to.	1.256	0.077	0.750	0.013
IL4. I would not study if my teachers did not make me to do it.	1.101	0.075	0.649	0.017
IL5. If my parents do not push me, I would not push myself to learn in school.	1.274	0.079	0.734	0.013
IL6. I study because my parents promise me, I will get presents/gifts if I do well.	1.238	0.079	0.710	0.023
IL7. I study hard to avoid my parents scolding me.	1.284	0.084	0.687	0.02
Partial-ego Internalization (INPE)				
IE1. I work hard in school, so I will look better than other students.	1.000	-	0.763	0.02
IE2. I study hard to get a better grade than other students.	0.927	0.051	0.691	0.019
IE3. I work hard so my teacher will think I work harder than other students.	0.894	0.049	0.693	0.014
IE4. I am motivated to study hard, so I will perform better than other students.	0.873	0.050	0.667	0.013
IE5. I study so I will not look incompetent in front of others.	0.742	0.052	0.549	0.018
IE6. I study to prove to others that I am smart.	0.928	0.052	0.679	0.015
IE7. I study to prove others that I am hardworking.	0.917	0.052	0/667	0.016
Partial-guilt Internalization (INPG)				
IG1. I feel like I have to study or else I would feel like a failure.	1.000	-	0.577	0.021
IG2. I feel guilty if I do not learn something well.	1.101	0.091	0.673	0.018
IG3. I feel ashamed if I make mistakes on homework or an exam.	1.093	0.095	0.609	0.015
IG4. I feel guilty if I do not finish my homework.	1.038	0.087	0.644	0.023
Identified Internalization (INID)				

IID1. I study in school because I personally value what I learn.	1.000	-	0.878	0.024
IID2. It is important to me that I study so I can reach my goals.	1.001	0.055	0.879	0.018
IID3. It is important to me that I study regularly/consistently.	0.863	0.057	0.758	0.02
IID4. I study because I know it will get me to my goals.	0.988	0.058	0.868	0.016
IID5. I study because I see the purpose for learning the material.	1.031	0.062	0.905	0.022
Integrated Internalization (ININ)				
IID1. Learning in school helps me understand who I am.	1.000	-	0.853	0.016
IID2. Learning in school helps me define my interests.	1.019	0.064	0.870	0.017
IID3. I am motivated to learn because it helps me overcome challenges/obstacles.	1.041	0.064	0.888	0.019
IID4. Studying increases my confidence.	0.996	0.062	0.850	0.017
IID5. I study because it helps me figure out a purpose in life.	0.999	0.069	0.852	0.016
IID6. I study so I can use what I learn to help others.	0.846	0.064	0.722	0.015
IID7. I study because it helps me figure out the world.	0.977	0.062	0.834	0.021
IID8. Learning in school helps me figure out what careers fit my personality.	0.935	0.066	0.798	0.018
IID9. I study increases my desire to learn more.	1.073	0.064	0.916	0.016
IID10. Studying is important to me because I want to keep learning.	1.112	0.063	0.949	0.019
Factor Covariance	0.956	0	1	0.06
INL WITH				
INPE	0.369	0.053		
INPG	-0.030	0.038		
INID	-0.378	0.043		
ININ	-0.309	0.038		
INPE WITH				
INPG	0.551	0.031		
INID	0.282	0.032		
ININ	0.280	0.049		
INPG WITH				
INID	0.28	0.035		
ININ	0.19	0.037		
INID WITH				
ININ	0.875	0.015		

Learning Belief	Unstandardized		Standardized	
	Estimate	Standard Error	Estimate	Standard Error
Belief of Effort (BE)				
BE1. The harder I work at something, the better I will be at it.	1.000	-	0.293	0
BE2R.It doesn't matter how hard I work - if I am not smart, I will not do well.	2.544	0.326	0.633	0
BE3R.If I am not good at a subject, working hard won't make me good at it.	2.699	0.351	0.659	0
BE5R. If I am not doing well at something, it's better to try something easier.	1.905	0.250	0.487	0
BE9R.If a subject is hard, it means I probably won't be able to do really well at it.	2.559	0.331	0.667	0
Belief of Ability (BA)				
BA1.I don't think I personally can do much to increase my academic ability.	1.000	-	0.658	0
BA2. My academic ability is something about me that I personally can't change very much.	1.219	0.062	0.742	0
BA3. If I am honest with myself, I don't think I can really change how much academic ability I have.	1.278	0.063	0.773	0
BA4.I can learn new things, but I don't have ability to change my academic ability.	1.193	0.061	0.746	0
Factor Covariance				
BE WITH				
BA	-0.312	0.040		
Choice and Obey	Unstandardized		Standardized	
	Estimate	Standard Error	Estimate	Standard Error
Preference of Choice				
PCG1	1.000	-	0.704	
PCG4	0.591	0.096	0.330	
PCG5	0.774	0.119	0.521	
Obey				
PCG6	1.000	-	0.583	
PCG7	0.799	0.093	0.454	
PCG9	1.130	0.135	0.615	
Factor Covariance				
Choice WITH				
Obey	-0.196	0.042		
Persistence	Unstandardized		Standardized	
	Estimate	Standard Error	Estimate	Standard Error
Persistence				
P1.I keep on going when the going gets tough.	1.000	-	0.728	
P2. People describe me as someone who can stick at a task, even when it gets difficult.	0.922	0.056	0.617	

P3. Even if it's difficult to understand, I will read an entire book until I "get" it.	0.846	0.060	0.516
P4. Setbacks do not discourage me.	0.700	0.061	0.409
P5. Even if something is hard, I will keep trying at it.	1.017	0.056	0.728
Inappropriate Persistence			
NP1. Sometimes I find myself continuing to do something, even when there is no point in carrying on.	1.000	-	0.561
NP2. Sometimes I will keep doing the same thing over and over, but I believe that it is normal to do so.	0.727	0.078	0.473
NP3. I will keep trying at something, even if I know my actions are worthless.	1.160	0.131	0.670
Factor Covariance			
Persistence WITH			
Inappropriate Persistence	0.174	0.037	

The measurement invariance for lack of internalization subscale was first tested. Chinese students served as the reference group in all invariance models. A configural invariance model was initially specified in which single-factor models were estimated simultaneously within each group; the first factor loadings for each subscale were set to 1 and the factor variance was fixed to 1 for identification within each group. As shown in Table 24, the configural model had good fit according CFI, and thus a series of parameter constraints were then applied in successive models to examine potential decreases in fit resulting from measurement or structural non-invariance.

Equality of the unstandardized item factor loadings across groups was then examined in a metric invariance model in which the factor variance was fixed to 1 in Chinese students but was freely estimated in American students; the factor means were fixed to 0 in both groups. All factor loadings were constrained to be equal across groups; all intercepts and residual variances were still permitted to vary across groups. The metric invariance model fit well (see Table 24) and did not result in a significant decrease in fit relative to the configural model, $-2\Delta LL(6) = 7.4499$, $p = .2812$. The modification indices suggested no points of localized strain among the constrained loadings. The fact that metric invariance (i.e., “weak invariance”) held indicates that the items were related to the latent factor equivalently across groups, or more simply, that the same latent factor was being measured in each group.

Equality of the unstandardized item intercepts across groups was then examined in a scalar invariance model. The factor mean and variance were fixed to 0 and 1, respectively, for identification in the American students, but the factor mean, and variance were then estimated in the Chinese students. All factor loadings and item intercepts were constrained to be equal across groups; all residual variances were still permitted to differ across groups. The scalar invariance model fit well (see Table 24) regarding CFI but did result in a significant decrease in fit relative

to the metric invariance model, $-2\Delta LL(6) = 49.314$, $p < .0001$. This indicated the scalar invariance does not hold, which was acceptable, as scalar invariance is relatively strict.

The same procedure applied to other subscales as well. For partial-ego internalization (Table 25), it was the same as lack of internalization. Configural and metric model held ($-2\Delta LL(6) = 12.413$, $p = 0.053$), but scalar did not ($-2\Delta LL(6) = 120.93$, $p < .0001$). For partial-guilt internalization (Table 26) metric model was not significantly worse than configural model ($-2\Delta LL(3) = 2.337$, $p = 0.5053$), but still the scalar model did not hold ($-2\Delta LL(3) = 36.97$, $p < 0.0001$). For identified internalization (Table 27), when compare configural and metric model, there was no significant difference ($-2\Delta LL(4) = 3.906$, $p = 0.4189$), but for metric and scalar there was ($-2\Delta LL(4) = 165.26$, $p < .0001$). The same for integrated internalization (configural & metric: $-2\Delta LL(9) = 7.0366$, $p = 0.633$; metric & scalar: $-2\Delta LL(9) = 184.97$, $p < .0001$) in Table 28. The effort belief (Table 29) scale only had configural model, and metric model was significantly worse ($-2\Delta LL(4) = 23.936$, $p < .0001$), so no further test needed. For ability belief (Table 30), also metric was not significantly worse than configural ($-2\Delta LL(3) = 33.743$, $p = 0.629$), but scalar was worse than metric model ($-2\Delta LL(3) = 33.743$, $p < .0001$). For preference of Choice (Table 31), configural model held, but not other model ($-2\Delta LL(2) = 11.646$, $p = .00296$). Both Obey (Table 32) and Persistence scale (Table 33) had configural model and metric model held (Obey: $-2\Delta LL(2) = 5.265$, $p = 0.0719$; Persistence: $-2\Delta LL(4) = 9.121$, $p = 0.0581$), but not scalar model (Obey: $-2\Delta LL(2) = 24.091$, $p < .0001$; Persistence: $-2\Delta LL(4) = 78.331$, $p < .0001$). The inappropriate persistence scale (Table 34) only had configural model held with metric model significantly worse ($-2\Delta LL(2) = 8.428$, $p = .0148$). Overall, most of the subscales achieve metric invariance, and preference of choice and inappropriate only achieved

configural invariance. As a consequence, we can conclude that this measure did not have substantial culture bias, at least for American and Chinese culture.

Structure Equation Modeling

The overall model. The first structure model examined included all the latent variables in this study: lack of internalization, partial-ego internalization, partial-guilt internalization, identified internalization, integrated internalization, belief of effort, belief of ability, preference of choice, obey, persistence, and inappropriate persistence. Correlations among latent constructs are displayed in Table 35. The model fit was marginally unacceptable: $\chi^2 (1431) = 2975.792$, $p < 0.0001$, CFI = .845, TLI = .833, RMSEA = .052 and counted for 80% of the variance in persistent and 46.2% for inappropriate persistence. However, none of the factor had significant effect on persistent or inappropriate persistent. This might be because there were many variables in this overall model, so significant effects of some latent variables might be washed out by the other variables, so the unique contribution of each latent factors and whether a group difference exist in such factor were measure next.

Lack of internalization and persistent. The unique contribution of lack of internalization was examined. Correlations are shown in Table 35. The model had acceptable fit, $\chi^2 (53) = 176.662$, $p < 0.0001$, CFI = .964, TLI = .955, RMSEA = .049 and counted for 13.5% variance of persistent. Group difference existed in lack of internalization when predicted persistent. When the regression coefficient were constrained to be equal for the students from two countries, the model was significantly worse than the factor loading were freely estimate ($-2\Delta LL (1) = 11.228$, $p = .0008$). The model fit for both the constrained model ($\chi^2 (127) = 416.051$, $p < 0.0001$, CFI = .917, TLI = .914, RMSEA = .068) and freely estimated model ($\chi^2 (126) = 404.823$, $p < 0.0001$, CFI = .920, TLI = .916, RMSEA = .067). As Chinese student was

Table 24 Lack of Internalization model fir tests of multiple group measurement and structural invariance

Model	# Free Parms	Chi- Square Value	Chi- Square DF	Chi- Square p- value	CFI	RMSEA Estimate	RMSEA Lower CI	RMSEA Higher CI	RMSEA p-vlaue
Configural Model	42	126.827	28	0.000	0.963	0.082	0.068	0.097	0.000
Metric Model	36	134.277	34	0.000	0.962	0.075	0.062	0.088	0.001
Scalar Model	30	183.591	40	0.000	0.946	0.082	0.071	0.095	0.000

Table 25 Partial-ego internalization model fit tests of multiple group measurement and structural invariance

Model	# Free Parms	Chi- Square Value	Chi- Square DF	Chi- Square p- value	CFI	RMSEA Estimate	RMSEA Lower CI	RMSEA Higher CI	RMSEA p-value
Configural Model	42	120.632	28	0.000	0.959	0.080	0.066	0.095	0.000
Metric Model	36	133.045	34	0.000	0.956	0.075	0.062	0.088	0.001
Scalar Model	30	253.977	40	0.000	0.905	0.101	0.090	0.113	0.000

Table 26 Partial-guilt internalization model fit tests of multiple group measurement and structural invariance

Model	# Free Parms	Chi- Square Value	Chi- Square DF	Chi- Square p- value	CFI	RMSEA Estimate	RMSEA Lower CI	RMSEA Higher CI	RMSEA p-value
Configural Model	24	0.572	4	0.966	1.000	0.000	0.000	0.000	0.997
Metric Model	21	2.910	7	0.897	1.000	0.000	0.000	0.024	0.997
Scalar Model	18	39.880	10	0.000	0.952	0.074	0.051	0.099	0.043

Table 27 Identified internalization model fit tests of multiple group measurement and structural invariance

Model	# Free Parms	Chi- Square Value	Chi- Square DF	Chi- Square p- value	CFI	RMSEA Estimate	RMSEA Lower CI	RMSEA Higher CI	RMSEA p-value
Configural Model	30	61.702	10	0.000	0.961	0.098	0.075	0.122	0.000
Metric Model	26	65.607	14	0.000	0.961	0.083	0.063	0.104	0.004
Scalar Model	22	230.868	18	0.000	0.840	0.148	0.132	0.166	0.000

Table 28 Integrated internalization model fit tests of multiple group measurement and structural invariance

Model	# Free Parms	Chi- Square Value	Chi- Square DF	Chi- Square p- value	CFI	RMSEA Estimate	RMSEA Lower CI	RMSEA Higher CI	RMSEA p-value
Configural Model	30	61.702	10	0.000	0.961	0.098	0.075	0.122	0.000
Metric Model	26	65.607	14	0.000	0.961	0.083	0.063	0.104	0.004
Scalar Model	22	230.868	18	0.000	0.840	0.148	0.132	0.166	0.000

Table 29 belief of effort model fit tests of multiple group measurement and structural invariance

Model	# Free Parms	Chi- Square Value	Chi- Square DF	Chi- Square p- value	CFI	RMSEA Estimate	RMSEA Lower CI	RMSEA Higher CI	RMSEA p-value
Configural Model	30	19.451	10	0.035	0.987	0.042	0.011	0.070	0.645
Metric Model	26	43.388	14	0.000	0.960	0.063	0.042	0.084	0.147

Table 30 Belief of ability model fit tests of multiple group measurement and structural invariance

Model	# Free Parms	Chi- Square Value	Chi- Square DF	Chi- Square p- value	CFI	RMSEA Estimate	RMSEA Lower CI	RMSEA Higher CI	RMSEA p-value
Configural Model	24	2.849	4	0.583	1.000	0.000	0.000	0.056	0.923
Metric Model	21	4.585	7	0.710	1.000	0.000	0.000	0.040	0.983
Scalar Model	18	38.328	10	0.000	0.980	0.072	0.049	0.097	0.057

Table 31 Preference of choice model fit tests of multiple group measurement and structural invariance

Model	# Free Parms	Chi- Square Value	Chi- Square DF	Chi- Square p- value	CFI	RMSEA Estimate	RMSEA Lower CI	RMSEA Higher CI	RMSEA p-value
Configural Model	18	0	0	0.000	1.000	0.000	0.000	0.000	NA
Metric Model	16	11.646	2	0.000	0.959	0.094	0.047	0.061	0.061

Table 32 Obey model fit tests of multiple group measurement and structural invariance

Model	# Free Parms	Chi- Square Value	Chi- Square DF	Chi- Square p- value	CFI	RMSEA Estimate	RMSEA Lower CI	RMSEA Higher CI	RMSEA p-value
Configural Model	18	0	0	0.000	1.000	0.000	0.000	0.000	NA
Metric Model	16	5.265	2	0.072	0.986	0.055	0.000	0.114	0.354
Scalar Model	14	29.356	4	0.000	0.893	0.108	0.073	0.146	0.004

Table 33 Persistent model fit tests of multiple group measurement and structural invariance

Model	# Free Parms	Chi- Square Value	Chi- Square DF	Chi- Square p- value	CFI	RMSEA Estimate	RMSEA Lower CI	RMSEA Higher CI	RMSEA p-value
Configural Model	30	14.673	10	0.144	0.995	0.030	0.000	0.060	0.849
Metric Model	26	23.794	14	0.049	0.990	0.036	0.003	0.061	0.806
Scalar Model	22	102.125	18	0.000	0.917	0.094	0.076	0.112	0.000

Table 34 Inappropriate persistence model fit tests of multiple group measurement and structural invariance

Model	# Free Parms	Chi- Square Value	Chi- Square DF	Chi- Square p- value	CFI	RMSEA Estimate	RMSEA Lower CI	RMSEA Higher CI	RMSEA p-value
Configural Model	18	0	0	0.000	1.000	0.000	0.000	0.000	NA
Metric Model	16	8.428	2	0.015	0.974	0.077	0.029	0.133	0.155

the reference group, the mean difference of lack of internalization was -0.079 and persistence was 0.479, so for lack of internalization American students had lower value and for persistent American student had higher value. The regression coefficient for Chinese students was $\beta = -0.269, p < .0001$ and for American students was $\beta = -0.528, p < .0001$. In conclusion, lack of internalization negatively directly predicted persistence, and a difference did exist between the two groups when using lack of internalization to predict persistence.

Partial-guilt internalization and persistence. The unique contribution of partial-guilt internalization to persistence were examined next. The model fit was acceptable $\chi^2 (26) = 92.136, p < 0.0001, CFI = .961, TLI = .945, RMSEA = .050$ and accounted for 0.05% variance of persistence. When analyzing group difference, the model fit is unacceptable, so there is no point to do further test. However, when predicting persistence from partial-guilt internalization

Partial-ego internalization and persistence. When examining the unique contribution of partial-ego internalization to persistence, the model fit was not ideal and partial-ego internalization could not predict persistence significantly, so modification indices were checked. It indicated item IE4 “*I am motivated to study hard, so I will perform better than other students*” had high residual covariance with persistence, so it was removed to improve the model fit. After removing IE4, the model fit was improved ($\chi^2 (43) = 118.814, p < 0.0001, CFI = .972, TLI = .964, RMSEA = .042$), but the prediction was still not significant ($\beta = -0.041, p = 0.363$).

Table 35 All Latent Variable Correlations

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10
1. Lack	0.03	0.61										
2. PartialE	0.28	0.30	.50									
			[-.14, .85]									
3. PartialG	0.29	0.30	-.22	.42								
			[-.72, .44]	[-.24, .82]								
4. Identified	0.32	0.55	-.92**	-.22	.40							
			[-.98, -.70]	[-.73, .44]	[-.26, .81]							
5. Integrated	0.34	0.49	-.89**	-.19	.42	.99**						
			[-.97, -.63]	[-.71, .46]	[-.25, .81]	[.98, 1.00]						
6. Effort	-0.04	0.60	-.96**	-.52	.05	.83**	.81**					
			[-.99, -.84]	[-.85, .11]	[-.57, .63]	[.47, .96]	[.41, .95]					
7. Ability	0.09	0.54	.94**	.49	-.10	-.84**	-.83**	-.98**				
			[.78, .98]	[-.16, .84]	[-.66, .53]	[-.96, -.49]	[-.95, -.45]	[-1.00, -.93]				
8. Choice	0.23	0.52	-.90**	-.32	.35	.97**	.95**	.78**	-.79**			
			[-.97, -.65]	[-.77, .34]	[-.32, .78]	[.87, .99]	[.83, .99]	[.34, .94]	[-.94, -.37]			
9. Obey	0.12	0.60	.98**	.55	-.04	-.86**	-.83**	-.97**	.95**	-.86**		
			[.91, .99]	[-.07, .86]	[-.62, .57]	[-.96, -.54]	[-.95, -.46]	[-.99, -.89]	[.81, .99]	[-.96, -.54]		
10. Persistent	0.28	0.51	-.92**	-.29	.25	.97**	.95**	.88**	-.88**	.93**	-.91**	
			[-.98, -.73]	[-.76, .37]	[-.42, .74]	[.87, .99]	[.83, .99]	[.60, .97]	[-.97, -.58]	[.75, .98]	[-.98, -.67]	
11. Npersistent	0.25	0.33	.55	.45	.23	-.37	-.32	-.68*	.63*	-.30	.63*	-.39
			[-.08, .86]	[-.20, .83]	[-.43, .73]	[-.79, .30]	[-.77, .35]	[-.91, -.13]	[.04, .89]	[-.76, .37]	[.05, .89]	[-.80, .28]

Note. *M* and *SD* are used to represent mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. The confidence interval is a plausible range of population correlations that could have caused the sample correlation (Cumming, 2014). * indicates $p < .05$. ** indicates $p < .01$.

Identified Internalization and persistent. Identified, when tested the two groups, had acceptable model fit ($\chi^2 (34) = 184.842, p < 0.001, CFI = .944, TLI = .926, RMSEA = .067$), counted for 52.1% of the variance, as well as predict persistent significantly ($\beta = 0.722, p < 0.001$). However, when analysis the two groups of students separately, the model fit was worse and unacceptable, which made it impossible to check for group difference.

Integrated internalization and persistent. Integrated was the same as identified, when analyzed the two groups together, the model fit were acceptable ($\chi^2 (89) = 301.629, p < 0.001, CFI = .952, TLI = .943, RMSEA = .050$) and counted for 51.3% of the variance, but not for the group difference. However, integrated internalization can predict persistent significantly ($\beta = 0.716, p < 0.001$).

Belief of effort and persistent. As integrated, belief of effort, can predict persistent significantly ($\beta = 0.504, p < 0.001$) and counted for 51.3% of the variance with a reasonable model fit ($\chi^2 (89) = 158.620, p < 0.001, CFI = .935, TLI = .914, RMSEA = .061$), but no group difference can be identified.

Belief of ability and persistent. The unique contribution of belief of ability was examine. The model had ideal fit, $\chi^2 (26) = 45.051, p = .012, CFI = .992, TLI = .986, RMSEA = .027$ and counted for 11% variance of persistent. Group difference existed in belief of ability when predicted persistent. When the regression coefficient were constrained to be equal for the students from two countries, the model was significantly worse than the factor loading were freely estimate ($-2\Delta LL (1) = 4.26, p = .039$). The model fit for both the constrained model ($\chi^2 (67) = 211.055, p < 0.001, CFI = .939, TLI = .935, RMSEA = .065$) and freely estimated model ($\chi^2 (66) = 206.795, p < 0.001, CFI = .941, TLI = .935, RMSEA = .065$). As Chinese student was the reference group, the mean difference of belief of ability was -0.438 and persistence was

0.360, so for belief in ability American students had lower value and for persistent American student had higher value. The regression coefficient for Chinese students was $\beta = -0.235$, $p < .0001$ and for American students was $\beta = -0.389$, $p < .001$. In conclusion, belief in ability negatively directly predicted persistent, and difference did exist between the two groups when using lack of internalization to predict persistent.

Preference of choice and persistent. Preference of choice when analyzed the two groups together, the model fit were acceptable ($\chi^2 (36) = 1627.88$, $p < 0.001$, CFI = .947, TLI = .927, RMSEA = .056) and counted for 33.7% of the variance, but not for the group difference. However, integrated internalization can predict persistent significantly ($\beta = 0.581$, $p < 0.001$).

Obey and persistent. Obey, when tested the two groups together, it has acceptable model fit ($\chi^2 (34) = 139.705$, $p < 0.001$, CFI = .943, TLI = .925, RMSEA = .056), counted for 3% of the variance, as well as predict persistent significantly ($\beta = -.174$, $p = 0.001$). However, when analysis the two groups of students separately, the model fit was worse and unacceptable.

Test the hypothesis. Even though group difference cannot be identified from each of the variable when predicted persistence, the hypotheses of this dissertation were still tested to see whether Chinese and American students have different patterns of persistent. To recall the hypothesis:

Chinese students: Belief in effort + Obey + partial-guilt + partial-ego = Persistent

American students: Belief in ability + Choice + identified/integrated = Persistent

Both models were explored separately. The Chinese model were analyzed, which had partially acceptable model fit, $\chi^2 (265) = 945.159$, $p < 0.001$, CFI = .868, TLI = .851, RMSEA = .061, so modification indices were checked. Item BE1 “*The harder I work at something, the*

better I will be at it” had high residual covariance with two latent factors: partial-guilt internalization (82.656) and persistent (104.428), so it was removed from the model. After removing BE1, the new model fit was $\chi^2 (242) = 777.37$, $p < 0.001$, CFI = .893, TLI = .878, RMSEA =.052. The model was still not ideal, so modification indices were checked again, item PCG 7 “*I do not feel comfortable deciding what to do at school without being told by teachers or parents*” had high residual covariance with factor effort, so it was removed. The model fit then became $\chi^2 (220) = 689.319$, $p < 0.001$, CFI = .902, TLI = .888, RMSEA =.051, most of the fit indices were acceptable. There were still potential misfit. After checking the modification indices, item IG4 were found having high residual covariance with latent factor effort, and it was removed. Then the model fit were ideal with $\chi^2 (220) = 689.319$, $p < 0.001$, CFI = .915, TLI = .902, RMSEA =.048, so the group comparison were conducted. Figure 6 demonstrates the final model. When compared the two group, only RMSEA were ideal, but as the sample size might be not big enough, so this was considered acceptable, which can provide the group difference with certain degree of validity. When constrained the regression coefficient the same for the two group of the students, the model was significantly worse than the one freely estimated the regression coefficient ($-2\Delta LL (4) = 23.605$, $p < .001$). The model fit for the freely estimated model was still partially acceptable with $\chi^2 (570) = 1636.883$, $p < 0.001$, CFI = .784, TLI = .773, RMSEA =.069. The detail of the group difference will be shown in Figure 7 and Figure 8. The group mean differences were shown in Table 36.

For the U.S. model, first identified internalization was put together with choice and ability to predict persistent. The model fit was fine ($\chi^2 (129) = 449.052$, $p < 0.001$, CFI = .930, TLI = .917, RMSEA =.053), but the model fit for further group comparison was not acceptable ($\chi^2 (570) = 1129.960$, $p < 0.001$, CFI = .820, TLI = .807, RMSEA =.081). Integrated

internalization was then explored in the same model instead of identified internalization, which had a great model fit ($\chi^2 (224) = 659.173$, $p < 0.001$, CFI = .927, TLI = .918, RMSEA =.048), shown in Figure 9. In the group comparison, only part of the model fit was fine ($\chi^2 (570) = 1636.883$, $p < 0.001$, CFI = .831, TLI = .824, RMSEA =.0714), but the constrained model and the freely estimate model were still compared. The result was not significant ($-2\Delta LL (3) = 0.872$, $p =.8323$), which indicate Chinese students and American students are significantly different in these latent traits when predict persistent. As a consequence, the group difference did not hold in this set of variables, but the group mean differences (Table 37) did exist.

Discussion

The purpose of the study is to develop a new scale to measure internalization in study 1 and identify how learning beliefs, preference of choice, internalization, and persistent differ between Western and East Asian students in study 2. In the first study, as previous theory indicated that there are four factors in internalization continuum, so I four-factor structure was proposed initially. In the second study, the expectation is Chinese students believe more in effort and American students believe more in innate ability. American students prefer choice while Chinese students are used to obey to authorities. American students are more likely fall onto the more internal side of the internalization spectrum and Chinese students are more onto the external side. Chinese students should show more persistence than American students. However, the current study showed different results.

Figure 4 The Whole Sample (The Chinese Model)

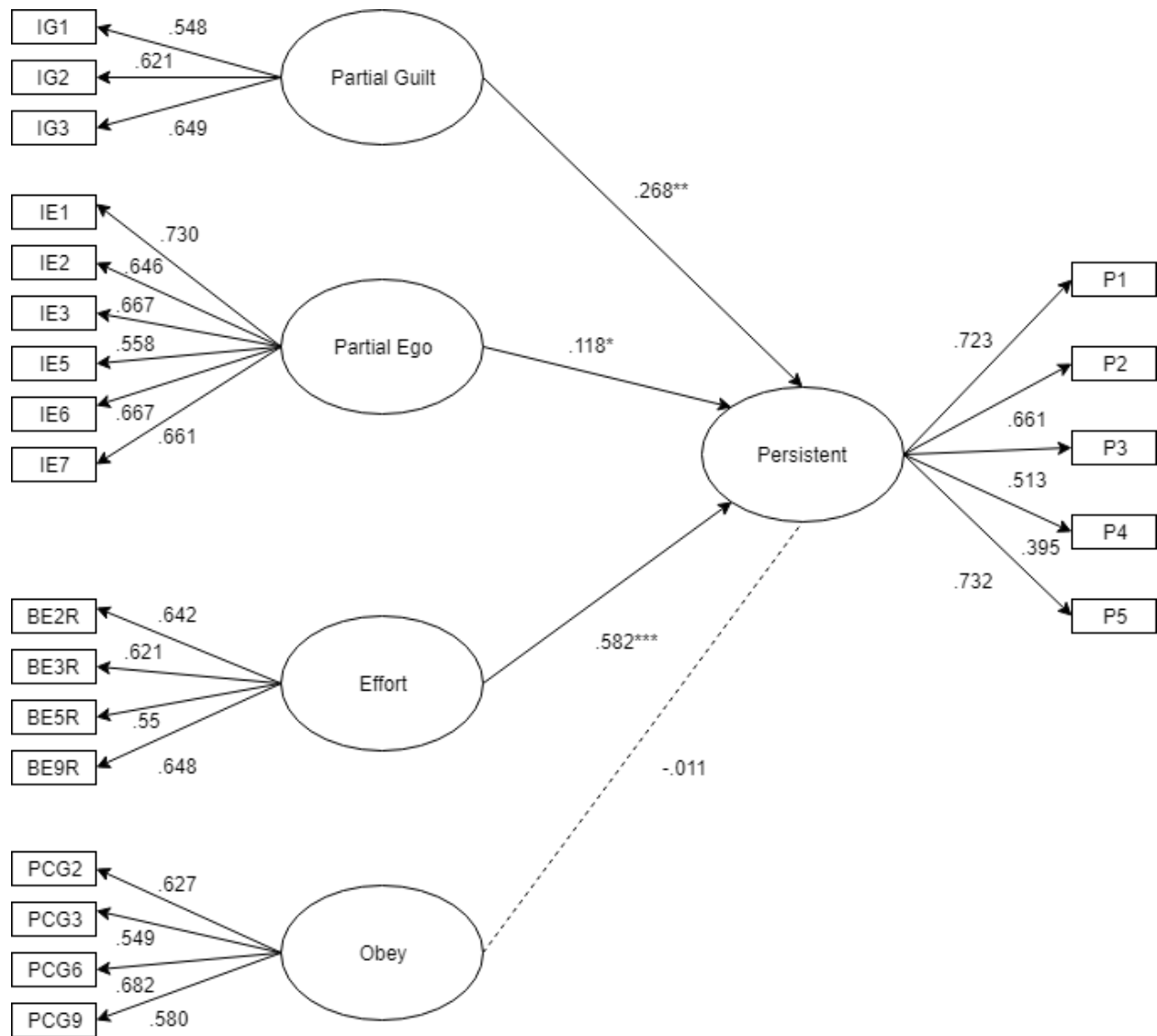


Figure 5 Chinese Sample (The Chinese Model)

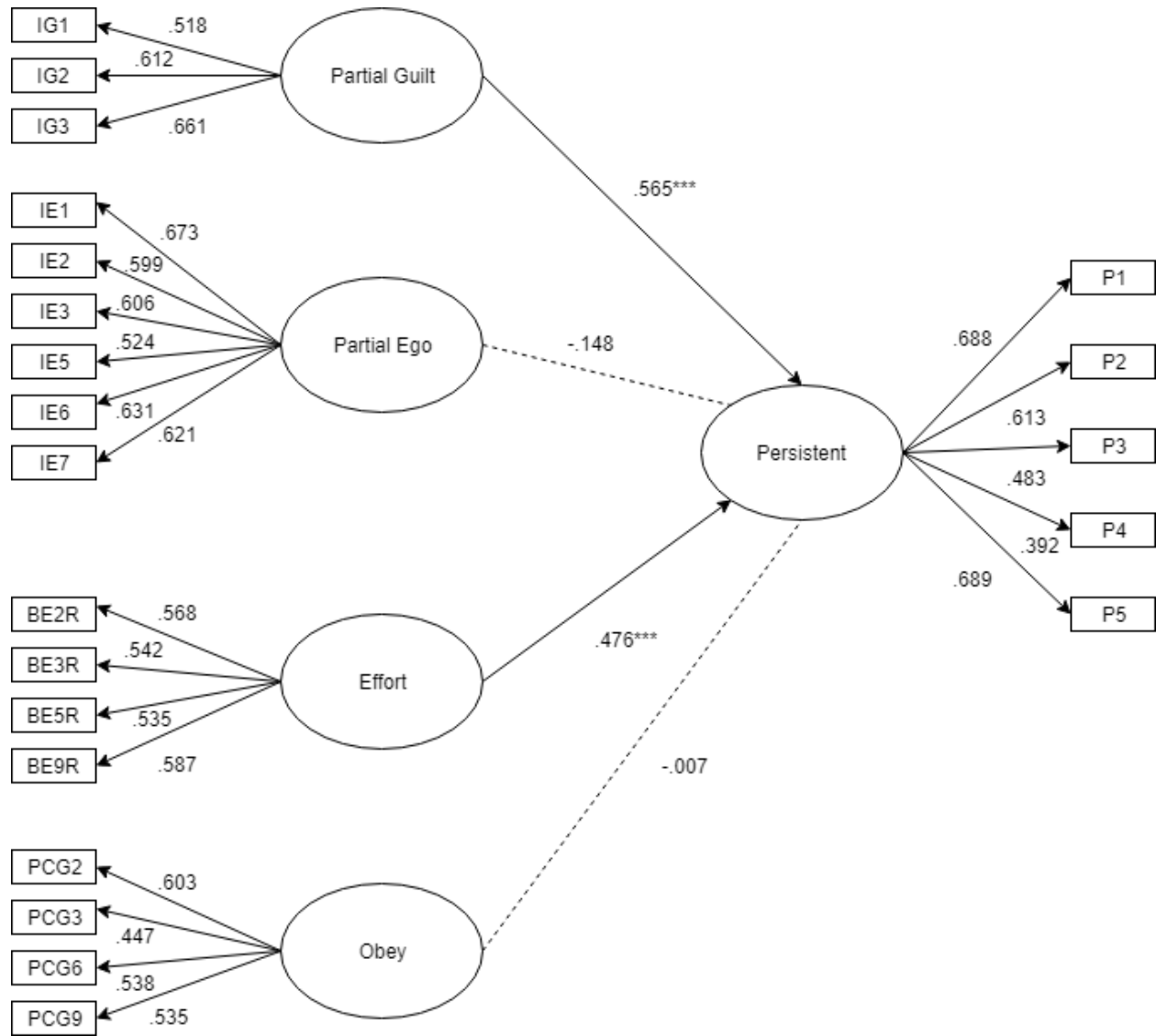


Figure 6 American Sample (The Chinese Model)

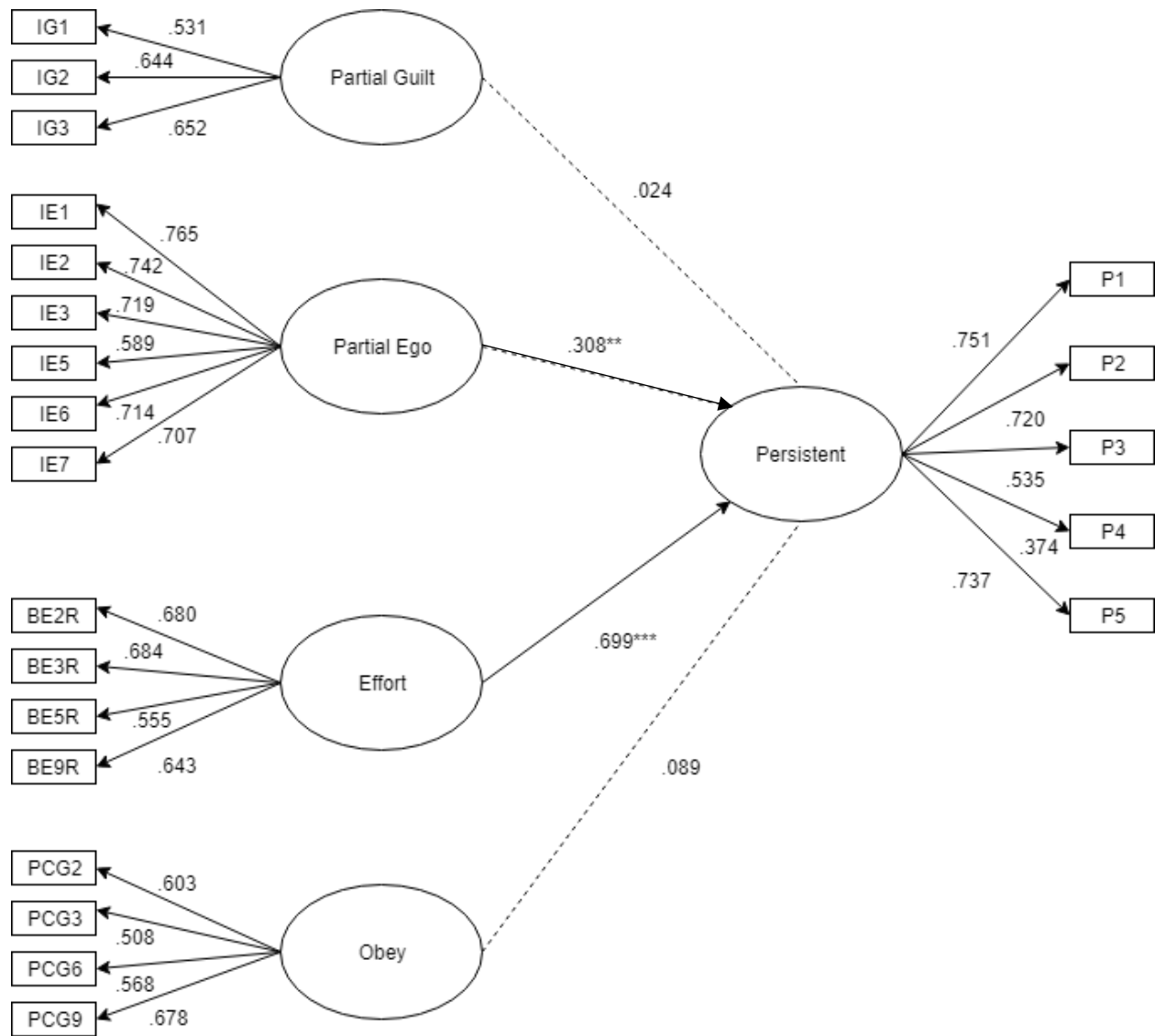


Table 36 Group Mean Differences (The Chinese Model)

	Partial Guilt	Partial Ego	Belief of Effort	Obey	Persistence
Chinese Students	–	–	–	–	–
American Students	-.263	.190	.622	-1.032	.152

Figure 7 The Whole Sample (the U.S. model)

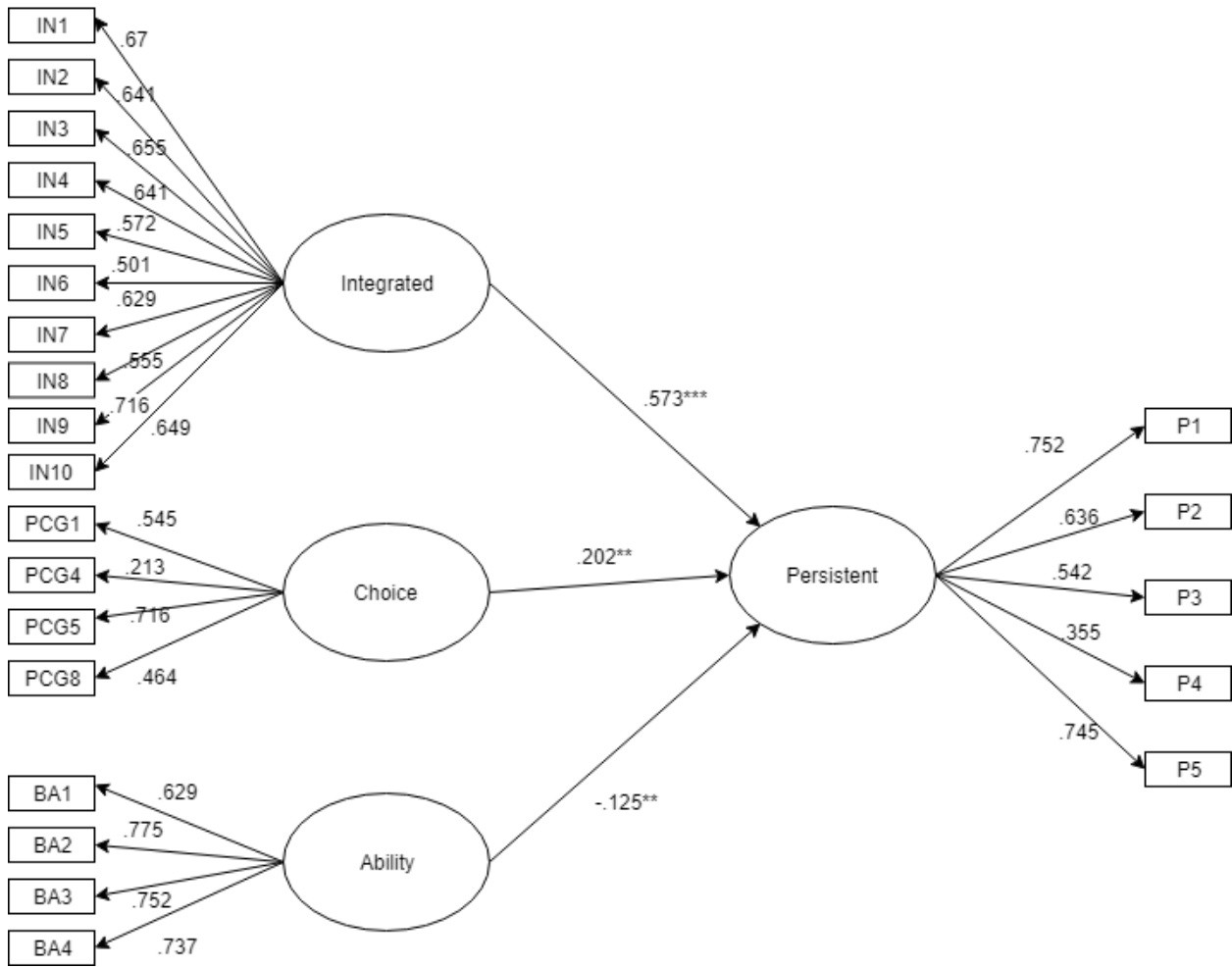


Table 37 Group Mean Differences (The U.S. Model)

	Integrated	Choice	Belief of Ability	Persistence
Chinese Students	–	–	–	–
American Students	.324	.165	-.455	.266

Study 1

Base on the confirmatory factor analysis from 1253 samples, the reliability and dimensionality of Internalization of Learning Motivation (ILM) scale were tested. The results is meaningful in three aspects. Firstly, the results support the presence of a continuum ordering of internalization of learning motivation. Even though the previous literature demonstrate such continuum ordering in theory, this study statistically supports such ordering. Secondly, instead of four-factor, the data suggested a five-factor model of the ILM scale. The theory suggested that both guilty and ego falls under partial internalization (Vansteenkiste et al., 2018). However, the data showed that guilt and ego are two different motivational forces. Students whose internalization is ego-involved want to study because they need to show they are smart, or they desire to look better than others. Students with guilt-involved internalization want to study because they feel guilty if they did not learn well or did not study enough. Thirdly, this ILM scale is apart from the existing measurements of motivation which hold a current and static view of students' motivation. From the motivational force perspective, students might show different types or degree of international towards various subjects, learning environments, cultures, and family disciplines.

Limitations and Future Research. The extent to which this scale can be extended to other cultures remains to be unknown. Only collected American sample and Chinese sample were collected. Whether or not the ILM scale will still hold to other cultures cannot be justified. However, the majority of the scale should be appropriate. Some of the items may need to be changed to adapt for different cultural context.

The development of scales demand retests and replicate in a systematic manner (Gerbing and Anderson, 1988). The ILM scale is newly developed and need further tests. Some items involved teachers and parents need to be clarified.

In future practice, the ILM scale can be used to help school and teachers to identify what kind of learning environment can form healthier internalization of learning motivation (e.g. identified internalization or integrated internalization) and help parents to understand what kind of family structure can promote their children to learn with an integrated view of learning. For example, longitudinal studies would be worthwhile to discover how students' internalization change after certain years of schooling and the comparison can be made among different types of school (e.g. public, private, and charter school). It may also help teacher to make their teaching plan more personalize for each of their student. For instance, if a student finds geology very hard, but he or she is interested in drawing, the teacher can use drawing to promote students' interest in geology. Moreover, students can use such measure to find out what kind of internalization of learning motivation they are having, and try to figure out what are the factors that undermine their learning motivation, for example, if their parents punish them a lot (punishment is associate with lack of internalization), then they will unlikely to form a positive internalization towards learning.

There are several approaches for future research. Firstly, in current study, the sample is college students, but it can be tested whether this measurement can be used to adolescent or even children. Secondly, another expansion is whether this survey can hold for people from different cultural background. The survey was designed together by an American scholar and a Chinese scholar, so it might be interesting to see whether this can

still be applied to other cultures. Moreover, internalization theory is a mini theory under self-determination theory, and self-determination were used to predict multiple outcome variables (e.g. academic performance, persistence; Vansteenkiste et al., 2018), so internalization types can also be used to predict these variables and may provide more information than intrinsic and extrinsic motivation.

In conclusion, a new Internalization of Learning Motivation was developed in this study. Even though, more studies is needed, especially on certain items, the results are promising. The continuum of internalization were proved statistically. I will provide deeper understanding of the formation and development of students' learning motivation.

Study 2

Summary of Findings. The goal of the second study was to understand the cultural difference in learning persistence, and to explore the role of internalization, learning belief, and preference of choice play for learning persistence, which expending previous literature in several notable ways. Firstly, all the scales that were used in this study were proved having good model fit and not having strong culture bias by conducting confirmatory factor analysis and measurement invariance analysis. Secondly, structure equation modeling was used to examine the relationships among lack of internalization, partial-guilt internalization, partial-ego internalization, belief in effort, belief in ability, preference of choice, authority guidance/obey, and persistence. Thirdly, the cultural differences among the factors that stated above were taken into consideration.

The correlations showed in Table 35 provide a simple and straightforward relationships among all the factors. Lack of internalization, belief in ability and tendency

to obey have strong negative correlations with learning persistence, while identified and integrated internalization, belief in effort, and preference of choice have strong positive correlations with persistence. However, when all the factors were put in the model, all the regression were non-significant, which means all these factors do not associate with persistence which was theoretical and practically impossible. The explanation was that demonstrated in the correlations, some of the factors had strong negative correlations. For example, belief in effort and belief in ability (-0.98) had very strong negative correlation, people who think effort is more important in learning would not think ability as a critical factor in learning at the same time. The effect of effort belief might be washed out by the effect of innate ability belief, so it does not make sense to put both factors in the model simultaneously.

Before testing the hypothesis, the unique contribution of each variable towards learning persistence were tested. All of them showed great model fit without testing the group difference. Partial-guilt and Partial-ego internalization did not show significant unique contribution to persistence, other factors are all contribute to learning persistence significantly. When testing group difference on the unique contribution, only lack of internalization and belief in ability showed reasonable model fit to validate the group mean difference. The result indicated, American students are less likely being lack of internalization and also belief less in ability than Chinese students. Both models illustrated that American students have higher learning persistence.

The unique contributions of each factor are valuable information, which provide the foundation to explore the major hypotheses of the dissertation. The hypothetical model were Chinese students' learning belief were more towards effort, had the tendency

to obey, and also internalization will be more towards the external end of the motivation spectrum, so the Chinese model tested was using partial-guilt internalization, partial- ego internalization, belief of effort, authority guidance/obey to predict persistence. Before taking the cultural difference into consideration, the model showed that partial-guilt internalization and belief in effort associate with learning persistence strongly. When analyzing the group difference, the findings are quite interesting.

Discussion. For Chinese students, partial-guilt internalization and belief in effort statistically predicted learning persistence, while for American students partial-ego internalization and effort predicted their learning persistence. American students had higher means in partial-ego internalization, belief in effort, and persistence, while Chinese students had higher means in partial-guilt internalization and tendency to obey.

The result means that American students may want to keep learning because they desire to do better than others and want other people think they are smart, which is consistent with the previous literature. Both Socrates's learning objective and western school mission are promoting students to become a better individual and find the ultimate truth by themselves. The idea of "I" in the learning environment is emphasized, and in Vallerand and Ratelle (2002)'s motivation theory, contextual factors like education in students' life can shape motivation. It is reasonable to see that American students have partial-ego internalization and such ego-involved motivation can promote their learning persistence. This also explained why they were more motivated by positive incidences like success and praise (Heine et al., 2001), because this satisfied their ego and confirm that they are good at certain things.

For Chinese students, in Confucius ideology and schools' mission (Cheng, 1998), students' learning is not focused around the self, rather it is about being able to contribute to the whole society and being "Xiao Shun" (filial piety), so if they cannot learn well, they would be a disappointment of their family and the society. As a consequence, partial-guilt internalization is a significant source for their learning persistence. Chinese students are more motivated by negative incidences, like failure and punishment, as these incidences make them feel guilt and push them to work more on the things that they are not very good at. The learning environment in China is highly controlled by teachers and parents, which is not an ideal contextual environment to develop intrinsic motivation or integrated internalization (Deci & Cascio, 1972).

In both cultures, effort was a valuable part of the learning persistence, and what was inconsistent with previous literature, American students seem to have stronger learning persistence than Chinese students across all the models. As mentioned before, the persistence that Chinese students have is highly external controlled, but not intrinsically motivated. The same as in the hypotheses, Chinese students do have a higher tendency to obey. In the Confucius ideology, students need to listen to authorities, and authorities are the source of knowledge. However, obeying did not play a crucial role in learning persistence, which means merely listening to authorities cannot keep a person to learn sustainably.

To explore the American students' learning persistence pathway, both identified and integrated internalization were testified in the model, because previous literature indicated that their learning motivation is more towards the intrinsic end of the spectrum. The preference of choice and belief of ability were also put into the structure model.

Identified internalization model did not have an acceptable model fit, so the integrated internalization model was used for further analysis. There was no cultural difference identified in this model, but all the factors: integrated internalization, preference of choice, and belief in ability are all associated with persistence significantly. Even though the difference was not identified, but as the model fits were reasonable, it was still validated to look at the group mean differences. In this model, American students had higher means of integrated internalization, preference of choice and persistence, but lower in belief of ability.

The results pointed out that American students can use learning to understand themselves better, to help them build their future career, as well as understand the world. However, Chinese students may not find learning as the same way. Connecting back to the basic needs theory (Gagne & Deci, 2014), the psychological needs of students should be satisfied first to form optimal motivation, in this case is integrated internalization. East Asian students are suffering from a lot of anxieties and pressures from the school system. For example, Korean students were claimed to be the unhappiest students in the world (Park, 2008), and suffering from depression, drug use, and unhappiness. So how can they find the true purpose of learning. This is also explained why in all the model Chinese students had lower learning persistence than American students. Preference of choice is another factor that worth to discuss, as it is an indicator of autonomy. In East Asian education system, autonomy were suppressed, “guan” (discipline) and obey were emphasized by Confucius (Tweed, 2000). This made students do not know how to choose by themselves when come to academic tasks. A lot of the factors are predetermined in East Asian education systems. It is hard to explain why Chinese students have stronger

belief in ability than American students, which was inconsistent with previous literature and needs further study.

There were some limitation with the sample. The first is the people who take surveys through Mturk may not be representation. There were over 60% of the participants graduated from college. The second is the gender composition, there were more female than male who participated in this study.

Future Direction. Firstly, no higher order confirmatory analysis were applied in the model, which can be the next step of data analysis. Secondly, there are many kinds of persistence. The one that used in this study was too generalized, so in the future study, whether the persistence is intrinsically motivated, ego-involved or externally controlled need to be tested.

Appendix 1: Internalization of Learning Motivation Scale

Label	Items
	Lack of Internalization (43 items)
	Lack of inherent appeal/personal meaning and relevance
LA1	I find school boring
LA2	Learning at school is rarely interesting to me
LA3	I almost never get excited about learning at school
LA4	Learning at school is not meaningful to me
LA5	Studying is almost always boring
LA6	Studying is rarely interesting
LA7	Studying is usually pointless
LA8	Studying is hardly ever exciting
LA9	Studying is meaningless
	Comments
CO1	I study because my parents expect me to.
CO2	I study because my teachers expect me to.
CO3	I learn in school because my parents say I have to.
CO4	I learn in school because my teachers say I have to.
CO5	I would not study if my parents did not make me do it.
CO6	I would not study if my teachers did not make me to do it.
CO7	I try to learn in school because my parents demand I learn.
CO8	I try to learn in school because my teachers demand I learn.
CO9	If my teachers did not push me, I would not push myself to learn in school.
CO10	If my parents do not push me, I would not push myself to learn in school.
	Reward
RE1	I study hard, so I can ask my parents to buy me something.
RE2	I study hard, so my parents will buy me something.
RE3	I try to learn in school, so my parents will approve.
RE4	I try to learn in school, so my teacher will approve.
RE5	I study because there is a reward from my teacher if I am ranked top in my class.
RE6	I study because my teacher gives a reward for studying.
RE7	I study because my teacher gives a reward for getting good grades.
RE8	I study because my parents promise me I will get presents/gifts if I do well.
RE9	I work hard in school, so my parents will think I do better than my classmates.
RE10	I study hard, so I will get a high-paying job in the future.
RE11	I study so I will have an easy life latter on.
RE12	I study so I will have highly prestigious job later on.
RE13	I study because I will have a decent job in the future.

RE14	I study because I will have “the good life” later.
	Punishment
PU1	I study so I won’t be punished by my parents.
PU2	I study so I will not be disciplined by my teacher or school.
PU3	I study hard to avoid my parents scolding me.
PU4	I study to avoid being criticized by my teacher.
PU5	I study to avoid being criticized by my parents.
PU6	If I do not study hard, my parents will punish me.
PU7	If I do not study hard, my teacher will punish me.
PU8	I am motivated to learn because I fear my parents would know I was doing poorly in school.
PU9	I will live a poor life in the future if I do not study hard.
PU10	If I do not study hard, I cannot find a good job.
	Partial Internalization (42 items)
	Ego-comparison
EC1	I work hard in school, so I won’t look worse than other students.
EC2	I work hard in school, so I will look better than other students.
EC3	Thinking others might get a better grade on an exam motivates me to study.
EC4	Thinking others might get a better grade on homework motivates me to study.
EC5	Thinking that others might do better than me in school, motivates me to work hard.
EC6	Wanting to do better than other students, pushes me to do well in school.
EC7	The thought of doing better in school than my classmates motivates me to learn.
EC8	I am motivated to study because I feel good when I get higher grades than other students.
EC9	I study hard to get a better grade than other students.
EC10	I work hard so my parents will think I am smarter than other students.
EC11	I work hard so my parents will think I work harder than other students.
EC12	I am motivated to study hard, so I will perform better than other students.
EC13	I study so I will not look incompetent in front of others.
EC14	I study to prove to others that I am smart.
	Ego-Personal Quality
EP1	I study to prove to myself that I am smart
EP2	I study so my grades show how smart I am
EP3	I put a lot of effort into my studies, so my teacher will think I work hard
EP4	I study because I want my teacher to think I am hardworking
EP5	I work on homework, so my classmates will think I am smart
EP6	I study do other students will think I am hardworking
EP7	I study because I want my teacher to think I am smart
EP8	I study so my parents will think I am smart
EP9	I study so my parents will think I am hardworking
	Guilt, Tension, Anxiety around Use of Time

GT1	When I do something besides studying, I feel guilty.
GT2	Doing something fun that is not related to school stresses me out.
GT3	I have a hard time relaxing when I do something unrelated to school
GT4	Going a day without studying makes me nervous or uptight.
GT5	I feel like I should be studying every chance I get
GT6	I get anxious if I take too long of a break from studying
GT7	I feel guilty if I do something besides study
GT8	I feel like I have to study or else I would feel guilty
GT9	I feel like I have to study or else I would feel like a failure
	Guilt, Tension, Anxiety/Shame around Academic Performance
GP1	I feel ashamed when I do not do well in school
GP2	I feel like a failure when I do not do well in school.
GP3	I study because I would feel bad about myself if got a bad grade
GP4	I feel guilty if I do not learn something well.
GP5	I feel guilty if I do not understand what is taught
GP6	I feel guilty if I do not understand a lesson
GP7	I feel ashamed if I make mistakes on homework or an exam.
GP8	I feel guilty if I do not finish my homework.
GP9	I feel ashamed if I do not get a good grade on an exam or homework assignment.
GP10	I study because I feel like I have to, not because I want to
	Identified Regulation (20 items)
	Personal Value
PV1	It is important to me to study
PV2	I study because learning is important to me.
PV3	I study because I want to learn
PV4	It is important to me that I do well in school
PV5	I study because it is important to me that I do well
PV6	I value the benefits of learning in school
PV7	I study in school because I personally value what I learn
PV8	It is important to me that I put effort into studying
PV9	What my teacher teaches me is relevant and worth studying.
	Goal Value
GV1	It is important to me that I study so I can reach my goals
GV2	It is important to me that I study regularly/consistently
GV3	I study because I know it will get me to my goals
GV4	Learning in school is an important part of reaching my goals
GV5	I put effort into my schoolwork in order to help reach my goals
	Meaning and Purpose
MP1	I am motivated to study because I find the content valuable

MP2	I am motivated to learn because I find the content meaningful
MP3	I study because I see the purpose for learning the material
MP4	I study because I can see the relevance of what I am learning
MP5	I am motivated to learn in school because it is interesting
MP6	The content in class is what motivates me to learn.
	Integrated Regulation (23 items)
	Identity
ID1	I study because I am committed to learning
ID2	I study because I am passionate about learning
ID3	I study because it is an important part of who I am
ID4	Learning in school helps me understand who I am
ID5	Learning in school helps me narrow my interests
ID6	Learning in school helps me define my interests
	Instrumental
IN1	I motivated to learn in school because it teaches me how to solve problems
IN2	I am motivated to learn because it helps me overcome challenges/obstacles
IN3	Studying increases my confidence
IN4	I study because it helps me figure out a purpose in life
IN5	School helps me figure out what my contribution to society will be
IN6	I study so I can use what I learn to help others
IN7	I study so I can use what I learn to improve society
IN8	I study so I can use what I learn to improve myself
IN9	I study because it helps me figure out the world
	Career
CA1	School has helped me find a career I am passionate about
CA2	School has helped me find a career I am interested in
CA3	Learning in school helps me figure out what careers fit my personality
	Qualities
QU1	I study because it helps me be an open-minded person
QU2	I study increases my desire learn more
QU3	I study because there is always more I want to learn
QU4	Studying is important to me because I want to keep learning
QU5	Studying is important to me because I want to keep growing

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