

# The Content and Structure of Supervisors' Implicit Followership Theories

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## **Abstract:**

Supervisors and postgraduates exhibit a typical leader-follower relationship. This study carries out research in the field of higher education to explore the content and structure of supervisors' implicit followership theories (IFTs), reveal the characteristics of followers with different levels of cognitive categories, and develop the scale for supervisors' IFTs. In compliance with strict procedures, a total of 768 subjects are investigated through four rounds of questionnaires. Subsequently, exploratory factor analysis, confirmatory factor analysis, and reliability and validity tests are carried out on the scale developed for analyzing supervisors' IFTs. The results show that supervisors' IFTs consist of three factors: good citizen, learning ability and learning attitude. The structure and content of the supervisors' IFTs scale are different from those used in previous studies by researchers with different cultural backgrounds or in different fields. The scale for supervisors' IFTs has good reliability and validity. It can be used for postgraduate training and in relevant follow-up research.

**Keywords:** Postgraduate; Supervisor; Implicit followership theories; Validity; Reliability.

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## **I. INTRODUCTION**

Across the world today, the leader-follower relationship adopts many specific forms, such as the superior-subordinate relationship in the political sphere, the supervisor-employee relationship in the commercial sphere, the officer-soldier relationship in the military sphere, coach-athlete relationship in the sporting sphere, the teacher-student relationship in the educational sphere, and more. Teaching in schools is a process whereby in the field (situation) of schools, in order to reach the goal (shared vision) of teaching and learning, under the guidance of teachers (leaders), by relying on certain learning materials and following certain rules and procedures, students' (followers') passion for learning is stimulated and guided through teaching activities. This enables students to study automatically, autonomously and consciously, thus achieving the students' goal (vision) of "developing their learning ability and growing comprehensively". Thus, teaching activities in schools involve leadership behaviors, which are a form of leadership activities.

Research into teachers' leadership, which originated in the 1980s, has gradually become a more

important topic, attracting the interest of scholars in educational circles in the United States, the United Kingdom, Canada, Australia and other countries in recent years. Education has become the second major field for research on leadership. Many scholars have conducted in-depth research on academic leadership,<sup>[1]</sup> supervisors' leadership, and more.<sup>[2]</sup> However, most of the studies in the field of education are focused on the leadership of teachers and students.<sup>[3]</sup> They ignore the fact that followership is an important aspect of leadership. Actually, some articles have challenged this tendency of neglecting "followership" as a central part of leadership.<sup>[4]</sup> Osborne proposed that in the field of higher education, less attention should be paid to the influencing factor of leadership, and more attention should be paid to the identification of teachers' and students' followership levels. Subsequently, Osborne argued, leaders should be trained to work with different types of followers.<sup>[5]</sup> Strong and Williams held that effective followership is an important part of successful organizations and successful leadership. With regard to education, in order to achieve learning objectives, students must be actively engaged in this process instead of only functioning as receptacles for knowledge.<sup>[3]</sup>

The effectiveness of leadership depends on their followers' willingness to follow. It is therefore essential to strengthen research into followers. This research should focus not only on "what the followers are like", but also on "what the followers should be like". That is, it should include both the requirements and the expectations for followers. The "hypotheses on the followers' traits and behavior characteristics" are called implicit followership theories (IFTs).<sup>[6]</sup> It is a new research topic in western management sciences. The relevant research has been established based on previous research into followership, implicit leadership theories (ILTs), and more. It has involved conducting "in-depth analyses" into how "leaders and followers perceive, make decisions and take action" from "the perspective of followers". It has provided an important way of understanding the processes of leadership and followership within an organization. The development of the idea of IFTs can be traced back as far as Mc Gregor's X-Y theory. However, the concept of IFTs corresponding to ILTs has only been formally proposed in recent years.<sup>[6]</sup> Although the concept is relatively new, it has attracted the attention of many scholars. In recent years, review articles have suggested that it might be a way to strengthen research into followership.<sup>[7, 8]</sup> Furthermore, in *Leadership Quarterly*, an authoritative journal in the field of leadership, articles for special issues on this topic were published in 2014 and 2017.<sup>[9, 10]</sup> IFTs have since become one of the most popular topics in the field of organizational behavior. In addition to the research and debate on the concept, content, and structure of IFTs, scholars also have conducted extensive research into the processing mechanisms,<sup>[6, 11]</sup> influencing factors,<sup>[12]</sup> and the consequences of IFTs.<sup>[13, 14]</sup>

Rosch et al. first put forward a general cognitive model for the classification of things, and held that, in the vertical direction, people's classification of things can be divided into three levels: the highest level, the basic level, and the lowest level. However, many different categories are involved in each level. The category of the lower level have all the attributes or features of the higher level, and the different categories at the same level all have different attributes or features.<sup>[15]</sup> Lord et al. first transposed this model of classification into research on organizational behavior. They proposed the theory of leadership

classification (i.e. IFTs).<sup>[16]</sup> Based on the research by Rosch, Lord, et al. Sy proposed the hypothesis that IFTs can also be classified into different levels of cognitive categories.<sup>[6]</sup> Many scholars have since emphasized the importance of conducting this kind of hierarchical research.<sup>[17]</sup> However, at present, research into IFTs is generally limited to revealing the characteristics of followers at the highest level cognitive category through studying leaders and followers in the commercial field. There has been relatively little research in other fields, especially in those fields in which followers possess the basic level cognitive category. This has greatly limited the development of research into IFTs, even making it impossible to fully reveal the characteristics of followers of the highest level cognitive category.

In this paper, research on IFTs is introduced to the field of high education, and the concept of supervisors' IFTs is proposed. This helps to enrich the concept and theoretical framework of IFTs. This study focuses on the content and structure of IFTs outside the commercial field, which thereby responding to the aforementioned appeals of previous scholars. Through comparing the differences and similarities between supervisors' IFTs in the field of education and leaders' IFTs in the commercial sector, the study outlines a basis for revealing the characteristics of followers of the highest level cognitive category. The supervisors' IFTs scale established in this study can provide localized measurement tool with field characteristics for relevant research and educational practice. This study will be of significant theoretical and practical value for research into how supervisors' IFTs correspond with supervisors' leadership in the field of higher education.

## II. MEASUREMENT OF IFTS

### 2.1 The Concept of Supervisors' IFTs

Graduate learning is a process in which postgraduates are guided by supervisors in advancing their knowledge. For postgraduates, supervisors serve as “experts providing professional guidance, coaches in scientific research training, active questioners and judges, prompters and motivators, demonstrators of scientific spirit and attitude, and academic supporters”.<sup>[18]</sup> The relationship between supervisors and postgraduates is a typical leader-follower relationship. Following the definition of IFTs provided by Sy,<sup>[6]</sup> in this paper, supervisors' IFTs are defined as the anticipation and hypothesis that a supervisor has regarding the behaviors and traits of a postgraduate. Positive perceptions of followers can bring about positive expectations and produce positive results. Therefore, by starting from the perspective of positive organizational behavior, this study focuses on the “positive” aspect of supervisors' IFTs.

### 2.2 Measurement of IFTs

As shown in TABLE 1, scholars have explored the structure and measurement of IFTs in different research contexts (at home and abroad), from different research perspectives (positive perspectives and dual positive and negative perspectives), and in relation to different research contents (focusing on realistic

followers and ideal followers within the cognitive scope). However, previous studies on IFTs have all been conducted based on the overall characteristics of followers in the commercial field. There have been relatively few studies that have investigated other fields, particularly with regards to the characteristics of followers of the basic level and lowest level cognitive categories. These studies cannot be directly applied to the field of postgraduate education and are therefore not suitable for measuring the supervisors' IFTs. It will therefore be necessary and valuable to develop a targeted scale for supervisors' IFTs.

**TABLE 1. Structure and measurement of IFTs**

Scholars	Time	Structure	Items
Carsten and Uhl-Bien	2009	Passive type, positive type, and initiative type	12
Sy	2010	Prototype of IFTs (diligent, enthusiastic and good citizen)	18
Derler and Weibler	2014	Anti-prototype of IFTs (incompetence, conformity, non-compliance)	9
		The perspective of traits: diligent, enthusiastic, good citizen The perspective of behavior: exploratory behavior and exploitative behavior	14
Mohamadzadeh et al.	2015	Prototype of IFTs (work construction, work ability, leaders' right-hand assistant, moral character and initiative)	25
Junker	2016	Anti-prototype of IFTs (destructive behavior, obedience, lack of ability, indifference and depression)	21
		Ideal followers (task orientation and relationship orientation) Non-ideal followers (task orientation and relationship orientation)	21
Zhenbin Zhu and Wenhao Luo	2017	Prototype of IFTs (good citizen, working ability, working attitude)	9
Yanhong Guo and Ling Lan	2017	Prototype of IFTs (diligence, compliance, aggressiveness, emotional intelligence, and citizen behavior)	15
Kun Zhang	2017	Prototype of IFTs (ideal task and good citizen)	21
Hongyu Wang and Yunjian Li	2018	Anti-prototype of IFTs (being slack in work and destructive behavior)	9
		Prototype of IFTs (working ability, sincere support, and precious harmony)	9

### III. STUDY PROCESS

In this study, according to the general procedure for developing scales, the supervisors' IFTs scale is developed by referring to the method used by Sy et al.. Subsequently, its reliability and validity are tested. The scale developed through this method contains a smaller number of questions that can effectively reduce the subjects' workload, helping to prevent the subjects from feeling tired and improving their response rate. Therefore, it is of significant practical value to organizational research. The development of the scale involves four stages:

#### 3.1 Item Generation

The items are generated by using a single adjective (for example, "diligent"), rather than a sentence (for example, "in my mind, qualified postgraduates are diligent"). The obtained items are sorted out and summarized to form the initial questionnaire.

**Subjects.** The subjects are 98 supervisors from 48 universities or research institutes in mainland China, with an average age of 41.67 (SD=3.87). Among them, 72 (73.47%) are male and 26 (26.53%) are female. The subjects are from a range of disciplines: science (23 subjects), engineering (33 subjects), and humanities and social sciences (42 subjects).

**Procedures.** The snowball sampling method (often used in research on organizational behavior) is applied to obtain subjects, who are rewarded through a lottery.<sup>[19]</sup> The specific procedure is as follows: first, make and issue a questionnaire on a questionnaire website; second, send the questionnaire link to several supervisors from different universities who have been contacted in advance; finally, invite them to fill in the questionnaire and send the questionnaire link to 3-5 supervisors they know well.

This study only focuses on the “positive” part of IFTs. Therefore, in the questionnaire, the subjects are asked to list 15 adjectives or phrases that best describe the traits or behaviors of “qualified academic postgraduates” (or “qualified students”), with the subjects distributed randomly, in their eyes. Consistent with the viewpoint of regarding implicit theory as a “layman’s” theory,<sup>[20]</sup> the definitions of stimulus clues such as “academic postgraduates” and “students” are not provided in the questionnaire. Besides, according to Rosch’s theory of cognitive classification,<sup>[15]</sup> “academic postgraduates” and “students” are terms of the lowest level and basic level, respectively.

**Analysis process and results.** 50 subjects list a total of 586 items (some subjects fail to list 15 items) under the title of “academic postgraduates”. By sorting the data, 267 non-repetitive items are obtained. 48 subjects list 556 items under the title of “students”. By sorting the data, 248 non-repetitive items are obtained. The degree of consistency of non-repetitive items (the number of the shared non-repetitive items divided by the sum of non-repetitive items) in the two stimulus titles is 90.1%, indicating that the items listed by the subjects under the two stimulus titles are similar. Besides, the typical items generated under the title of “students” can be well reflected in the item pool under the title of “academic postgraduates”. Therefore, a combination of the two provides a total of 1142 items.

In order to control the number of items in the preliminary questionnaire to within a reasonable range, the researchers order and reduce the items through the following steps: first, they rewrite nouns, verbs, etc. as adjectives, and delete any items that are insignificant, ambiguous, and semantically fuzzy, or that do not show the traits or behavior of “qualified academic postgraduates”; then, they calculate the frequency of each item mentioned, and delete the items mentioned less than 4 times; finally, they merge items that are semantically the same or similar (such as “smart” and “wise”, “steady” and “calm”, etc.). Through this process, a total of 49 items are obtained from the item pool.

In order to make the questionnaire cleaner, clearer, and more consistent with the reading habits of Chinese subjects, the researchers induce and deduce the items obtained by reorganizing them and reducing

them into idioms (phrases) with four Chinese characters. Afterwards, six experts from the fields of management, education and psychology discuss and revise the semantic consistency and expression accuracy of the items, the initial questionnaire for supervisors' IFTs (containing 29 items) is finally obtained.

### 3.2 Exploration of Factor Structure

The goals of this stage are to test the initial questionnaire for supervisors' IFTs, to determine the basic structure of supervisors' IFTs through exploratory factor analysis, and then to develop the formal questionnaire based on the results of the analysis.

**Subjects.** At this stage, the subjects of 187 supervisors fill in the questionnaires. 171 effective questionnaires are obtained, with an effective rate of 91.44%. The effective subjects are from 59 universities and research institutions in mainland China, with an average age of 41.31 (SD = 5.70). Among them, 106 (61.99%) are male, and 65 (38.01%) are female. The subjects are from a range of disciplines: science (42 subjects), engineering (45 subjects), and humanities and social sciences (84 subjects).

**Procedures.** Data are collected from two different samples. In Sample 1, a snowball sampling method is used to obtain the subjects, who are composed of 129 supervisors. The subjects fill in the questionnaire online, and they are rewarded via a lottery. Sample 2 is composed of 42 supervisors who are not rewarded. A survey is conducted through issuing paper questionnaires on site. The initial questionnaire for supervisors' IFTs is scored on a seven-point scale and the subjects are asked to indicate how representative each item is for a qualified postgraduate in their opinion (1 = Rather inconsistent; 7 = Quite consistent). As with the process of item generation, no specific definitions for terms are provided. The t-test shows that there is no significant difference in the responses to the 29 items in the initial questionnaire for supervisors' IFTs from the subjects in either of the two samples. Therefore, the data from the two samples are merged, and exploratory factor analysis is carried out using SPSS24.0.

**Analysis process and results.** Following the advice of experts,<sup>[21]</sup> exploratory factor analysis is carried out through the method of principal axis factoring. As demonstrated by previous studies, there is a higher correlation between different factors of IFTs.<sup>[22]</sup> Thus, the optimal Promax is selected for factor rotation. In this study, the number of factors is determined according to the following principles: the characteristic root is greater than 1; the interpretability is higher; the internal consistency is higher; and the cumulative variance interpretation quantity is greater than 60%. Meanwhile, items are screened according to the following criteria: the items with lower factor loading (with the maximum factor loading less than 0.5), the items with high cross loading (the loading of two or more factors is greater than 0.4), and the items with the approximate cross loading (the difference between the loading of the two maximum factors is less than 0.2) will be deleted. As shown in TABLE 2, after several rounds of exploratory factor analysis, three factors are finally extracted to explain the variation with a variance of 76.074 in total.

**TABLE 2. Summary on the exploratory factor analysis of the supervisors' IFTs scale**

Item	Factor 1 (0.885)	Factor 2 (0.837)	Factor 3 (0.910)	Commonalit y	M	SD
TIFTs23	0.999	0.069	-0.218	0.800	5.68	1.093
TIFTs26	0.867	-0.093	0.052	0.722	5.87	1.060
TIFTs28	0.814	-0.091	0.064	0.651	6.07	1.003
TIFTs22	0.759	-0.006	0.124	0.720	5.80	1.146
TIFTs29	0.748	-0.130	0.157	0.622	5.91	1.062
TIFTs27	0.741	0.102	0.094	0.775	5.73	1.056
TIFTs21	0.623	0.210	0.126	0.757	5.53	1.280
TIFTs24	0.608	0.245	0.012	0.627	5.29	1.327
TIFTs25	0.580	0.126	0.275	0.795	5.64	1.192
TIFTs7	-0.039	0.848	-0.141	0.542	4.58	1.323
TIFTs10	0.209	0.772	-0.061	0.757	5.15	1.237
TIFTs2	-0.177	0.771	0.242	0.615	5.19	1.243
TIFTs4	0.012	0.724	0.073	0.615	5.11	1.163
TIFTs11	0.195	0.595	0.120	0.680	5.43	1.232
TIFTs15	0.060	-0.046	0.908	0.848	5.65	1.155
TIFTs13	0.117	-0.032	0.767	0.693	5.80	1.115
TIFTs18	0.194	0.041	0.726	0.820	5.67	1.222
TIFTs14	-0.023	0.274	0.660	0.731	5.49	1.170
TIFTs16	0.394	-0.068	0.600	0.771	5.65	1.098
TIFTs5	-0.093	0.393	0.593	0.713	5.62	1.209
Characteristic root	12.399	1.809	1.007			
Variance interpretation quantity	61.995	9.043	5.036			

Note: the values in brackets are  $\alpha$  coefficient.

According to the analysis, it has been proved that each factor should involve three or more items.<sup>[23]</sup> In order to reduce the subjects' workload, prevent them from feeling tired, and improve the rate and quality of their responses, this study refers to the practices by Sy,<sup>[6]</sup> Zhenbing Zhu and Wenhao Luo<sup>[22]</sup> et al. To ensure both scientificity and practicability, only the three items with the highest factor loading on each factor are kept, meaning that a total of nine items on three factors are kept.

After discussion, the six experts from the field of management, education, and psychology name three factors. Factor 1 involves items such as enthusiasm and friendliness, physical and mental health, respect for teachers, etc. Its contents are related to the following traits: postgraduates' strong interpersonal skills, morality, behavior, and more. It is similar to the factor of "good citizen" identified by Sy. As such, it is named the "good citizen" factor. Factor 2 involves items such as talent and wisdom, persistence and courage, flexibility and innovation, etc. Its contents are all related to postgraduates' aptitude for learning, so it is named "learning ability". Factor 3 involves items such as diligence and hard work, studiousness and motivation, rigor and eagerness, etc. Its contents are all related to the positive learning attitude of postgraduates, so it is named "learning attitude". Finally, a formal scale for supervisors' IFTs with three factors and nine items is obtained.

### 3.3 Structure Verification, Reliability and Validity Test

The goal of this stage is to carry out cross-validation on the structure of factors obtained in the previous stage, and to test the scale's reliability and validity.

**Subjects.** At this stage, the questionnaires are filled in by a total of 353 supervisors. Among the responses, 330 questionnaires are effective, with the effective rate of 93.48%. The subjects submitting effective questionnaires are from 83 universities and research institutes in mainland China, with an average age of 41.76 (SD = 5.80). Among them, 212 (64.2%) subjects are male, and 118 (35.8%) subjects are female. The subjects are from different disciplines: science (97 subjects), engineering (82 subjects), and humanities and social sciences (151 subjects).

**Research tools.** The tools include the formal scale for supervisors' IFTs, the IFTs scale established by Sy (the prototype part),<sup>[6]</sup> and the IFTs scale established by Zhenbing Zhu and Wenhao Luo.<sup>[22]</sup>

**Procedures.** Data are collected from two different samples. In Sample 1, a snowball sampling method is used to obtain the subjects, who are composed of 278 supervisors. The subjects fill in the questionnaire online, and they are rewarded through a lottery. Sample 2 is composed of 52 supervisors who are not rewarded. They are surveyed using paper questionnaires on site. The formal scale for supervisors' IFTs is scored on a seven-point scale and the subjects are asked to indicate how representative each item is for a qualified postgraduate in their opinion (1 = Rather inconsistent; 7 = Quite consistent). As with the process of item generation, no specific definitions for terms are provided. The t-test shows that there are no significant differences in the responses to all the items in the formal scale from the subjects in the two samples. Therefore, the data from the two samples are merged. Descriptive statistics, as well as reliability and validity analysis are conducted using software SPSS24.0, etc. Finally, confirmatory factor analysis is carried out through Mplus7.4.

**Analysis process and results.** According to the tests, the skewness and kurtosis coefficients of each item are less than 2 and 7, respectively. Therefore, it is clear that at this stage the confirmatory factor analysis that uses a maximum likelihood estimation is robust.<sup>[24]</sup> In addition to conducting confirmatory factor analysis on the three-factor model obtained from the exploratory factor analysis in the previous stage, this study uses two competition models to further test the three-factor hypothesis model. (1) A one-factor model. In this model, all the items are loaded on one factor, because the supervisors' IFTs scale may measure only one general concept. (2) A two-factor model. In this model, TIFTs1, TIFTs2 and TIFTs3 in the dimensions for "good citizen", are loaded on one factor, and TIFTs4, TIFTs5, and TIFTs6 in the dimensions for "learning ability", and TIFTs7, TIFTs8 and TIFTs9 in the dimensions for "learning attitude" are loaded on another factor. This is because the former three items are all related to the ways in which postgraduates conduct their lives, whereas the latter six items are all related to their studies.



**TABLE 3. Overall fit indices for alternative factorial models of the supervisors' IFTs scale**

Model	$\chi^2$	df	$\chi^2/df$	CFI	TLI	AIC	BIC	SRMR	RMSEA
Baseline	1631.022***	36	45.306						
One-factor	754.155***	27	27.932	0.544	0.392	6965.986	7068.562	0.159	0.286
Two-factor	378.401***	26	14.554	0.779	0.694	6592.233	6698.608	0.115	0.203
Three-factor	54.123***	24	2.255	0.981	0.972	6271.955	6385.928	0.031	0.062
Second-order	54.123***	24	2.255	0.981	0.972	6271.955	6385.928	0.031	0.062
Fit standards			<3	>0.90	>0.90			<0.08	<0.08

Note:\*\*\* p < 0.001.

According to the results in TABLE 3, all the fit indices of the one-factor and two-factor models fail to reach the standards. Those of the three-factor model, however, are superior to those of the one-factor and two-factor models; they meet the requirements of the fit standards. Table 3 indicates that the three-factor model is the model that fits best with the data. However, due to the larger sample size and the higher correlation between items in the three-factor model,  $\chi^2 = 54.123$ , and  $p < 0.001$ . This indicates that the fit of this model is not perfect. Through testing, it is clear that the standardized path coefficients between factors and items in the three-factor model are all greater than 0.5, thereby reaching the level of significance ( $p < 0.001$ ). Also, the residual variance for all items reaches the level of significance ( $p < 0.001$ ). Furthermore, the correlation among the factors in the three-factor model is high, and according to the studies by Sy,<sup>[6]</sup> Zhenbin Zhu and Wenhao Luo<sup>[22]</sup> et al., the second-order model has stronger theoretical interpretability for IFTs. When there are only three first-order factors, the second-order model is equivalent to the first-order model; it has the same fit indices (as shown in Table 3). Thus, the advantages and disadvantages of each cannot be compared.<sup>[25]</sup> However, the second-order model can use higher-order factors to explain the correlation between lower-order factors. Also, it has stronger theoretical interpretability, and so is preferable. The model pattern for the second-order confirmatory factor analysis obtained through Mplus7.4 is shown in Fig 1.

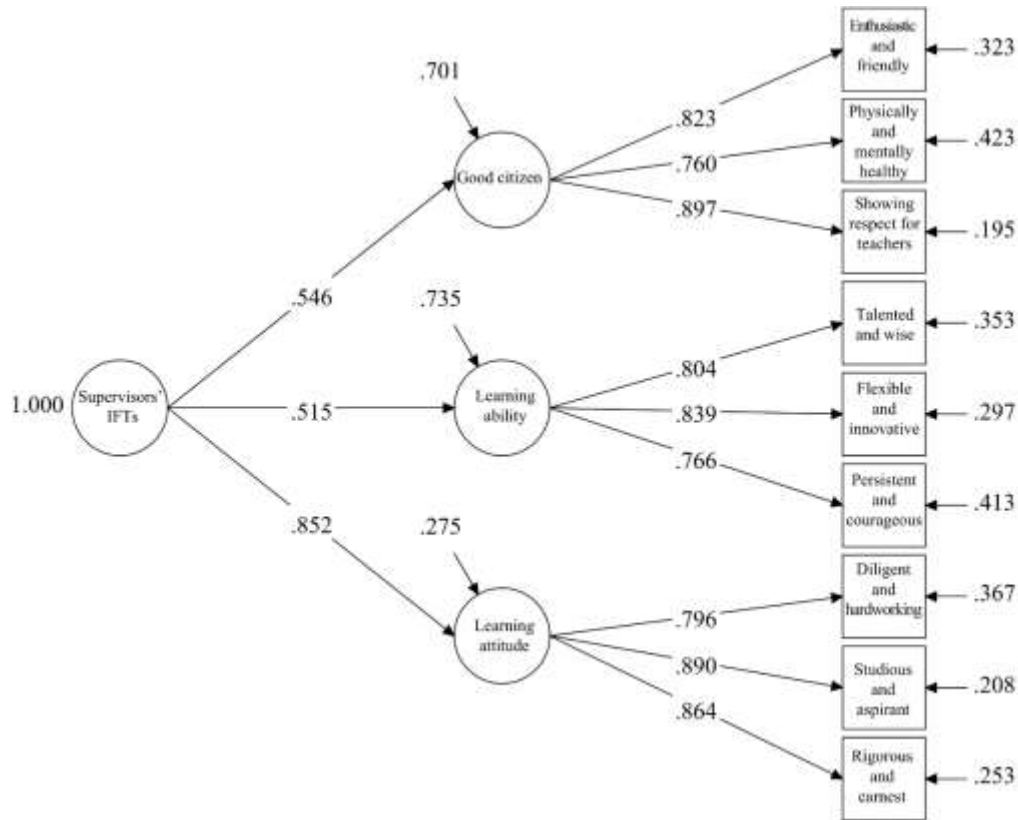


Fig 1: second-order factor model of supervisors' IFTs

In this study, the reliability and validity of the supervisors' IFTs scale are tested. As shown in TABLE 4, Cronbach's  $\alpha$  coefficients of the full scale and all the dimensions are greater than 0.8, and the combined reliability is also greater than 0.7, indicating that the scale's internal consistency reliability is good. The average variation extraction (AVE) of each of the three first-order factors is greater than 0.5, indicating that the scale's convergence validity is good. The square roots of the AVE are greater than the correlation coefficients of horizontal or vertical cells. Furthermore, the correlation coefficients between factors are all less than 0.85, and the confidence intervals of 95% for correlation coefficients are 0.117–0.328, 0.290–0.503, and 0.288–0.495, respectively, all of which are exclusive of 1. This indicates a good discriminant validity between factors.

TABLE 4. Reliability and validity of the supervisors' IFTs scale

Factor	Factor 1 (good citizen)	Factor 2 (learning ability)	Factor 3 (learning attitude)	Full scale (supervisors' IFTs)
Items	3	3	3	9
M	5.534	4.774	5.927	5.412

Factor	Factor 1 (good citizen)	Factor 2 (learning ability)	Factor 3 (learning attitude)	Full scale (supervisors' IFTs)
SD	0.860	0.747	0.797	0.601
$\alpha$ coefficient	0.867	0.840	0.885	0.842
CR	0.867	0.845	0.887	0.951
AVE	0.687	0.646	0.724	
Correlation				
Factor 1	(0.829)			
Factor 2	0.228**	(0.804)		
Factor 3	0.403**	0.396**	(0.851)	

Note: \*\* p < 0.01, and the values in brackets are the square root of AVE.

This study takes the IFTs scale established by Sy (the prototype part) and the IFTs scale established by Zhenbing Zhu and Wenhao Luo as the criterion. It tests the criterion validity of the supervisors' IFTs scale and the results are shown in TABLE 5. As these results suggest, the supervisors' IFTs scale shows a significant positive correlation with the scale established by Sy, as well as with the scale established by Zhenbing Zhu and Wenhao Luo. This indicates a good criterion validity.

**TABLE 5. Criterion validity for the supervisors' IFTs scale**

	M	SD	$\alpha$ coefficient	Supervisors' IFTs	Good citizen	Learning ability	Learning attitude
IFTs (Sy)	5.798	0.693	0.883	0.684**	0.655**	0.521**	0.594**
Diligent (Sy)	5.936	0.747	0.759	0.608**	0.533**	0.510**	0.526**
Enthusiastic (Sy)	5.368	0.862	0.779	0.520**	0.487**	0.443**	0.412**
Good citizen (Sy)	6.090	0.813	0.828	0.575**	0.612**	0.348**	0.539**
IFTs (Zhu)	5.827	0.682	0.896	0.749**	0.675**	0.649**	0.649**
Good citizen (Zhu)	5.986	0.743	0.840	0.638**	0.613**	0.528**	0.542**
Working ability (Zhu)	5.609	0.818	0.738	0.578**	0.466**	0.574**	0.477**
Working attitude (Zhu)	5.886	0.769	0.821	0.698**	0.645**	0.561**	0.636**

Note: \*\* p < 0.01.

### 3.4 Test-retest Reliability Testing and Cross-validation on Factor Structure

The goal of this stage is to ascertain the test-retest reliability of the supervisors' IFTs scale and to conduct further cross-validation on its factor structure.

Subjects. Undergraduates are likely to develop IFTs because implicit theories are developed at an early age.<sup>[26]</sup> Therefore, at this stage, undergraduates from a university in mainland China are taken as the subjects. The questionnaires are filled in by a total of 182 undergraduates. Among them, there are 169 effective responses, with an effective rate of 92.86%. The subjects submitting effective questionnaires are from three majors of different grades across the university, with an average age of 20.36 (SD = 1.28). Among them, 43 (25.4%) subjects are male, and 126 (74.6%) subjects are female.

Research tool. The tool is the supervisors’ IFTs scale.

Procedures. The interval between the two tests (i.e. Time 1 and Time 2) on supervisors’ IFTs is four weeks. The subjects fill in the supervisors’ IFTs scale, without being rewarded. A reliability test is carried out using software SPSS24.0, etc., and a confirmatory factor analysis is carried out using Mplus7.4.

Analysis and results. As shown in TABLE 6, the test-retest reliability of the full supervisors’ IFTs scale, along with all the dimensions, is greater than 0.8, indicating that the test-retest reliability of the scale is good. The internal consistency of the supervisors’ IFTs scale is acceptable at Time 1 and at Time 2.

**TABLE 6. Test-retest reliability of the supervisors’ IFTs scale**

Factor	Factor 1 (good citizen)	Factor 2 (learning ability)	Factor 3 (learning attitude)	Full scale (supervisors’ IFTs)
Test-retest reliability	0.812**	0.834**	0.848**	0.876**
α coefficient (1)	0.872	0.824	0.928	0.889
α coefficient (2)	0.881	0.830	0.904	0.892

Note: \*\* p < 0.01.

Furthermore, as shown in TABLE 7, confirmatory factor analysis at Time 1 and at Time 2 provides further verification for the first-order, three-factor model and the second-order, one-factor model.

**TABLE 7. Verification on factor structure of the supervisors’ IFTs scale**

	$\chi^2$	df	$\chi^2/df$	CFI	TLI	AIC	BIC	SRMR	RMSEA
Time 1	39.577*	24	1.649	0.971	0.957	3714.950	3808.847	0.038	0.062
Time 2	37.473*	24	1.561	0.983	0.974	3283.912	3377.809	0.041	0.058
Fit standards			<3	>0.90	>0.90			<0.08	<0.08

Note: \*p < 0.05.

#### IV. DISCUSSION

According to the four stages of the above study, it is clear that supervisors’ IFTs are composed of three factors: good citizen, learning ability, and learning attitude. Among them, the dimension of “good citizen” refers to a student’s enthusiasm and friendliness, physical and mental health, respect for teachers, and more. The dimension of “learning ability” refers to a student’s talent and wisdom, flexibility and innovation, persistence and courage, and more. The dimension of “learning attitude” refers to diligence and hard work, studiousness and motivation, rigor and eagerness, and more.

#### 4.1 Findings

Firstly, this study shows that while supervisors' IFTs and leaders' IFTs in the commercial sector share many similarities in structure, they are very different in content. Sy and other scholars suggested that the characteristics of followers of the highest level cognitive category could be revealed by comparing the similarities and differences of IFTs in different fields within the basic cognitive category. In response to these appeals, this study is the first to research the content and structure of IFTs outside of the commercial field. By comparing the similarities and differences between supervisors' IFTs in the education sector and leaders' IFTs in the commercial sector, the study provides a basis for examining the characteristics of followers in the highest-level cognitive category.

From a structural perspective, the forms of IFTs discovered by researchers in different fields always involve two major aspects: performing actions and conducting oneself. When it comes to performing actions, supervisors' IFTs include learning ability and learning attitude. IFTs discovered by Sy include diligence.<sup>[6]</sup> IFTs discovered by Mohamadzadeh et al. include constructive viewpoints on work, working ability, and leaders' right-hand men.<sup>[27]</sup> IFTs discovered by Junker et al. include task-orientation.<sup>[17]</sup> IFTs discovered by Zhenbing Zhu and Wenhao Luo include working ability and working attitude.<sup>[22]</sup> IFTs discovered by Yanhong Guo and Ling Lan include diligence, obedience and aggression.<sup>[28]</sup> IFTs discovered by Kun Zhang include rational task management.<sup>[29]</sup> IFTs discovered by Hongyu Wang and Yunjian Li include working ability and sincere support.<sup>[30]</sup> As far as conducting oneself is concerned, supervisors' IFTs bring a good citizen. IFTs discovered by Sy include enthusiasm and good citizen,<sup>[6]</sup> IFTs discovered by Mohamadzadeh et al. include moral behavior and initiative.<sup>[27]</sup> IFTs discovered by Junker et al. include relationship-orientation.<sup>[17]</sup> IFTs discovered by Zhenbing Zhu and Wenhao Luo include good citizen.<sup>[22]</sup> IFTs discovered by Yanhong Guo and Ling Lan include EQ (emotional quotient) and citizen behavior;<sup>[28]</sup> IFTs discovered by Kun Zhang include good citizen.<sup>[29]</sup> IFTs discovered by Hongyu Wang and Yunjian Li include precious harmony.<sup>[30]</sup> This indicates that many people believe that, on the one hand, qualified followers should try to perform their job well in order to meet the requirements of leaders and organizations, and that they should have the skills and the attitude required to succeed. On the other hand, they should also meet social expectations with regards to their moral behavior and lifestyle. In other words, they should conduct themselves well.

That being said, due to the fact that this study focuses on a different field, the contents of supervisors' IFTs differ from those in previous studies. The IFTs concerning postgraduates in the field of education are different from those concerning the subordinates in the commercial field. For example, various items such as flexibility and innovation, studiousness and progressiveness, rigorousness and eagerness are only found in supervisors' IFTs. They are all reflective of the characteristics of a "qualified postgraduate" in people's eyes. However, items such as loyalty and devotion, trustworthiness and responsibility, experience, and more, are found in leaders' IFTs in the commercial field. They are all reflective of the characteristics of "qualified subordinates" in people's eyes. This indicates that IFTs can be divided into different levels of

cognitive categories. It is insufficient to study IFTs only in the commercial field. A comparative study should be carried out in order to investigate the characteristics of followers in different fields such as education, military, politics, and more. This will allow for better understanding of the characteristics of followers in the highest-level cognitive categories.

Secondly, according to the findings of this study, IFTs for persons of the same cultural background are more similar in structure and content. This indicates that, as with ILTs,<sup>[7]</sup> IFTs have very strong cultural specificity. Nevertheless, IFTs also have some commonalities across different cultural backgrounds. In future, scholars should focus on these commonalities in their research.

The supervisors' IFTs scale developed in this study is similar in structure to the one established by Zhenbing Zhu and Wenhao Luo.<sup>[22]</sup> Both are composed of the three factors of good citizen, learning (or working) ability, and learning (or working) attitude. This is different from the three-factor (diligence, enthusiasm, and good citizen) structure developed by Sy.<sup>[6]</sup> It also differs from the five-factor structure developed by Mohamadzadeh et al. which focused on constructive viewpoints on work, working ability, leaders' right-hand man, moral behavior, and initiative.<sup>[27]</sup> Finally, it differs from the two-factor structure (focused on task-orientation and relationship-orientation) developed by Junker et al.<sup>[17]</sup>

There are also differences in content between IFTs scales in China compared to other countries. For example, "showing respect for leaders" is unique to followers of a Chinese background. It is contained in the IFTs scales established by Zhenbing Zhu and Wenhao Luo,<sup>[22]</sup> and by Yanhong Guo and Ling Lan,<sup>[28]</sup> and by Hongyu Wang and Yunjian Li.<sup>[30]</sup> It is also an important aspect of supervisors' IFTs. Showing respect for teachers is not only a traditional virtue in China, but also the foundation for the relationship between teachers and students in China. At the same time, it is also a specific manifestation of the wide power gap in China's cultural tradition. Thus, it may be particular to the Chinese cultural context.

Furthermore, as shown in Table 5, the correlation between the supervisors' IFTs scale is generally closer to the IFTs scale established by Zhenbing Zhu and Wenhao Luo than to the IFTs scale established by Sy. This indicates that IFTs tend to be more similar for persons of the same cultural background.

On the other hand, this study also shows that some elements of IFTs are consistent across cultures. For example, "enthusiasm and friendliness" is reflected in the scale established by Sy ("outgoing and friendly"),<sup>[6]</sup> as well as in the scale established by Mohamadzadeh et al. ("interpersonal relationship and social relationship"),<sup>[27]</sup> and by Junker et al. ("communicative and talkative").<sup>[17]</sup> Moreover, "diligence and hard work" is reflected in the scales established by Sy (hard-working),<sup>[6]</sup> by Mohamadzadeh et al. ("accepting of poor working conditions"),<sup>[27]</sup> and by Junker et al. ("devotion").<sup>[17]</sup> This indicates that "enthusiasm and friendliness," as well as "diligence and hard work," are common ways in which followers should conduct themselves regardless of their different cultural backgrounds.

## 4.2 Study Limitations

First, as far as the selection of research objects is concerned, this sample survey was conducted with supervisors in mainland China. Due to limitations on time, manpower, material resources, financial resources and other research conditions, this study initially used a method for intentional sampling, and then used a snowball sampling method to select supervisors from different universities and scientific institutions in mainland China. This made it very difficult to control the sampling rate of different types of supervisors, or to ensure they came from different regions and represented different types of universities and scientific research institutions.

Second, in relation to the implementation of the questionnaires, this study used network questionnaires and a snowball sampling method to collect data in order to improve the subjects' willingness to respond and increase the speed and efficiency of the survey. However, network questionnaires also have limitations, such as implicit bias in subjects' answers. That is why this study adopted methods such as setting questions about social approval and emphasizing confidentiality in order to ensure the quality of data.

## 4.3 Practical Implications

The supervisors' IFTs scale is applicable to the academic postgraduates' supervisors.

For the purpose of improving the quality of postgraduate training, it is necessary for training units to measure supervisors in the future and select them using the scale developed in this study for understanding supervisors' IFTs. This will help them learn about supervisors' IFTs and predict the supervisors' attitudes towards training and behavioral performance. In the process of making mutual selections with regards to the pairing of teachers and students, training units should examine whether a given supervisor's IFTs are compatible with a given postgraduate's characteristics. This will be an important reference index that will save investment in training and communication and lead to better training results. Furthermore, some research findings show that the external environment can also change the internal representation of an individual.<sup>[31]</sup> Therefore, regular training by training units could help to improve supervisors' internal representation. For example, training units could improve the supervisors' positive attitude with respect to the role of postgraduate students through lectures, seminars, and more. This would convince supervisors that postgraduates need to have effective learning abilities, positive learning attitudes, moral qualities and positive expectations for academic activities. Just like mindfulness, high-levels of IFTs can standardize the behavior of supervisors and allow postgraduates to understand their expectations regarding their roles by way of practical actions.

Supervisors' IFTs are important antecedent variables for the effects of postgraduate training. Supervisors can learn about their IFTs through the supervisors' IFTs scale developed in this study. This can

help them improve their motivation. In the contemporary mainstream view, IFTs tend to be regarded as a stable cognitive structure that resists changes once formed. However, some scholars have proposed that IFTs can be corrected with the continuous accumulation of experience of leader-follower interactions.<sup>[7]</sup> Therefore, in the process of training postgraduates, it is feasible that supervisors will be able to continuously improve their motivation of IFTs through self-regulation. Supervisors' IFTs could also be used as the basis for supervisors to select postgraduates. According to the structure and content of supervisors' IFTs that have been identified in this study, supervisors could select postgraduates who are most consistent with their IFTs from the perspectives of learning ability, learning attitude, and good citizen. Postgraduates who are more consistent with the IFTs of their supervisors will likely provide more resources and invest more mental energy. This process would be conducive not only to fully developing the potential of postgraduates, but also to establishing a good relationship between teachers and students in the mentorship process. It could also help to achieve beneficial results in training postgraduates.

The relationship between supervisors and postgraduates is mutual. Postgraduates can also influence supervisors, change supervisors' cognition, and help supervisors improve their mentorship. Postgraduates can try to understand the IFTs of their supervisors. By comparing the similarities and differences between their own characteristics and their supervisors' IFTs, postgraduates can adjust their attitudes and behaviors to make sure that their behaviors match their supervisors' IFTs. This could help to reduce cognitive conflicts between teachers and students and improve the relationship between supervisors and postgraduates. This would lead to smoother cooperation and mean that students would have more positive expectations about their treatment from their supervisors.

### ACKNOWLEDGMENT

This research was supported by Humanities and Social Sciences Foundation for Youth of Ministry of Education of China (Grant No. 18YJCZH022), "A Study on the Influencing Mechanism of Supervisors and Postgraduates' Implicit Followership Theories on Postgraduates' Academic Expectations".

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