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Development and Validation of the Social Hierarchy Scale

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Abstract

The Social Hierarchy Scale (SHS) was developed as a measurement tool of the construct of social hierarchy. Its development began with a comprehensive literature review and an in-depth discussion of the definition and practices of social hierarchy. Four samples, a combined total of 1,063 participants, were involved during the course of developing the scale. The processes of items' formation, selection, evaluation, and inclusion in the final scale are detailed. The final SHS consisted of 32 items using a 7-point Likert scale rating scheme. The two subscales, each with 16 items, are also confirmed by factor analyses. The psychometric properties of the scale have been confirmed to meet quality standards by two measures of reliability (internal reliability and test-retest reliability) and four measures of validity (content validity, construct validity, convergent validity, and discriminate validity). This research concludes with a discussion of the importance of developing the SHS from an indigenous approach, as well as possible contributions to and applications in social science.

Keywords: cultural difference, scale development, social hierarchy

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「內在社會階級構念量表」之發展與編製

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摘要

本研究討論及發展編製「內在社會階級構念量表」（SHS），以作為測量內在社會階級構念（social hierarchy）的工具。本研究討論過去文獻中對於內在社會階級構念的定義以及此構念和其他相關構念與理論的關係，並以此作為編製此量表的依據和藍圖。本量表的編製過程共使用四個樣本，總樣本數為 1,063 人。研究中描述包含題目選取、項目分析、信效度檢驗，以及因素結構分析等編製過程。所編製的「內在社會階級構念量表」採用李克特氏七點量表評分，共計 32 題且包含兩個分量表。兩個 16 題的分量表之向度結構也以因素分析進行驗證。本量表在兩項信度指標（內部一致性、重測信度）以及四項效度指標（內容效度、建構效度、聚合效度，以及區辨效度）的檢驗均有良好的信效度表現。結論亦針對本量表用於社會科學研究和其他可能的應用進行討論。

關鍵詞：文化差異、內在社會階級構念、測驗編製

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Introduction

Hierarchy is prevalent among groups of individuals, organizations, and societies. It can take different forms, but all involve interpersonal relationships and interactions. A review of psychological research on the topic of hierarchy in interpersonal behavior paints a contradictory picture. On one hand, research on hierarchy conducted in the West consistently focuses on the abuse of power, injustice, corruption, and dominance (Blader & Chen, 2012; Hays, 2013; Hofstede, 1980, 1992; Kipnis, 1972; Magee & Galinsky, 2008; Molm, Quist, & Wiseley, 1994; Rosenblatt, 2012; Sidanius, Levin, & Pratto, 1996). In this framework, hierarchy is positively associated with domination or authoritarianism. In other words, hierarchy is adversely related to individual quality of life or social well-being. For example, prior research conducted in the West indicated that dominance hierarchies create stressful environments that lead to adverse adrenocortical, cardiovascular, reproductive, immunological, and neurobiological consequences (Sapolsky, 2005).

On the other hand, research on hierarchy conducted in East Asia or with Asian-Americans focuses on benevolence and righteousness, filial piety, and parenting, which are considered crucial factors contributing to better quality of life and well-being. Research in this area differentiates various kinds of relationships. In this framework, hierarchy is positively associated with benevolence and closeness in relationships (Chao, 1994; Hwang, 1995a, 1995b, 1999; Pye, 1985; Yang, 1992; Yeh & Belford, 2004). The key reason for such contradictory perspectives on the same construct is the use of different cultural models.

In each culture, the normative model for hierarchical relationships is continually maintained through specific cultural contexts and practices. It is transmitted and regenerated by sharing common sense knowledge of “the right way” to build a society and to form relationships (Markus & Kitayama, 2004; Markus, Kitayama, & Heiman, 1996). Cultural models give form and substance to the experience of interpersonal relationships. These models for interpersonal relationships are reflected in individual interpretive frameworks and schemas and in publicly available forms such as practices, symbols, and social institutions and situations (Markus & Kitayama, 2004).

Tsai (2006) proposed two cultural models of interpersonal relationships that come from different traditions. The equality model is rooted in European-American traditions of individualism and democracy (Galinsky, Magee, Gruenfeld, Whiston, & Liljenquist, 2008; Magee & Galinsky, 2008; Markus & Kitayama, 1991; Markus et al., 1996; Tocqueville, 2000; Zitek & Tiedens, 2012). The propriety model is rooted in East Asian traditions of Confucianism and relational interdependence (Fiske, Kitayama, Markus, & Nisbett, 1998; Ho, 1995, 2001; Hwang, 1995a; Tu, 1988; Yang, 1991).

The East and West perspectives approach the concept of hierarchy from different angles and lead to quite different interpretations and explanations for behaviors. The perspective of the equality model has been studied more thoroughly than the propriety model. Moreover, the related concepts can also be measured through well-established scales [e.g., the Perceived Social Power Scale (Imai, 1989), the Attitude toward Group Scale (Chang & Koh, 2004), and the Social Dominance Scale (Pratto, Sidanius, Stallworth, & Malle, 1994)]. However, discussion of social hierarchy from the perspective of the propriety model, as well as a related measurement tool, is lacking. To fill this gap, in this paper we discuss the concept of social hierarchy from the perspective of the propriety model, and develop and validate a scale to measure social hierarchy.

The remainder of the paper is organized as follows. First, we discuss the definitions and practices of social hierarchy as well as how it relates to existing constructs. Second, we describe items and samples used for scale development. Third, we detail the steps of constructing the Social Hierarchy Scale, as well as the psychometric analyses of scale validities and reliabilities. The relationships between the social hierarchy measured through SHS and related constructs are discussed in the discussion section. Finally, we conclude with discussions of the importance of developing the SHS from an indigenous approach as well as possible contributions to and applications in cross-cultural psychology.

Definition and Practices of Social Hierarchy

To understand the construct of social hierarchy, we need to discuss its definition and functions at the conceptual level as well as its actual practices at the behavioral level. We will first explain the propriety cultural model, which is used to define the construct of social hierarchy, and then we will discuss the definition and practices of social hierarchy in different contexts and situations.

Propriety Model

The propriety model is socially constructed and rooted in a belief in the natural hierarchical order of human relationships as evidenced in familial ties (Ho, 1995, 2001; Hwang, 1995a). Propriety is defined by qualities of suitability, harmony, or appropriateness (Hwang, 1995b; Yang, 1991). Propriety is a fundamental core belief that the ideal relationship is based on hierarchy, with proper distinctions for separate roles working together in harmony. Individuals are socialized to become fully connected members of relationship networks through playing their parts in the hierarchical web of interconnections (Wu, 1996; Wu & Xue, 1995). A mature person is not self-centered, and thus is attentive to others in the hierarchical network and adjusts oneself accordingly (Bond & Hwang, 1986; Ho, 1995).

The propriety model of having relationships requires one to know his/her place in the hierarchical network and perform one's duties based on the specific requirements of each role (Bond, 1996; Hwang, 1995a). Each party in a relationship has a place to fill, whether it is a superior role in one setting or a subordinate role in another setting (Hwang, 1997, 1998; Yang, 1992). Power or status differences are relationally rather than institutionally constituted. Thus, checks on powers tend to appeal to norms in family relationships (Gabrenya & Hwang, 1996; Hwang, 1998). The self is also trained to rise above self-centered preferences, choices, and ways of doing things in order to benefit either the relationship or those connected to the relationship (Hwang,

2006; Yang, 1991). The end product is increased stability and security in a harmoniously ordered society (Bond, 1996; Hwang, 1998).

Social Hierarchy Defined by the Propriety Model

Based on the propriety model, hierarchy leads to more interdependence and harmony through ordered connections to others who are family, kin, or (eventually) members of society. Justification for and legitimacy of power are not the main issues (Goodwin & Tang, 1996; Leung, 1996; Li, 2002). In contexts where propriety is the norm, equality among all persons becomes a source of chaos and social disorder. Equality, especially between parent and child, teacher and student, and boss and employee, can be construed as distant, artificial, awkward, and potentially nonfunctional (Gao, Ting-Toomey, & Gudykunst, 1996). Observing the hierarchy is the key to interdependence, harmony, and social order (Bond, 1996; Gabrenya & Hwang, 1996; Goodwin & Tang, 1996).

Social hierarchy is defined not only by interdependence, but also by constructing vertical relationships as a natural and proper part of that interdependence. The role of the more senior person is to take care of and be responsible for the more junior person. The role of the junior person is to respect and defer to the senior person. This symbiotic dynamic of hierarchy is widely prevalent in Chinese societies (Wu, 1996; Wu & Xue, 1995; Yang, 1991).

Based on the propriety model, social hierarchy is conceptualized as the proper distinctions and roles that are observed by each person to create harmonious relationships that are mutually beneficial. This interpretation of the concept suggests that social hierarchy relates to the well-established constructs of interdependence and vertical collectivism rather than to social dominance. The details of how social hierarchy relates to these concepts are discussed next.

Triandis (1995, 2001) suggested that the cultural dimensions of individualism and collectivism could best be categorized as four types: *horizontal individualism*, *vertical individualism*, *horizontal collectivism*, and *vertical collectivism*. The essence of social hierarchy is most adequately captured by the concept of vertical collectivism. In vertical collectivism, people submit to the authorities of the in-groups, and are willing to sacrifice themselves for their in-groups (Singelis, Triandis, Bhawuk, &

Gelfand, 1995; Triandis, 2001). This definition of vertical collectivism relates closely to that of social hierarchy in several respects. First, both of the concepts are situated in a social setting. Second, the two concepts are formed within the interactions among individuals. In addition, they both relate to the differentiation of rank orders. Considering their similar conceptual definitions and empirical practices, the SHS is expected to be positively associated with items measuring vertical collectivism.

The concept of interdependence is also closely related to social hierarchy. Singelis (1994) defined interdependence as seeing the self as being intertwined with, or connected to, others. The dynamic of people in relationships, playing their superior or subordinate roles and fulfilling their mutual obligations, illustrates one way to achieve interdependence. Seeing the self as connected to others enables one to define the "self" by one's position relative to others. The interdependence dimension of the Self-Construal Scale (SCS) (Singelis, 1994) has been commonly used to measure the concept of interdependency. According to this definition, we would expect the SHS to be positively related to interdependence.

Social dominance has been studied by various researchers (Pratto et al., 1994; Sidanius et al., 1996). For instance, Jost and Thompson (2000) constructed a balanced version of the Social Dominance Orientation (SDO) scale from the 16-item version of the original scale developed by Pratto et al. (1994). Two separate factors were hypothesized and confirmed with different groups of college students in Jost and Thompson's (2000) study using the modified SDO scale. One of the two factors was identified as *Opposition to Equality* (OEQ), and the other was identified as *Group-Based Dominance* (GBD). The GBD subscale measures dominance in the domains of aggression and control. Aggression and control are thought to be unrelated to social hierarchy as defined in the propriety model, which looks at interdependent relationships, order, and the importance of family ties. Therefore, we would expect little relationship between GBD and social hierarchy as measured by the scale developed in this paper.

Like all the hypothesized psychological constructs, we cannot directly measure the latent concept of social hierarchy but through outward behaviors. Therefore, a measurement model is needed to capture this latent construct. Moreover, the items need to describe various specific contexts, in which respondents can situate themselves in

proper roles and express their views. In order to cover the valued dimension underlying the construct, items also need to span a sufficiently broad range of common scenarios.

Items and Samples for Constructing the Social Hierarchy Scale

Next, we describe how the initial item pool was formed and how the various samples were used to construct the SHS based on the propriety cultural model.

Forming an Initial Item Pool

In line with the propriety model, we developed potential items for the hierarchy scale in three ways: (a) writing items based on the theoretical framework of social hierarchy and in reference of relevant existing scales, (b) asking informants to suggest items, and (c) writing new items based on ideas from a past study on social hierarchy (Tsai, 2006). These efforts yielded more than 200 items that comprise the initial item pool.

Review of existing scales

Published scales relating to the construct of social hierarchy (SH) as understood in the propriety model were obtained for review to help with the writing of new items. The scales examined included: the Perceived Social Power Scale (Imai, 1989), the Index of Personal Reactions (Bennett, 1988), the Attitude Toward Group Scale (Chang & Koh, 2004), the Schwartz Value Survey (Schwartz, 1992), the Paternalistic Leadership Scales (Cheng, Chou, & Farh, 2000), the Subordinate Response Scales and Traditional Authority Orientation (Cheng, Chou, Wu, Huang, & Farh, 2004), the Harmony Control Scale (Morling & Fiske, 1999), and the Tutor Superordination and Distance/Closeness Questionnaire (Spencer-Oatey, 1997). These instruments were screened to obtain useful items, particularly items explicitly assessing attitudes to-

ward dominant and submissive groups.

Informant interviews

Informal interviews were conducted with four professors, four graduate students, and 10 undergraduates at National Taiwan University (NTU) in order to solicit suggestions for items. In the interviews, informants commented on SH in general and discussed specific practices as well as their personal experiences. They were then asked to exemplify items that may be included in the SHS. Approximately 20 items were written based on the suggestions made in these interviews.

Adoption of ideas from an earlier study

In a previous study (Tsai, 2006, study 3), participants were asked to respond to open-ended questions on the topic of hierarchy by associations. We generated items from insights gained from their written answers. Additionally, we examined unpublished data in Chinese and English on free associations (Tsai & Hsieh, 1998) with regards to professor-student, parent-child, and boss-employee dyads to help refine the items.

Overview of Samples

Sample 1 included 173 undergraduates (58 males and 115 females) from National Taiwan University (NTU), who participated in the study in exchange for course credit. Participants answered a package of questionnaires including the 60-item SH scale using a 7-point Likert scale rating, the Vertical Individualism-Collectivism Scale (V-IC) (Singelis et al., 1995), and the Independent-Interdependent Self-Construal Scale (IND-INT) (Singelis, 1994). Data collected in this sample were used in the preliminary analysis to assemble the final scale.

Sample 2 included 135 undergraduates (94 males, 29 females, and 12 unreported) from National Taiwan University of Science and Techology (NTUST), who participated in return for course credit. Participants in this sample responded to a package of questionnaires including the 32-item SHS, the V-IC scale, the IND-INT scale, the SDO scale, and several demographic questions. Data obtained from this

sample were analyzed in subsequent validity studies.

Sample 3 included 190 undergraduates (71 males and 119 females) from NTU, who completed the 32-item SH scale once at the beginning of the semester and a second time 12 weeks later. Respondents had an opportunity to win one of three randomly drawn prizes of NT$1,000 each (approximately $32 USD). Data obtained from this sample were used to estimate the test-retest reliability.

Sample 4 included 565 undergraduates (236 males, 322 females, and seven unreported). Participants in this sample were recruited from nine different undergraduate classes across NTU, and they volunteered to take part in the study. Participants completed the 32-item SH scale and several demographic questions.

Construction of Social Hierarchy Scale

The initial item pool created at the first stage of scale development consisted of more than 200 items. Many of the items in the initial pool were deemed redundant, and a substantial number of them may not have adequately captured the essence of social hierarchy. Furthermore, it was necessary to keep the administration time within a reasonable range while achieving high psychometric quality (such as validity and reliability). To develop an efficient and effective instrument for assessing social hierarchy, several steps were taken to minimize the number of items.

Item Analysis

Items were divided into two categories, each with two subcategories. The first category was *directional actions*, with *top-down* and *bottom-up* as subcategories. The top-down actions relate to items involving *role modeling*, *guiding*, *care-giving*, and *help-providing*. The bottom-up directional actions are associated with the terms *sacrifice*, *turn-in*, *obey*, and *trust*. The second category, *concept*, is divided into two subcategories: *function* and *definition*. The *function* subcategory relates to concepts of *order*, *harmony*, *role*, and *how to interact*. The *definition* subcategory includes terms describing the concept of hierarchy, and a few key words in this subcategory are *natural*, and *existed obvious*.

The initial item pool consisted of more than 200 items. Several steps were taken

to winnow down the number of items to create an efficient and effective instrument. We undertook a critical review of the items in order to eliminate, combine, and/or rewrite redundant and inadequate items based on the theoretical framework of social hierarchy. The goals of this step were to ensure the wording and content-appropriateness of the items, and to reduce the pool to a more manageable size. The resulting 60 items were then categorized into two main domains: *practices* and *concepts*. The *practices* domain consisted of items describing *bottom-up* and *top-down* directional actions. The *concepts* domain was divided into two subcategories: *function* and *definition*. In total, this pool comprised four groups of items. Internal consistencies and the number of items are presented in Table 1, by subcategories, domains, and the entire pool. As displayed in the first column of Table 1, all groups of items attained satisfactory levels of consistency.

Table 1. *Reliability measures of items and scales*

	60 items		49 items		32 items (Sample 1)		32 items (Sample 2,3,4)	
	α (# items)		α (# items)		α (# items)		α (# items)	
Bottom-Up	.78	(20)	.79	(15)	.70	(7)	.74	(7)
Top-Down	.81	(18)	.80	(14)	.81	(9)	.80	(9)
Practices	**.86**	**(38)**	**.86**	**(29)**	**.84**	**(16)**	**.86**	**(16)**
Function	.88	(10)	.87	(9)	.85	(7)	.88	(7)
Definition	.76	(12)	.75	(11)	.72	(9)	.79	(9)
Concepts	**.89**	**(22)**	**.90**	**(20)**	**.90**	**(16)**	**.90**	**(16)**
Total	**.92**	**(60)**	**.92**	**(49)**	**.92**	**(32)**	**.93**	**(32)**
	N = 173 (Sample 1)		N = 173 (Sample 1)		N = 173 (Sample 1)		N = 890 (Sample 2, 3 4)	

Psychometric Properties of Items

The next step in screening the items was based on their psychometric properties. Eleven items were deemed as not meeting the requirements: one item had a negative

item-total correlation; five items had low item-total correlations; one item had extreme skewness; one item had an unexpected direction of skew (positively skewed); and three items had a restricted range of responses (i.e., the full range of the ratings was not used). After removing these items, 49 items remained (a total of 15, 14, 9, and 11 for bottom-up, top-down, function, and definition, respectively). Cronbach's α was used again to examine internal reliabilities for the 49 items. As shown in the second column of Table 1, levels of consistency were satisfactorily high for each of the four subcategories, the two domains, and for the total.

Relationships to Other Scales

In this step of item selection, we examined the relationships between the items and several well-established scales. Subscales of three measures were considered: (a) the Vertical Individualism (VIND) and Vertical Collectivism (VCOL) subscales of the Vertical Individualism-Collectivism Scale (Singelis et al., 1995), (b) the Independent (IND) and Interdependent (INT) subscales of the Independence-Interdependence Scale (Singelis, 1994), and (c) the Opposition to Equality (OEQ) and Group-Based Dominance (GBD) subscales of the Social Dominance Scale (SDO) (Jost & Thompson, 2000). The scoring of these referenced scales was based on the original measures. The high- and low-scoring groups on each of the scales and subscales were defined as the top 33% and the bottom 33% of the sample on that particular scale or subscale.

The SH total scores were defined as the sum of the 49 items (with reverse coding on four items), as obtained in the preceding step. We compared item scores of the high- and low-scoring groups selected for each referenced scale. The *t*-test results showed no significant differences between the high and low VCOL groups for five items, and between the VIND groups for six items. Similarly, there were no significant differences found between the INT groups for three items and between the IND groups for 10 items. With respect to SDO, no significant differences were found between the high-scoring and low-scoring groups for two items. In addition, item scores were correlated with the SH total scores. One item was identified as having low item-total correlation.

The results summarized above were used to select items for the final scale. In

this step, 17 items showing a lack of discriminating power with respect to one or more reference scales (including the SH total) were removed. The final scale (referred to as the SHS hereafter) consisted of 32 items divided into four groups, with a total of seven, nine, seven, and nine items for *bottom-up*, *top-down*, *function*, and *definition*, respectively. The results of the reliability analysis for the SHS are presented in Table 1 [the third column, *32 items (Sample 1)*]. The reliability indices (Cronbach's α) suggested that both the scale and the subscales achieved reasonable levels of consistency.

Analysis of Factor Structure

Exploratory factor analysis was performed on the final 32 items using Sample 1 in order to confirm the intended two-factor structure. Two factors were extracted, and Promax rotation with target patterns was employed to obtain the results. The Promax factor loadings are presented in Table 2, along with the English translations of the items. The correlation between the two factors is .45 ($p < .001$), and together they accounted for 69.1% of the total variance.

The positive inter-factor correlation and the factor patterns support the structure of the scale and subscales as planned. The factor patterns, as shown in Table 2, reveal that Factor 1 represents the *concept* domain, and Factor 2 represents the *practice* domain. Although Stevens (1992) recommends 0.4 as the cut-off for factor loadings because it can explain 16% of variance, this criterion is more appropriate for principal component analysis (PCA). Unlike PCA, factor analysis assumes that the variables do not account for 100% of the variance. In alignment with this line of reasoning, Field (2000) advised against an absolute cutoff; rather, he suggested that factor loadings are sample-size-dependent. Tabachnick and Fidell (2007) cited .32 as a good rule of thumb for the minimum loading of an item, which accounts for 10% variance overlap between the item and that factor. According to this criterion, all but three of the items meet this criterion and load on the expected factor. Two *bottom-up* items (items 4 and 5) and one *definition* item (item 29) have loadings lower than .32 on their respective factors. However, these items still gave higher factor loadings on their own expected factor than the other factor.

Table 2. *The 32 items in the Social Hierarchy Scale (SHS) and the Factor patterns for the two subscales*

		Label†	Items	Factor 1	Factor 2
Bottom up	1	I-3	When my parents insist on telling me what to do, I trust that they know better.	-0.22	0.69
	2	I-6	Deferring to a superior rank is matter of course.	-0.03	0.49
	3	I-16	I get along with those higher ranked than me because I give respect where respect is due.	0.24	0.37
	4	I-10	As a research lab member, I should sacrifice my own benefits to maintain my professor's benefits.	0.06	0.31
	5	I-5	I would offer my seat at a seminar discussion to my professor.	0.16	0.23
	6	I-1	My happiness depends on the happiness of my parents.	-0.09	0.46
	7	I-7	I automatically tune myself into my parent(s)' expectations of me.	-0.01	0.59
Top Down	8	I-12	In the family context, the more senior members (or those of an older generation) have the responsibility to teach those more junior (or of a younger generation).	0.17	0.37
	9	I-2	It is important for me to know that I am taking good care of my younger siblings.	-0.10	0.66
	10	I-5	If I were a teacher, I would care about and advise my students outside of their academic work (e. g., career planning , interpersonal relationships).	0.01	0.35
	11	I-9	I take special care of friends younger than me.	0.10	0.51
	12	I-4	Parents mean well for their children so children should be able to empathize well with their parents.	-0.06	0.72
	13	I-8	As a more senior person, I set high standards for myself in order to serve as a role model for the more junior.	0.10	0.55
	14	I-11	I expect myself to take care of those junior in academic years (e. g. frosh) than me.	0.14	0.44
	15	I-14	I expect those junior (in age/rank) to me to trust my decisions and choices.	0.21	0.41
	16	I-13	I learn well by modeling those more senior than me.	0.17	0.42
Function	17	I-13	Having social hierarchies makes it easier for everyone to know how to interact with different people.	0.46	0.23
	18	I-32	I feel secure when each person plays their role in a relationship.	0.45	0.34
	19	I-29	It is important for me to play my role in the group by knowing my place.	0.62	0.10
	20	I-30	In terms of interpersonal relationships, knowing my place in the hierarchy helps me anticipate others' wants or needs.	0.64	0.15
	21	I-21	In situations where many people need to coexist, social hierarchy creates hamony.	0.65	-0.02
	22	I-19	Social hierarchy provides order in society.	0.78	-0.11
	23	I-20	Observing appropriate hierarchical roles can increase efficiency in society.	0.76	-0.06
Definition	24	I-28	When thinking about interpersonal interactions, social hierarchy is a must.	0.63	0.08
	25	I-22	A person is born into a web of hierarchical relationships.	0.51	-0.01
	26	I-23	The power of a leader comes from the social networks that s/he can access.	0.40	0.01
	27	I-25	The leader of a group is like the head of a household.	0.37	0.01
	28	I-26	The legitimacy of a leader's power comes from the position s/he occupies.	0.49	0.04
	29	I-24	I think social hierarchy in society is hard to challenge and revert.	0.27	0.01
	30	I-18	Social hierarchy is NOT necessary for society to function efficiently.	0.37	-0.07
	31	I-27	A family is made up of individuals hierarchically connected to each other by blood.	0.46	0.05
	32	I-17	A group is made of individuals occupying different ranks and roles.	0.66	-0.14

Note. Label† indicated in this column referring to the actual item number used in SHS.

Verification of the Social Hierarchy Scale

We examined two reliability measures and four types of validities to ensure that the SHS was a reliable and valid measure.

Reliability

In order to ensure that SHS was a reliable measure, we analyzed a combined sample of Samples 2, 3, and 4 (N = 890) to obtain reliability estimates of the SHS.

Internal reliability

Cronbach's α was used as a measure of internal reliability. The last column in Table 1 gives the Cronbach's α for each of the two domains (subscales), for each of the four groups of "within domain" items, and for the scale as a whole. The internal consistency indices indicate that the scale satisfied the reliability standards. Additionally, the average inter-item correlation for this sample was .51 (SD = .12), which falls within the reasonable range.

Test-retest reliability

Participants in Sample 3 (N = 190) completed the SHS questionnaire twice at intervals of 12 weeks. Test-retest reliabilities were estimated by the correlations of scores between administrations. The test-retest reliabilities were .65 for the SHS, .61 for the *concepts* subscale, and .66 for the *practices* subscale. These reliability indices suggest that the scores were fairly stable over time. Because the test-retest reliability coefficient, which is a single number, may over-summarize the data, a histogram, a boxplot, and parallel coordinates were employed to investigate the degree of stability of the responses over time. Figure 1(a) shows the histogram and the boxplot of the overall test-retest responses. While the histogram depicts a fairly normal distribution

of the difference between the two tests, the boxplot indicates that there are several outliers, which are defined by their location (outside 1.5 * interquartile range of the boxplot). These observations did not demonstrate stable responses across the two administrations of the same survey. Figure 1(b) illustrates the positions of these outliers relative to the majority. Because these outliers showing dramatic fluctuations seem to be randomly distributed, it was concluded that no threat was found against the test-retest reliability of the scale.

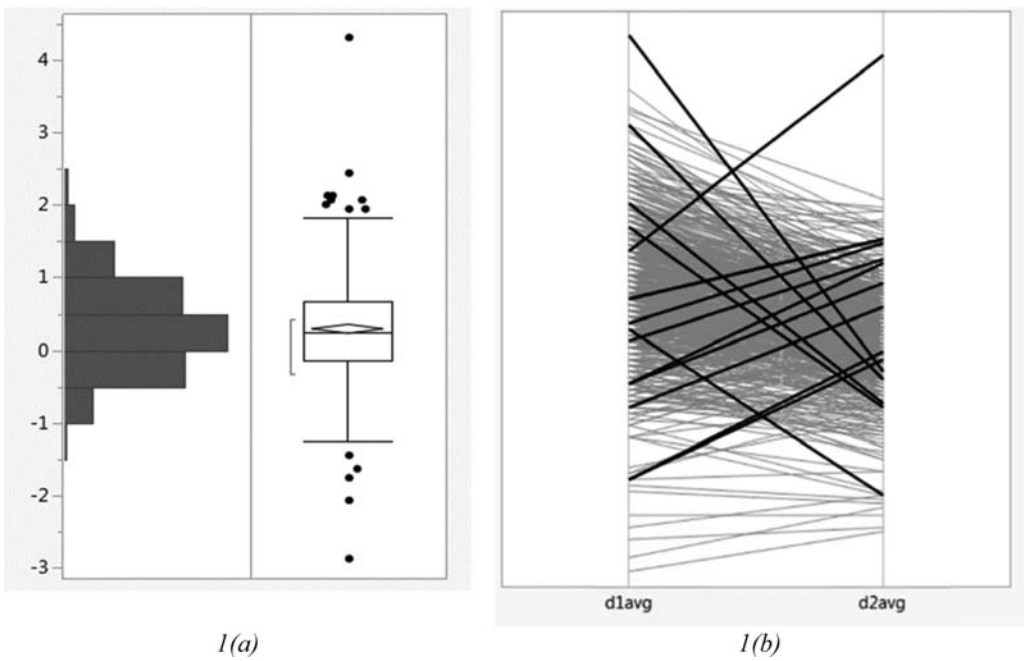

Figure 1. *(a) Histogram and boxplot of the test-retest difference. (b) Parallel coordinates of test-retest difference***.**

Validity

In this section, the validity of the SHS was studied from various perspectives. Four common types of validity were included in the analysis: content validity, construct validity, convergent validity, and divergent validity.

Content validity

Some of the evidence supporting the content validity of the SHS is discussed here, under the evaluation by content experts. First, the items loaded on the *concepts* factor were focused directly on characteristics defining the construct or on related functions of social hierarchy based on the propriety model. For example, the item stating, "In terms of interpersonal relationships, knowing my place in the hierarchy helps me anticipate others' wants or needs," assessed the function of hierarchy, while another item, "A group is made of individuals occupying different ranks and roles," defined hierarchy. These items clearly measured a respondent's understanding of, and attitude toward, hierarchy. Second, the items associated with the *practices* factor covered various everyday practices of social hierarchy. For example, the item stating, "I expect those junior (in age/rank) to me to trust my decisions and choices," assessed *top-down* actions directed toward someone who is junior in rank, while another item, "I get along with those higher ranked than me because I give respect where respect is due," assessed *bottom-up* actions directed toward someone who is senior in rank.

Overall, the items in the SHS encompassed a variety of feelings, behaviors, and thoughts that define social hierarchy. The variety and breadth of item coverage contributed significantly to the content validity of the scale. Furthermore, a wide range of contexts, such as relationships with other individuals, with members in a group, and within society in general, increased the content validity of the SHS by spanning across various context-specific phenomena.

Construct validity

Data from Sample 2 were used in the construct validity analysis. The construct validity of the SHS has an established relationship with the VCOL scale (Singelis et al., 1995). Though the VCOL items might not fully capture respondents' practices, endorsements, and understandings of hierarchy, it was considered the most appropriate scale available to assess the construct validity of the SHS. As expected, the VCOL score was significantly and positively correlated with the SHS score ($r = .43$, $p < .001$). The scatterplot of SHS versus VCOL scores (Figure 2) revealed a bivariate outlier. After the outlier was removed, Pearson's r increased to .53 ($p < .001$).

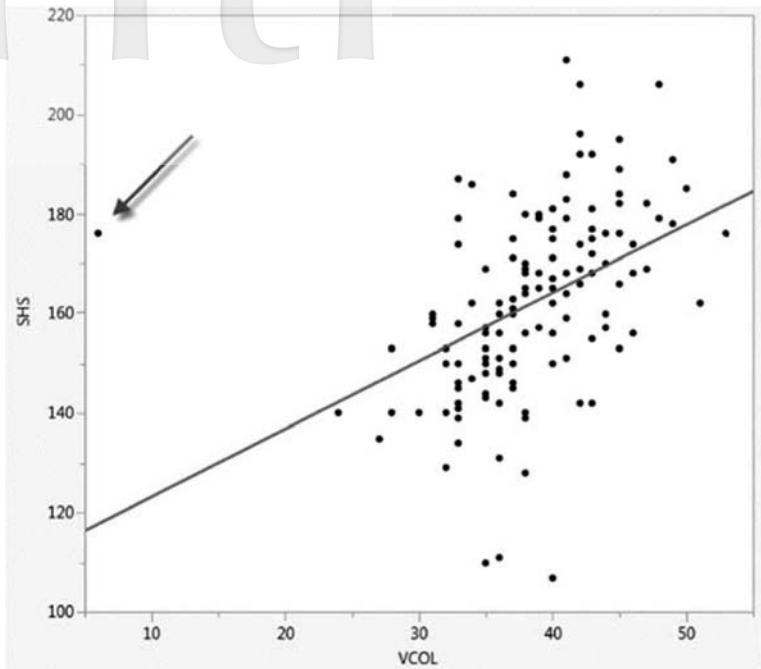

Figure 2. *Scatterplot of SHS vs. VCOL*

Additional evidence supporting the construct validity of the SHS was the discrimination of low and high VCOL groups (median split) by SHS scores. The mean SHS score of the high VCOL group was much higher (M = 172.35, SD = 15.23) than the low VCOL group (M = 153.01, SD = 16.70), and the difference between the two groups was significant [$t(126) = 7.01$, $p < .001$]. The boxplots in Figure 3 indicate that in both high and low VCOL groups there were outliers, located outside the lower tail or the upper tail of the boxplots. After the outliers were removed, the high VCOL group had a mean of 172.79 and an SD of 13.84, whereas the low VCOL group had a mean of 154.25 and an SD of 13.56, yet the difference remained significant [$t(125) = 7.70$, $p < .0001$]. These findings confirmed the construct validity of the SHS.

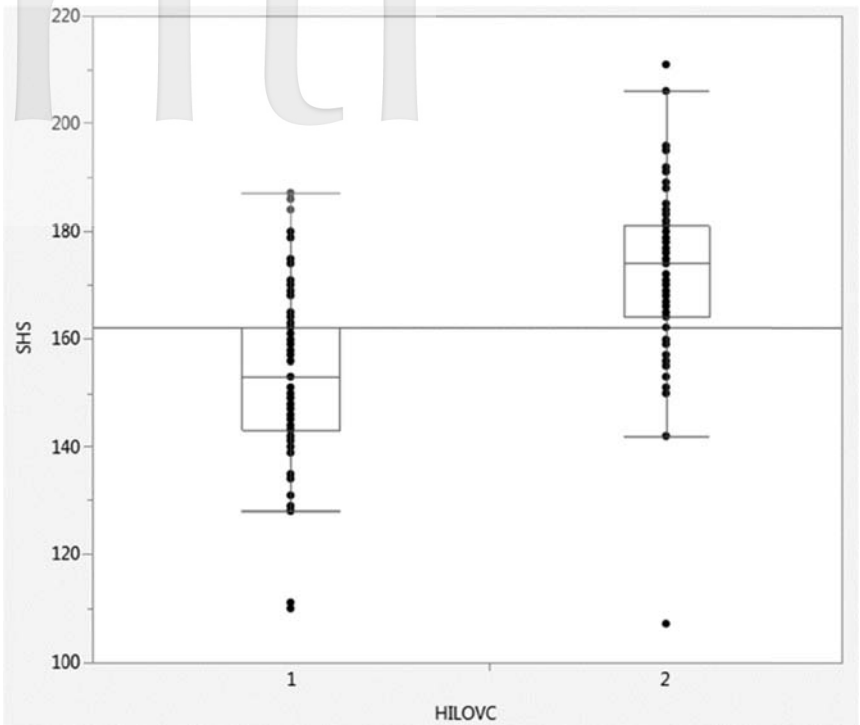

Figure 3. *Boxplots of high and low VCOL groups*

Convergent validity

Analysis of data from Sample 2 supported the convergent validity of the SHS. As discussed in the previous section, the VCOL represents the same concept of hierarchy (vertical ranking of relationships) as the SHS. The convergent validity of SHS was also evidenced by its positive correlation with VCOL (r = .53, p < .001). Similarly, the correlation between the SHS and INT was significantly positive (r = .55, p < .001), as expected, because both measures were designed to assess interdependence in relationships. In addition, as the SDO measured disagreement with attitudes supporting equality, a positive correlation was expected and confirmed between the SDO and the SHS (r = .32, p < .001). These findings confirmed the convergent validity of the SHS.

Discriminate validity

Data from Sample 2 were also used in the analysis of discriminate validity. The relationship of the SHS and the subscales of the SDO provided clear evidence of the discriminate validity of the SHS. Both the SHS and the GBD subscale of the SDO relate to verticality, but the GBD does not address individual roles within the group. Therefore, the GBD subscale was expected and confirmed to have a weaker correlation with the SHS (r = .19, p < .05) than the overall SDO. On the other hand, under the propriety model, hierarchy is about interdependence, order, and family ties as opposed to equality, which was reflected in the OEQ subscale. This contrast was supported by the negative correlation between the OEQ and the SHS (r = -0.24, p < .01).

There were some intriguing relationships between the SHS and SDO subscales. First, there was a negative but significant correlation between the *practices* subscale and the OEQ, while the *practices* subscale was not correlated with the GBD (r = 0.01, p = .95). Second, the *concepts* subscale had a weak negative correlation with the OEQ (r = -0.19, p < .05) and a positive correlation with the GBD (r = 0.35, p < .01). Specifically, the differences between the two subscales were discriminated through the GBD subscale but not through the OEQ subscale.

Discussion

The underlying construct of social hierarchy discussed in this paper is grounded on the propriety model with a focus on Eastern culture. The relationships of the concept of social hierarchy with other related theories were discussed in detail. The SHS was developed as a tool to measure social hierarchy. Four samples, with a total of more than 1,000 participants, were involved in the course of developing the scale. The SHS consists of 32 items with 16 items in each of the two subscales (*concepts* and *practices*). Reliabilities for the scale and its two subscales were found to be high in light of their internal consistencies (as indexed by Cronbach's α) and the test-retest reliability. A series of validity analyses were performed to validate the SHS as a measure of social hierarchy under the propriety model.

The data confirmed that the SHS was positively related to interdependence and

verticality, as predicted. Relationships between the SHS and SDO subscales pointed to several intriguing differences at the conceptual level. More specifically, the GBD subscale correlated only with the *concept* subscale of SHS but not the *practice* subscale, and the correlations between the OEQ subscale and the two subscales of the SHS were roughly equivalent. This suggests that there may be some discrepancy between inward thoughts and outward behaviors. Future research is needed to further investigate how these two components are related. It would also be interesting to examine whether this discrepancy is universal, or unique to either East Asian or Western culture.

One important contribution of this paper is the development of the social hierarchy construct and scale utilizing an indigenous approach. This indigenous approach makes the content and scenarios included in the scale culturally relevant; therefore, it can better capture and extract the true latent construct of social hierarchy. The SHS, as a measurement tool, has many potential applications for empirical studies across various domains. For example, it can be applied to study immigrant groups from East Asia with respect to how their cultural acclimation relates to workplace behaviors and satisfaction. The scale may also provide information on individual differences in leadership and entrepreneurship development as well as career path decisions. Such information can be helpful in understanding which professionals succeed in different organizations. Furthermore, the scale may be of value when selecting effective strategies to counsel various groups of individuals in regard to family and social issues.

Conclusion

In sum, developing a scale to measure social hierarchy using an indigenous approach had the advantage of capturing the essence of this culturally-dependent construct. The examinations of the factor structure and the categorizations of subscales provided a unique and comprehensive understanding of social hierarchy since they laid out a conceptual framework of social hierarchy. Confirmed by rigorous examinations of psychometric properties and meeting the satisfactory reliability and validity criteria, the developed SHS is a reliable measurement tool of the latent construct of social hierarchy.

The final 32-item SHS is included in the Appendix. The English version of the SHS was established through the use of back translation by content experts (presented in Table 2). With both Chinese and English versions of the SHS available, samples in both East Asian and Western cultures can be obtained. Together with other well-established scales [e.g., Independence-Interdependence Scale (Singelis, 1994) and the Social Dominance Scale (Jost & Thompson, 2000)], intriguing cross-cultural differences on topics related to social hierarchy could be investigated. Furthermore, if the norm of the SHS can be established by a sufficiently large sample, it may also open up many possible applications of the SHS in theoretical or empirical research.

Discussing social hierarchy from the relatively less-studied perspective of the propriety model provides fresh perspective in understanding this latent construct. The contrast between the equality and propriety model unites the Eastern and Western perspectives of social hierarchy and maps it onto a bigger theoretical framework. Together with other empirical studies that exploring cross-cultural differences, we hope to contribute to the understanding of various concepts, constructs, and factors related to social hierarchy in the context of both Eastern and Western cultural perspectives.

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Appendix
內在社會階級構念量表

請在下列句中圈選出你同意該敘述的程度：

非常不同意 1 2 3 4 5 6 7 非常同意

1	我快樂與否要視我父母快樂與否定定。	1	2	3	4	5	6	7
2	在家庭中，長輩背負著教導晚輩的責任。	1	2	3	4	5	6	7
3.	當我的父母堅持告訴我該做什麼時，我相信他們懂得比我多。	1	2	3	4	5	6	7
4.	父母的出發點都是為子女好，作子女的要能體會父母的苦心。	1	2	3	4	5	6	7
5.	我會關心並輔導我的學生課業以外的事情，例如：生涯規劃、人際關係。	1	2	3	4	5	6	7
6.	「上位者優先」是理所當然的事。	1	2	3	4	5	6	7
7.	我會自動調整自己來符合父母親對我的期望。	1	2	3	4	5	6	7
8.	身為長輩，我會嚴格地要求自己，以作為晚輩的榜樣。	1	2	3	4	5	6	7
9.	我一向特別照顧比我年幼的朋友們。我期許自己要照顧學弟妹。	1	2	3	4	5	6	7
10.	身為研究室裡的一員，我應該犧牲個人的利益以維持我教授的利益。	1	2	3	4	5	6	7
11.	我期許自己要照顧學弟妹。	1	2	3	4	5	6	7
12.	在家庭中，長輩背負著教導晚輩的責任。	1	2	3	4	5	6	7
13.	我可以從長輩的典範中學到很多。	1	2	3	4	5	6	7
14.	我期望那些比我小（年紀／位階）的心能信賴我的決定和選擇。	1	2	3	4	5	6	7
15.	聽專題演講的時候，我會讓座給我的教授。	1	2	3	4	5	6	7
16.	因為我尊重應當尊重的人，我和位階（輩份）比我高的人相處融洽。	1	2	3	4	5	6	7
17.	團體是由個人處在不同的位階及角色所組成的。	1	2	3	4	5	6	7
18.	當我想到人際互動，階層關係（輩份關係）是必要的。	1	2	3	4	5	6	7
19.	社會要有效率地運作，「位階關係」與「輩份關係」不是必要的。	1	2	3	4	5	6	7
20.	適當的階層關係（輩份關係）可以增加社會的運作效率。	1	2	3	4	5	6	7
21.	在許多人需要共同生存的情況下，位階關係（輩份關係）可以帶來和諧。	1	2	3	4	5	6	7
22.	一個人生下來就在一個位階關係（輩份關係）的網裡。	1	2	3	4	5	6	7
23.	一個領導者的權力來自他在關係網所取得的資源。	1	2	3	4	5	6	7
24.	我認為社會中既定的階層關係（輩份關係）是很難被挑戰或顛覆的。	1	2	3	4	5	6	7
25.	一個團體的領導者就如同一家之主。	1	2	3	4	5	6	7
26.	一個領導者的正當性來自於他所處的位置。	1	2	3	4	5	6	7
27.	家庭是個人因血緣並以輩份關係（位階關係）相互連結而組成的。	1	2	3	4	5	6	7
28.	階層關係（輩份關係）的存在能夠維持社會秩序。	1	2	3	4	5	6	7
29.	依著明白自己的位置來扮演好在團體中的角色對我而言是很重要的。	1	2	3	4	5	6	7
30.	就人際關係而言，知道我在位階關係（輩份關係）裡的角色可以幫助我預期他人的期望或需要。	1	2	3	4	5	6	7
31.	「位階關係」（輩份關係）能使大家比較容易拿捏人際中適切的舉動。	1	2	3	4	5	6	7
32.	當每個人在人際關係中扮演好自己的角色時，我會感到安心／有安全感。	1	2	3	4	5	6	7