

# Understanding Chinese university student conceptions of assessment: cultural similarities and jurisdictional differences between Hong Kong and China

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Received: 29 January 2015 / Accepted: 23 July 2015 / Published online: 19 October 2015  
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**Abstract** Hong Kong (HK) and the People’s Republic of China (PRC), while sharing historic cultural roots, have different policies for and practices of educational assessment. Student conceptions of assessment function to guide individual behaviour in response to the functions, purposes, and consequences of assessments. A new self-report questionnaire was developed to account for attitudes and beliefs detected in qualitative and pilot survey studies. In a two-group confirmatory factor analysis, an eight-factor solution, in which seven factors were dependent on a higher order factor (i.e., School Quality), was found with good fit. The seven factors were named: Societal Uses, Class Benefits, Accuracy, Negative Aspects, Teacher Use, Family Effects, and Competition. Invariance testing showed that regression weights were not equivalent between the PRC and HK students, though they were among PRC pre-degree and postgraduate students. There were statistically significant differences in factor mean scores between the HK and PRC groups. Conventional Chinese cultural norms were less explanatory of results than the effect of institutional assessment policies and practices in each jurisdiction.

**Keywords** Assessment · Attitudes and beliefs · Chinese · Higher education · Students · Survey research

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## 1 Introduction

The achievements and attitudes, especially towards teaching and learning, of Chinese learners have been widely studied and praised, especially in light of the performance of Chinese students on international comparative tests such as PISA (Chan and Rao 2009; OECD 2011; Watkins and Biggs 1996). Chinese learners are perceived as being highly motivated, persistent, and effortful in their studying behaviours from a very early age. While there is some criticism that Chinese learners, perhaps because of the teaching and assessment regime, rely overly on surface, reproduction-oriented learning strategies, there is no doubt the general performance of Chinese students is meritorious.

Part of the reason for this success lies in the value given in Chinese contexts to academic achievement. An individual's merit, worth, and value are ascribed through academic performance (China Civilisation Centre 2007); that is, a good person is one who scores well because examination results reflect the quality of the individual. Confucian thought is considered the origin of the notion in Chinese cultures (Li 2009; Pong and Chow 2002; Tsui and Wong 2009) that a strong love of learning and academic success perfects the person morally and socially. Consistent with Confucian ideas, Chinese learners tend to exhibit relatively low self-efficacy due to modesty, humility, and high standards, but nevertheless through effort and persistence attain high achievement (Hau and Ho 2008; Salili et al. 2004).

Chinese parents, especially, expect students to become better academically, attitudinally, and behaviourally through schooling (Gao and Watkins 2001) and will enforce such expectations with harsh authoritarian parenting practices (Ho 1986; Paul 2011; Salili 2001). Chinese societies are generally considered to be collectivist in that the self is embedded in a network of significant people around the self (Martin et al. 2014). This means that performance on assessment and academic achievement for Chinese students is tied up with their social obligations to their families (Yu and Yang 1994). Indeed, duty to learn out of obligation to others (e.g., I learn because it is expected by family and society) and duty to work hard (e.g., If a task is difficult, I must concentrate and keep trying) were positive predictors of achievement among 152 Asian (73 % of whom were from Confucian-Heritage ethnicities) university students in a New Zealand research intensive university (Peterson et al. 2013).

Additionally, within China itself and the various Chinese dominated societies (e.g., Singapore, Hong Kong, and Taiwan) there is a long history of using examinations and tests to select and reward talent (China Civilisation Centre 2007) and to regard high academic performance on high-stakes examinations as a legitimate, meritocratic basis for upward social mobility regardless of social background (Cheung 2008; Lee 1996). Students' implicit beliefs about educational activities like assessment are expected to arise from the socialisation of their experiences within families and within the educational system they experience. Hence, if conceptions are ecologically rational (Rieskamp and Reimer 2007), changes in uses in different contexts (i.e., political jurisdiction) may result in differences in belief systems. Simultaneously, given the strong similarities among

students of Chinese ethnicity and culture around the goals of learning and academic achievement, it could legitimately be expected that they would have very similar views as to the purposes, functions, and nature of assessment.

Hence, the goal of this study was to compare and contrast responses of university students in China (PRC) and Hong Kong (HK) concerning the purposes and functions of assessment. This study allows us to examine the impact of cultural similarities (i.e., being Chinese) and policy differences between two ethnically similar populations (i.e., HK is 95 % Han Chinese, while PRC is 92 % Han).

## 1.1 Conceptions of assessment

The beliefs, attitudes, experiences, and responses of university students about assessment arise from their experiences with formative and summative uses of assessment both prior to and within higher education itself (Ecclestone and Pryor 2003). Beliefs act to guide, frame, and filter the actions of actors within a society or ecology (Fives and Buehl 2012). Hence, an understanding of student conceptions of assessment in different jurisdictions, but with shared ethnicity and culture, would help us understand whether the commonalities of Chinese uses of assessment explain how university students perceive assessment. Assessments and examinations are used throughout and prior to higher education for evaluative (i.e., summative) and improvement (i.e., formative) purposes. Summative (e.g., grading, selection, or certification) and formative (i.e., feedback independent of evaluation) goals create tensions in how any assessment event or task could be understood. In other words, what might be intended by the teacher as formative (i.e., giving feedback on how to improve) may be perceived and understood by the student as highly evaluative (i.e., constructive criticism is seen as a bad result). How students understand the nature of assessment and its functions or purposes seems to shape their behavioural responses to assessment practices (Brown 2011). For example, if students agree that assessment evaluates them, their test performance and effort tend to increase; whereas, if they conceive that assessment evaluates schools or can be ignored, their achievement and effort decreases (Brown and Hirschfeld 2008; Brown et al. 2009; Wise and Cotten 2009). Additionally, it has been found that accepting the purpose for standardised testing results in greater acceptance of the importance of doing institutional accountability testing and greater effort in doing that testing (Zilberberg et al. 2014).

There are relatively few studies of how Chinese higher education students conceive of and experience assessment, despite the dominance of high-stakes public examinations in the educational systems of China (Feng 1995; Han and Yang 2001; Wang 1996, 2006) and Hong Kong (Biggs 1998; Choi 1999; Yan and Chow 2002). The coherent, consistent, and competitive environment of public examinations is assumed to define student conceptions of assessment. Since formal, summative examinations determine selection, students may be less trustful of teacher-based or even peer-based assessment practices (e.g., Gao 2009). Hong Kong university students are very aware of the negative, controlling impact of assessment on their lives (Brown and Wang 2013) and have serious doubts as to the validity of assessment, its accuracy, and its limited utility because of its focus only on

academic content (Wang and Brown 2014). Furthermore, the HK students indicated that “achievement was an obligation one had toward one’s family in order to please, show respect to, or build reputation for the family” (Wang and Brown 2014, p. 1073). At the same time, the students accepted that assessment had legitimacy for selecting the best candidates and provided upward social mobility. There was also some acceptance that assessment could motivate learning and could evaluate the quality of teachers and schools.

Two survey studies of Chinese university students concerning assessment have been found. From a survey of over 40,000 Chinese higher education students, Guo and Shi (2014) demonstrated that students who received more feedback from faculty through the classroom assessment system had higher learning outcomes. Using the multi-dimensional (eight factors and 33 items) *Student Conceptions of Assessment* (SCoA) inventory, it was found that the HK students agreed more than the PRC students that assessment was irrelevant, bad and to be ignored; otherwise, the PRC students agreed more than the HK students that assessment helped socially and affectively, and that it contributed to improved teaching and learning (Brown 2013). Since performance on assessment is determined by rank more than quality of work, the incentive to be cooperative and supportive in classroom environments may be reduced; there even may be an incentive not to help one’s peers. Additionally, the exposure of students in Hong Kong to western individualistic values during HK’s colonisation by the west, while PRC was relatively isolated in the 2nd half of the 20th century, may also contribute to a less supportive attitude towards classmates. However, the use of the SCoA, which was developed in a Western individualist society, may not be sufficiently coherent with the full range of Chinese perceptions of assessment. Thus, the current study attempts to develop a self-report more consistent with the Chinese context.

## 1.2 Assessment within the Chinese culture

China is now the second largest economy in the world and about one-quarter of the world population is Chinese (United Nations Statistics Division 2013). Both HK and PRC share common cultural roots in Confucian values and social contexts in which selection for higher education was competitive and determined through formal assessment processes. However, despite shared cultural and historical values there are significant differences between contemporary HK and PRC in terms of educational practice and policy which may impact on assessment experiences and conceptions. More details of the differences between these two systems, despite now being part of one country, are available in Postiglione and Leung (1992).

### 1.2.1 Hong Kong

Recently Hong Kong has made significant changes to its educational system (e.g., Koo et al. 2003; Ngan et al. 2010). For example, academic aptitude tests used at the end of Primary 6 to sort students into high school bands have been stopped, the number of high school bands has been reduced to three from five (meaning schools enrol students with a broader range of achievement), and the 13th year of schooling

has been moved to university (bringing Hong Kong into alignment with American and Chinese systems of 12 years of schooling followed by 4 years of university to reach bachelor degrees). School-based assessment procedures now form a part of the secondary school qualification system, though teacher marks are still statistically moderated by school-wide performance on end-of-year written examinations (Qian 2014). School self-assessment procedures and annual government monitoring of school achievement have also been implemented, though endorsement of these school evaluation systems is not universal among school leaders (Ngan et al. 2010). Hence, Hong Kong schooling, despite efforts to introduce an assessment for learning policy (Berry 2011), is still characterised by summative testing or examination with many high-stakes decisions (especially selection) based on rank order position.

### 1.2.2 People's Republic of China

Similarly, the education system in PRC places great emphasis on regular high-stakes public examinations (e.g., the Entrance Examination for Senior High School and the Entrance Examination for Higher Education—*zhong kao* and *gao kao*, respectively). Nonetheless, the government of China, since at least the 1990s, has introduced assessment reforms that attempt to move evaluation systems away from transmission and memorisation of 'bookish' knowledge for purely ranking or selection purposes towards more formative, authentic, and humanistic approaches to assessment (Han and Yang 2001; OECD 2011), including the introduction of integrated quality assessment which emphasises judging students' personal character (Liu and Qi 2005; PRC Ministry of Education 2005). These reform efforts are an extension of the curricular calls for all-round development of good character and good person attributes prevalent in PRC since the mid-1950s (Wang 1996).

However, the degree of change in the assessment system seems limited. Demand for space in higher education institutions exceeds supply, such that only half of examined candidates are awarded a place (Davey et al. 2007); although this represents about a quarter of the 18- to 22-year-old population (PRC Ministry of Education 2010). Further, higher education resources are not equally distributed across all regions, which favours students in urban areas along the southern and eastern coasts (Wang 2011). Hence, intensive cramming practices to maximise performance continue.<sup>1</sup>

Nonetheless, consistent with official policy, entrance to university is not simply a function of performance on the *gao kao*. A number of non-academic criteria exist, including students' demonstrating right moral character, privileging students who live in the same jurisdiction as the university, students' membership in a specified minority group, or having a recommendation that permits bypassing the examination altogether (Davey et al. 2007; Wang 2011). Consistent with market reforms, it

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<sup>1</sup> See the story of an examination hothouse school 'Maotanchang High School' at: <http://www.nytimes.com/2015/01/04/magazine/inside-a-chinese-test-prep-factory.html>.

is now possible for families with economic resources to relocate to regions that have lower entry standards or obtain extra score status illegitimately (Wang 2011).

Given these many variations to tested performance as routes to university entrance, there are concerns within PRC about the legitimacy of the system (Davey et al. 2007; Wang 2011). Specifically, the system is not seen as fair for all, the content of the examinations seems to exclude important practical skills and application of theoretical knowledge, the chance of success is not high, students are expected to dedicate too much of their lives to preparation, and it is possible the system is not immune to corruption by teachers or officials. Additionally, tuition-free higher education has been replaced by a user-pay mechanism (costing about 60 % of average per capita household disposable income) meaning that tuition costs are a substantial obstacle (Wang 2011). These structural anomalies are not limited in PRC to education. For example, despite regulation that penalises non-payment of wages, there are persistent cases of employers refusing to pay workers' end-of-year wages (Wu 2015).

To summarise, Hong Kong and PRC both have gone through assessment reforms aimed at promoting more formative assessments and reducing reliance on high-stakes public examinations, although with limited success. Unlike Hong Kong, however, entrance to university has more diverse selection criteria in PRC which makes the process itself less transparent and more vulnerable to corruption and inequality. It is this level of jurisdictional difference that is assumed to create differences in student conceptions of assessment, despite the common cultural values of both Chinese jurisdictions.

### 1.3 Research hypotheses

Given the high degree of similarity between PRC and Hong Kong concerning the use of assessment (i.e., high consequence public examinations) and the strong importance of obligation and duty to family shared in all Confucian-Heritage cultures, we expected that university students in both jurisdictions would have very similar responses. This is especially true of aspects of assessment having to do with meeting family obligations, being highly competitive, and experiencing significant social benefits as a consequence of performance. However, the differences in methods of entry to university suggest that PRC university students might be fairly negative about the validity, fairness, and accuracy of assessment. Furthermore, given the power of schools to determine success, through excellent teaching or through informal processes, it should be expected that PRC students will react negatively to the relative lack of equity and equality in the PRC university entry system, producing differences to the more transparent and meritocratic system the HK students experience. This means that aspects of assessment that connect to the more general nature of being Chinese should have similar regression weights between Hong Kong and PRC students, while those aspects connected to the institutional specific practices of each jurisdiction should elicit quite different responses, in accordance with observed ecological differences.

## 2 Methods

### 2.1 Participants

This inventory was administered on a volunteer sample of university students in PRC (13 institutions) and Hong Kong (9 institutions) obtained through convenience and snowball methods. The survey was administered in May and December 2012, using both paper (81 %) and online (19 %) administration. About one-fifth (21 %) were male, 77 % female, and 1 % not given. Of the 827 valid cases (Table 1), 55 % were enrolled in PRC universities and 45 % in HK. PRC institutions which specialise in teacher education (called Normal Universities) provided 265 cases, while an additional 353 HK cases were enrolled in a specialist teacher education institute. This means that 75 % of participants were enrolled in teacher education institutions, although, because these institutions are multi-disciplinary it cannot be

**Table 1** Demographic characteristics

Country and Institute	Count
<i>People's Republic of China</i>	
Shenyang Normal University	183
China Academy of Art	164
South China Normal University	55
East China Normal University	20
Guangdong University of Business Studies	17
Taizhou University	6
Foshan University	3
Southwest University	3
Beijing Normal University	2
Hangzhou Women's College	1
Northeast Normal University	1
Nanjing Normal University	1
China Pharmaceutical University	1
Sub-total	457
<i>Hong Kong</i>	
HK Institute of Education	353
Polytechnic University	6
City University	3
University of HK	3
Chinese University of HK	1
HK Vocational Training College	1
HK Baptist University	1
Lingnan University	1
Open University	1
Sub-total	370
Grand Total	827

guaranteed that each participant was enrolled in teacher education. Participants indicated the type of degree they were enrolled in: that is, 23 % were in pre-degree diplomas or certificates (90 % in PRC), 38 % in bachelor degree programs (87 % in HK), and 39 % in post-graduate diplomas or doctoral degrees (78 % in PRC). These enrolment patterns of the two groups indicate they do not come from similar populations. The high proportion of women may be consistent with education faculty enrolments, but is certainly not consistent with overall university enrolments, which in PRC are predominantly male (Wang 2011).

## 2.2 Instrument

Large-scale studies with the *Student Conceptions of Assessment* (SCoA) inventory into student perceptions of or beliefs about the purpose of assessment have grown out of New Zealand high school studies (Brown 2011). Research with the SCoA has shown that students who endorse certain self-regulatory beliefs about assessment achieve better; these include, the idea that assessment (a) guides students into appropriate learning, (b) helps teachers know how to teach better, and (c) holds students personally responsible for assessment results (Brown and Hirschfeld 2008; Brown et al. 2009). Studies with the SCoA have been carried out with higher education students in Brazil, Hong Kong, and China (Brown 2013), with invariance between New Zealand, Hong Kong, and China students being established for parts of the inventory, suggesting that some items and scales could be used effectively in Chinese contexts.

However, qualitative research with Chinese students has suggested strongly that a new multi-dimensional inventory was required (Brown and Wang 2013; Wang and Brown 2014). The qualitative studies identified 18 possible uses for or effects of assessment. These constructs included: (1) assessment is negative; (2) assessment requires effortful modesty; (3) students have validity concerns about assessment; (4) assessment has high-stakes consequences; (5) assessment focuses only on academic content; (6) assessment is lifelong; (7) assessment success permits social mobility; (8) assessment is examinations; (9) assessment success comes from ‘gaming’ strategies; (10) assessment selects; (11) success on assessment meets family obligations; (12) assessment presses and monitors students to fit society’s expectations; (13) assessment is useful for teachers and schools; (14) assessment helps personal improvement, self-reflection, and motivation; (15) assessment generates positive emotions; (16) assessment generates negative emotions; (17) assessment has too much control which needs to be escaped; and (18) assessment indicates my personal value and worth. Empirical validation of the items drafted for these 18 constructs was conducted and reported briefly.

### 2.2.1 Instrument validation: content and language

A total of 209 items were subjected to two validity tests, based on procedures taken from Gable and Wolf (1993), before being piloted with university students. First, after splitting the items into three equally sized sets, three panels of five judges assigned items to one of the 18 construct definitions and indicated how confident



their assignment was. Items for which fewer than three judges agreed on a category or which had an average confidence rating of less than two out of four were removed from the next round. Items which a majority of judges assigned, with strong confidence, to a different category than expected by the authors were retained, on the possibility that the developers had erred. Simultaneously, the functional equivalence of English and Chinese expressions for each item was evaluated by having three panels of five bilingual Hong Kong adults rate the equivalence of items. Items which did not receive at least an average equivalence of greater than 'kind of close' from three or more judges were removed from further analysis. These processes reduced the item pool to 137 items and 17 constructs (i.e., category 17 and category 12 were merged).

### 2.2.2 Pilot surveys

A pilot survey among the HK and the PRC university students with the 137 items was conducted by splitting the item pool into two forms (both tested in Mandarin and Cantonese) with approximately equal number of items to mitigate against fatigue. A convenience sample of 231 HK and 216 PRC students completed Part A, while 239 HK and 227 PRC students completed Part B. Each part was analysed with confirmatory factor analysis to test the validity of the intended factors. In both parts, the intended factor structure failed and a series of exploratory techniques (e.g., deletion of items with strong cross-loadings or modification indices to other factors; merging or deletion of factors which had negative error variances; conversion of a correlation between factors to a subordination of one factor to another if correlation values were  $r > .95$ ) were used to identify a valid, acceptably fitting model. Multigroup confirmatory factor analysis was used to determine the degree of invariance between the HK and PRC samples.

Part A resulted in a model with marginal fit ( $k = 37$ ;  $\chi^2 = 1760.894$ ;  $df = 619$ ;  $\chi^2/df = 2.845$ , CFI = .81; gamma hat = .88; RMSEA = .064; SRMR = .0734). The model had two second order correlated factors (i.e., Effects and responses and School assessment) with six and three first order factors respectively. Effects and Responses contained (1) High Stakes Consequences, (2) Effortful Modesty, (3) Personal Worth, (4) Social Mobility, (5) Lifelong, (6) Validity Concerns; while School Assessment contained (7) Examination, (8) Academic Content Only, and (9) Negative. This model was not configurally invariant between HK and PRC samples. In contrast, Part B resulted in a model with good fit ( $k = 37$ ;  $\chi^2 = 2428.15$ ;  $df = 1246$ ;  $\chi^2/df = 1.95$ , CFI = .83; gamma hat = .94; RMSEA = .045; SRMR = .063) and full invariance between HK and PRC samples. The model had a second order factor (Select and Society) consisting of seven items which predicted six more factors (i.e., Gaming Strategies; Family Obligation; Useful for Teachers; Improvement; Positive Emotions; and Negative Emotions). Analysis of Part A and B resulted in 74 items related to 16 factors which were merged into the C-SCoA inventory reported in this paper.

### 2.2.3 C-SCoA inventory

The C-SCoA inventory (74 items, 16 factors) was administered in two versions; Cantonese in traditional script in Hong Kong and Mandarin in simplified script in PRC. Sample items for each factor are provided:

*Selection and Societal* (7 items): Assessment is used to select the best people for job and education opportunities.

*Gaming Strategies* (4 items): Assessment is a game which needs to be played strategically.

*Family Obligation* (6 items): It is my obligation to my parents to do well on assessments.

*Useful for Teachers* (5 items): Assessment provides information on how well schools are doing.

*Improvement* (6 items): I use assessments to take responsibility for my next learning steps.

*Positive Emotion* (5 items): When we do assessments, there is a good atmosphere in our class.

*Negative Emotion* (3 items): Even when I have studied, I feel I cannot control my assessment results.

*High Stakes Consequences* (5 items): Assessments determine my fate and future.

*Effortful Modesty* (3 items): No matter how hard I try, I will never be as good as others on assessments.

*Personal Worth* (5 items): My grades determine my value and worth to my family and society in general.

*Social Mobility* (4 items): Higher social status comes from good academic performance.

*Lifelong* (4 items): I have been assessed my whole life.

*Validity Concerns* (4 items): Assessment results are sufficiently accurate

*Examination* (4 items): School/class assessments are training for final/public examinations.

*Academic Content Only* (4 items): Assessments only focus on book learning and knowledge.

*Negative Evaluation* (4 items): Assessment is value-less.

Participants responded by indicating their degree of agreement with each statement using an ordered six-point, positively-packed, agreement scale, having two negative and four positive options. Positive-packing (i.e., increased number of response options in the positive direction) is deemed appropriate when participants are inclined to be agreeable (Brown 2004; Klockars and Yamagishi 1988; Lam and Klockars 1982); a situation likely for academically successful students enrolled in higher education. Furthermore, good measurement characteristics (i.e., ordered response options with relatively equal intervals) were found with this rating scale in a study of Chinese higher education students (Deneen et al. 2013).

### 2.3 Analysis

All analyses were conducted with AMOS version 20 software (IBM 2011). First, data were cleaned by removing cases with more than 10 % missing responses and imputing missing values with the expectation maximisation procedure. Second, confirmatory factor analysis was used to determine if the data fit the empirically and theoretically defined 16 factors. Third, due to poor or inadmissible fit, exploratory factor analysis, following procedures described in Courtney (2013), was used. Emphasis was put on the number of dimensions identified by the Velicer's squared MAP and 4th power MAP. Where multiple solutions were recommended, all were tested, with the more conceptually-sound solution being preferred. Fourth, the EFA model was further trimmed in AMOS by removing items with weak loadings ( $\lambda \leq .40$ ), with strong cross-loadings ( $\lambda \geq .30$ ), or with strong modification indices to other factors (sum MI > 30).

Although the inventory elicits responses using a six-point, ordinal agreement scale, maximum likelihood estimation was used since scales of this length can be treated as continuous variables (Finney and DiStefano 2006). Fit of a confirmatory model is determined by inspection of a number of indices (Fan and Sivo 2005; Hu and Bentler 1999). Current standards suggest that models do not need to be rejected if the root mean square error of approximation (RMSEA) is <.08, the standardised root mean residual (SRMR) is <.08, the comparative fit index (CFI) and gamma hat indices are >.90 (Fan and Sivo 2007; Yu 2002).

Multi-group confirmatory factor analysis with sequential nested invariance testing was used to evaluate the degree to which the model was invariant across groups (Cheung and Rensvold 2002). This procedure sequentially tests the statistical equivalence of a model between groups by examining the impact of constraining a set of parameters to be equal upon the comparative fit index (CFI) measure of fit. Invariance testing generally follows the sequence: (1) configural equivalence of paths; (2) equivalent regression weights for factors to items (metric); (3) equivalent intercepts of items at factors (scalar); (4) equivalent structural paths from factors to factors; and (5) equivalent covariances among factors. Equivalent residuals for items and factors are not required to make comparisons. Configural invariance is accepted if RMSEA < .05, while equivalence for all other tests is accepted if the ACFI < .01.

### 3 Results

We report first the factor analytic statistical modelling that best represents Chinese higher education student conceptions of assessment responses. Then we evaluate the equivalence of the model across the jurisdictions and conclude with an analysis of the mean score differences.

**Table 2** C-SCoA factors, items, and standardised loadings

No.	Factor and statements	Loading		
		HK B	PRC Pre	PRC Post
<i>Culturally-similar factors due to shared Confucian heritage</i>				
F8 Family Effect				
51	My family values me only if I do really well on assessments <sup>ns</sup>	.71	.69	.69
41	My grades determine my value and worth to my family and society in general <sup>ns</sup>	.65	.69	.69
64	I am smart only if I get 100 % or am best in class <sup>ns</sup>	.57	.62	.62
60	A high rank in school is how I please my family**	.76	.65	.65
46	My family's reputation depends on my performance on assessments***	.77	.65	.65
71	My family is very much affected by my assessment results***	.77	.60	.60
F4 Accuracy				
27	Assessment results can be depended on <sup>ns</sup>	.62	.60	.60
54	Assessment results are sufficiently accurate**	.77	.66	.66
F1 Societal Uses				
7	Higher social status comes from good academic performance <sup>ns</sup>	.65	.58	.56
70	Success in society depends on doing well on assessments**	.70	.58	.58
56	With higher grades, I can gain a better position in society***	.87	.63	.63
37	Good grades lead to a better career path***	.84	.66	.66
F7 Competition				
2	Assessments have a huge impact on my place in society <sup>ns</sup>	.51	.49	.49
1	Assessment is used to select the best people for job and education opportunities <sup>ns</sup>	.50	.47	.47
30	Assessment is a competition to select the best***	.80	.66	.66
6	Assessment never stops; it's part of being alive***	.40	.65	.65
<i>Institutional policy factors unique to jurisdiction</i>				
F2 Class Benefits				
39	When we do assessments, there is a good atmosphere in our class***	.43	.63	.63
50	Our class becomes more supportive when we are assessed**	.79	.71	.71
65	Assessment encourages my class to work together and help each other*	.83	.77	.77
42	Assessment makes our class cooperate more with each other <sup>ns</sup>	.79	.75	.75
F3 School Quality				
24	Assessment prepares students for examinations***	.56	.35	.35
63	Assessment provides information on how well schools are doing*	.51	.62	.62
33	Growing up means you get assessed regularly <sup>ns</sup>	.53	.49	.49
31	Assessment measures the worth or quality of schools <sup>ns</sup>	.59	.66	.66
F5 Negative Aspects				
18	Assessment is limited to what can be learned in books***	.81	.66	.66
4	Assessments only focus on book learning and knowledge***	.73	.57	.57
19	I am useless if I don't get top in my class***	.44	.68	.68
26	My classmates and peers are better at assessments than I am***	.31	.55	.55
25	I ignore or throw away my assessment results**	.22	.52	.52

**Table 2** continued

No.	Factor and statements	Loading		
		HK B	PRC Pre	PRC Post
36	Assessment results ignore all the other things I can do well**	.53	.36	.36
14	Assessment results are filed and ignored <sup>ns</sup>	.43	.52	.52
	F6 Teacher Use			
53	Assessment helps teachers track my progress***	.56	.71	.71
73	Teachers use my assessment results to see what they need to teach me next**	.69	.57	.57

HK = Hong Kong; PRC = People's Republic of China; B = Bachelor's degree; Pre = Pre-degree diploma or certificate; Post = Post-graduate diploma or degree; all values are standardised; statistical significance of loading differences between HK and PRC: ns = not statistically significant

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

### 3.1 Model determination

After removing mis-fitting items, an inter-correlated model of eight factors was found ( $N = 861$ ;  $k = 33$ ;  $\chi^2 = 20134.12$ ,  $df = 467$ ;  $\chi^2/df = 4.36$ ,  $p = .04$ ; CFI = .84; gamma hat = .91; SRMR = .056; RMSEA = .061, 90 %CI = .058–.064). The factors discovered were named: Societal Uses, Class Benefits, School Quality, Accuracy, Negative Aspects, Teacher Use, Family Effects, and Competition (Table 2 provides items contributing to each factor). We considered that the common cultural factors for Confucian-Heritage societies were: Competition, Societal Use, Exam Accuracy, and Family Effects. These factors point to the Chinese use of high-stakes examinations to award on a competitive basis societal benefits, motivated by obligation or duty to the family. In contrast, we considered the factors sensitive to jurisdictional differences in institutional practices and policies as: Teacher Use, School Quality, Class Benefit, and Negative Effects. These factors point to the different applications of assessment by teachers and students within school contexts and the different bases for judging school quality seen in each jurisdiction. Finally, the negative effects factor points to the different reasons within each jurisdiction that invalidate the legitimacy of assessment.

### 3.2 Model equivalence evaluation

Two-group analysis resulted in a positive not definite covariance matrix among the PRC participants, suggesting over-factoring had occurred for that group. Inspection of the factor inter-correlations for the whole group (Table 3) suggested that the School Quality factor could be modelled as a source factor, predicting all other factors; this produced an admissible solution with acceptable fit, when run as a two-group model ( $N_{\text{PRC}} = 458$ ,  $N_{\text{HK}} = 370$ ;  $k = 33 * 2$  groups;  $\chi^2 = 3052.32$ ,  $df = 976$ ;  $\chi^2/df = 3.13$ ,  $p = .08$ ; CFI = .78; gamma hat = .93; SRMR = .086; RMSEA = .051, 90 %CI = .049–.053). After constraining the factor to item

**Table 3** C-SCoA factor inter-correlations

Factor	Pearson inter-correlations							
	1	2	3	4	5	6	7	8
1. Teacher Use	–							
2. Competition	.53	–						
3. <i>School Quality</i>	.69	<b>.88</b>	–					
4. Class Benefits	.62	.28	<i>.40</i>	–				
5. Societal Uses	.50	<b>.77</b>	<b>.80</b>	.28	–			
6. Accuracy	<b>.76</b>	.59	<i>.72</i>	.61	.57	–		
7. Negative Effects	.45	.34	<i>.47</i>	–.04	.49	.27	–	
8. Family Effects	.27	.51	<i>.62</i>	.21	.60	.47	.57	–

Values >.70 in bold; values for F3 in italic;  $N = 861$

regression weights (metric) to be equivalent, the model was found not to be invariant ( $\Delta\text{CFI} = .010$ ).

However, since the distribution of students by country was different by the level of study, invariance testing was also carried out on three groups (i.e., PRC pre-degree  $n = 170$ , HK bachelor degree  $n = 272$ , and PRC post-degree diplomas and degrees  $n = 251$ ). This model had good fit, with configural invariance ( $N = 693$ ;  $k = 33 \times 3$  groups;  $\chi^2 = 3836.11$ ,  $df = 1570$ ;  $\chi^2/df = 2.44$ ,  $p = .12$ ; CFI = .72; gamma hat = .94; SRMR = .112; RMSEA = .046, 90 %CI = .044–.048), and although metric equivalence was demonstrated ( $\Delta\text{CFI} = .009$ ), this was not sufficient to make inter-group comparisons. All two-way comparisons among these three groups were conducted and strict equivalence was found for PRC pre-degree vs. PRC post-degree groups (i.e., metric  $\Delta\text{CFI} = .006$ ; scalar  $\Delta\text{CFI} = .001$ ; structural weights  $\Delta\text{CFI} = .001$ ; structural covariances  $\Delta\text{CFI} = .000$ ; structural residuals  $\Delta\text{CFI} = .003$ ; and item residuals  $\Delta\text{CFI} = .007$ ), while metric equivalence was not found between either PRC group and the HK group ( $\Delta\text{CFI} = .012$ , and .011, PRC pre-degree and PRC post-degree respectively). Hence, it is concluded that responses within PRC, despite differences in degree type, were statistically equivalent, and the PRC students in general, regardless of degree status, had statistically different responses to those of the HK students. The HK group responses indicated they were sampled from a separate population to the PRC students and this is more likely to be due to differences in jurisdiction than degree level.

We had expected that factors related to more general Confucian-Heritage conceptions of assessment would be statistically equivalent between groups. In contrast, we expected the jurisdictionally specific factors to elicit non-equivalent responding. As Table 2 shows, seven of the 16 items in the Confucian-Heritage factors had non-statistically significant differences in loading, while 13 of the 17 of the jurisdictionally specific items had statistically significant differences in loading. This means that 44 % of the items in the Confucian-Heritage group matched expectations, while 76 % of jurisdictionally specific items matched expectations.

Nonetheless, it is reasonably clear that conventional Chinese cultural values are not strong predictors of the similarity of responses between PRC and Hong Kong. It does seem, in contrast, that jurisdictional or institutional factors do contribute more to understanding the differences in responses between PRC and Hong Kong.

### 3.3 Factor means evaluation

Although the invariance testing indicated that the groups had responded in non-equivalent ways to the items, it is informative to examine the factor means to help appreciate the nature of the differences between groups. Table 4 shows the factor means (created by averaging responses to each factor’s contributing items) and MANOVA (main effects and interaction for country [PRC vs. HK] and level [PRC pre, HK B, PRC Post] and effect size comparisons between the three groups. For seven factors, except Class Benefit, the HK Bachelor degree group had the highest means, while the PRC Pre-degree group had the lowest means. Except for Class Benefit and Family Effects, the scale of differences between those two groups was statistically significant, with moderate to large effect sizes. The HK Bachelor and PRC Post-degree group means were much closer, with only half reaching statistical significance (i.e., Societal Use,  $F = 55.05, p < .001, R^2 = .09$ ; School Quality,  $F = 9.94, p .002, R^2 = .02$ ; Negative Aspects,  $F = 25.25, p < .001, R^2 = .04$ ; and Competition,  $F = 4.43, p = .04, R^2 = < .01$ ). Tukey post hoc HSD test indicated that for three factors the HK Bachelor mean was distinguishable from the two PRC groups (i.e., Societal Use, School Quality, Negative Aspects); for three factors the PRC Pre-degree group was distinguishable from the PRC Post-degree and HK Bachelor groups which were indistinguishable (i.e., Accuracy, Teacher Use, and Competition); while, as per the ANOVA and effect size results, two factors

**Table 4** C-SCoA(HE) scale means by degree group with comparisons

C-SCoA(HE) Scale	Group descriptive statistics						Difference statistics		
	HK B		PRC Pre		PRC Post		MANOVA		Effect size
	M	SD	M	SD	M	SD	$F_{(2)}$	p	Cohen’s <i>d</i>
<i>Culturally-similar factors</i>									
Competition	3.86	0.89	3.40	0.88	3.69	0.97	13.02	<.001	.50
Societal Use	3.65	1.09	2.84	0.86	2.98	0.95	45.64	<.001	.82
Exam Accuracy	3.01	0.87	2.54	0.93	2.91	1.00	13.88	<.001	.50
Family Effects	2.49	0.97	2.43	0.90	2.49	0.93	0.27	.76	.06
<i>Jurisdictional policy factors</i>									
Teacher Use	3.98	0.89	3.50	1.05	3.83	1.07	12.57	<.001	.49
School Quality	3.63	0.81	2.54	0.89	3.39	0.88	17.35	<.001	.56
Class Benefit	3.00	0.90	3.09	0.94	3.09	1.03	0.65	.52	.09
Negative Effects	2.80	0.75	2.39	0.75	2.46	0.82	19.13	<.001	.52

HK = Hong Kong; PRC = People’s Republic of China; B = Bachelor’s degree; Pre = Pre-degree diploma or certificate; Post = Post-graduate diploma or degree;  $N_{(HK\ B)} = 272$ ;  $N_{(PRC\ Pre)} = 170$ ;  $N_{(PRC\ Post)} = 251$

produced indistinguishable means across the three groups (Class Benefit and Family Effects).

Within the HK Bachelor group, four factors had means  $>3.50$  (i.e., close to or greater than moderately agree); these had to do with the external uses of assessment to evaluate schools, generate societal benefits with success, generate competition, and inform teachers. Among the two PRC groups Teacher Use had a similar mean score, as did Competition for the PRC Post-degree group. It is noteworthy that only two factors had means below 3.00 (i.e., slightly agree) in the HK Bachelor group, whereas the PRC Pre group had five and the PRC Post group had four means below the same threshold. This indicates a more general unwillingness to agree with these statements among PRC respondents. The least endorsed belief had to do with impact of assessment on family relationships and the negative aspects of assessment. Compared to previous studies, this result suggested Chinese students, more so Hong Kong Bachelor degree students, viewed assessment predominantly in terms of external purposes, even rejecting the idea that assessment was inaccurate, while not associating assessment performance with negative familial consequences.

## 4 Discussion

### 4.1 Summary of findings

A configurally equivalent model of Chinese university students' beliefs about assessment was found between students in Hong Kong and the People's Republic. The statistical model indicates that students do discriminate among these competing purposes for assessment, but see them as facets of evaluating schools. Assessment as an indicator of school quality is the central factor and all other aspects of assessment are perceived as being dependent on this core concept. However, there were statistically significant differences in item regression weights and factor mean scores between the two jurisdictions that seem to be attributable more to institutional differences in how assessment is implemented than to the conventional assumption that shared Chinese cultural factors determine the beliefs and attitudes of Chinese students. Because this study was an anonymous survey, it was not possible to seek explanations from the participants for the current results. Hence, we offer the following speculations for the observed results.

### 4.2 Cultural Chinese views of assessment

Four factors were considered to reflect the conventional cultural Chinese view of assessment being reliable, competitive examinations that produce important social consequences and fulfil obligations to family. We expected similarity between PRC and HK students especially in these factors and this was more or less not the case.

The relatively low scores for the family effects factors, equally endorsed by all three groups, indicated that students' perceived place in and value to the family was not contingent upon tested performance. This suggests that Chinese families are not seen as cold and punitive, at least, by these students, who are successfully enrolled in universities.



The rejection of the idea that family reputation is dependent on student performance may be a strong divergence from the traditional notion of collectivist responsibility to ancestors and family urged by Confucian philosophy. For the PRC students, this may well be a reflection of ‘single child’ policies post-1979 and free-market economic practices post-1984. These two systemic changes may have contributed to greater parental warmth towards a sole child and the greater belief that educational success is no longer necessary for family well-being. For HK students, longer exposure to western individualism and a greater diversity of economic opportunities may have defused the notion that academic success is driven by familial obligations. Or much more simply, it may be that having successfully entered universities, these students had already fulfilled familial obligations and so no great negative effect would be incurred as long as the students completed their studies successfully.

Nonetheless, three items in this factor had statistically significant differences in regression weights that were stronger in Hong Kong. These three items speak strongly to the classic Confucian notion of familial piety or obligation. It is possible these items elicit stronger association for HK students, even though weaker level of endorsement, because of the anti-Confucian movement in 1973 (*pī Lín pī Kǒng*) as part of the PRC Cultural Revolution (1966–1976). In contrast, Hong Kong students gave higher factor means and stronger item loadings (four out of six items) for the factors of assessment accuracy and societal uses.

We suspect that within Hong Kong there is a stronger basis for attributing societal success to assessment results and that examinations are reliable. With agencies such as the Independent Commission against Corruption and with a free press to conduct public scrutiny of government agencies such as the Hong Kong Examination and Assessment Authority, there is a reasonably strong basis for Hong Kong students to have confidence in the reliability of the examination system and the meritocratic application of examination results for university entrance. This social fabric stands in contrast to the multi-faceted basis for entry to university seen in the PRC system and the relative difficulty in ensuring transparent and consistent application of the legal system in the PRC. The alternative (and potentially corrupt) methods of university entrance in PRC may also explain why the competition factor had a higher mean among HK students and why Item #30 had a stronger loading among HK students—it is clear that HK university students have this experience (Brown and Wang 2013; Wang and Brown 2014).

We have, as yet, no explanation for why one item (#6) had a stronger loading for the PRC students than the HK students. Perhaps this statement captures the Chinese expression 考考考，老师的法宝；分分分，学生的命根 [exam, exam, exam, teacher’s magic weapon, grade, grade, grade, students’ lifeblood] reinforcing the widespread perception of the perpetual nature of examinations and assessment in PRC.

### 4.3 Jurisdictional effects on views of assessment

Four factors were considered to reflect the differences in institutional policies and practices in the two different legal jurisdictions. These have to do with assessment being a positive classroom influence, a valid measure of school quality, a tool for teachers, and being negative. As pointed out earlier most of these items had

statistically different loadings and three of the factors had large differences in mean scores. While we had not expected differences, these factors do potentially reflect jurisdictional differences and thus, under the principle of ecological rationality, differences are observed in these samples.

While the School Quality factor was the central predictor of all other factors for both groups, the mean score for this factor was considerably higher for HK students. The centrality of this factor may reflect a somewhat simplistic logic (i.e., good schools have high results; high results equal quality). The association of school quality and high examination scores (item #24) might be strengthened by the systemic nature of school segregation, especially in HK where schools are identified by bands, in contrast to the PRC where a multiplicity of status factors (e.g., money, connections, and location) can be used to gain entrance. Nonetheless, a greater loading on item #63 by PRC students might suggest that the public comparison of university entrance results by schools has an impact on their perceptions of how assessments reflect school quality. Fundamentally, everyone knows which schools are good by the public dissemination of their examination results. Since university access depends heavily upon tested performance, schools that have higher mean scores on those measures are considered to be high quality. Perhaps a form of reflected glory is at work in which attendance at a successful school ensures examination success for the individual.

Belief that teachers use assessment to improve teaching was higher for HK and the postgraduate students of PRC and the loadings of these items differed by statistically significant margins. The notion that teachers track students with assessment loaded on the factor more for PRC students, while teachers diagnosing next teaching steps loaded more strongly for HK students. This latter result may reflect the established use of school-based assessments in HK secondary schools which makes more transparent to students how teachers adjust teaching in response to tested performance (Carless 2011; Gao 2009). In contrast, conventional practice in PRC involves drilling for examinations and monitoring student performance regularly (Chen 2015).

While the differences in mean score for class benefits were trivial and not statistically significant, there were statistically significant differences in the item loadings. Two class cooperation items received stronger loadings in HK than PRC, while good atmosphere had stronger loading in PRC than HK. This is consistent with HK higher education practices that assess students in and through cooperative, collaborative group work (e.g., Auyeung 2004; Jackson 2005; Li 2001).

The negative aspects factor elicited quite different responses from HK and PRC students. There was a moderate mean score difference between jurisdictions, with stronger endorsement in HK than PRC. Three items (Items #18, 4, and 36) to do with the narrow focus of assessment on book learning had stronger loadings in HK, while two items to do with rank order comparison (Items #19, 26) had stronger loadings in PRC. Likewise, an item to do with ignoring assessment results (#25) had stronger loadings in PRC. It seems the HK students are more attuned to the artificial nature of examined knowledge and skill, and seem to long for a broader and more valid form of learning (Brown and Wang 2013; Wang and Brown 2014). The greater sensitivity to normative comparisons combined with greater ignoring of results in

PRC may reflect the public display of examination results (i.e., results are listed in rank order on noticeboards within institutions for inspection by all); in other words, everyone can see my results, so it is important that I outperform my classmates. Since the PRC students gave this factor a very low score (i.e., they disagreed with this factor), it would seem that the strong loading on this item indicates a rejection of the habit of ignoring the results. This means that for the PRC students, much more than HK students, high rank matters, while HK students instead reject the validity of examinations.

#### **4.4 Limitations of study**

Notwithstanding the statistical significance and the plausibility of the results reported here, there are a few limitations. As a natural consequence of voluntary access and participation restrictions, the sampling, albeit large, is not systematically representative and equivalent across the three groups studied. Likewise, the oversampling from three institutions and from teacher education institutions limits the generalisability of the results. Hence, further replication studies which ensure greater variety and equivalence of disciplines, degree levels, and institutions are required. Additionally, the speculations we have given to explain the results are testable research topics in future studies using techniques such as think-aloud or retrospective stimulation, or by specifying the type or function of assessment which the participant must evaluate. Future research that links this inventory to measures of achievement emotions, learning approaches and conceptions, and causal attributions would also give validity to the speculations we have offered.

#### **4.5 Significance and conclusions**

Nonetheless, this study contributes to our understanding of the role social and cultural factors play on the beliefs, attitudes, and values students have. This study demonstrates that the Chinese-Student Conceptions of Assessment (Higher Education) inventory is sensitive enough to pick up nuanced differences between the HK and China students' individual beliefs and emotional reactions to assessment, while at the same time successfully identifying culturally invariant factors that speak to the Confucius heritage of the Chinese people. This study suggests that sharing Chinese identity is not enough to understand how university students in Chinese contexts understand and respond to assessment. Instead, student conceptions of assessment seem to reflect more the ecological factors of the educational environment in which they are schooled. This study should help university educators and administrators to better understand the diversity in Chinese students' attitudes and behaviour in terms of learning processes and outcomes.

This study helps further establish that environmental differences can invalidate comparative studies since responses to good inventories are often not equivalent across jurisdictions, and highlights the importance of developing culturally appropriate measurement tools incorporating both a theory driven and bottom up empirical perspective. Students' conceptions of assessment reflecting an agentive response to the micro and macro environments might be sensitive to ongoing

educational and assessment reforms. An evolving historical perspective guarantees ecological validity and will require constant updating of research inventories.

**Acknowledgments** The authors thank their research assistant, Ho Yee Tang, who carried out the validation studies, which were funded by an Internal Research Grant (#RG42/09–10) to the first author from the Hong Kong Institute of Education. Specific thanks go to colleagues who facilitated the data collection, including Dr. Lamei Wang (Institute of Psychology, Chinese Academy of Sciences), Prof. Lingbiao Gao (South China Normal University), Dr. Yang Wu (Zhengzhou Normal University), Dr. Xiaorui Huang (East China Normal University), Dr. Junjun Chen (Hong Kong Institute of Education), and Prof. Ming Gao (Shannxi Normal University).

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