Mechanism of Influence of Postgraduates' Implicit Followership Theories on Their Academic Expectation

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Abstract:

To explore the mechanism of influence of postgraduates' implicit followership theories (PIFTs) on their academic expectation (PAE), a questionnaire survey was conducted among 198 postgraduates in 52 groups, and multi-level structural equation models were established by Mplus7.4. Furthermore, the model of mechanism of influence of PIFTs on PAE was determined by testing the fitting indexes and path coefficients of the models. Based on the analysis on the models, the following main conclusions were drawn. PIFTs not only directly influences PAE, but also indirectly affects PAE through the mediating effect of postgraduates' perception of tutors' expectation (PPTE) and the chain mediating effect of advisory working alliance (AWA) and PPTE.

Keywords: Implicit followership theories; Academic expectation; Postgraduate; Multi-level structural equation model

I. INTRODUCTION

As the overall quality of higher education improves considerably, the strategic focus of postgraduate education in China has further shifted from quantity growth to quality improvement. Scholars have explored the law of postgraduate training from different perspectives, and have achieved many useful results. However, the existing research still lacks the discussion of the dynamic system (such as academic expectation) and influencing factors (such as implicit followership theories) of postgraduates' academic activities, which is inconducive to the in-depth grasp of the law of graduate training. In response to this problem, this paper presents in-depth research on the mechanism of postgraduates' implicit followership theories (PIFTs) that affects postgraduates' academic expectation (PAE) from the perspective of postgraduates. The research basis is the Pygmalion effect, modern expectancy-value theory, self-verification theory, and especially the latest research results of implicit followership theories.

II. LITERATURE REVIEW

2.1 Concept and Related Research of PIFTs

Postgraduate study is a process of postgraduates being guided by tutors around advanced knowledge.

For postgraduates, tutors are "experts who provide professional guidance, coaches who train in scientific research, active questioners and judges, supervisors and motivators, demonstrators of scientific spirit and attitude, and academic supporters"[1]. The relationship between tutors and postgraduates is a typical leader-follower relationship. According to Sy's definition of implicit followership theories[2], this research defines PIFTs as pre-existing expectation and assumptions about the behavior and characteristics of postgraduates. The core is the cognitive structure or schema of the prototype of postgraduates.

Just like leaders' implicit followership theories, followers' implicit followership theories also significantly influences their psychology and behavior. Carsten et al. discussed the influence of followers' implicit followership theories on their work attitude and behavior through interviews[3]. Hoption et al. explored the influence of individuals passively or actively labeling themselves as "followers" or "leaders" on their behavior[4]. Peng and Wang found that the consistency between leaders' implicit followership theories and followers' implicit followership theories affects task performance and relationship performance through work input[5]. Knoll et al. concluded that followers whose gain high scores for "good citizenship" are more likely to follow the unethical advice from leaders, while followers whose gain high scores for "disobey" are less likely to do it[6]. Wang and Li disclosed that employees' active implicit followership theories has a significant positive impact on innovation behavior[7].

2.2 Concept and Related Research of Academic Expectation

Eccles et al. held the view that expectation includes two parts: the ability belief that focuses on the current ability in a specific field and the success expectation that focuses on the completion of a specific task in the future. The ability belief is defined as an individual's view of his/her own current ability in a specific field, and the success expectation is defined as an individual's belief in whether he/she can successufully complete an upcoming or future task[8]. Based on the definition and classification of expectation by domestic and foreign scholars, Peng limited the context to the academic work environment, and proposed the definition of academic expectation: Academic expectation refers to postgraduates' belief in the ability or skills required to perform thesis writing work, including self-efficacy belief and expected success belief[9]. With reference to previous studies, this research believes that academic expectation refers to postgraduates' belief in the ability to successfully complete thesis writing work, that is, their belief in their ability or skills required to perform thesis writing work, including ability belief and success expectation. Ability belief means that postgraduates confirm whether they are effective in executing thesis writing work based on their past success or failure experience, that is, they assess whether they are capable of completing it. Success expectation refers to their belief about the possibility of their success in thesis writing work.

Numerous studies have revealed that students' expectation and self-perception of their abilities are the mediator between the environmental background and the actual achievement behavior[10]. Researchers also conducted in-depth research on an concept similar to academic expectation, namely the relationship between research self-efficacy and postgraduate's academic activity (research output). Jang and Shin conducted a meta-analysis on 14 related studies and found that the correlation coefficient between research self-efficacy and research output variables (such as research output) is .38[11]. Hemmings and Kay disclosed that research self-efficacy is the most important predictor variable in the model that affects scientific research output[12]. Gong's research on the mechanism of influence on academic activities of

academic postgraduates in China revealed that self-efficacy is the most influential factor in academic activities[13]. In short, raising PAE is the key to stimulating their academic motivation and promoting their academic activities, and it is also a key internal factor to improve the quality of postgraduate training.

Although modern expectancy-value theory believes that students' expectation depend on experience and environment as well as students' perceptions of them, research on the Pygmalion effect shows that the formation of teachers' expectation is affected by factors such as teachers' own personality characteristics, teaching mode and evaluation criteria. However, these factors lack either stability or a direct impact on expectation. Whiteley et al.'s research in the business field shows that positive leaders' implicit followership theories led to higher leaders' performance expectations for their followers[14], which sheds light on the research on the antecedent variables of PAE and provides a direction with more theoretical and practical value.

III. THEORETICAL MODEL AND RESEARCH HYPOTHESES

3.1 Theoretical Model Construction

Most researches on the Pygmalion effect explore the influence of tutors' expectation (TE) on student variables from the perspective of teachers, but they ignore the active role of students in the process of TE transmission. Although the self-verification theory proposes that the self-fulfilling prophecy effect is mediated by the self-verification process, the existing researches fail to reveal the mechanism by which the self-verification process affects the self-fulfilling prophecy effect. In view of this fact, this research proposes a model of the mechanism of influence of PIFTs on PAE regarding the process of self-verification affecting the self-fulfilling prophecy effect. The research basis is the self-verification theory, the Pygmalion effect research and implicit followership theories research.

The model comprises four variables at the postgraduate level, i.e., PIFTs, advisory working alliance (AWA), postgraduates' perception of tutors' expectation (PPTE) and PAE. The relationship among the variables reflects the formation process of PAE, the transmission process of TE and the self-verification process of postgraduates (Fig 1).
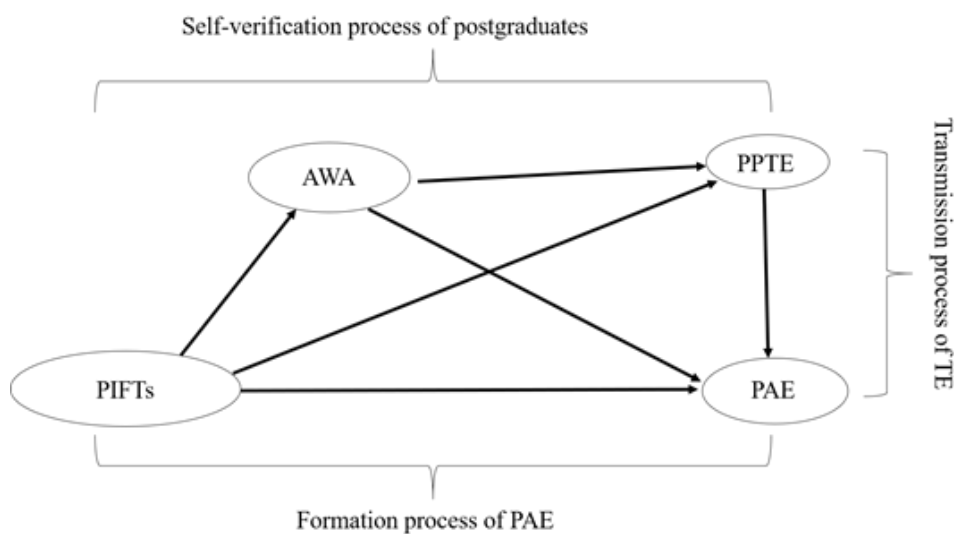

Fig 1: hypothetical model of the influence mechanism of PIFTs on PAE

PIFTs is the pre-existing expectation and assumptions about the behavior and characteristics of postgraduates. When PIFTs is activated, it will trigger a variety of related conceptual representations and corresponding behavior patterns. Therefore, PIFTs may be a stable and direct internal antecedent variable of PAE.

In addition to TE, PPTE is also directly affected by PIFTs and AWA. This shows that postgraduates are not a simple "container" of TE. Instead, PIFTs can influence the transmission process of TE by influencing PPTE, which highlights the subjective initiative of postgraduates.

In the self-verification process model proposed by Swann, people can verify themselves in two ways: (1) to create a social environment and (2) to distort reality information[15]. On the one hand, PAE is affected by TE and is partly internalized by TE. On the other hand, PAE is affected by postgraduates' own ideas which will influence their perception and internalization of TE. PIFTs not only directly affects PAE, but also influences PPTE, their performance in the process of teacher-student interaction, as awell as their interpretation of tutor's behavior. Moreover, it also has an indirect impact on PAE by influencing postgraduate's interpretation of AWA and their perception of TE. In the process of teacher-student interaction, postgraduates constantly compare the expectation and other information transmitted by their tutors with their own implicit followership theories, select information consistent with their own implicit followership theories, and then decide to accept or resist the TE, which embodies the self-verification process of postgraduates.

3.2 Research Hypotheses

The following research hypotheses are proposed based on the above theoretical model:
Hypothesis 1: PIFTs positively affects PAE;
Hypothesis 2: PIFTs positively affects AWA;
Hypothesis 3: PIFTs positively affects PPTE;
Hypothesis 4: AWA positively affects PPTE;
Hypothesis 5: AWA positively affects PAE;
Hypothesis 6: PPTE positively affects PAE;
Hypothesis 7: AWA plays a mediating role between PIFTs and PAE;
Hypothesis 8: PPTE plays a mediating role between PIFTs and PAE;
Hypothesis 9: PIFTs positively and indirectly (in order) influences PAE through AWA and PPTE.

IV. RESEARCH METHODOLOGY

4.1 Research Tools

It has been verified that the scales listed in TABLE I boast good reliability and validity[16]. The scale uses Likert 5-point scoring where 1 means "very inconsistent" and 5 means "very consistent". In this study, some reverse scoring questions were set up during the formal administration process, and some social praise questions were added.

TABLE I. Operational Measurement of Variables

Variable category	Variable measurement method	Compiler	Item	Dimension	α Coefficient
Independent variable	**PIFTs** scale	Fubin Chu	9	Learning ability, good citizenship, learning attitude	.857
Mediating variable	**PPTE** scale	Fubin Chu	9	Perceived success expectation, perceptual ability belief	.944
	AWA inventory (student version)	Liang Gong	18	Strictness, encouragement, academic guidance, lack of guidance and alienation	.893
Dependent variable	**PAE** scale	Fubin Chu	9	Success expectation, ability belief	.896

Note: The bold words represent the variables involved in this research.

4.2 Research Object

TABLE II. Sample Feature Distribution

Master (N=198)	Category	Frequency	Percentage
Gender	Female	98	49.5
	Male	100	50.5
Undergraduate graduation institution	Ordinary Universities	122	61.6
	Key Universities	76	38.4
Current school	Ordinary Universities	103	52.0
	Key Universities	95	48.0
Age	22-23	39	19.7
	24	55	27.8
	25	59	29.8
	26-30	45	22.7
Time to follow the tutor (Months)	1-12	82	41.4
	13-24	80	40.4
	25-36	36	18.2
Subject category	Humanities and social sciences	75	37.9
	Science	60	30.3
	Engineering	63	31.8

In this research, master tutors in different universities and scientific research institutions across China

were contacted by means of snowball sampling, and the postgraduates they supervise were contacted via them. All subjects filled in the questionnaire through the Internet, after which they were rewarded through a lottery. In addition to the basic demographic information and the above-mentioned scales, the subjects also needed to fill in a set of 6-digit numbers as an identification code to determine the nesting relationship.

A total of 318 master students completed the questionnaire. After deleting invalid answers, unmatched answer sheets, and groups with less than 3 responding subjects, 52 paired samples consisting of 198 master students (effective rate 62.26%) were finally obtained (see TABLE II for the distribution of sample characteristics). Effective subjects came from 27 universities and research institutions in different regions, types and levels across China. Each paired sample included 3-6 (M=3.81) master students.

V. RESEARCH RESULTS AND ANALYSIS

According to the test results, none of the demographic indexes (including gender, age, undergraduate graduation institution, current school, time to follow the tutor and subject category of postgraduates) have a significant influence on AWA, PPTE and PAE, which means there is no need to incorporate these variables into the multi-level structural equation model.

In the hope of verifying the research hypotheses, a multi-level structural equation model is established with the aid of Mplus7.4, and the slight non-normality of the research variables is explained by means of robust maximum likelihood estimation. In order to further test the hypothetical model, 6 competition models are also proposed based on theories and previous studies:

Competition model 1 removes the examination of the direct relationship between AWA and PAE and the corresponding indirect relationship on the basis of the hypothetical model. The reason is that in the process of self-verification, AWA may only affect PPTE, rather than directly affect PAE;

Competition model 2 removes the examination of the direct relationship between AWA and PPTE and the corresponding indirect relationship on the basis of the hypothetical model. In addition to directly affecting PAE, PIFTs may also indirectly influence PAE through the mediating effect of AWA and PPTE;

Competition model 3 removes the examination of the direct relationship between PIFTs and PPTE, the direct relationship between AWA and PAE, and the corresponding indirect relationship on the basis of the hypothetical model. In addition to directly affecting PAE, PIFTs may also indirectly influence PAE through the mediating effect of AWA and PPTE;

Competitive model 4 limits the path coefficient of AWA in the hypothetical model to zero to test its importance in the model. Although AWA is considered an important mediating variable in the process of TE transmission, there might exist other cognitive and behavioral variables that are more important for raising PAE and have not been included in the model;

Competitive model 5 limits the path coefficient of PPTE in the hypothetical model to zero to test its importance in the model. Although the role of PPTE in the process of TE transmission has been repeatedly demonstrated by related theories, its role is often overlooked in empirical research. Perhaps, without the mediating effect of the PPTE, TE can directly affect PAE;

Competition model 6 is a baseline model assuming that there is no relationship between the variables.

TABLE III. Fitting Index and Difference Test of Multi-level Structural Squation Model

Model	χ^2	df	$\triangle \chi^2$	$\triangle$ df	LL	AIC	BIC	CFI	TLI	RMSEA	SRMR-W	SRMR-B
Hypothetical model	7.416	6			-2752.197	5558.394	5647.177	.996	.989	.035	.024	.007
Competition model 1	14.376	8	7.283[*]	2	-2755.199	5560.398	5642.605	.983	.962	.063	.025	.058
Competition model 2	57.661[***]	8	35.005[***]	2	-2779.719	5609.438	5691.645	.870	.707	.177	.074	.415
Competition model 3	35.902[***]	9	27.429[***]	3	-2765.437	5578.874	5657.793	.929	.859	.123	.089	.055
Competition model 4	106.531[***]	11	72.621[***]	5	-2820.929	5685.857	5758.199	.749	.590	.209	.240	.362
Competition model 5	264.094[***]	11	212.235[***]	5	-2894.305	5832.610	5904.952	.335	-.087	.341	.282	.480
Competition model 6	320.679[***]	15	257.841[***]	9	-2967.359	5970.717	6029.906	.197	.037	.321	.378	.523

Note: [*]*p*<.05, [**]*p*<.01, [***]*p*<.001.

As shown in TABLE III, the fitting indexes of the hypothetical model and competition model 1 resemble, both meeting or approaching the requirements of the fitting standard. Among them, the BIC value of competition model 1 is smaller than that of the hypothetical model, indicating that competition model 1 boasts a better data description capability. Therefore, this study chooses the relatively simpler competition model 1.

In addition, as illustrated in Fig 2, all the path coefficients in competition model 1 have reached a significant level. However, the path coefficients of AWA in the hypothetical model and competition model 2 have not reached a significant level, indicating that Hypotheses 5 and 7 are not valid. Besides, the results of competition models 4 and 5 suggest that AWA and PPTE play an indispensable role in the models. The above results show that competition model 1 fits the data well, and is statistically and theoretically more reasonable than the other six models.
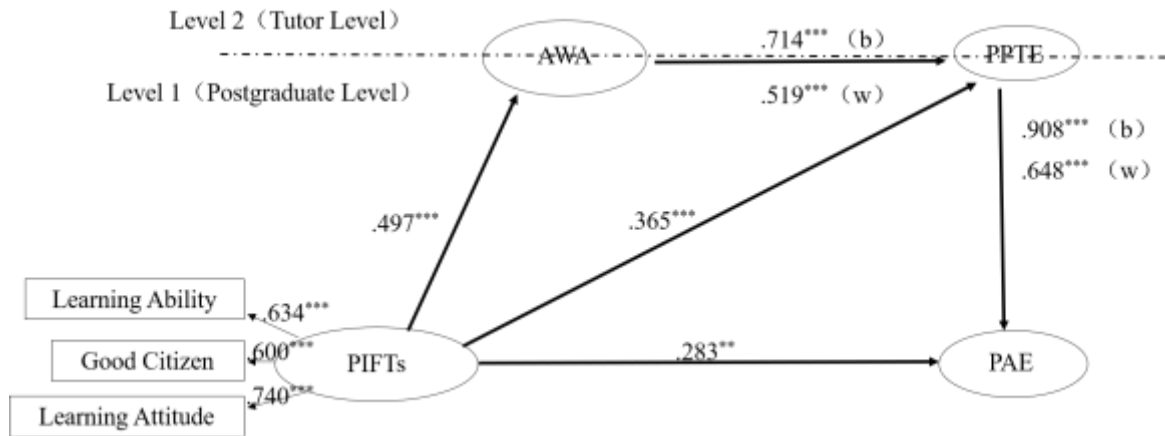
Note: $^*p<.05$, $^{**}p<.01$, $^{***}p<.001$; all numbers are standardized coefficients; (w) represents the intra-group effect; (b) represents the inter-group effect.

Fig 2: model of influence mechanism of the PIFTs on PAE

According to related theoretical studies, PIFTs is a relatively stable variable reflecting the individual characteristics of postgraduates[17]. Therefore, in this study, PIFTs is set as a variable that only changes at Level 1, that is, an individual-level variable. Therefore, PIFTs only has intra-group relationships with the three Level-1 variables (i.e., AWA, PPTE and PAE).

In the baseline model, the intra-group correlation coefficients ICC (1) of the three Level-1 variables (i.e., AWA, PPTE and PAE) are .304, .320 and .325, respectively, which are all greater than .059, indicating the necessity to conduct multi-level analysis. In this study, a multi-level structural equation model is used to decompose the relationship between these three Level-1 variables into two parts, namely, the intra-group effect and the inter-group effect, to avoid the wrong estimation caused by the confusion of the two effects.

In this study, the product of the two-stage path coefficients at Level 1 (PIFTs→PPTE, the latent variable of the deviation of an individual from the group mean for PPTE→the latent variable of the deviation of an individual from the group mean for PAE) is used to represent the intra-group part of the 1-1-1 mediating effect. The product of the two-stage path coefficients at Levels 1 and 2 (PIFTs→PPTE, the latent variable of the group mean for PPTE→the latent variable of the group mean for PAE) is used to represent the inter-group part of the 1-1-1 mediating effect. The product of the three-stage path coefficients at Level 1 (PIFTs→AWA, the latent variable of the deviation of an individual from the group mean for AWA→the latent variable of the deviation of an individual from the group mean for PPTE, the latent variable of the deviation of an individual from the group mean for PPTE→ the latent variable of the deviation of an individual from the group mean for PAE) is used to represent the intra-group part of the 1-1-1-1-1 chain mediating effect. The product of the three-stage path coefficients at Levels 1 and 2 (PIFTs→AWA, the latent variable of the group mean for AWA→ the latent variable of the group mean for PPTE, the latent variable of the group mean for PPTE→ the latent variable of the group mean for PAE) is used to represent the inter-group part of the 1-1-1-1 chain mediating effect.

TABLE IV. Test of the Relationship Between Variables

Path	Coefficient	S.E.	95% confidence interval (low)	95% confidence interval (high)
PIFTs→PAE (Hypothesis 1)	.646**	.232	.190	1.101
PIFTs →AWA (Hypothesis 2)	2.213***	.554	1.128	3.298
PIFTs→PPTE (Hypothesis 3)	.958**	.308	353	1.562
AWA →PPTE (Hypothesis 4)				
Intra-group effect	.305***	.045	.217	.394
Inter-group effect	.445**	.154	.143	.746
PPTE→PAE (Hypothesis 6)				
Intra-group effect	.564***	.068	.430	.698
Inter-group effect	.803***	.070	.665	.940
PIFTs→PPTE→PAE (Hypothesis 8)				
Intra-group effect	.540**	.186	.176	.904
Inter-group effect	.769**	.248	.282	1.256
PIFTs→AWA→PPTE→PAE (Hypothesis 9)				
Intra-group effect	.381***	.101	.183	.580
Inter-group effect	.790*	.372	.060	1.520

Note: * $p <.05$, ** $p<.01$, *** $p<.001$; the coefficients in the table are non-standardized coefficients.

As shown in TABLE IV the path coefficients between PIFTs and PAE, AWA and PPTE have all reached a significant level, and the 95% confidence intervals of these coefficients do not contain 0, indicating a significant direct effect. Hypotheses 1, 2 and 3 are supported. The path coefficients of the intra-group part and the inter-group part between AWA and PPTE and between PPTE and PAE have all reached a significant level, and the 95% confidence intervals of these coefficients do not contain 0, indicating that the direct effect reaches a significant level within and between groups. Hypotheses 4 and 6 are supported.

PPTE have reached a significant level in the intra-group part and the inter-group part of the 1-1-1 mediating effect between PIFTs and PAE, and the 95% confidence intervals of these coefficients do not contain 0, indicating that the significant mediating effect of PPTE between PIFTs and PAE. Hypothesis 8 is supported. AWA and PPTE have reached a significant level in the 1-1-1-1 chain mediating effect between PIFTs and PAE, and the 95% confidence intervals of these coefficients do not contain 0, indicating that the significant mediating effects of AWA and PPTE between PIFTs and PAE. Hypothesis 9 is supported. Moreover, the path coefficients between PIFTs and PAE reach a significant level, which suggests that the mediating effect proposed in Hypotheses 8 and 9 belong to a partial mediating effect.

VI. DISCUSSION OF CONCLUSIONS

6.1 PIFTs Positively Affects PAE

Since PIFTs is the pre-existing expectation and assumptions about the behavior and characteristics of postgraduates are relatively stable, it is a stable and direct internal antecedent variable of PAE. This shows that postgraduates are not a simple "container" of TE, and PAE is by no means the overall internalization of TE. Instead, it is directly affected by PIFTs. Hence, PAE can be promoted in two ways: (1) to increase TE on the postgraduates and (2) to establish a positive PIFTs.

6.2 PIFTs Affects PAE Through the Mediating Effect of PPTE

PIFTs positively affects PPTE, which shows that PPTE is not only affected by TE, but also directly affected by PIFTs. In other words, PIFTs not only directly affects PAE, but also directly affects PPTE. To be specific, in the process of self-verification, postgraduates will make selective attention, coding, extraction and interpretation of TE that is manifested as tutors' behaviors. Meanwile, PPTE positively affects PAE, and their relationship can be decomposed into two parts, namely, the intra-group effect and the inter-group effect. The intra-group effect represents the difference between postgraduates in the same group (under the guidance of the same tutor), while the inter-group effect represents the difference between postgraduates in different groups (under the guidance of different tutors). The test result of Hypothesis 8 shows that the mediating effect of PPTE between PIFTs and PAE is significant, and the mediating effect belongs to a partial mediating effect. This shows that PIFTs can not only directly affect PAE, but also indirectly affect PAE by influencing PPTE. In the process of self-verification, postgraduates will compare their original expectation formed by their own implicit followership theories with the perceived TE, and then decide to accept or resist TE, which ultimately affects the role of the Pygmalion effect.

6.3 PIFTs Effects PAE Through the Chain Mediating Effect of AWA and PPTE

PIFTs positively affects the AWA evaluated by postgraduates. Although tutors often dominate the process of teacher-student interaction, their implicit followership theories is externalized as their words and deeds and is reflected by their guiding styles as well as their ways of conducting themselves, which will have a greater impact on AWA. However, postgraduates are also active participants in teacher-student interaction. They will use strategies such as deliberately triggering self-verification feedback to create a social environment conducive to self-verification. For example, PIFTs will affect the enthusiasm of postgraduates to participate in the teacher-student interaction, the attitude and way of interaction between postgraduates and their tutors, and even postgraduate's interpretation of words and deeds of their tutors and their feelings about the AWA. Therefore, compared with tutors' implicit followership theories, PIFTs will have a more direct impact on the AWA evaluated by postgraduates. This conclusion further highlights the main role of postgraduates in the process of teacher-student interaction. At the same time, it also means that in future research on implicit followership theories, more attention should be paid to the analysis of problems from the perspective of followers. It is also found that the AWA positively affects PPTE. During their postgraduate study, postgraduates spend most of the time in cultivating academic ability and engaging in academic activities under the guidance of their tutors. The research results of many scholars demonstrate that the quality of postgraduate training is affected by AWA, a special leader-follower relationship. The results of this study indicate that the more active the AWA is, the more positive the PPTE. The

establishment of a good AWA will help postgraduates to perceive TE, which is crucial for the establishment of PAE, the cultivation of academic ability and the completion of academic work. In addition, the test result of Hypothesis 9 shows that the mediating effect between PIFTs and PAE is significant, and the mediating effect belongs to a partial mediating effect. This shows that postgraduates are positive perceivers of TE instead of passive recipients of TE, and they are also the creators of their own expectation. In the process of teacher-student interaction, on the one hand, they form different PAEs under the influence of PIFTs; on the other hand, they also form different AWAs with their tutors under the influence of PIFTs. Different-quality AWAs affect PPTE, and the different PPTEs affect PAE. Therefore, although PAE is affected by TE, it is by no means the overall internalization of TE. The enthusiasm, initiative and decisiveness of postgraduates in the formation of academic expectation cannot be ignored.

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