

# 中文版團隊認同量表的發展與心理計量檢測

## Development and Psychometric Testing of the Group Identification Scale (Chinese Version)

鄧景宜

盧瑞芬

趙銘崇

許文馨

Ching-I Teng Jui-fen Rachel Lu Minston Chao Wen-Hsin Hsu

### 摘要

多數的產業都重視團隊合作這項議題，其中，健康服務是一個重要的產業，也通常是由團隊所提供。對於團隊有強烈的認同感有助於提升團隊的效能，然而，目前仍缺乏一個發展較為完善的中文版團隊認同量表。基於 Mayhew et al. (2010) 的研究，本研究發展一個中文版的團隊認同量表，使用前譯與回譯過程來確認語意同等性，此外，也檢測中文版本的心理計量特性。研究一的參與者為 229 位大學生，研究二的參與者為 290 位北台灣一所醫學中心的白天班護理人員。中文版本也與原版本比較，分析結果發現本研究所發展之中文版本具有足夠的信度、收斂效度、以及區辨效度。因此，此中文版本量表是一個有足夠品質的量表，可協助諸多產業管理者評估其服務提供者的團隊認同的水準，也可以用來協助管理者調整其管理政策與強化管理效能。

關鍵詞：團隊認同、量表發展、前譯、回譯、心理計量特質。

### ABSTRACT

The issues of teamwork have recently come under the spotlight across a range of industries. Among them, health services comprise an important service sector, and such services are generally delivered by teams. A strong identification with the team can improve a team's effectiveness. However, a Chinese version of a well-developed scale of group identification is lacking. This study develops a Chinese translation of a group identification scale, based on the Group Identification Scale of Mayhew, Gardner, and Ashkanasy (2010). Semantic equivalence is ensured using forward and backward translation. Additionally, the psychometric properties of the Chinese version are tested, based on survey data, which consists of 229 responses from college students in Study 1 and 290 responses from day-shift nurses in a northern Taiwan medical center in Study 2. Moreover, the Chinese version is compared with the scale of Mayhew et al. (2010). Analysis results indicate that the Chinese version exhibits sufficient reliability, convergent validity, and discriminant validity, thus offering a quality scale for the managers of many industries to assess the level of group identification among their service providers. The scale can also help managers to adjust management policy and enhance management efficiency.

Keywords: Group identification; scale development; forward translation; backward translation; psychometric properties.

### 1. Introduction

Good teamwork usually has a positive concomitant effect on job performance, making group identification an important issue both for the

group members and the operation of the team, and also to the recipients of the wide range of services delivered by teams.

When strongly identifying with a team,

individuals strive to reach a consensus. Moreover, individuals who strongly identify with a group tend to comply with leaders (Hogg & Hains, 1998), commit themselves to the group (Ellemers, Spears, & Doosje, 1997), increase their intention to stay within the group, and highly prioritize the group's interests (Zdaniuk & Levine, 2001). [The](#) above findings demonstrate the relevance of evaluating group identification.

Mayhew, Gardner, and Ashkanasy (2010) developed [a Group Identification Scale](#) to assess identification with a team. The scale has [elevated](#) psychometric properties and requires only a short response time. However, the lack of a Chinese version of the scale has prevented its wide applicability to Chinese-speaking managers. A Chinese version could help managers evaluate the group identification status of their [team](#) members in order to take necessary measures to improve such identification.

Therefore, this study develops a Chinese translation of [a Group Identification Scale](#), based on the scale of Mayhew et al. (2010). Its psychometric properties are also examined, along with a comparison of those results with those of Mayhew et al. (2010). [These](#) analysis results demonstrate the quality of the Chinese version in evaluating group identification.

## 2. Literature Review

### 2.1 Group Identification

Group identification refers to how individuals attribute team achievements and failures personally (Ashforth & Mael, 1989). As for its formal definition, group identification refers to how individuals view themselves within a group (Tropp & Wright, 2001). This definition corresponds [with](#) the general definition of “identification”: “psychological orientation of the self in regard to

something (as a person or group)” (Merriam-Webster Online Dictionary, 2012). Therefore, this study also defined group identification as how individuals view themselves within a group.

Group identification profoundly impacts individual psychology. In particular, group identification involves a specific role in a group (i.e. parent in a family, goalkeeper on a soccer team) (Ashforth & Mael, 1989), individuals' self-evaluation of their status in a group, and the pride that individuals experience in belonging to certain groups (Smith & Tyler, 1997). The pride associated with group identification derives from the perception of acceptance by group members and confidence in the group's reputation (Kreiner & Ashforth, 2004).

Group identification also affects individual behavior within a group. Individuals who strongly identify with a group tend to strive to reach a consensus with the other group members. Moreover, individuals who strongly identify with a group also tend to comply with the group leaders (Hogg & Hains, 1998). The literature indicates the importance of group identification in [the](#) management [of most industries](#). Restated, the strong identification of members with their teams can improve team effectiveness, ultimately [resulting in](#) high-quality service outcomes.

### 2.2 Group Identification Scale

[Group identification contains three sources, i.e., cognitive, affective, and behavioral \(Henry, Arrow, & Carini, 1999\). The three were stated as three dimensions of group identification \(by Henry et al., 1999\), increasing confusion around whether they are sources or dimensions.](#)

[Based on solid psychological literature \(i.e.,](#)

Brewer, 1991; Markus & Kitayama, 1991), Mayhew et al. (2010) developed the idea that group identification consists of self-definition and belongingness. This study chose to translate the scale of Mayhew et al. (2010) for several reasons. First, the scale was developed basing on solid psychological literature. Second, the scale is relatively short (11 items), indicating its usefulness of application. Third, the scale is relatively up-to-date. Fourth, the scale consists of two useful dimensions, i.e., self-definition and belongingness that are specific and viable to managers.

The scale of Mayhew et al.'s (2010) was derived from a pool of 30 items selected because each was a concise statement. Their scale had five points, ranging from 1 (very disagreeable) to 5 (very agreeable) and they solicited eight social and organizational psychologists to examine inter-rater reliability. The intraclass correlation coefficient (ICC) was .70. The experts also added seven items to the item pool and scored the items in terms of their appropriateness in determining group identification. The scores ranged from 8 to 24. The seven items scoring less than 14 were excluded.

While using the above items, Mayhew et al. (2010) surveyed 126 Australian undergraduates (among them, 77.8% were female, and the average age was 21.2 years old). Their responses were analyzed using exploratory factor analysis (EFA). Analytical results indicated that the retained 20 items were loaded on two factors. The two factors were labeled belongingness and self-definition.

### 2.3 Psychometric Properties of the Group Identification Scale

While drawing upon the responses from the 221 participants, this study determined the Cronbach's  $\alpha$  for the items evaluating self-definition to be .86. Cronbach's  $\alpha$  for the items evaluating

belongingness was .76. Performance of Cronbach's  $\alpha$  conformed to the suggestion of Nunnally and Bernstein (1994). Indicator loadings for the items exceeded .52, thus satisfying Anderson and Gerbing's (1988) criterion for convergent validity. Moreover, the two-factor model outperformed the one-factor model in the chi-squared difference test, which supports adequate discriminant validity. Notably, the convergent validity and discriminant validity are the common terms in the CFA paradigm. Eventually, the model fit indices performed acceptably ( $\chi^2 = 75.09$ , GFI = .93, AGFI = .90, RMSEA = .06, NFI = .85, CFI = .93).

As for the convergent validity, the scores of belongingness were positively related to extraversion ( $r = .30, p < .01$ ) agreeableness ( $r = .37, p < .01$ ), and the need for affiliation ( $r = .30, p < .01$ ). Moreover, the scores of self-definition were positively related to the need for affiliation ( $r = .43, p < .01$ ). The above analytical results conformed to previous findings (Dollinger & Clancy, 1993; Dollinger, Preston, O'Brien, & DiLalla, 1996; Wiesenfeld, Raghuram, & Garud, 2001), thus supporting the convergent validity of the group identification scale.

Mayhew et al. (2010) performed another survey that involved 180 Australian undergraduates. Of the respondents, most were male (57.2%) and their ages ranged from 18 to 36 years old. According to the survey results, the two-factor structure outperformed the one-factor structure. Moreover, the analytical results confirmed that the scale had sufficient reliability and validity.

Regarding the scale stability, Mayhew et al. (2010) solicited 57 graduate students to form a panel for the first survey round and retained 40 of them in the second round 12 weeks later. Most of the retained participants were male (67%) and

averaged 31 years [of age](#). The analytical results demonstrated a tolerable test-retest reliability for the scores for belongingness ( $r = .46, p < .05$ ). The scores for self-definition also had a [sufficient](#) test-retest reliability ( $r = .70, p < .01$ ). Additionally, the scores for self-definition and belongingness in the first round did not significantly differ from those in the second round, further supporting the scale's stability.

## 2.4 Forward and Backward Translation

Rigorous translation processes are required when developing a scale based on [one](#) in [an](#) alternative language. The translation of scales into another language can increase the applicability of the scales in international contexts. An illustrative example is the survey instrument for patient-reported outcome, SF-36, which has been translated into more than 140 languages. Its Chinese version was translated and tested by Lu, Tseng, and Tsai (2003). The translation facilitates an international comparison of the test results.

When translating scales into another language, translation should ensure measurement-tool equivalence (Church, 2001) and include forward and backward translation, which have been extensively adopted in studies that translate scales from one language to another (Jones & Kay, 1992). Forward and backward translations can ensure the equivalence between the original scales and the translated versions (Behling & Law, 2000; Chen, Chiou, & Chen, 2008). The benefits of forward and backward translations motivated the use of these methods in the scale translation efforts of this study.

Forward translation refers to the translation of a scale from the original language (i.e. English in this study) into the target language (i.e. Chinese in this study). Backward translation refers to translation from the target language (i.e. Chinese in

this study) back to the original language (i.e. English in this study), subsequently generating a second version in the original language. The two versions (i.e. original and second one) are compared to examine whether they [are](#) consistent in context. This process examines whether the translated version contains the essential meaning of the original scales. When the two versions are determined to be consistent with each other, the translated version (i.e. the Chinese version in this study) can be regarded as equivalent to the original scale (McDermott & Palchanes, 1994; Sousa, Zauszniewski, Mendes, & Zanetti, 2005; Yu, Lee, & Woo, 2004).

## 3. Method

### 3.1 Forward and Backward Translation

Prior to conducting the studies, the authors obtained agreement from Dr. Mayhew via email to translate the scale into Chinese. The forward translation was performed from September to October, 2011. [Three](#) bilingual experts were invited to conduct [it](#), i.e. to translate the scale of Mayhew et al. (2010) from English [into](#) Chinese. The three experts were qualified [in](#) conducting forward translation because they had acquired PhD degrees [and](#) expertise in translation or English language education. All three were university faculty members. The original group identification scale of Mayhew et al. (2010) includes 11 items. Each expert was requested to produce their own translation individually. [The](#) three versions were then synthesized into a consolidated version. Following the forward translation, the backward translation was performed from October to November, 2011. Two experts not involved in the forward translation were invited to perform the backward translation. Each expert was asked to translate each of the 11 items in Chinese (i.e. the

results of the forward translation) into English. The backward-translated items were compared with [the](#) original version of the scale. Notably, the items were considered to have been successfully backward translated if items in the backward-translated version were consistent in context with the corresponding original scale.

### 3.2 Word Modification of the Translated Scale

When the preliminary Chinese version was ready, a pilot study was performed to confirm its clarity to the respondents. [Nineteen](#) senior nurses were invited to participate in [the](#) pilot study that focused on ensuring the clarity of the scale.

### 3.3 Research Design

This study then used two cross-sectional studies to examine the psychometric properties of the Chinese version. Questionnaires and survey methods were used to collect data. Study 1 was used to preliminarily examine the psychometric

properties of the Chinese version, while Study 2 was used to further examine its applicability in practice.

### 3.4 Data Collection for Study 1

In the first study, the inclusion criterion [was](#) full-time students who can read and respond to items in [the](#) Chinese language. Prospective respondents were briefed with the research purpose, and questionnaires were issued to those who agreed to participate. [In](#) total, 231 students in one university returned 229 complete questionnaires, yielding an effective response ratio of 99.1%.

[Among the respondents, 128 \(55.9%\) were female and the majority \(59.0%\) studied in management-related departments. The profile of the respondents is described in Table 1.](#)

Table 1: Participant Profile for Study 1

Variable	Category	Frequency	Percent (%)
<a href="#">Gender</a>	Male	<a href="#">101</a>	<a href="#">44.1</a>
	Female	<a href="#">128</a>	<a href="#">55.9</a>
<a href="#">Department</a>	Health Care Management	<a href="#">68</a>	<a href="#">29.8</a>
	Business Administration	<a href="#">67</a>	<a href="#">29.2</a>
	Biomedicine	<a href="#">32</a>	<a href="#">14.0</a>
	Information Engineering	<a href="#">23</a>	<a href="#">10.0</a>
	Others	<a href="#">39</a>	<a href="#">17.0</a>

### 3.5 Data Collection for Study 2

The inclusion criteria for the nurses in the study [were](#) as follows: work full-time; do not work as nursing supervisors or student nurses; have worked for six months or longer; and worked [ed](#) during the day shift in the data-collection phase of the study. The inclusion criteria ensured comparability across the participants and fulfilled the research objectives. Next, all of the nurses who fit the above criteria were surveyed. Such an approach maximizes the sample representativeness in this study.

The first survey round lasted from March 6 to April 3, 2012. The sample consisted of nurses in a northern Taiwan medical center. The study received ethical approval from the institute review board ([100-3110B](#)) and the nursing departments of the medical center before the data [was](#) collected.

Before data [was](#) collected, research assistants were oriented on research ethics and data collection. The research assistants solicited eligible participants by briefing them on the study purpose. The consenting participants were requested to sign informed consent forms. All nurses included in this study were assigned a unique code. The research

assistants then made appointments with the participants to collect the completed questionnaires within three days. This procedure was followed to prevent interruptions in the nurses' work schedules. It total, 299 questionnaires were issued and 290 were collected, yielding a return rate of 97.0%.

After the first survey round, the second survey round was held in May and June 2012. Questionnaires were sent to the participating nurses with the return address placed on an envelope to be returned via the post office. In total, 99 valid responses out of 208 participants who can be contacted were collected to yield a return rate of 47.6%.

The following examines the psychometric properties of the Chinese version. The same procedure was applied to the data of Study 1 and Study 2 with one exception that test-retest reliability was assessed using only the data of Study 2 because of it involved two survey rounds.

The questionnaire comprised two parts. The

first part contained the 11 items in the Chinese version of the Group Identification Scale. The second part collected information concerning the participant's gender, age, educational level, nursing experience, and nursing certification level (e.g., N1, N2, N3, and N4). Details of the nursing certification levels can be found in Teng et al. (2012).

Table 2 summarizes demographic distribution of the participants. Among the participants, 99.3% were female; 95.9% were below 40 years old; 96.2% had acquired a bachelor's degree; 59.0% had nursing work experience of less than 10 years; and 51.8% had a nursing certification level of N2 or N3. The profile indicates that the participants were young women with a relatively high educational attainment. According to the National Union of Nurses' Association of the Republic of China (2012), 98.8% of all nurses are female. Similar to nationwide statistics, most of the participants in this study were female.

Table 2: Participant Profile for Study 2

Variable	Category	Frequency	Percent (%)
Gender	Female	288	99.3
	Missing	2	0.7
Age	≥ 20 and < 30 years old	169	58.3
	≥ 30 and < 40 years old	109	37.6
	≥ 40 and < 50 years old	9	3.1
	Missing	3	1.0
Educational level	High schools	3	1.0
	Universities/colleges	279	96.2
	Graduate institutes	4	1.4
	Missing	4	1.4
Nursing work experience	< 1 year	37	12.8
	≥ 1 and < 5 years	97	33.5
	≥ 5 and < 10 years	74	25.5
	≥ 10 and < 15 years	52	17.9
	≥ 15 and < 20 years	23	7.9
	≥ 20 years	4	1.4
	Missing	3	1.0
Nursing certification level	N/N0	52	17.9
	N1	32	11.0
	N2	79	27.3
	N3	71	24.5
	N4	54	18.6
	Missing	2	0.7

### 3.6 Instrument-Convergent Validity

Mayhew et al. (2010) found that belongingness (i.e. one dimension of group identification) is positively related to agreeableness. The construct

agreeableness was operationalized using sympathetic, warm, kind, and cooperative, and was found to play an influential role in nursing contexts (Chang, Teng, Chu, Chang, & Hsu, 2012). Therefore, agreeableness was adopted in this study



as a criterion for belongingness. The four-item scale of Chang et al. (2012) had a reliability of .94 and sufficient convergent validity (i.e. loadings exceeding .90); the same scale also had a reliability of .87 in another study (Teng, Huang, & Tsai, 2007a), indicating sufficient reliability and validity of this scale. Additionally, the agreeableness scale was used in [the Chinese version of Teng et al. \(2007a\)](#). Hence, this scale was adopted in this study to evaluate agreeableness.

Mayhew et al. (2010) observed that extraversion is positively related to belongingness. Therefore, extraversion was selected as another criterion for the belongingness dimension. The two-item scale of Teng et al. (2007a) had a reliability of .79. Moreover, in Teng et al. (2007a), the two items had indicator loadings exceeding .74, thus demonstrating sufficient validity. Moreover, the two-item scale of extraversion was used in [the Chinese version](#). Hence, the scale of Teng et al. (2007a) was used in this study to evaluate extraversion.

Moreover, Mayhew et al. (2010) found that the two dimensions (i.e. belongingness and self-definition) are positively related to the need for

affiliation. Therefore, the need for affiliation was used as another criterion for the two dimensions in this study. Armeli, Eisenberger, Fasolo, and Lynch (1998) developed a five-item scale for evaluating the need for affiliation that involved a response option with a seven-point Likert scale. The five items had a reliability of .85 and loadings that exceeded .60, implying the feasibility of using this to evaluate the need for affiliation with sufficient reliability and validity.

Finally, Kreiner and Ashforth (2004) found that the group's reputation is associated with group identification. Therefore, in this study, the group's reputation was used as a criterion for group identification. Walsh, Beatty, and Shiu (2009) developed a customer-based reputation scale. The group's reputation in this study was evaluated using this four-item sub-scale for product and service quality. However, one item, "develops innovative services," was deleted in Study 2 because innovative services [may not be](#) highly valued in the healthcare context.

Table 3 summarizes the criteria for the two dimensions (i.e. belongingness and self-definition) of the group's identification.

Table 3: Criteria for Belongingness and Self-Definition

Dimension	Validity Criteria
Belongingness	Agreeableness, Extraversion, Need for Affiliation, Reputation of the Group
Self-Definition	Need for Affiliation, Reputation of the Group

### 3.7 Instrument-Psychometric Properties and Test-Retest Reliability

Psychometric properties of the Chinese version were tested by analyzing the data of Study 2 via the CFA process. Reliability of the scale was also tested using Cronbach's  $\alpha$  values, composite reliability, and average variance extracted. Additionally, convergent validity was tested using indicator

loadings. Discriminant validity was also tested by comparing the average variance extracted and squared correlation. Furthermore, the test-retest reliability was examined by averaging the responses in the first survey round and correlating the results with the average response in the second round.

## 4. Results

### 4.1 Forward and Backward Translation

After forward and backward translation, the twice translated English items were compared with the English items in the original scale. That comparison revealed no significant differences, thus verifying the semantic equivalence of the translated Chinese scale and the original English scale.

### 4.2 Word Modification of the Translated Scale

In the pilot study, most of the participants (63.2%) ranged from 40 and 50 years old. Most (52.6%) had acquired more than 20 years of nursing experience.

As the senior nurses suggested, the word “mission” was deleted from the third item evaluating belongingness. Stating that someone represents a group’s mission is seldom done in Chinese society. Other suggestions included revising the meaning of the items and, thus, were not adopted. The Chinese version of the Group Identification Scale was placed in the Appendix.

### 4.3 Assessment of Psychometric Properties for Study 1

This study also evaluated the reliability and validity of the Chinese version of the Group Identification Scale by using confirmatory factor

analysis (CFA). The results of the CFA are listed in Table 4. The items for each construct had Cronbach’s  $\alpha$  exceeding .79 ( $> .70$ ), fulfilling the criterion of Nunnally and Bernstein (1994). Composite reliability (CR) exceeded .84 ( $> .60$ ) and average variance extracted (AVE) ( $> .50$ ), fulfilling the criteria of Bagozzi and Yi (1988). Moreover, indicator loadings exceeded .51 ( $> .50$ ), satisfying the convergent validity criterion of Anderson and Gerbing (1988). The correlation between the average score for the two dimensions (i.e., belongingness and self-definition) was .60 ( $p = .00$ ), indicating that the two dimensions are likely sub-dimensions of group identification. The squared correlation between the two dimensions was .36, below the AVEs (i.e., .51 and .57), meeting the discriminant validity criterion of Fornell and Larcker (1981).

Some fit indices performed acceptably (CFI = .93, NFI = .93) while others performed suboptimally (RMSEA = .18; GFI = .78). This study aimed to translate the scale of Mayhew et al. (2010) and therefore did not delete items. However, the fit indices indicated the potential for future research to develop a better scale measuring group identification. Moreover, the value of a study should be evaluated as a whole, not solely on the performance of fit indices (Fabrigar, Porter, & Norris, 2010; Iacobucci, 2010).

Table 4: Results of the Confirmatory Factor Analysis for Study 1

Construct-Item	Mean	SD	$\lambda$	$\alpha$	95% C.I. of $\alpha$	CR	AVE
<b>Belongingness</b>				.79	[.75, .84]	.84	.51
<u>I have a lot in common with other members of my groups.</u>	4.86	1.21	.61				
<u>I enjoy being part of my groups.</u>	5.69	1.09	.82				
<u>No matter which group I belong to, I would like to think of myself as representing what that group stands for.</u>	4.79	1.28	.51				
<u>I would rather say ‘we’ than ‘they’ when talking about the groups I am part of.</u>	6.02	1.14	.78				
<u>I am comfortable with other people knowing about my group memberships.</u>	5.75	1.17	.81				
<b>Self-Definition</b>				.87	[.84, .90]	.88	.57
<u>When I think about myself, I think about the groups I am part of.</u>	5.20	1.17	.80				
<u>Being a member of groups provides me with a strong sense of who I am.</u>	5.03	1.21	.84				
<u>Being a part of groups provides me with an identity.</u>	5.29	1.13	.89				
<u>My understanding of who I am comes from the groups I am part of.</u>	4.42	1.34	.69				
<u>Without the groups I am part of, I would feel incomplete.</u>	4.32	1.61	.61				
<u>My groups illustrate who I am.</u>	4.24	1.36	.64				

Note.  $\lambda$  denotes indicator loading; CR denotes composite reliability; AVE denotes average variance extracted.



#### 4.4 Assessment of Psychometric Properties for Study 2

Table 5 summarizes the CFA results of Study 2. Items measuring each dimension had a Cronbach's  $\alpha$  exceeding .90, thus satisfying the criterion of Nunnally & Bernstein (1994) that Cronbach's  $\alpha$  should exceed .70. This criterion is widely adopted in scale development literature (e.g., Kim & Kim, 2010; Teng, Ing, Chang, & Chung, 2007b). Items measuring each dimension also had a composite reliability (CR) that exceeded .92, thus satisfying the criterion ( $> .60$ ) of Bagozzi and Yi (1988). Moreover, items measuring each dimension had an average extracted variance (AVE) that exceeded .69, thereby satisfying the criterion ( $> .50$ ) of Bagozzi and Yi (1988). Items measuring each dimension had an indicator loading greater than .72, thus meeting the convergent validity criterion ( $> .50$ ) of

Anderson and Gerbing (1988). The squared correlation between the two dimensions was .55, which was below the AVE of each dimension (i.e., AVE = .69 for belongingness and AVE = .76 for self-definition). This finding suggests that this study has sufficient discriminant validity, according to the suggestion of Fornell and Larcker (1981).

Some fit indices performed acceptably (CFI = .94, NFI = .93) while others performed suboptimally (RMSEA = .14; GFI = .85). This study aimed to translate the scale of Mayhew et al. (2010) and therefore did not delete items. However, the fit indices indicated the potential for future research to develop a better scale measuring group identification. Moreover, the value of a study should be evaluated as a whole, not solely on the performance of fit indices (Fabrigar, Porter, & Norris, 2010; Iacobucci, 2010).

Table 5: Results of the Confirmatory Factor Analysis for Study 2

Construct-Item	Mean	SD	$\lambda$	$\alpha$	95% C.I. of $\alpha$	CR	AVE
<b>Belongingness</b>	4.67	1.09		.90	[.88, .92]	.92	.69
<u>I have a lot in common with other members of my groups.</u>	4.59	1.18	.84				
<u>I enjoy being part of my groups.</u>	4.97	1.19	.89				
<u>No matter which group I belong to, I would like to think of myself as representing what that group stands for.</u>	4.45	1.29	.78				
<u>I would rather say 'we' than 'they' when talking about the groups I am part of.</u>	5.06	1.26	.82				
<u>I am comfortable with other people knowing about my group memberships.</u>	4.99	1.15	.83				
<b>Self-Definition</b>	4.81	1.02		.94	[.93, .95]	.95	.76
<u>When I think about myself, I think about the groups I am part of.</u>	4.94	1.20	.79				
<u>Being a member of groups provides me with a strong sense of who I am.</u>	4.75	1.15	.95				
<u>Being a part of groups provides me with an identity.</u>	4.76	1.22	.98				
<u>My understanding of who I am comes from the groups I am part of.</u>	4.60	1.23	.91				
<u>Without the groups I am part of, I would feel incomplete.</u>	4.52	1.32	.72				
<u>My groups illustrate who I am.</u>	4.50	1.33	.84				

Note.  $\lambda$  denotes indicator loading; CR denotes composite reliability; AVE denotes average variance extracted.

#### 4.5 Assessment of Convergent Validity

First, the responses to the agreeableness items were averaged, with that result correlated with the average score of the belongingness dimension. The correlation coefficient was .49 ( $p = .00$ ) for Study 1 and .53 ( $p = .00$ ) for Study 2. Second, the responses

to the two items on extraversion were averaged, and the result was correlated with the average response to the items measuring belongingness. The correlation coefficient was .30 ( $p = .00$ ) for Study 1 and .41 ( $p = .00$ ) for Study 2. Therefore, according to those criteria, the Chinese version of the Group Identification Scale's belongingness dimension had

adequate [convergent](#) validity.

In addition to agreeableness and extraversion, the responses of need for affiliation were averaged, with that result correlated with the average response to the Chinese version of the Group Identification Scale. The correlation coefficient was .53 ( $p = .00$ ) for Study 1 and .58 ( $p = .00$ ) for Study 2, indicating that the Chinese version had sufficient [convergent](#) validity.

Additionally, the correlation between the belongingness dimension and the need for affiliation was .47 ( $p = .00$ ) for Study 1 and .53 ( $p = .00$ ) for Study 2, whereas the correlation between the self-definition dimension and the need for affiliation was .48 ( $p = .00$ ) for Study 1 and .57 ( $p = .00$ ) for Study 2. The consistent correlations indicated that the Chinese version had sufficient [convergent](#) validity.

Table 6: Correlations for Assessing Convergent Validity

Variable/Criterion	Agreeableness	Extraversion	Need for Affiliation	Reputation
Self-Definition Dimension			.48*/.57*	.58*/.59*
Belongingness Dimension	.49*/.53*	.30*/.41*	.47*/.53*	.50*/.65*
Group Identification			.53*/.58*	.61*/.66*

*Note.* \* denotes  $p < .05$ . The value on the left of / was that in Study 1. The value on the right of / was that in Study 2.

#### 4.6 Assessment of Test-Retest Reliability

For the data of Study 2, the correlation coefficient between the first round and the second round of average scores was .57, which indicates a moderate level of correlation as well as sufficient test-retest reliability. In addition to the overall responses, we also examined the test-retest reliability for the two dimensions (i.e. belongingness and self-definition). The test-retest reliability was .61 ( $p = .00$ ) for belongingness and .43 ( $p = .00$ ) for self-definition. Both statistics showed sufficient test-retest reliability. In Mayhew et al. (2010), the test-retest reliability was .46 for belongingness and .70 for self-definition. Thus, the

Finally, the criterion of reputation's responses to the three remaining items was averaged, with that result subsequently correlated with the average response to items of the Chinese version of the Group Identification Scale. The correlation was .61 ( $p = .00$ ) for Study 1 and .66 ( $p = .00$ ) for Study 2, indicating sufficient [convergent](#) validity for the Chinese version. Additionally, the correlation between the belongingness dimension and the group's reputation was .50 ( $p = .00$ ) for Study 1 and .65 ( $p = .00$ ) for Study 2, whereas the correlation between [the](#) self-definition dimension and the group's reputation was .58 ( $p = .00$ ) for Study 1 and .59 ( $p = .00$ ) for Study 2. Thus, the Chinese version had sufficient [convergent](#) validity when considering the group's reputation as a criterion. [Table 6 lists the above correlations for increasing clarity.](#)

test-retest reliability values were [different from Mayhew et al. \(2010\)](#), but all [were](#) between .40 and .70 in the present study and the study of Mayhew et al. (2010).

A non-response bias was tested by using  $t$ -tests to examine whether the respondents and the non-respondents were different with regard to gender, age, educational level, nursing work experience, and nursing certification level. The non-respondents did not differ significantly from the respondents in gender (all were female), age ( $t = 1.30$ ,  $p = .20$ ), educational level ( $t = 1.34$ ,  $p = .18$ ), nursing work experience ( $t = 0.25$ ,  $p = .80$ ), and nursing certification level ( $t = 0.23$ ,  $p = .82$ ). The

lack of significant analytical results demonstrates the minimal non-response bias (regardless of the response ratio) in this follow-up study.

This study also examined whether the respondents of the second round and the non-respondents differed in their average scores of belongingness and self-definition. Analytical results indicated that the respondents and non-respondents did not differ in these dimensions ( $t < 1.82, p > .07$ ).

#### 4.7 Application of the Scale and Comparison with Mayhew et al. (2010)

Additionally, the data for Study 2 was further analyzed to examine the applicability of the scale and compare the results with those in Mayhew et al. (2010). Study 2 calculated the means, standard deviations, and the coefficient of variance of the scale among the Chinese population. Although the coefficients of variance were used for comparison because Mayhew et al. (2010) used a five-point scale, this study used a seven-point scale.

In this study, the responses to belongingness

had an average of 4.81 with a standard deviation of 1.02, subsequently generating a coefficient of variance of 0.21. In Mayhew et al. (2010), the responses to belongingness had an average of 3.85 with a standard deviation of 0.69, subsequently generating a coefficient of variance of 0.18, which is consistent with that (0.21) of this study.

Moreover, the responses to self-definition had an average of 4.67 with a standard deviation of 1.09, subsequently generating a coefficient of variance of 0.23. In Mayhew et al. (2010), the responses to self-definition had an average of 2.91 with a standard deviation 0.93, subsequently generating a coefficient of variance of 0.32. The difference between the coefficients of variance (0.23 vs. 0.32) may originate from the sample. Mayhew et al. (2010) adopted snowball sampling, which increases sample heterogeneity. Meanwhile, this study sampled nurses working for the sample hospital, which reduces heterogeneity. Table 7 lists the results to increase clarity.

Table 7: Comparison between Mayhew et al. (2010) and This Study

Variable/Criterion	Mean	Standard Deviation	Coefficient of Variance
Self-Definition Dimension	2.91/4.67	0.93/1.09	0.32/0.23
Belongingness Dimension	3.85/4.81	0.69/1.02	0.18/0.21

*Note.* The value on the left of / was that in Mayhew et al. (2010). The value on the right of / was that in this study.

## 5. Discussion

### 5.1 Main Findings and Implications for Managers

This study developed a Chinese version of a group identification scale based on the scale of Mayhew et al. (2010). The rigorous forward and backward translation process ensured the semantic equivalence of the Chinese version with the original (English) version. After forward and backward translation, 19 senior nurses were invited to participate in a pilot study to assess the Chinese

version, in terms of wording clarity. Finally, two cross-sectional studies were conducted to examine the psychometric properties of the Chinese version, one containing a sample of full-time students, and the other based on a study sample composed of nurses working in the hospital. The Chinese version has adequate psychometric properties in terms of reliability, convergent validity, discriminant validity, and test-retest reliability.

The adequate psychometric properties may originate from the quality of the scale and the rigor

of the developmental process. Moreover, the suboptimal performance of fit indices indicates the potential for future studies to develop a better scale in terms of fit indices performance.

This study provides a Chinese version of [a](#) group identification scale, thus increasing the applicability of this scale to Chinese-speaking populations. Group identification may affect [the](#) relationships among group members, and subsequently their willingness to engage in collaboration with their team. A Chinese version of [this](#) group identification scale allows managers to evaluate their members' group identification in areas with Chinese-speaking populations. With adequate evaluation of the group identification, managers can consider adapting their leadership styles or design activities to enhance the group identification of certain members. Additionally, the Chinese version of [the](#) group identification scale can be used to measure the effectiveness of the activities aiming to improve group identification. Managers can use this instrument to evaluate the group identification at baseline before implementing improvement activities, and then assess the level of group identification after the implementation of [the](#) improvement activities. The outcomes can also [offer](#) direction for future improvement activity planning.

### 5.2 Academic Implications

Mayhew et al. (2010) developed a useful scale for evaluating group identification. This study extended the results of Mayhew et al. (2010) in providing a [Chinese version of the](#) scale to evaluate group identification, thereby increasing its applicability to Chinese-speaking populations and contributing to its international impact.

Moreover, by using the forward-backward translation process, this study developed a Chinese version that is semantically equivalent to the scale

of Mayhew et al. (2010). This Chinese version allows for the measurement of individual differences in group identification among Chinese populations, thus facilitating the evaluation of the relationship between group identification and individual differences.

### 5.3 Research Limitations and Future Research Directions

This study developed a group identification scale in Chinese, the native language of more than 1.3 billion [people globally](#). Such a scale increases the international applicability of evaluating group identification. The widespread use of this scale in other languages suggests further research opportunities in developing group identification scales globally.

The participants of Study 1 were students, restraining the applicability of the Chinese version in practice. Therefore, Study 2 was conducted to examine the applicability of the Chinese version. Study 2 surveyed all of the nurses working the day shift in the ward units of a medical center. Such an approach helps to minimize the confounding effects of organizational characteristics because all of the sampled nurses worked for the same organization. However, such an approach cannot be used to examine how organizational characteristics affect the evaluation of group identification. Because the effects of organizational characteristics were beyond the scope of this study, future studies may replicate the results of this study in the context of other health care organizations and examine how organizational characteristics affect group identification.

[The American Psychological Association has adopted the Standards for Educational and Psychological Testing \(APA, 2014\). Although it is currently not the standard reporting format for the](#)

[majority of academic journals, future researchers could design, conduct, and report their studies according to it.](#)

## REFERENCES

1. [American Psychological Association \(2014\). The standards for educational and psychological testing.   
http://www.apa.org/science/programs/testing/standards.aspx. Accessed on July 9, 2014.](#)
2. Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin*, 103(3), 411-423.
3. Armeli, S., Eisenberger, R., Fasolo, P., & Lynch, P. (1998). Perceived organizational support and police performance: The moderating influence of socioemotional needs. *Journal of Applied Psychology*, 83(2), 288-297.
4. Ashforth, B. E., & Mael, F. (1989). Social identity theory and the organization. *Academy of Management Review*, 14(1), 20-39.
5. Bagozzi, R. P., & Yi, Y. (1988). On the evaluation of structural equation models. *Journal of the Academy of Marketing Science*, 16(1), 74-94.
6. Behling, O., & Law, K. S. (2000). *Translating questionnaires and other research instruments: Problems and solutions*. Thousand Oaks, CA: Sage.
7. [Brewer, M. B. \(1991\). The social self: On being the same and different at the same time.   
Personality and Social Psychology Bulletin, 17\(5\), 475-482.](#)
8. Chang, H.-Y., Teng, C.-I., Chu, T.-L., Chang, H.-T., & Hsu, W.-H. (2012). Impact of nurse agreeableness and negative mood of nursing supervisors on intention to help colleagues. *Journal of Advanced Nursing*, 68(3), 636-646.
9. Chen, Y.-H., Chiou, H.-Y., & Chen, P.-L. (2008). The development of a Chinese version of the tobacco use subscale of the behavioral risk factor surveillance system (BRFSS). *Preventive Medicine*, 46(6), 591-595.
10. Church, A. T. (2001). Personality measurement in cross-cultural perspective. *Journal of Personality*, 69(6), 979-1006.
11. Dollinger, S. J., & Clancy, S. M. (1993). Identity, self, and personality: II. Glimpses through the autophotographic eye. *Journal of Personality and Social Psychology*, 64(6), 1064-1071.
12. Dollinger, S. J., Preston, L. A., O'Brien, S. P., & DiLalla, D. L. (1996). Individuality and relatedness of the self: An autophotographic study. *Journal of Personality and Social Psychology*, 71(6), 1268-1278.
13. Ellemers, N., Spears, R., & Doosje, B. (1997). Sticking together or falling apart: In-group identification as a psychological determinant of group commitment versus individual mobility. *Journal of Personality and Social Psychology*, 72(3), 617-626.
14. [Fabrigar, L. R., Peter, R. D., & Norris, M. E. \(2010\). Some things you should know about structural equation modeling but never thought to ask.   
Journal of Consumer Psychology, 20\(2\), 221-225.](#)
15. Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39-50.
16. [Henry, K. B., Arrow, H., & Carini, B. \(1999\). A tripartite model of group identification: Theory and measurement.   
Small Group Research, 30\(5\).](#)

- 558-581.
17. Hogg, M. A., & Hains, S. C. (1998). Friendship and group identification: A new look at the role of cohesiveness in groupthink. *European Journal of Social Psychology*, 28(3), 323-341.
18. Iacobucci, D. (2010). Structural equations modeling: Fit indices, sample size, and advanced topics. *Journal of Consumer Psychology*, 20(1), 90-98.
19. Jones, E. G., & Kay, M. (1992). Instrumentation in cross-cultural research. *Nursing Research*, 41(3), 186-188.
20. Kim, M. G., & Kim, J. (2010). Cross-validation of reliability, convergent and discriminant validity for the problematic online game use scale. *Computers in Human Behavior*, 26(3), 389-398.
21. Kreiner, G. E., & Ashforth, B. E. (2004). Evidence toward an expanded model of organizational identification. *Journal of Organizational Behavior*, 25(1), 1-27.
22. Lu, J.-F. R., Tseng, H.-M., & Tsai, Y.-J. (2003). Assessment of health-related quality of life in Taiwan (I): Development and psychometric testing of SF-36 Taiwan version. *Taiwan Journal of Public Health*, 22(6), 501-511.
23. Mael, F. (1988). Organizational identification: Construct redefinition and a field application with organizational alumni. Detroit, MI: Wayne State University.
24. Markus, H. R., & Kitayama, S. (1991). Culture and the self: Implications for cognition, emotion, and motivation. *Psychological Review*, 98(2), 224-253.
25. Mayhew, M. G., Gardner, J., & Ashkanasy, N. M. (2010). Measuring individuals' need for identification: Scale development and validation. *Personality and Individual Differences*, 49(5), 356-361.
26. McDermott, M. A. N., & Palchanes, K. (1994). A literature review of the critical elements in translation theory. *Journal of Nursing Scholarship*, 26(2), 113-117.
27. Merriam-Webster Online Dictionary (2012). Identification. <http://www.merriam-webster.com/dictionary/identification>, accessed on May 1, 2012.
28. National Union of Nurses' Association, R.O.C. (2012). Statistics of Taiwanese nurses. <http://www.nurse.org.tw/DataSearch/Manpower.aspx>. Accessed on May 29, 2012.
29. Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory* (3<sup>rd</sup> ed.). New York, NY: McGraw-Hill.
30. Smith, H. J., & Tyler, T. R. (1997). Choosing the right pond: The impact of group membership on self-esteem and group-oriented behavior. *Journal of Experimental Social Psychology*, 33(2), 146-170.
31. Sousa, V. D., Zauszniewski, J. A., Mendes, I. A. Z., & Zanetti, M. L. (2005). Cross-cultural equivalence and psychometric properties of the Portuguese version of the Depressive Cognition Scale. *Journal of Nursing Measurement*, 13(2), 87-99.
32. Teng, C.-I., Huang, K.-W., & Tsai, I.-L. (2007a). Effects of personality on service quality in business transactions. *Service Industries Journal*, 27(7), 849-863.
33. Teng, C.-I., Ing, C.-K., Chang, H.-Y., & Chung, K.-P. (2007b). Development of service quality scale for surgical hospitalization. *Journal of the Formosan Medical Association*, 106(6), 475-484.
34. Teng, C.-I., Shyu, Y.-I. L., Dai, Y.-T., Wong, M.-K., Chu, T.-L., & Chou, T.-A. (2012).



- Nursing accreditation system and patient safety. *Journal of Nursing Management*, 20(3), 311-318.
35. Tropp, L. R., & Wright, S. C. (2001). Ingroup identification as the inclusion of ingroup in the self. *Personality and Social Psychology Bulletin*, 27(5), 585-600.
36. Walsh, G., Beatty, S. E., & Shiu, E. M. K. (2009). The customer-based corporate reputation scale: Replication and short form. *Journal of Business Research*, 62(10), 924-930.
37. Wiesenfeld, B. M., Raghuram, S., & Garud, R. (2001). Organizational identification among virtual workers: The role of need for affiliation and perceived work-based social support. *Journal of Management*, 27(2), 213-229.
38. Yu, D. S. F., Lee, D. T. F., & Woo, J. (2004). Issues and challenges of instrument translation. *Western Journal of Nursing Research*, 26(3), 307-320.
39. Zdaniuk, B., & Levine, J. M. (2001). Group loyalty: Impact of members' identification and contributions. *Journal of Experimental Social Psychology*, 37(6), 502-509.
- Appendix: Items of the Group Identification Scale (Chinese Version)
- Belongingness Dimension:
1. 我與團隊中的其他成員有很多的共通點
  2. 我樂於身為團隊的一員
  3. 不管我屬於哪個團隊，我自認能代表我的團隊
  4. 談及我參與的團隊時，我會說「我們」而不會說「他們」
  5. 讓別人知道所參與的團隊，我覺得很自在
- Self-Definition Dimension:
1. 當我想到自己時，我會想到我為一份子的那個團隊
  2. 身為團隊的一員讓我強烈的感受到我是誰
  3. 作為團隊的一員讓我有自我認同
  4. 我對「我是誰」的瞭解，來自於我所屬的團隊
  5. 若沒有所屬的團隊，我會感到不完整
  6. 我的團隊說明了我是誰

