Higher Education (2021) 81:1215–1235
https://doi.org/10.1007/s10734-020-00608-0

International students' self-determined motivation, beliefs about classroom assessment, learning strategies, and academic adjustment in higher education

Hyun Jin Cho[1] · Chantal Levesque-Bristol[1] · Mike Yough[2]

Published online: 22 September 2020

Abstract
As an increasing number of international students are studying in English-speaking universities, there has been growing interest in exploring the factors and complexities that impact international students' academic achievement and adaptation during their studies. The present study aimed to investigate how international students adapt to new academic environments in US universities by exploring the relationships between self-determined motivation, beliefs about classroom assessments, the use of self-regulatory learning strategies, and academic performance based on self-determination theory. To examine international students' learning experiences, 321 international Asian undergraduate students at a large research-intensive midwestern university participated in an online survey. Structural equation modeling was conducted to test the proposed model. The findings demonstrated that self-determined motivation in courses led to adaptive beliefs about classroom assessments, which promoted a variety of self-regulatory learning strategies, including shallow and metacognitive strategies. Metacognitive learning strategies were significantly related to students' academic performance. This study allows us to better understand how Asian international students adapt to US academic environments through their motivation to learn, perspectives about classroom assessments, and learning strategies across different academic disciplines at the university level.

Keywords Self-determined motivation · International students · Beliefs about classroom assessments · Learning strategies · Academic performance

✉ Hyun Jin Cho
cho193@purdue.edu

Chantal Levesque-Bristol
cbristol@purdue.edu

Mike Yough
mike.yough@okstate.edu

Extended author information available on the last page of the article

Introduction

As an increasing number of international students are studying in English-speaking universities, their unique and significant contributions have been recognized (Li et al. 2010). International students not only bring significant economic benefits to universities but also add linguistic, social, and cultural diversity (Ecochard and Fotheringham 2017; Phakiti et al. 2013; Wu et al. 2015). As a result, there has been growing interest in exploring the factors and complexities that impact international students' academic achievement and adaptation during their studies (e.g., Andrade 2006; Gu et al. 2010; Wu et al. 2015). The extant literature suggests that the adjustment process is not linear or passive, but rather transitional, transformational, and multifaceted (Gu et al. 2010; Rienties et al. 2012). To be successful in their academics and to adjust successfully to university life, international students require not only English language proficiency but also other personal and environmental factors that influence international students, including motivational beliefs, cognitive skills, and social engagement or relationships (Andrade 2006; Macgregor and Folinazzo 2018; Martirosyan et al. 2015; Phakiti et al. 2013).

Research has shown that international students from Asian countries have greater adjustment difficulties than international students from non-Asian countries (Abe et al. 1998; Wu et al. 2015). The existing literature has noted that students from Asian countries encounter considerably more academic and social difficulty than non-Asian international students or other student groups do, due to linguistic and cultural barriers (Abe et al. 1998; Andrade 2006; Leong 2015; Rienties et al. 2012; Wu et al. 2015). In order to help this group, the largest international student population that struggles the most to adjust to US universities (Abe et al. 1998), there is a need to focus on Asian international students' unique academic integration during the transition to US universities. However, there is little evidence-based literature about how these students' motivational beliefs, cognitive beliefs, and learning skills contribute to their academic adjustment during this transition. Considering that students' beliefs regarding motivation and assessment have a significant association with their learning approaches, understanding students' motivational beliefs and perspectives about assessment will provide important insight into their learning approaches during the adjustment process in higher education. The present study investigates the relationships between Asian international students' self-determined motivation, beliefs about classroom assessments, and uses of self-regulatory learning strategies regarding their academic adaptation to US universities.

Literature review

International students' academic adjustment and learning strategies

Asian international students encounter unique adjustment challenges during their transition to US academic environments. The challenges that these students frequently mention include academic challenges due to a lack of English proficiency or language barriers, the formation of social relationships with peer group students or faculty, and familiarization with new ways of teaching and curriculum differences (Banjong 2015; Poyrazli et al. 2002; Poyrazli and Grahame 2007; Wu et al. 2015). Among the many challenges that impact students' academic adjustment, the most prominent one may be a lack of language proficiency and communication skills, which can affect students' social and academic performance (Chen 1999; Olivas and Li

2006). Language skills and academic integration are associated with international students' academic performance (Andrade 2006; Martirosyan et al. 2015; Olivas and Li 2006; Ramburuth 2001; Rienties et al. 2012). Asian international students who are familiar with a one-way communication style may not be familiar with discussion skills or the dialogic characteristics of US classroom environments (Holmes 2004). Similarly, difficulties with language anxiety and a lack of confidence can impede students' participation in classroom activities (Robertson et al. 2000).

However, the extant literature suggests that although the challenges caused by language barriers can affect academic learning, they are not the only obstacle to academic success (Macgregor and Folinazzo 2018). Researchers have pointed out that motivation, academic self-efficacy, social engagement, and the adoption of adaptive learning approaches are critical factors that can affect international students' academic integration (Andrade 2006; Martirosyan et al. 2015; Poyrazli et al. 2002). Motivation and self-regulation as well as language proficiency can play key roles in influencing students' academic performance (Phakiti et al. 2013). In particular, international students' approaches to learning can reflect their engagement in learning, which leads to academic success (Sakurai et al. 2014).

In general, approaches to learning, including surface learning and deep learning, have been widely examined in the existing literature (Biggs et al. 2001; Entwistle and McCune 2004; Hay 2007). A surface learning approach refers to students' attempts to memorize and reproduce informational content without deep understanding or elaboration, or rote learning (Dolmans et al. 2016; García et al. 2015). On the other hand, a deep learning approach involves understanding the learned content and constructing an in-depth understanding of it (Entwistle et al. 2003). Students who take a deep learning approach try to understand what is being studied; integrate new knowledge with their background knowledge, structure, and relate ideas; and evaluate their understanding (Biggs et al. 2001; Entwistle and McCune 2004; Dolmans et al. 2016). Students' use of deep learning approaches has been associated with other positive regulatory and cognitive strategies, as well as higher academic grades than those received as a result of the use of shallow approaches (Everaert et al. 2017; Heikkilä and Lonka 2006; Platow et al. 2013; Sakurai et al. 2014). In particular, students' application of metacognitive strategies leads to students' deep learning process. When students begin to employ metacognitive learning strategies, they experience less difficulty understanding concepts than they had when they focused on memorizing facts; thus, deep learning strategies improve students' performance and motivation (Cook et al. 2013).

The literature on international students' learning approaches has shown inconsistent findings regarding the impact of students' approaches to learning (e.g., Kember 2009; Ramburuth and McCormick 2001; Sun and Richardson 2012). Recently, several studies criticized the stereotype that Asian international students tend to adopt a more surface-level learning approach than Western students. For example, Ramburuth and McCormick (2001) disproved stereotypical claims suggesting that Asian international students rely on surface approaches to learning. Their findings showed that, although international students from Asian countries showed higher use of surface learning strategies, their overall approaches to learning were not different from those of Western students. Richardson and Sun (2016) mentioned in their review that this stereotype about Asian international students was not based on empirical evidence because rote learning is generally related to poor learning outcomes, while Chinese international students have been shown to outperform their domestic counterparts (Kember and Watkins 2010). In addition, while one study found that Chinese students were less likely than Western students to use a deep learning approach, the results showed no significant

difference between Western students and Chinese students in terms of the use of a surface learning approach (Sun and Richardson 2012).

Addressing the contradictory findings about international students' learning approaches, Sakurai et al. (2014) explained that students' selected learning approaches may stem from their varying different early educational learning environments rather than from their own characteristics. Kember (2009) also commented that, since there are intense family and societal pressures regarding academic performance for international students, these contextual pressures might impact international students' approaches to learning. Thus, Asian international students' reliance on a surface learning approach can be interpreted as a result of contextual factors rather than their inherent characteristics (Kember 2009). For international students who are experiencing challenges in a foreign environment, a highly demanding workload may prompt them to choose a surface approach; thus, they may adopt more techniques, such as rote learning that pertain to a surface approach (Sakurai 2009). The increasingly inconsistent findings regarding international students' learning approaches suggest that further investigation is needed to study what kind of environmental or personal factors may affect their learning approaches during their transition to US universities. More studies need to be conducted to comprehend the dynamics of Asian students' learning experiences in academic environments (Abe et al. 1998).

Moreover, little is known about international students' self-regulated learning strategies that lead to the deep learning processes and what types of learning approaches are associated with international students' academic adaptation. There are many factors that can cause variability in learning strategies across a range of disciplines, and the characteristics of different groups of students may contribute to variability in learning strategies across courses (Nijhuis et al. 2008). In this study, based on the tenet of self-determination theory tenet suggesting that supportive learning environments promote students' self-determined motivation, we focus on the variability in Asian international students' learning processes, which involves motivation to learn, perception of assessment, and students' self-regulated learning strategies. This study aims to examine how international students' motivational beliefs and cognitive learning strategies affect their academic performance.

Beliefs about assessment and learning approach

In relation to students' learning approach, recent research has shown that students' beliefs about assessment are significantly associated with their learning approach. A recent study examined students' perspectives on assessment through interviews and surveys and found that students had various perspectives and beliefs about assessments (Cho et al. 2020). There is a growing body of literature examining the relationships between students' adaptive perceptions of assessment and their approaches to learning and other learning outcomes (e.g., Brown and Hirschfeld 2008; Cho et al. 2020; Dorman and Knightley 2006; Peterson and Irving 2008).

Research on assessment suggests that how students perceive assessments is linked to their learning approaches (Struyven et al. 2005). One study showed that perceptions of the quality of teaching and appropriateness of the assessment were the strongest predictors of students' use of a deep learning approach (Lizzio et al. 2002). Moreover, adaptive perceptions of assessment were closely related to students' self-regulation in their learning (Brown 2011).

In addition, researchers have found a strong relationship between students' adaptive perceptions and positive learning outcomes. Adaptive beliefs about assessment have been found to be more positively associated with good academic performance than nonadaptive

beliefs about assessment (Brown and Hirschfeld 2008; 'Otunuku et al. 2013; Peterson and Irving 2008). However, although studies of students' perceptions have reported consistent and statistically significant associations between adaptive beliefs and academic achievement, much less is known about how these perceptions are mediated by actual students' practices or learning strategies. Furthermore, most studies have been conducted with domestic students in secondary education contexts, not with international students at the university level. Thus, investigating international students' perspectives about assessment will provide important insight into their learning approaches in higher education.

Based on previous research, we hypothesized that international students' adaptive beliefs about assessment practices may be associated with desirable learning behaviors such as the use of a deep learning approach. In particular, how students view assessments has been related to students' self-regulated learning (Brown 2011; Cho et al. 2020; Paris and Paris 2001). Students' beliefs about assessment may help them take responsibility for their own learning, sustain their efforts, be aware of their learning processes, and reflect on their learning approaches and outcomes, which are the main characteristic of self-regulated learning (Paris and Paris 2001). Thus, adaptive beliefs about assessment are assumed to be associated with deep learning approaches rather than with surface learning approaches. Understanding Asian international students' perspectives about assessment and learning strategies will provide crucial clues regarding their academic adjustment.

Self-determined motivation

Another crucial indicator of Asian international students' adjustment is their motivational beliefs related to learning (Andrade 2006). The current study is guided by self-determination theory (SDT; Deci and Ryan 1985, 2002), which is a conceptual framework explaining individual motivation that is increasingly used in diverse disciplines. SDT proposes that individuals' behavioral regulation during a task can be intrinsically motivated, extrinsically motivated, or amotivated. These motivational regulations can vary depending on the extent to which they are self-determined (autonomous). SDT suggests that the extent to which individuals participate in various activities, exert effort, and persist in various tasks can be classified along a continuum of self-determination (Deci and Ryan 2002; Ryan and Deci 2000). The most self-determined type of regulation is intrinsic motivation, which refers to behaviors performed out of pure enjoyment or pleasure, whereas amotivation, which represents a lack of any type of motivation, lies at the opposite end of the continuum (Ryan and Deci 2017). There are four types of extrinsic motivation that are situated between intrinsic motivation and amotivation: integrated, identified, introjected, and external regulation (Deci and Ryan 2000).

Specifically, according to Deci and Ryan (2000, 2002), these regulations can be explained as follows. Intrinsically motivated behaviors are those that an individual enjoys. These behaviors are performed purely for the enjoyment that is derived from engaging in the activity or task. Intrinsic motivation is the strongest form of self-determination. Extrinsically motivated behaviors can be categorized based on four different types of behavioral regulation: integrated, identified, introjected, and external regulation (Deci and Ryan 1985; Ryan and Deci 2000). Integrated regulation refers to the extent to which individuals choose to perform behaviors to harmonize the self. These behaviors are regulated for instrumental reasons, so they are extrinsically regulated, but they are still located at the higher end of the self-determination continuum. Integrated regulation represents the most self-determined form of extrinsic motivation and the culmination of the internalization process. Identified regulation refers to the

extent to which individuals identify with the outcomes of their behaviors and value the behaviors performed. Although these behaviors are not necessarily enjoyable, people perform them because they are valued and do not feel external pressure to engage in them. Identified regulation is considered a self-determined form of regulation. Introjected regulation underlies behaviors that are partially internalized, but not fully self-determined. Under introjected regulation, individuals perform a task to gain social approval or self-worth or to avoid internal pressure or negative feelings, such as feelings of guilt. External regulation controls behaviors through external sources such as rewards, fear of punishment, or pressure from significant others. Finally, amotivation refers to the absence of any type of motivation. It is characterized by a lack of belief that the task can result in the desired outcomes. Thus, the self-determined types of regulation (autonomous motivation) include intrinsic, integrated, and identified regulation, whereas the non-self-determined types of regulation (controlled motivation) include introjected regulation, external regulation, and amotivation (Ryan and Deci 2017).

Guided by SDT, recent work has highlighted the importance of self-determined motivation in students' learning (e.g., Thøgersen-Ntoumani and Ntoumanis 2006). The different types of motivational regulation can directly or indirectly explain a wide range of behavioral, cognitive, and affective outcomes (Vallerand 1997). In the extant self-determined motivation literature, researchers have investigated the relationship between students' motivation and academic achievement (e.g., Burton et al. 2006; Joe et al. 2017). Employing the same SDT tenets, research has shown that students' self-determined motivation has a positive relationship with desirable learning outcomes such as engagement, self-regulation, improved performance, and perseverance (Burton et al. 2006; Chirkov et al. 2007; Noels et al. 2000; Thøgersen-Ntoumani and Ntoumanis 2006; Vallerand 1997). When students exhibit self-determined motivation in classroom tasks, they are more likely to participate in tasks and engage in classroom activities (Ryan and Deci 2017).

Despite these attempts to apply the SDT principles in diverse contexts, a research gap remains regarding international students' motivation and their adjustment during their transitions to US universities.

Consistent with recent work that points to the role of self-determined motivation (e.g., Yang et al. 2018), the current study proposes that international students' self-determined motivation may shape their adaptive beliefs about classroom assessments, which, in turn, may contribute to their use of self-regulated learning strategies and eventually their academic performance as a learning outcome.

The present study

Our study focuses on how international students adapt to a new academic environment. Considering the important role of students' motivation in the learning process, specifically self-determined motivation from the SDT perspective, we are interested in how students' motivations to learn are related to their experiences of a new academic environment, acknowledging that international students may encounter many academic challenges during their transition to US universities. Additionally, we are interested in exploring how these motivations affect students' adaptive learning perceptions (i.e., adaptive beliefs about assessment) and learning behaviors (i.e., learning strategies) and what type of learning approach would enhance international students' academic performance. We hypothesize that international students' successful academic adaptation can be represented by their course grades.

The purpose of the present study is to explore how international students adjust to US universities by investigating the relationships between self-determined motivation, beliefs about classroom assessments, and the use of self-regulatory learning strategies. This study is guided by the following research questions, and the hypothesized model presented in Fig. 1:

1. Does self-determined motivation relate to international students' adaptive beliefs about course-based assessments, self-regulated learning strategies, and academic performance?
2. How do adaptive beliefs about assessment relate to students' self-regulated learning strategies?
3. Do specific learning strategies relate to international students' academic performance?

In the SEM model, we examine the relationships (a) between motivation and adaptive beliefs about assessment, (b) between adaptive beliefs about assessment and the use of self-regulatory learning strategies, and (c) between the use of self-regulatory learning strategies and academic performance. We also test the indirect effects of these variables on the outcome variables. Considering the limited role of shallow strategies in higher education, we hypothesize that metacognitive approaches to learning are more positively related to students' academic performance than to shallow strategies.

Method

Participants

The participants were 321 Asian international undergraduate students at a large research intensive midwestern university where most students are white American undergraduate. To explore international students' perceptions of learning and learning approaches, a project invitation email was sent through the registrar office to students on the campus who were registered as "Asian international students." Those who agreed to participate were invited to complete the online survey in the middle of the 2016 fall semester.

Of the participants, 51.4% were male and 48.6% were female. Approximately 28.7% of the participants reported being freshmen, 25.9% reported being sophomores, 24.9% reported being juniors, and 20.6% reported being seniors. Additionally, approximately 42.4% of the participants were majoring in engineering and technology, 12.5% were majoring in liberal arts

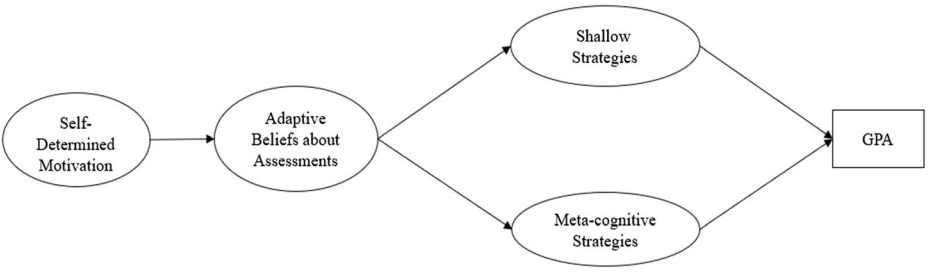

Fig. 1 Hypothesized structural model

majors, 22.7% were majoring in science and math, 14.3% were majoring in business, and 8.1% were majoring in other fields. Additionally, approximately 19.1% of the participants reported having been in the USA or other English-speaking countries for less than 1 year, 22.6% reported 1 to 2 years, 18.2% reported 2 to 3 years, 18.2% reported 3 to 5 years, and approximately 21.9% reported more than 5 years. Table 1 shows the participants' demographics and profiles.

Measures

The following measures were used to examine the relationships between self-determined motivation, beliefs about assessment, different types of learning approaches, and academic performance: the Situational Motivation Scale (SIMS; Guay et al. 2000), Beliefs about Assessment Scale (Cho et al. 2020), and Motivated Strategies for Learning Questionnaire (MSLQ; Wolters et al. 2005).

Table 1 Demographic profiles ($N = 321$)

Category		*N*	%
Gender	Female	165	51.4
	Male	156	48.6
Academic year	Freshman	92	28.7
	Sophomore	83	25.9
	Junior	80	24.9
	Senior	66	20.6
Major	Engineering & Technology	136	42.4
	Liberal Arts	40	12.5
	Science & Math	73	22.7
	Business	46	14.3
	Others	26	8.1
Duration in the US or English-speaking countries	Less than 1 year	61	19.1
	1–2 years	72	22.6
	2–3 years	58	18.2
	3–5 years	58	18.2
	More than 5 years	70	21.9
TOEFL Scores			
Reading	1–10	3	1.0
	11–15	4	1.3
	16–20	30	9.9
	21–25	124	40.8
	26–30	143	47.0
Listening	1–10	1	0.3
	11–15	3	1.0
	16–20	34	11.1
	21–25	128	42.0
	26–30	139	45.6
Speaking	1–10	1	0.3
	11–15	6	2.0
	16–20	43	14.1
	21–25	172	56.6
	26–30	82	27.0
Writing	1–10	1	0.3
	11–15	6	2.0
	16–20	37	12.2
	21–25	152	50.2
	26–30	107	35.3

SIMS (Guay et al. 2000)

To measure students' self-determined motivation, the SIMS was used. The SIMS contains six subscales: intrinsic, integrated, identified, introjected, external, and amotivated regulation. In this study, the participants were asked to indicate the reasons why they took the course that they had indicated in the introduction of the survey. The SIMS consists of 18 items answered on a 7-point Likert scale from 1 (strongly disagree) to 7 (strongly agree). To reflect students' perceptions of self-determination, a self-determination index (SDI) was calculated by weighting the different motivation subscales. Each subscale score was multiplied by an assigned weight according to its position on the self-determination continuum (Levesque et al. 2004; Ryan and Connell 1989; Vallerand 1997). For the calculation of the overall SDI, the following formula was used: (intrinsic motivation*3) + (integrated regulation*2) + (identified regulation *1) − (introjected regulation*1) − (external regulation*2) − (amotivation*3). The SDI scores were then summed to calculate an index of self-determination. The alpha coefficients for intrinsic, integrated, identified, introjected, external, and amotivated regulation were .89, .80, .82, .85, .80, and .82, respectively, in the current study.

BAS (Cho et al. 2020)

The BAS is a comprehensive instrument to assess students' adaptive beliefs about assessment and captures students' general adaptive beliefs about assessment; the BAS was developed based on the results of semi-structured interviews with undergraduate students in which students' perceptions about assessments were gathered and previous research (Brown 2011; Brown and Hirschfeld 2008; Dorman and Knightley 2006; Peterson and Irving 2008). The BAS is composed of 26 items that are grouped into four subscales: benefit for learning, authenticity, consistency with learning objective, and fairness. The benefit for learning subscale measures the extent to which students believe that assessments benefit their learning and increase their engagement-related learning behaviors. The authenticity subscale refers to students' beliefs that assessments are related to and reflect real-life situations. The consistency with learning objectives subscale measures the extent to which students believe that they are tested on what they learned in class. Finally, the fairness subscale refers to the extent to which students believe that assessments reflect their actual skills and efforts and that they have a fair opportunity to accomplish diverse assessment tasks. The participants indicated their agreement with the statements on a 5-point scale ranging from 1 (disagree) to 5 (agree). The Cronbach's alpha for the four factors were .92, .88, .83, and .85, respectively.

MSLQ (Wolters et al. 2005)

To assess the use of self-regulatory strategies, the cognitive and metacognitive strategy subscales were adapted from the learning strategy subscale of the latest version of the MSLQ (Wolters et al. 2005). To capture the use of self-regulated learning in more detail, items related to shallow strategies (4 items) and metacognitive strategies (12 items) were used in this study. Strategies that focus on rehearsal are referred to as *shallow strategies* (e.g., I practice saying the material to myself over and over), while strategies that include planning, reviewing, and evaluating are referred to as *metacognitive strategies* (e.g., When I become confused about something I'm reading for this class, I go back and try to figure it out) (Ahmed et al. 2013). The items are scored on a seven-point, Likert-type scale ranging from very untrue (1) to very

true (7). The Cronbach's alpha for shallow strategies and metacognitive strategies were .61, and .58, respectively.

Academic performance

Students self-reported their final grades with letter values from A+ (4.0) to D/F (0.0) for the courses that they referenced to complete the survey. Students' grades from assessments are a crucial and valid indicator of their learning because assessments function as a snapshot of students' understanding of a concept and their ability to apply it appropriately. In addition, students' grades provide crucial information on how much and how accurately students have gained knowledge from the target course. Therefore, students' grade can be better represented as a successful academic adaptation rather than students' perceived adjustment.

Procedures

We used a convenience sampling strategy to send the project invitation email to international students who were registered as "Asian international undergraduate student" on campus via the registrar's office. Those who were interested in participating in the project had access to an online survey in the middle of the semester that measured their motivational beliefs, adaptive beliefs about assessment, and use of self-regulated learning strategies. In the survey introduction, students were directed to indicate the most important course in their respective major fields and answer the survey questions accordingly. Students were also asked to report their grade in the indicated course.

Overview of analysis

Structural equation modeling (SEM) was conducted to test the model proposed in Fig. 1. SEM allowed us to test the theoretical fit of the hypothesized model based on SDT. All analyses were conducted using Stata 13. The parameters were estimated using maximum likelihood estimation. The various types of motivation proposed by SDT, adaptive beliefs about assessment, shallow strategies, and metacognitive strategies were treated as latent variables. Based on the nature and dimensionality of the items, this study used parcels of items as variables in the SEM procedures (Little et al. 2002). For example, self-determined motivation was calculated by an SDI (Levesque et al. 2004; Ryan and Connell 1989; Vallerand 1997), and three parcels were used for the SDI in the SEM model. For adaptive beliefs about assessments, four parcels were used to represent each factor as indicators.

Results

Table 2 shows the descriptive statistics, and Table 3 presents the correlations among all constructs included in the hypothesized model. The hypothesized model depicted in Fig. 1 was tested with the assumption that adaptive beliefs about assessment influenced by self-determined motivation would be associated with self-regulated learning strategies and would eventually promote international students' academic performance. The hypothesized model represented the data well: $\chi 2(71) = 204.98$, $p < .001$; comparative fit index (CFI) = .93; Tucker-Lewis index (TLI) = .91; standardized root mean square residual (SRMR) = .07; root mean square error of approximation (RMSEA) = .08.

Although the CFI was lower than .95, overall, the indices suggested an acceptable model fit. The full SEM model is depicted in Fig. 2.

Students' self-determined motivation was a significant positive predictor of their adaptive beliefs about assessment (β = .57, $p < .001$). The variable adaptive beliefs about assessment was significantly and positively associated with both learning strategies: shallow strategies (β = .39, $p < .001$) and metacognitive strategies (β = .55, $p < .001$). However, only metacognitive strategies were positively significantly associated with academic performance (β = .89, $p = .03$).

Table 4 presents the direct, indirect, and total effects and their significance levels in the SEM model. Self-determined motivation had a direct effect on adaptive beliefs about assessment, while this motivation had a significant indirect effect on shallow strategies (β = .22), metacognitive strategies (β = .32), and academic performance (β = .12). Self-determined motivation was predictive of adaptive beliefs about assessment, both learning strategies through indirect effects, and international students' academic performance through indirect effects. In addition, adaptive beliefs about assessment had a significant indirect effect on academic performance as well (β = .21).

Based on these findings from the SEM analysis, we highlight the following results: For RQ1, self-determined motivation was significantly associated with international students' adaptive beliefs about course-based assessments, self-regulated learning strategies, and academic performance. Regarding RQ2, students' adaptive views about assessment were positively associated with both learning strategies, even shallow strategies. For RQ3, regarding which specific learning strategies are related to international students' academic performance, it was found that only metacognitive strategies were related to international students' academic performance.

Discussion

Motivation, adaptive beliefs about assessment, and self-regulated learning

The current study aimed to identify the factors that contribute to international students' academic adaptation and to understand their unique academic adaptation process within the

Table 2 Descriptive statistics ($N = 321$)

Variable	M	SD	Minimum	Maximum
Intrinsic Regulation	4.59	1.40	1.00	7.00
Integration	5.18	1.16	1.00	7.00
Identification	5.24	1.14	1.00	7.00
Introjection	3.80	1.55	1.00	7.00
External Regulation	5.10	1.34	1.00	7.00
Amotivation	2.69	1.42	1.00	7.00
Benefit for Learning	3.87	.68	1.00	5.00
Authenticity	3.60	.84	1.00	5.00
Consistency with Learning Objectives	3.98	.80	1.00	5.00
Fairness	3.78	.82	1.00	5.00
Shallow Strategies	4.58	1.14	1.00	7.00
Metacognitive Strategies	4.83	1.07	1.00	7.00
GPA	3.26	0.87	0.00	4.00

GPA is demonstrated as grade letter values

Table 3 Correlation coefficients among the variables ($N = 321$)

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Intrinsic	1.00												
2. Integration	.64**	1.00											
3. Identification	.61**	.82**	1.00										
4. Introjection	.07	.17**	.12*	1.00									
5. External	− .22**	.11	.08	.33**	1.00								
6. Amotivation	− .28**	− .31**	− .35**	.39**	.15**	1.00							
7. Benefit	.46**	.55**	.61**	.05	.10	− .34**	1.00						
8. Authenticity	.38**	.37**	.45**	.15**	.08	− .20**	.67**	1.00					
9. Consistency	.45**	.46**	.48**	− .03	− .01	− .37**	.68**	.45**	1.00				
10. Fairness	.44**	.39**	.49**	.03	.04	− .29**	.77**	.72**	.65**	1.00			
11. Shallow	.23**	.28**	.23**	.16**	.08	.06	.29**	.16**	.10	.14*	1.00		
12. Meta	.32**	.42**	.37**	.16**	.13*	− .07	.42**	.28**	.22**	.29**	.52**	1.00	
13. GPA	.31**	.15**	.08	− .06	− .13*	− .14*	.15**	.14*	.15**	.23**	.09	.17**	1.00

*Significant at the $\alpha = .05$ level (two-tailed)

**Significant at the $\alpha = .01$ level (two-tailed)

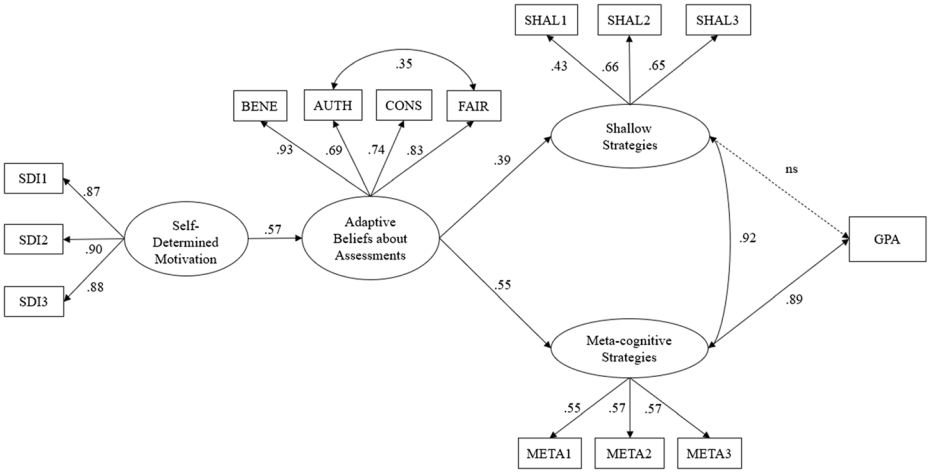

Fig. 2 Structural equation model. All solid line path coefficients are significant, while the dotted line path coefficient is nonsignificant at $p < .05$

SDT framework. Students' motivation in class is a strong contributor to their persistence, engagement, and effort regulation (Ryan and Deci 2017). Consistent with the recent literature that highlights the role of self-determined motivation (e.g., Yang et al. 2018), the current study proposed that international students' self-determined motivation toward courses would promote their academic adjustment through other adaptive learning variables during their transition to US universities. These relationships were tested in the current study, with a focus on Asian international students. The current findings provide theoretical and practical implications.

First, from a theoretical perspective, this study shows that students' self-determined motivation regarding academic tasks can be a major factor shaping their beliefs about assessment work. Students' inner motivational beliefs in courses lead to positive cognitive beliefs, which may contribute to desirable learning achievement. We tested the relationship between students' self-determined motivation and their adaptive beliefs about classroom assessment, which refers to the extent to which students perceive that assessments are consistent with learning objectives and provide beneficial, useful, and fair learning experiences. The SEM findings showed that students' self-determined motivation in their courses

Table 4 Standardized direct, indirect, and total effects in the SEM model

Predictor	Criterion	Direct effect	Indirect effect	Total effect
SDI	Adaptive beliefs	.57**		.57**
SDI	Shallow strategies		.22**	.22**
Adaptive		.39**		.39**
SDI	Metacognitive strategies		.32**	.32**
Adaptive		.55**		.55**
SDI	GPA		.12**	.12**
Shallow		− .72		− .72 ($p = .095$)
Metacognitive		.89*		.89*
Adaptive			.21**	.21**

*$p < 0.05$

**$p < .001$

was significantly associated with their adaptive response to their classroom assessments. Higher student self-determined motivation was directly and indirectly associated with a greater likelihood of holding adaptive beliefs about classroom assessments. This result is in line with previous research on SDT suggesting that the degree to which an individual holds self-determined reasons for engaging in academic work is related to desirable behavioral, cognitive, and affective outcomes (Deci and Ryan 2002; Vallerand and Ratelle 2002). In addition, the results demonstrate that students' inner motivation for academic tasks can shape their beliefs about assessment. Self-determined motivational beliefs were linked to international students' academic adaptation through their learning beliefs and concrete learning strategies. This study highlights the role of self-determined motivation in academic courses during international students' transition processes.

Consequently, these findings provide applicable principles for international students' academic work. The empirical evidence from the SEM results showed that adaptive beliefs about classroom assessments were significantly linked to both types of international college students' learning approaches, including shallow and metacognitive learning strategies. This finding is aligned with previous assertions that adaptive perceptions of assessment are linked to students' self-regulation (Brown 2011; Paris and Paris 2001). How students view classroom assessment affects the use of self-regulated learning strategies. Assessment feedback mainly provides information about the learning gap between students' actual performance and desired levels of performance and enables students to set meaningful learning goals and achieve them, which is aligned with self-regulation (Cauley and McMillan 2010; Nicol and Macfarlane-Dick 2006; Rushton 2005). When students perceive assessment to be a beneficial learning experience and use the assessment feedback, they are more likely to use self-regulated learning strategies, including shallow and metacognitive strategies. Initially, we expected that if students identify the value and benefits of assessment for learning, then they will be more likely to use a higher-level learning approach (metacognitive approach) rather than simply a mechanical learning approach (shallow approach). However, self-regulated learning strategies may fall on a continuum from a shallow learning approach to a metacognitive approach. The results indicated that adaptive beliefs about assessments still predicted both shallow and metacognitive strategies. However, notably, based on the standardized coefficients, adaptive beliefs about assessment were more significantly related to metacognitive strategies ($\beta = .55$) than shallow strategies ($\beta = .39$). Thus, a possible explanation is that when students hold adaptive beliefs about classroom assessments, they still use shallow learning strategies, but they are more likely to use a higher-level learning approach, such as metacognitive strategies. Moreover, students' adaptive perceptions were significantly indirectly related to international students' academic performance. This finding is consistent with previous findings that adaptive beliefs about assessment are associated with desirable learning outcomes, such as improved academic achievement and positive approaches to learning (Brown and Hirschfeld 2008; Peterson and Irving 2008).

In addition, importantly, metacognitive learning strategies were found to be positive indicators of academic performance in US higher education. This finding implies that it is crucial for international students to employ higher-level learning approaches to accommodate themselves to a new learning environment in US higher education.

In conclusion, employing SDT perspectives, we examined SDT principles among international students by investigating their motivation, cognitive beliefs, and behavior. Our findings suggest that international students' levels of self-determination may play a crucial role in shaping their adaptive beliefs about assessment. These adaptive beliefs about assessment

promote students' self-regulatory strategies, including shallow and metacognitive strategies. In turn, only metacognitive strategies contribute to academic performance in US universities. These findings contribute to the SDT literature by showing that self-determined motivation results in desirable academic learning outcomes.

Theoretical and practical implications

The study has important implications for educators in higher education. First, the current study draws attention to the importance of self-determined types of motivation in international students' academic adjustment. According to the tenets of SDT, self-determined motivation is affected by the degree to which the basic human psychological needs for autonomy, competence, and relatedness are satisfied or fulfilled (Deci and Ryan 2002; Ryan and Deci 2000). SDT states that individuals seek out experiences to satisfy these three basic needs and that these experiences promote self-determined types of motivation (Deci and Ryan 2002). Therefore, instructors need to create supportive learning environments where students' psychological needs can be met to promote their self-determined motivation. Instructors should identify what international students need to fulfill their academic learning goals and should provide supportive learning environments that promote international students' academic skills (Leong 2015; Ramsay et al. 1999). For example, instructors can provide individual sessions or help sessions. By striving to create favorable structures that allow international students to develop interest in learning and by identifying the values of learning activities, they can elicit students' full and genuine engagement.

Adjustment takes time and effort, and much support and assistance from various aspects, such as the faculty or institutional level, is required for students to successfully transition into the new academic environments (Martirosyan et al. 2015; Mesidor and Sly 2016; Wu et al. 2015). Environmental factors such as support from faculty or host institutions seem to play more key roles in shaping international students' experiences in the new environment (Banjong 2015; Leong 2015). When faculty and institutions are well aware of factors that contribute to students' adjustment processes, international students are able to be better served (Mesidor and Sly 2016).

In particular, in line with the creation of a supportive learning environment for international students, faculty can play a crucial role in providing adequate assistance to them during their transition to US academic environments. Proactive pedagogical efforts from faculty are necessary to support international students in reaching successful academic experiences (Macgregor and Folinazzo 2018). The findings suggest that international students can benefit from the use of metacognitive strategies. However, some international students might not have developed appropriate metacognitive learning strategies at the time of their transition yet; thus, for international students to be successful in the US academic environments, they should understand how these learning strategies can be applied to enhance their academic life and put them into practice through appropriate learning tasks to have an opportunity to develop these skills (García et al. 2015). Therefore, faculty should provide appropriate learning tasks so students can practice the self-regulatory learning strategies that achieve academic success. Implementing teaching methods that introduce self-regulated learning techniques will assist international students in adjusting to their new learning environment (Poyrazli and Grahame 2007).

This study provides a basis for advice for instructors regarding communication about the purpose of assessments, beneficial aspects of assessment practices, and the use of self-regulated learning strategies in higher education. The findings suggest that when students

are more likely to use metacognitive strategies than shallow strategies, they tend to adapt themselves to new academic environments. Instructors can introduce various self-regulated learning strategies to apply to coursework and more adaptive learning strategies when students face academic difficulties. Furthermore, when instructors design course assessments, they need to provide verbal rationales for the course assessments so that students have an opportunity to view assessments as genuine learning experiences to monitor their learning process.

Last, this study fills the gap in the literature on international students' learning strategies in their major academic disciplines. A great amount of research has emphasized international students' language proficiency in the English as a second language (ESL) classroom while little is known about how international college students engage in their major fields beyond the ESL classroom. We recruited international undergraduate students from different disciplines to investigate their motivational beliefs, perspectives about learning, and learning approaches in their major academic fields (42.4% of participants in engineering and technology; 12.5% in liberal arts majors; 22.7% in science and math; 14.3% in business; and, finally, 8.1% in other majors, such as agronomy or exploratory studies). The results showed that students' self-determined motivation in courses was significantly associated with their adaptive perspectives about classroom assessments, and these perspectives contributed to their use of different types of learning approaches. In particular, the use of metacognitive learning strategies was strongly related to international students' academic performance. Although the participants in this study represented a rather broad range of academic disciplines, the study provides a broad but meaningful snapshot to understand international students' perspectives about learning components in their major fields and academic adaptation in higher education when they advance after ESL courses. Continued research efforts employing a self-determination framework to examine international students' academic work would be beneficial to the growing body of literature concerning international students.

Our study makes an important contribution in that that the findings provide a rationale for creating supportive learning environments for international students to enhance their self-determined motivation and encourage faculty to have a clear communication with students about their assessment practices and self-regulated learning strategies.

Limitations and suggestions for future studies

Because this study focused more on students' perceptions of learning environments, self-reporting learning strategies, and perspectives about learning concepts rather than their actual performances, it has a couple of limitations. First, there are limitations regarding the participants' characteristics. We did not group Asian international students into specific ethnic groups; thus, we do not know whether there could be variability in learning strategies and perceptions of the learning environment depending on national culture. Future studies are needed to further investigate international students' learning behaviors based on their specific nationalities.

Second, there is a limitation in terms of the research design. The participants in this study were from a broad range of higher education academic disciplines, from engineering to liberal arts. The survey directed participants to choose one of their major courses and to answer the survey using this course as the reference. It is plausible that their perceptions of the learning environment and learning strategies may have varied depending on the course selected (Nijhuis et al. 2008). Also, classroom observations, interviews, or a mixed-method approach in course-specific environments could be complementary methods to use in future studies. In addition, we acknowledge that the timing of the distribution of the survey may have had an

impact on our findings because students might undergo different adjustment and transition processes during the course of the semester. Future studies should consider the timing of survey distribution and control for the length of time students have been in the US. In addition, this study was a single cross-sectional study, which might have limited the comprehension of the overall adjustment process. Another valuable avenue for future studies would be a longitudinal investigation of the relationship between self-determined forms of motivation and international students' academic achievement. A longitudinal approach would provide additional evidence of the contribution of self-determined motivation to students' positive learning outcomes. Additionally, this study relied on self-report data, such as students' self-reported grades. If we were able to collect students' actual scores in the future, the relationship with learning strategies could be examined more explicitly.

Moreover, although it was shown that adaptive beliefs about assessment contribute to international students' academic adjustment, we did not specify types of assessments in the classroom. Considering that classroom assessments have different functions and purposes, depending on the disciplines or instructional style, it is possible that students experience different types of assessments in different courses and that their responses to the assessments may vary. Future research should examine how students' beliefs about assessment vary depending on the different types of classroom assessments.

Finally, the study sample was selected randomly based on participants' voluntary participation, but in future studies, it would be beneficial if a specific group is targeted based on major or living experience in the US to investigate whether the recruitment of different international students groups yields the same results or different results.

Conclusion

The aim of this study was to investigate the role of self-determined motivation in international students' academic adjustment processes. The empirical evidence from the study shows a clear association between self-determined types of motivation and adaptive beliefs about assessment. The second part of the study demonstrates that self-regulated learning strategies have a significant relationship with international students' academic adjustment. Therefore, understanding these students' motivational beliefs may be equally as important as providing them with academic assistance. The current study sheds light on the importance of self-determined motivation. Personal and pedagogical factors are as meaningful as sociocultural factors in influencing students' adaptation (Gu et al. 2010). Thus, faculty and institutions should understand and enhance students' motivational beliefs and learning strategies and offer appropriate guidance and assistance to help international students develop self-regulated learning strategies that enhance students' lived academic experiences. The study draws attention to the importance of self-determined types of motivation in international students' academic adjustment. Furthermore, the study can serve as a basis for future research examining the relationship between international students' motivational beliefs and other important learning behaviors. Understanding Asian international students' unique academic integration processes would benefit the larger international population on US campuses.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

References

Abe, J., Talbot, D. M., & Geelhoed, R. J. (1998). Effects of a peer program on international student adjustment. *Journal of College Student Development, 39*(6), 539–547.

Ahmed, W., van der Werf, G., Kuyper, H., & Minnaert, A. (2013). Emotions, self-regulated learning, and achievement in mathematics: A growth curve analysis. *Journal of Educational Psychology, 105*(1), 150–161. https://doi.org/10.1037/a0030160.

Andrade, M. S. (2006). International students in English-speaking universities: Adjustment factors. *Journal of Research in International Education, 5*(2), 131–154. https://doi.org/10.1177/1475240906065589.

Banjong, D. N. (2015). International students' enhanced academic performance: Effects of campus resources. *Journal of International Students, 5*(2), 132–142.

Biggs, J., Kember, D., & Leung, D. Y. P. (2001). The revised two-factor study process questionnaire: R-SPQ-2F. *The British Journal of Educational Psychology, 71*, 133–149. https://doi.org/10.1348/000709901158433.

Brown, G. T. L. (2011). Self-regulation of assessment beliefs and attitudes: A review of the Students' Conceptions of Assessment inventory. *Educational Psychology, 31*(6), 731–748. https://doi.org/10.1080/01443410.2011.599836.

Brown, G. T. L., & Hirschfeld, G. H. F. (2008). Students' conceptions of assessment: Links to outcomes. *Assessment in Education: Principles, Policy and Practice, 15*(1), 3–17. https://doi.org/10.1080/09695940701876003.

Burton, K. D., Lydon, J. E., D'Alessandro, D. U., & Koestner, R. (2006). The differential effects of intrinsic and identified motivation on well-being and performance: Prospective, experimental, and implicit approaches to self-determination theory. *Journal of Personality and Social Psychology, 91*(4), 750–762. https://doi.org/10.1037/0022-3514.91.4.750.

Cauley, K. M., & McMillan, J. H. (2010). Formative assessment techniques to support student motivation and achievement. *The Clearing House: A Journal of Educational Strategies, Issues and Ideas, 83*(1), 1–6. https://doi.org/10.1080/00098650903267784.

Chen, P. C. (1999). Common stressors among international college students: Research and counseling implications. *Journal of College Counseling, 2*, 49–65.

Chirkov, V., Vansteenkiste, M., Tao, R., & Lynch, M. (2007). The role of self-determined motivation and goals for study abroad in the adaptation of international students. *International Journal of Intercultural Relations, 31*(2), 199–222. https://doi.org/10.1016/j.ijintrel.2006.03.002.

Cho, H. J., Yough, M., & Levesque-Bristol, C. (2020). Relationships between beliefs about assessment and self-regulated learning in second language learning. *International Journal of Educational Research, 99*(December 2019), 101505. https://doi.org/10.1016/j.ijer.2019.101505.

Cook, E., Kennedy, E., & McGuire, S. Y. (2013). Effect of teaching metacognitive learning strategies on performance in general chemistry courses. *Journal of Chemical Education, 90*(8), 961–967. https://doi.org/10.1021/ed300686h.

Deci, E. L., & Ryan, R. M. (1985). The general causality orientations scale: Self-determination in personality. *Journal of Research in Personality, 19*(2), 109–134.

Deci, E. L., & Ryan, R. M. (2000). Psychological inquiry: An international journal for the advancement of psychological theory the " what " and " why " of goal pursuits : Human needs and the self-determination of behavior the " what " and " why " of goal pursuits: Human needs and the Sel. *Psychological Inquiry, 11*(4), 37–41. https://doi.org/10.1207/S15327965PLI1104.

Deci, E. L., & Ryan, R. M. (Eds.). (2002). *Handbook of self-determination research*. Rochester, NY: University of Rochester Press.

Dolmans, D. H. J. M., Loyens, S. M. M., Marcq, H., & Gijbels, D. (2016). Deep and surface learning in problem-based learning: A review of the literature. *Advances in Health Sciences Education, 21*(5), 1087–1112. https://doi.org/10.1007/s10459-015-9645-6.

Dorman, J. P., & Knightley, W. M. (2006). Development and validation of an instrument to assess secondary school students' perceptions of assessment tasks. *Educational Studies, 32*(1), 47–58. https://doi.org/10.1080/03055690500415951.

Ecochard, S., & Fotheringham, J. (2017). International students' unique challenges – Why understanding international transitions to higher education matters. *Journal of Perspectives in Applied Academic Practice, 5*(2), 100–108. https://doi.org/10.14297/jpaap.v5i2.261.

Entwistle, N., & McCune, V. (2004). The conceptual bases of study strategy inventories. *Educational Psychology Review, 16*(4), 325–345. https://doi.org/10.1007/s10648-004-0003-0.

Entwistle, N., McCune, V., & Hounsell, J. (2003). Investigating ways of enhancing university teaching-learning environments: Measuring students' approaches to studying and perceptions of teaching. In E. De Corte, L. Verschaffel, N. Entwistle, & J. Van Merrie¨nboer (Eds.), *Powerful learning environments: Unravelling basic components and dimensions* (pp. 89–108). Oxford: Elsevier Science.

Everaert, P., Opdecam, E., & Maussen, S. (2017). The relationship between motivation, learning approaches, academic performance and time spent. *Accounting Education, 26*(1), 78–107. https://doi.org/10.1080/09639284.2016.1274911.

García, T., Cueli, M., Rodríguez, C., Krawec, J., & González-Castro, P. (2015). Conocimiento y habilidades metacognitivas en estudiantes con un enfoque profundo de aprendizaje. Evidencias en la resolución de. *Revista de Psicodidactica, 20*(2), 209–226. https://doi.org/10.1387/RevPsicodidact.13060.

Gu, Q., Schweisfurth, M., & Day, C. (2010). Learning and growing in a "foreign" context: Intercultural experiences of international students. *Compare, 40*(1), 7–23. https://doi.org/10.1080/03057920903115983.

Guay, F., Vallerand, R. J., & Blanchard, C. (2000). On the assessment of situational intrinsic and extrinsic motivation: The Situational Motivation Scale (SIMS). *Motivation and Emotion, 24*(3), 175–213. https://doi.org/10.1023/A:1005614228250.

Hay, D. B. (2007). Using concept maps to measure deep, surface and non-learning outcomes. *Studies in Higher Education, 32*(1), 39–57. https://doi.org/10.1080/03075070601099432.

Heikkilä, A., & Lonka, K. (2006). Studying in higher education: Students' approaches to learning, self-regulation, and cognitive strategies. *Studies in Higher Education, 31*(1), 99–117. https://doi.org/10.1080/03075070500392433.

Holmes, P. (2004). Negotiating differences in learning and intercultural communication. *Business Communication Quarterly, 67*(3), 294–307. https://doi.org/10.1177/1080569904268141.

Joe, H. K., Hiver, P., & Al-Hoorie, A. H. (2017). Classroom social climate, self-determined motivation, willingness to communicate, and achievement: A study of structural relationships in instructed second language settings. *Learning and Individual Differences, 53*, 133–144. https://doi.org/10.1016/j.lindif.2016.11.005.

Kember, D. (2009). International students from Asia. In M. Tight, K. H. Mok, J. Huisman, & C. Morphew (Eds.), *The Routledge international handbook of higher education* (pp. 47–60). New York: Routledge.

Kember, D., & Watkins, D. (2010). Approaches to learning and teaching by the Chinese. In M. H. Bond (Ed.), *The Oxford handbook of Chinese psychology* (pp. 169–185). New York: Oxford University Press.

Leong, P. (2015). Coming to America: Assessing the patterns of acculturation, friendship formation, and the academic experiences of international students at a U.S. college. *Journal of International Students, 5*(4), 459–474 http://ojed.org/index.php/jis/article/view/408.

Levesque, C., Stanek, L. R., Zuehlke, A. N., & Ryan, R. M. (2004). Autonomy and competence in German and American university students: A comparative study based on self-determination theory. *Journal of Educational Psychology, 96*(1), 68–84. https://doi.org/10.1037/0022-0663.96.1.68.

Li, G., Chen, W., & Duanmu, J. L. (2010). Determinants of international students' academic performance: A comparison between Chinese and other international students. *Journal of Studies in International Education, 14*(4), 389–405. https://doi.org/10.1177/1028315309331490.

Little, T. D., Cunningham, W. A., Shahar, G., & Widaman, K. F. (2002). To parcel or not to parcel: Exploring the question, weighing the merits. *Structural Equation Modeling, 9*(2), 151–173.

Lizzio, A., Wilson, K., & Simons, R. (2002). University students' perceptions of the learning environment and academic outcomes: Implications for theory and practice. *Studies in Higher Education, 27*(1), 27–52. https://doi.org/10.1080/03075070120099359.

Macgregor, A., & Folinazzo, G. (2018). Best practices in teaching international students in higher education: Issues and strategies. *TESOL Journal, 9*(2), 299–329. https://doi.org/10.1002/tesj.324.

Martirosyan, N. M., Hwang, E., & Wanjohi, R. (2015). Impact of English proficiency on academic performance of international students. *Journal of International Students, 5*(1), 60–71.

Mesidor, J. K., & Sly, K. F. (2016). Factors that contribute to the adjustment of international students. *Journal of International Students, 6*(1), 262–282.

Nicol, D., & Macfarlane-Dick, D. (2006). Formative assessment and self-regulated learning: A model and seven principles of good feedback practice. *Studies in Higher Education, 31*(2), 199–218. https://doi.org/10.1080/03075070600572090.

Nijhuis, J., Segers, M., & Gijselaers, W. (2008). The extent of variability in learning strategies and students' perceptions of the learning environment. *Learning and Instruction, 18*(2), 121–134. https://doi.org/10.1016/j.learninstruc.2007.01.009.

Noels, K. A., Pelletier, L. G., Clément, R., & Vallerand, R. J. (2000). Why are you learning a second language? Motivational orientations and self-determination theory. *Language Learning, 50*(1), 57–85. https://doi.org/10.1111/0023-8333.00111.

Olivas, M., & Li, C. (2006). Understanding stressors of international students in higher education: What college counselors and personnel need to know. *Journal of Instructional Psychology, 33*(3), 217–222.

'Otunuku, M., Brown, G. T. L., & Airini. (2013). Tongan secondary students' conceptions of schooling in New Zealand relative to their academic achievement. *Asia Pacific Education Review, 14*(3), 345–357. https://doi.org/10.1007/s12564-013-9264-y.

Paris, S. G., & Paris, A. H. (2001). Classroom applications of research on self-regulated learning. *Educational Psychologist, 36*(2), 89–101. https://doi.org/10.1207/S15326985EP3602_4.

Peterson, E. R., & Irving, S. E. (2008). Secondary school students' conceptions of assessment and feedback. *Learning and Instruction, 18*(3), 238–250. https://doi.org/10.1016/j.learninstruc.2007.05.001.

Phakiti, A., Hirsch, D., & Woodrow, L. (2013). It's not only English: Effects of other individual factors on English language learning of ESL international students in Australia. *Journal of Research in International Education, 12*(3), 239–258.

Platow, M. J., Mavor, K. I., & Grace, D. M. (2013). On the role of discipline-related self-concept in deep and surface approaches to learning among university students. *Instructional Science, 41*(2), 271–285. https://doi.org/10.1007/s11251-012-9227-4.

Poyrazli, S., & Grahame, K. M. (2007). Barriers to adjustment: Needs of international students within a semi-urban campus community. *Journal of Instructional Psychology, 34*(1), 28–45.

Poyrazli, S., Arbona, C., Nora, A., McPherson, R., & Pisecco, S. (2002). Relation between assertiveness, academic self-efficacy, and psychosocial adjustment among international graduate students. *Journal of College Student Development, 43*(5), 632–642.

Ramburuth, P. (2001). Language diversity and the first-year experience: Implications for academic achievement and language skills acquisition. *Journal of The First-Year Experience & Students in Transition, 13*(2), 75–93.

Ramburuth, P., & McCormick, J. (2001). Learning diversity in higher education: A comparative study of. *Higher Education, 42*, 333–350. https://doi.org/10.1023/A:1017982716482.

Ramsay, S., Barker, M., & Jones, E. (1999). Academic adjustment and learning processes: A comparison of international and local students in first-year university. *International Journal of Phytoremediation, 21*(1), 129–144. https://doi.org/10.1080/0729436990180110.

Richardson, J. T. E., & Sun, H. (2016). Approaches to studying among international students from China. In D. Jindal-Snape & B. Rienties (Eds.), *Multi-dimensional transitions of international students to higher education* (pp. 106–122). London: Routledge.

Rienties, B., Beausaert, S., Grohnert, T., Niemantsverdriet, S., & Kommers, P. (2012). Understanding academic performance of international students: The role of ethnicity, academic and social integration. *Higher Education, 63*(6), 685–700. https://doi.org/10.1007/s10734-011-9468-1.

Robertson, M., Line, M., Jones, S., & Thomas, S. (2000). International students, learning environments and perceptions: A case study using the Delphi technique. *Higher Education Research and Development, 19*(1), 89–102. https://doi.org/10.1080/07294360050020499.

Rushton, A. (2005). Formative assessment: A key to deep learning? *Medical Teacher, 27*(6), 509–513. https://doi.org/10.1080/01421590500129159.

Ryan, R. M., & Connell, J. P. (1989). Perceived locus of causality and internalization: Examining reasons for acting in two domains. *Journal of Personality and Social Psychology, 57*(5), 749–761. https://doi.org/10.1037/0022-3514.57.5.749.

Ryan, R. M., & Deci, E. L. (2000). The darker and brighter sides of human existence: Basic psychological needs as a unifying concept. *Psychological Inquiry, 11*(4), 319–338.

Ryan, R. M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. New York, NY: Guilford Press.

Sakurai, Y. (2009). Academic experiences in a cross-national tertiary program: Language immersion amid the sciences. *International Journal of Teaching and Learning in Higher Education, 21*(2), 239–248 http://search.proquest.com/docview/762467926?accountid=14391.

Sakurai, Y., Pyhältö, K., & Lindblom-Ylänne, S. (2014). Are Chinese university students more likely to exhibit a surface approach to learning than other international students in Finland? *Journal of Research in International Education, 13*(2), 135–148.

Struyven, K., Dochy, F., & Janssens, S. (2005). Students' perceptions about evaluation and assessment in higher education: A review. *Assessment and Evaluation in Higher Education, 30*(4), 325–341. https://doi.org/10.1080/02602930500099102.

Sun, H., & Richardson, J. T. E. (2012). Perceptions of quality and approaches to studying in higher education: A comparative study of Chinese and British postgraduate students at six British business schools. *Higher Education, 63*(3), 299–316. https://doi.org/10.1007/s10734-011-9442-y.

Thøgersen-Ntoumani, C., & Ntoumanis, N. (2006). The role of self-determined motivation in the understanding of exercise-related behaviours, cognitions and physical self-evaluations. *Journal of Sports Sciences, 24*(4), 393–404. https://doi.org/10.1080/02640410500131670.

Vallerand, R. J. (1997). Toward a hierarchical model of intrinsic and extrinsic motivation. *Advances in Experimental Social Psychology, 29*(C), 271–360. https://doi.org/10.1016/S0065-2601(08)60019-2.

Vallerand, R. J., & Ratelle, C. F. (2002). Intrinsic and extrinsic motivation: A hierarchical model. In E. L. Deci & R. M. Ryan (Eds.), *Handbook of self-determination research* (pp. 37–69). Rochester, NY: The University of Rochester Press.

Wolters, C. A., Pintrich, P. R., & Karabenick, S. A. (2005). Assessing academic self-regulated learning. In K. A. Moore & L. H. Lippman (Eds.), *What do children need to flourish? Conceptualizing and measuring indicators of positive development* (pp. 251–270). New York: Springer.

Wu, H., Garza, E., & Guzman, N. (2015). International student's challenge and adjustment to college. *Education Research International, 2015*, 1–9. https://doi.org/10.1155/2015/202753.

Yang, Y., Zhang, Y., & Sheldon, K. M. (2018). Self-determined motivation for studying abroad predicts lower culture shock and greater well-being among international students: The mediating role of basic psychological needs satisfaction. *International Journal of Intercultural Relations, 63*(October 2017), 95–104. https://doi.org/10.1016/j.ijintrel.2017.10.005.

Affiliations

Hyun Jin Cho[1] · **Chantal Levesque-Bristol**[1] · **Mike Yough**[2]

[1] Purdue University, 151 S Grant St, West Lafayette, IN 47906, USA

[2] Oklahoma State University, 214 Willard Hall, Stillwater, OK 74078, USA