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A PLS-SEM Analysis: How Supervisory Problem Affects EFL Undergraduate Thesis Writing Apprehension

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Abstract

The supervisory practices, particularly in undergraduate thesis writing, have not received sufficient attention, specifically regarding their impact on EFL students' writing apprehension and the potential gender differences in these dynamics. To fulfil this gap, this study examines the path coefficients among supervisory problem dimensions (research interests, different expectations, limited support, personal relationships, personal conflicts), writing self-efficacy, academic writing competence, toward writing apprehension, focusing on the potential gender differences among EFL students. A Partial Least Square Structural Equation Modeling (PLS-SEM) analysis was performed on a total of 219 EFL students undertaking their undergraduate thesis writing. The study revealed supervisory problems through mediated variables of academic writing competence and writing self-efficacy influence writing apprehension ($\beta=0.214$ and $\beta=0.509$, respectively; $p < 0.000$ for both). Furthermore, the multi-group analysis uncovered notable gender differences. In contrast with male students, in which only a few paths were statistically significant, all paths were found to be significant for female students. In

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particular, the path from supervisory problem to academic writing competence had the strongest impact on female students, indicating the heightened sensitivity to supervisory problems related to the students' writing apprehension. These novel findings shed light on the gender difference impact on the academic writing process, and a more pronounced impact from supervisory problems on their writing apprehension frequently happened to female students. Accordingly, these findings highlight the importance of recognizing and addressing those differences in instructional strategies to promote a more encouraging and productive learning environment.

Keywords: Academic writing, gender, supervisory practices, writing apprehension, PLS-SEM.

1. INTRODUCTION

Writing proficiency is a critical skill for higher education students, specifically those studying English as a foreign language (EFL). However, EFL students mostly faced cognitive and affective problems in the process of writing (Bastug et al., 2017), frequently referred to as writing apprehension. Prior research have identified writing apprehension as a significant barrier to successful academic writing (Al Maawali, 2022; Nurkamto, Prihandoko, Primasita et al., 2024; Park, 2020). Students with writing apprehension tend to avoid writing due to their fear of evaluative judgments (Park, 2020) or making errors (Al Maawali, 2022) and the insufficient support for writing (Nurkamto, Prihandoko, Putro et al., 2024). Furthermore, identifying the influential factors of writing apprehension potentially contributes positively to overcoming the issues and enhancing the student's academic writing performance.

Writing apprehension is potentially affected by various factors, including personal, contextual, and pedagogical factors. Personal factors encompass students' writing skills (Fajaryani et al., 2021; Lin & Morrison, 2021; Nurkamto, Prihandoko, Putro et al., 2024; Park, 2020; Torres et al., 2020), writing self-efficacy (Olivier & Olivier, 2016; Sanders-Reio et al., 2014; Strickland et al., 2023), cognitive anxiety (Al Maawali, 2022; Ardi et al., 2024; van der Rijst et al., 2023), writing anxiety (Limpo, 2018), or writing impatience (Fry et al., 2019; Strickland et al., 2023), while contextual factors comprise students' lack of school support, such as insufficient instructors' support (Waer, 2021) or poor quality of the student-supervisor relationship (Liu & Yu, 2022; Waer, 2021). Furthermore, in pedagogical factors, teaching strategy plays a critical role in reducing students' writing apprehension (Jee, 2016; van der Rijst et al., 2023). Consequently, it is important to take these influential factors into account to reduce students' writing apprehension.

Noted by prior studies, supervisory practices particularly take an important role in developing students' writing performance, as they potentially affect students' writing apprehension. As supervisors provide guidance in the writing process and give corrective feedback, they mostly contribute to the students' writing development. However, different supervisory practices may vary in their quality in supporting the students' writing process depending on the supervisors' expectations, kinds of support they provide (Jee, 2016). Supervisory factors potentially affect students' writing apprehension, either positively or negatively.

Despite its massive existing studies, a study on writing apprehension employing advanced statistical techniques, such as partial least squares structural equation modelling (PLS-SEM), to investigate the relationships among the key variables, is limited. As PLS-SEM acquires the ability to examine the complex interplay of the key variables, it offers a more detailed understanding of influential factors of writing apprehension and how these factors interact with each other. Hence, this current study aimed at addressing this gap by examining the relationship of internal and external factors affecting EFL students' writing apprehension in undergraduate thesis writing,

with a particular focus on the roles of academic writing competence, writing self-efficacy, supervisory practice, and the factors contributing to supervisory problems.

Furthermore, [Lindahl et al. \(2021\)](#) noted that gender may influence students' writing apprehension. Building on this, the present study examined the potential impact of gender differences on factors affecting writing apprehension. Specifically, using multi-group analysis within a Partial Least Squares Structural Equation Modeling (PLS-SEM) framework, the study explored whether the relationships between supervisory practices, students' writing competence, and writing apprehension differ between male and female EFL students. By doing so, it aimed to inform the development of targeted strategies to reduce writing apprehension and enhance academic writing performance across genders.

Despite extensive research on gender differences in academic writing, limited attention has been given to how supervisory practices distinctly affect male and female undergraduate EFL students during thesis writing. This study addresses that gap by analyzing how dimensions of supervisory problems, such as mismatched expectations, limited support, and personal conflicts, affect writing apprehension through the mediating roles of self-efficacy and academic competence. In doing so, it contributes to the literature by highlighting the need for gender-sensitive supervisory practices to foster more effective and supportive academic environments. This study was guided by the following research questions:

1. How is the interrelation among students' writing apprehension, supervisory practices, and writing competence?
2. How does the interrelation differ between male and female students?

This study investigated the relationships among several factors influencing undergraduate EFL students' thesis writing, including academic writing competence, writing apprehension, writing self-efficacy, and supervisory challenges. Specifically, it (1) examined the interconnections between academic writing competence and writing apprehension, (2) mismatched expectations and limited support, personal conflict, personal relationship, and research interest, (3) limited support and personal conflict; personal conflict and supervisory problems, (4) personal relationship and both personal conflict and supervisory problems, (5) research interest and personal relationship, (6) supervisory problems and both academic writing competence and writing self-efficacy, and finally (7) writing self-efficacy and writing apprehension. Mismatched expectations and differing research interests between students and supervisors often result in limited support, which can hinder supervision quality. These disagreements may escalate into personal conflicts, weakening the student-supervisor relationship and impairing supervisory effectiveness. As a result, students' self-efficacy and academic writing competence may decline, increasing their writing apprehension and negatively impacting thesis completion.

2. LITERATURE REVIEW

2.1 Undergraduate Thesis and Writing Apprehension

Undergraduate thesis frequently requires students to conduct a literature study, create a research plan, collect and analyze their data, and lastly present the results ([Agricola et al., 2018](#)). Various strategies were developed to support students in writing their theses. [Gu et al. \(2020\)](#) successfully developed a technology-based learning environment to support students in writing their undergraduate thesis. They reported that the utility of technology provided opportunities to develop their research problem awareness, related information, and research design. Furthermore, [Sangster \(2023\)](#) confirmed that the "writing retreats" activity successfully developed students' motivation, confidence, and positive outlook on their undergraduate thesis projects.

Writing an undergraduate thesis is significant for students' academic careers since it gives them a chance to show their capability to conduct independent research and effectively express their results in a written form. However, as writing is a complex process involving pre-writing, drafting, getting feedback, revising, editing, and finally submitting ([Paltridge & Starfield, 2007](#)),

students frequently faced various difficulties in the writing process, commonly referred to as writing apprehension (Ahmed & Güss, 2022; Nurkamto, Prihandoko, Primasita et al., 2024). Writing apprehension may come in the form of writing anxiety, avoidance, or negligence. Bastug et al. (2017) reported that writing apprehension may emerge from the limited time in writing, students' anxiety of being controlled and assessed, fear of being criticized, lack of information about writing, and the shortcomings of vocabulary.

2.2 Supervisory Practices and Their Influential Factors

Research on supervisory practice on thesis writings (e.g., Agricola et al., 2020; Bui, 2014; Kirk & Lipscombe, 2019; Seeber & Horta, 2021) has been conducted massively in recent years. Much research reported that different expectations, limited support, personal conflict, personal relationships, and different research interests potentially affect EFL students' writing apprehension. As students and their supervisors have different expectations for the writing process and results, it surely has a negative impact on the supervisory process and outcome (Roland, 2015). In Roland's study (2015), it was also highlighted that supervisory skills were equal to students' success. It indicates that limited support potentially hinders students in the supervisory and writing process. Neupane Bastola (2021) then reported that supervisors occasionally provide demotivating, discouraging, and self-esteem-busting feedback to students that affects their writing process negatively. Also, supervisors' feedback occasionally did not cater to students' expectations (Neupane Bastola & Hu, 2021). Hence, students and supervisors need to have a similar perspective on the writing process and outcome, and provide adequate support to achieve successful thesis writing.

Furthermore, as writing involves a cognitive process (Paltridge & Starfield, 2007), students' personal issues potentially interfere with the writing process. Reported by Thornberg et al. (2022), students' relationship with teachers affects their engagement in class. Students with positive perspectives of their teachers and classroom setting were found to be more engaged in learning and achieved more satisfactory results. In a supervisory setting, students were pleased to have supervisors with good personalities and affection (Davis, 2020). Wan et al. (2023) further highlighted that a positive student-teacher relationship was positively associated with students' openness, empathy, and emotional intelligence. Acquiring good emotional intelligence eventually dissociates them from personal conflicts, specifically with their supervisors. However, a personal conflict may occur when disagreements between students and supervisors happen, as each supervisor commonly has a different supervisory style, which potentially mismatches with the students' preferences (Boehe, 2016). This personal conflict surely has a negative impact on the writing process.

Last, the research interest between students and supervisors also determines the success of supervisory practices. Different research interests may bring disagreements in the supervisory process and negatively affect the outcomes. Franke and Arvidsson (2011) noted that supervisors need to mediate their and the students' research interests so that they can come to the same understanding and agreement to further proceed with the supervisory practices. Students were found to be more profound toward supervisors with similar research interests (Davis, 2020; Seeber & Horta, 2021). The students expected to have supervisors who acquire knowledge in the field they are interested in.

2.3 Writing Self-Efficacy and Academic Writing Competence

Writing self-efficacy refers to a student-writer's confidence in their capability in writing in a particular condition (Bruning et al., 2013). Students' writing self-efficacy is affected by several factors. Zhang and Zhang (2024) reported that students' writing self-efficacy is highly affected by self-efficacy. It indicates that students with high self-efficacy mostly have higher writing self-efficacy. Several studies (Rahimi & Fathi, 2022; Zhang & Zhang, 2024) reported that it is also affected by learning strategies. In Rahimi and Fathi's (2022), the students were reportedly to

acquire higher writing self-efficacy as they learned using collaborative learning supported by Wiki.

Students with high writing self-efficacy were found to have better academic writing competence since writing is commonly conducted in a self-scheduled time independently (Huerta et al., 2016). Also, as writing requires several revisions to cater to the standardized writing (Zimmerman & Bandura, 1994), students with better self-confidence benefit more in doing the process. Furthermore, prior studies (Alberth, 2019; Prat-Sala & Redford, 2012; Zimmerman & Bandura, 1994) noted that writing self-efficacy is positively associated with students' writing performance. It potentially indicates that students with higher self-efficacy in writing are likely to have higher writing competence.

2.4 Gender and Academic Theses Writing Process

Gender significantly influences the academic thesis-writing process, a trend increasingly recognized in recent educational research. Studies highlight a range of gender-based disparities in academic contexts. For instance, female researchers frequently face structural disadvantages, notably lower probabilities of securing academic positions than their male counterparts, with academic prestige disproportionately favoring male-associated research knowledge (Kim et al., 2022). Additionally, gender differences permeate writing skills and approaches, notably in argumentative contexts. Female students generally excel in argumentative writing tasks, demonstrating enhanced abilities in articulating clear positions, conducting peer reviews, and revising essays based on feedback (Banihashem et al., 2024; Noroozi et al., 2023).

These gendered dynamics, however, are culturally contingent. Furthermore, Franco et al. (2021) emphasizes that gender bias in scientific writing extends beyond linguistic expression, with publication productivity significantly influencing academic success. Finally, innovative pedagogical approaches advocate 'queering' supervisory processes in master's supervision to foster greater gender inclusivity, reflexivity, and critical consciousness, thus challenging traditional, gendered educational practices (Ardiles et al., 2023).

3. METHODS

3.1 Research Instruments

Drawing on an online questionnaire, we obtained the respondents' demographic information (i.e., gender, major, semester, university, province) and their perceptions of the focus variable. In collecting the respondents' perceptions, we adapted the instruments of Autman and Kelly's (2017) for writing apprehension (WA), Bruning et al.'s (2013) for writing self-efficacy (WSE), and Iwasaki et al.'s (2019) for academic writing competence (AWE). Furthermore, for supervisory practice (research interests or RI), different expectations (DE), limited support (LS), personal relationships (PR), personal conflicts (PC), and supervisory problems (SP), we developed the instrument from Roberts and Seaman's (2018). A total of 47 items with a five-point Likert scale (1=strongly disagree to 5=strongly agree) were completed by the respondents.

To ensure its validity and reliability, we took several steps in adapting the instrument to adjust to the context and conditions of the respondents. First, doctoral students in translation disciplines translated the English original instrument into Indonesian. Second, two professors from the English Language Education and Linguistics disciplines were involved in carrying out the face validation. They were corrected on one item on academic writing competence (AWC_5) and two items on writing apprehension (WA_3 and WA_4). Third, pilot testing was carried out by involving 30 prospective respondents to fill out a questionnaire. We conducted reliability and validity tests on the data obtained. The results of the reliability test showed the Cronbach's Alpha number=0.942, and the results of the validity test showed the R-Obtained in the range of 0.407-0.693 with R-Table=0.349. Referring to the Cronbach's Alpha and R-Obtain values, the instrument is categorized as valid and reliable (Brown, 2002).

3.2 Sample and Data Collection

The target population was English Education and Literature students in Indonesia. The purposive sample included students in semester 6 or above who were writing their thesis and had completed seminar proposal and research methodology courses. A total of 219 students completed the online questionnaire within one week. Accordingly, with 13 hypotheses in the model, the recommended minimum number of respondents is 130 (Wong, 2013). The instrument link was distributed via the heads of the English Education Study Program and the English Department, who shared it in student WhatsApp groups. Ethical approval and data collection permissions were obtained from each program's university research institute. The demographic information of the respondents can be seen in Table 1. Most respondents were female (77.6%), mostly coming from the English Education Department (76.7%). Also, most respondents were in semester 7 (40.6%) who were studying at a public university (79%). Last, the respondents mostly came from Central Java province (36.1%).

Table 1. Respondents' demographic information.

Parameter	Category	Frequency	Percentage (%)
Gender	Male	49	22.4
	Female	170	77.6
Major	English Literature	51	23.3
	English Education	168	76.7
Semester	6	16	7.3
	7	89	40.6
	8	29	13.2
	9	50	22.8
	10	9	4.1
	>10	26	12
University	Private	46	21
	Public	173	79
Province	Central Java	79	36.1
	Central Sulawesi	6	2.8
	East Kalimantan	9	4.1
	North Sumatra	15	6.8
	Papua	9	4.1
	South Sulawesi	16	7.3
	South Sumatra	44	20.1
	West Java	23	10.5
	Yogyakarta	18	8.2

3.3 Data Analysis

This exploratory research employed PLS-SEM analysis, as it is in line with our goal to explain the relationship between variables with a complex model (Hair et al., 2017). Furthermore, in conducting data analysis, we employed SmartPLS 4 (Ringle et al., 2024) with three stages of analysis, namely measurement and structural model assessment, and multi-group analysis (Hair et al., 2019). The first analysis stage assessed loading indicators, Cronbach's alpha, composite reliability (CR), average variance extracted (AVE), and the heterotrait-monotrait ratio (HTMT). The second stage involved analyzing variance inflation factor (VIF) values, T-statistics, R^2 , and f^2 . Then, in the third stage, a multi-group analysis (MGA) was carried out on the gender group (male vs. female) by conducting a path coefficients comparison (Matthews, 2017).

4. RESULTS

Our study employed PLS-SEM to investigate the relationship between students' external (supervisory problems) and internal factors (writing self-efficacy and academic writing competence), and their impact on writing apprehension in the context of undergraduate thesis

writing. The measurement model assessment revealed strong indicator loadings and composite reliability, thereby confirming the convergent validity of our constructs. Discriminant validity was also established, suggesting minimal overlap between constructs. The structural model assessment indicated no concerns of multicollinearity, and the path analysis validated all hypothesized relationships. Notably, it highlighted the significant positive impact of supervisory problems, mediated by writing self-efficacy and academic writing competence, on undergraduate writing apprehension. Furthermore, a multigroup analysis revealed significant gender differences in the effects of various paths on English as a Foreign Language (EFL) students.

4.1 Measurement Model Assessment

4.1.1 Indicator loadings, internal consistency reliability, and convergent validity values

We employed the recommended threshold by [Hair et al. \(2019\)](#) as a guide in conducting measurement model assessments, which are presented in Table 2. The recommended threshold value for the loading indicator is above 0.708 ([Hair & Alamer, 2022](#)). We dropped several indicators (AWC_5, DE_1, PC_5, WA_4-6, WSE_1-2) since they have an indicator loading value that is lower than the recommended threshold. Furthermore, each construct has an ideal number of indicators, namely at least three indicators ([Astrachan et al., 2014](#)).

Then, based on the acquisition of values from α and CR, the constructs obtained values in the range of 0.765-0.897. Based on these results, internal consistency reliability is categorized at a good level because it exceeds the recommended threshold, which is >0.70 ([Hair et al., 2019](#)). Furthermore, a convergent validity analysis was carried out to obtain an average variance extracted (AVE) value with a recommended threshold of >0.50 ([Hair et al., 2019](#)). The AVE value obtained on the constructs (see Table 2) is in the range 0.614-0.706, which exceeds the recommended threshold. Hence, the convergent validity of the construct in the model has been confirmed.

Table 2. Indicator loading, internal consistency reliability, and convergent validity value.

Construct	Outer Loadings	α	CR	AVE
AWC_1	0.767	0.792	0.796	0.614
AWC_2	0.813			
AWC_3	0.797			
AWC_4	0.757			
DE_2	0.781	0.804	0.841	0.622
DE_3	0.710			
DE_4	0.837			
DE_5	0.829			
LS_1	0.864	0.896	0.902	0.706
LS_2	0.846			
LS_3	0.809			
LS_4	0.873			
LS_5	0.808			
PC_1	0.848	0.827	0.840	0.659
PC_2	0.860			
PC_3	0.808			
PC_4	0.724			
PR_1	0.828	0.895	0.897	0.704
PR_2	0.870			
PR_3	0.792			
PR_4	0.853			
PR_5	0.851			
RI_1	0.849	0.879	0.925	0.665
RI_2	0.705			
RI_3	0.878			
RI_4	0.742			
RI_5	0.887			

Table 2 continued...

SP_2	0.854	0.824	0.836	0.654
SP_3	0.845			
SP_4	0.772			
SP_5	0.759			
WA_1	0.858	0.825	0.826	0.658
WA_2	0.761			
WA_3	0.883			
WA_7	0.733			
WSE_3	0.789	0.765	0.777	0.679
WSE_4	0.863			
WSE_5	0.819			

Remark: writing apprehension (WA), writing self-efficacy (WSE), academic writing competence (AWE), research interests (RI), different expectations (DE), limited support (LS), personal relationships (PR), personal conflicts (PC), and supervisory problems (SP)

4.1.2 Discriminant validity

To ensure that there is no overlap between constructs, discriminant validity testing was carried out to obtain values from the Fornell-Larcker criterion and the Heterotrait-Monotrait ratio (HTMT). The recommended threshold value for the Fornell-Larcker criterion is 0.70, and for HTMT, it is below 0.90 (Roemer et al., 2021). The acquisition of the Fornell-Larcker criterion value is in the range (see the bold value in Table 3) of 0.784-0.839, with the acquisition of the HTMT value in Table 4 showing the range of 0.207-0.895. Hence, it can be concluded that there is no overlap between constructs since they have met the recommended threshold.

Table 3. Fornell-Larcker criterion.

	AWC	DE	LS	PC	PR	RI	SP	WA	WSE
AWC	0.784								
DE	0.417	0.789							
LS	0.274	0.547	0.841						
PC	0.417	0.585	0.542	0.812					
PR	0.473	0.588	0.482	0.748	0.839				
RI	0.516	0.367	0.282	0.349	0.372	0.815			
SP	0.424	0.557	0.757	0.720	0.686	0.328	0.809		
WA	0.402	0.355	0.200	0.233	0.228	0.374	0.290	0.811	
WSE	0.370	0.223	0.177	0.211	0.186	0.333	0.259	0.588	0.824

Table 4. Heterotrait-Monotrait ratio.

	AWC	DE	LS	PC	PR	RI	SP	WA	WSE
AWC									
DE	0.518								
LS	0.317	0.592							
PC	0.514	0.669	0.622						
PR	0.563	0.662	0.529	0.856					
RI	0.585	0.398	0.293	0.366	0.387				
SP	0.515	0.644	0.895	0.868	0.785	0.337			
WA	0.479	0.446	0.233	0.281	0.261	0.421	0.343		
WSE	0.467	0.296	0.207	0.264	0.222	0.393	0.313	0.728	

4.2 Structural Model Assessment

4.2.1 Multicollinearity testing

The initial step in the structural model assessment stage is to conduct a multicollinearity test to obtain the Variance Inflation Factor (VIF) value. The recommended threshold value is <3.00 (Hair et al., 2017). The multicollinearity test is crucial to carry out to ensure that there are no multicollinearity issues that can contribute to bias in the results of the path analysis (Ghasemy

et al., 2020). The VIF value obtained as shown in Table 5 ranges between 1,000 and 2,272, which corresponds to the recommended threshold. It indicates that there is no multicollinearity issue among the nine constructs in the model.

Table 5. Variance inflation factor.

	AWC	DE	LS	PC	PR	RI	SP	WA	WSE
AWC								1.158	
DE			1.000	1.773	1.156	1.000			
LS				1.512					
PC							2.272		
PR				1.619			2.272		
RI					1.156				
SP	1.000								1.000
WA									
WSE								1.158	

4.2.2 Path analysis

We bootstrapped with a significance level of 5% to perform path analysis. With reference to the threshold suggested by Hair et al. (2019) in which -1 means strong negative and +1 means strong positive, the obtained values for all constructs in the model (see value number in arrow in Figure 1) show the acquisition of value +1, which indicates that the relationship between constructs is a strong positive relationship. Furthermore, this acquisition was confirmed in the acquisition of the T-Statistics value in Table 6 with a threshold >1.96 (0.05 significance) (Hair et al., 2014) for hypothesis testing. Accordingly, the eight formulated hypotheses were supported.

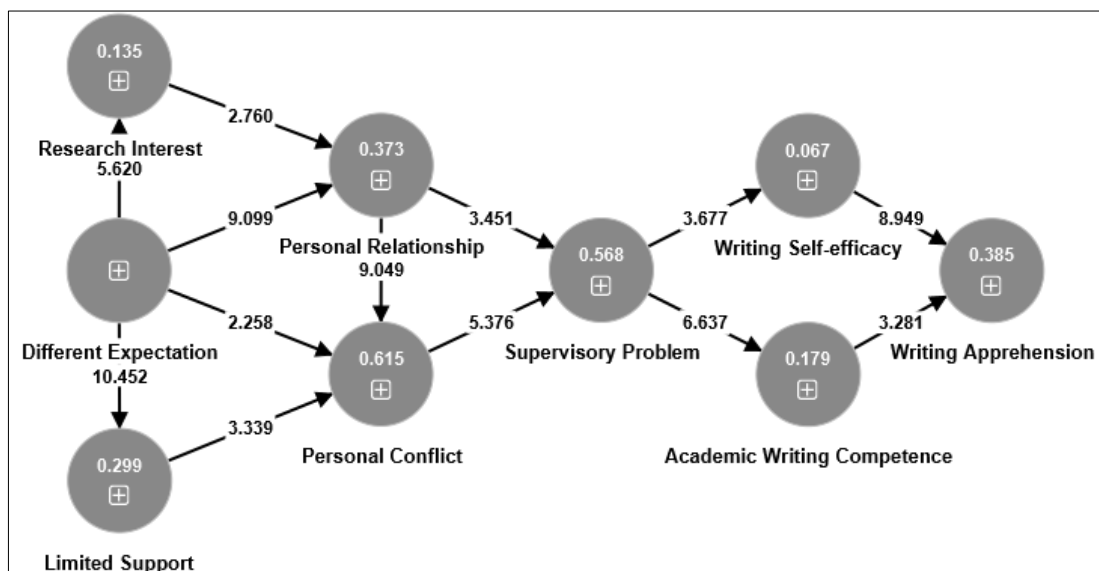


Figure 1. Path coefficient, generated by SmartPLS 4.

The path analysis in Table 6 illuminates the intricate dynamics of supervisory problems and their impact on English Education undergraduates engaged in the thesis writing process in Indonesia. The strongest influence emerged from different expectations (DE), which significantly affected limited support (LS), personal relationships (PR), research interests (RI), and personal conflicts (PC) (β values ranged from 0.147 to 0.547), highlighting the centrality of aligned expectations between students and supervisors in the academic mentoring process. Notably, the interaction between DE and LS was particularly pronounced ($\beta=0.547$; $p<0.000$), suggesting that misalignments in expectations could severely impact the perceived support that the students received. The statistically significant paths, such as DE influencing PR ($\beta=0.522$) and RI ($\beta=0.367$), indicate that expectations played a crucial role in shaping the quality of student-

supervisor relationships and the pursuit of research interests, which are vital components in the thesis writing journey.

Furthermore, personal conflicts (PC) exerted a substantial positive effect on supervisory problems (SP), which then influenced both academic writing competence (AWC) and writing self-efficacy ($\beta=0.471$ and $\beta=0.259$ respectively; $p<0.000$ for both), underscoring the pervasive impact of interpersonal conflicts on academic outcomes. The significant pathway from WSE to WA ($\beta=0.509$; $p<0.000$) highlights the importance of self-efficacy in mitigating apprehension. The findings reflect the academic milieu of the student body, predominantly in their later semesters, where the culmination of their writing activities manifests as heightened self-efficacy or increased apprehension, significantly shaping their academic writing competence.

Table 6. Path analysis result.

	Path	β	Mean	SD	T statistics	P values	Sig.
H1	AWC $\rightarrow$ WA	0.214	0.219	0.065	3.281	0.001	Supported
H2a	DE $\rightarrow$ LS	0.547	0.551	0.052	10.452	0.000	Supported
H2b	DE $\rightarrow$ PC	0.147	0.145	0.065	2.258	0.024	Supported
H2c	DE $\rightarrow$ PR	0.522	0.524	0.057	9.099	0.000	Supported
H2d	DE $\rightarrow$ RI	0.367	0.374	0.065	5.620	0.000	Supported
H3	LS $\rightarrow$ PC	0.186	0.186	0.056	3.339	0.001	Supported
H4	PC $\rightarrow$ SP	0.471	0.472	0.088	5.376	0.000	Supported
H5a	PR $\rightarrow$ PC	0.572	0.576	0.063	9.049	0.000	Supported
Hb	PR $\rightarrow$ SP	0.333	0.333	0.097	3.451	0.001	Supported
H6	RI $\rightarrow$ PR	0.180	0.179	0.065	2.760	0.006	Supported
H7a	SP $\rightarrow$ AWC	0.424	0.428	0.064	6.637	0.000	Supported
H7b	SP $\rightarrow$ WSE	0.259	0.261	0.071	3.677	0.000	Supported
H8	WSE $\rightarrow$ WA	0.509	0.509	0.057	8.949	0.000	Supported

4.2.3 Coefficient of determination (R^2) and effect size (f^2)

We conducted a coefficient of determination analysis with a threshold value of weak (0-0.10), modest (0.11-0.30), moderate (0.30-0.50), and strong (>0.50) (Hair & Alamer, 2022). This analysis is used to measure the predictive accuracy of the proposed model. Table 7 illustrates that there are two constructs (LE & SR) that have moderate predictive power. Meanwhile, there are also two constructs (PM and SE) that have modest predictive power. Then, only OL has weak predictive power. We then conducted an analysis of effect sizes with threshold values, namely small (0.02), medium (0.15), and large (0.35) (Hair & Alamer, 2022).

Table 7. Coefficient of determination (R^2).

Construct	R Square	R Square Adjusted	Consideration
DE	0.179	0.176	Modest
LS	0.299	0.296	Modest
PC	0.615	0.610	Strong
PR	0.373	0.368	Moderate
RI	0.135	0.131	Modest
SP	0.568	0.564	Strong
WA	0.385	0.379	Moderate
WSE	0.067	0.063	Weak

Based on Table 8, the path from PR (Personal Relationships) to PC (Personal Conflicts) has the largest effect size ($f^2=0.525$), indicating a substantial influence of personal relationships on personal conflicts. This is closely followed by the path from DE (Different Expectations) to LS (Limited Support), which also exhibits a large effect size ($f^2=0.427$), emphasizing that differing expectations notably influence perceptions of support. Additionally, the path from WSE (Writing Self-Efficacy) to WA (Writing Apprehension) demonstrates a significant large effect size ($f^2=0.363$), highlighting the critical role of students' self-confidence in reducing their writing anxiety. Other paths with medium effect sizes include SP (Supervisory Problems) influencing AWC (Academic Writing Competence) ($f^2=0.219$), suggesting supervisory issues moderately

impact students' academic writing performance. Finally, several relationships, such as AWC influencing WA ($f^2=0.064$) and RI (Research Interest) affecting PR ($f^2=0.045$), show small effect sizes, indicating that while statistically significant, these factors exert relatively limited practical influence within the overall model.

Table 8. Effect size (f^2).

Path	f^2	Effect size
AWC -> WA	0.064	Small
DE -> LS	0.427	Large
DE -> PC	0.032	Small
DE -> PR	0.376	Large
DE -> RI	0.156	Medium
LS -> PC	0.060	Small
PC -> SP	0.226	Medium
PR -> PC	0.525	Large
PR -> SP	0.113	Small
RI -> PR	0.045	Small
SP -> AWC	0.219	Medium
SP -> WSE	0.072	Small
WSE -> WA	0.363	Large

4.3 PLS-SEM Multi-group Analysis (MGA)

We then perform PLS-SEM MGA to make an in-depth comparison between the groups of gender. We focused on acquiring and comparing t-values and p-values for EFL male and female students using the results obtained from bootstrapping. The predetermined threshold we adhered to was a t value >1.96 and a p value <0.05 , as suggested by [Kock \(2018\)](#).

Table 9. Bootstrapping for path coefficients comparison (male and female).

Path	Male		Female	
	t value	p value	t value	p value
AWC -> WA	1.749	0.080	2.842	0.005
DE -> LS	5.990	0.000	8.493	0.000
DE -> PC	0.741	0.459	2.174	0.030
DE -> PR	3.541	0.000	8.155	0.000
DE -> RI	2.038	0.042	5.481	0.000
LS -> PC	2.811	0.005	2.245	0.025
PC -> SP	6.018	0.000	3.904	0.000
PR -> PC	3.199	0.001	8.111	0.000
PR -> SP	0.132	0.895	5.944	0.000
RI -> PR	0.167	0.868	3.265	0.001
SP -> AWC	1.859	0.063	7.462	0.000
SP -> WSE	1.816	0.069	3.324	0.001
WSE -> WA	3.868	0.000	7.759	0.000

Table 9 highlights significant gender-based discrepancies in the effects of various academic pathways on EFL students. It was observed that path coefficients for female students were almost universally significant, whereas only specific paths were significant for male students. Notably, the path from DE to LS showed strong positive correlations for both genders, with t-values of 5.990 ($p<0.000$) for males and 8.493 ($p<0.000$) for females. The path from AWC to WA was significant for females ($t=2.842$; $p=0.005$) but less so for males. Additionally, the path from LS to PC significantly influenced females ($t=2.245$; $p<0.025$) but had a lower impact on males ($t=2.811$; $p=0.005$). WSE to WA pathway also showed strong positive effects for both genders, with t-values of 7.759 ($p<0.000$) for females and 3.868 ($p=0.000$) for males. However, the paths from PR to SP and RI to PR were insignificant for both genders. Finally, the SP to AWC pathway significantly affected only female students.

5. DISCUSSION

This current study aims to examine the interplay of external factors (i.e., supervisory practice) and internal factors (i.e., writing self-efficacy and academic writing competence) affecting EFL students' writing apprehension in writing their undergraduate thesis. Employing a PLS-SEM analysis, we uncovered several significant relationships between the variables under investigation. Furthermore, we also employed PLS-SEM multi-group analysis to compare the results between male and female students.

First, related to the interrelation among students' writing apprehension, supervisory practices, and writing competence, our first finding shows a positive significance relationship between academic writing competence and writing apprehension ($\beta=0.214$, $p=0.001$) was revealed, indicating that students with academic writing competence affected writing apprehension in their undergraduate thesis writing. This finding strengthens the previous studies' findings (e.g., [Al Maawali, 2022](#); [Limpo & Alves, 2013](#); [Waer, 2021](#)) that as the students' writing competence increased, their writing apprehension eventually decreased. Moreover, [Huerta et al. \(2016\)](#) found that the students would have less anxiety in writing as they acquired higher academic writing competence. Therefore, the findings of the present study bring confirmation to the existing studies' reports by providing statistical evidence of the positive significance relationship between writing apprehension and academic writing competence.

The results also demonstrated a positive and significant relationship between writing self-efficacy and writing apprehension ($\beta=0.509$, $p=0.000$), supporting the previous findings that the students with higher self-efficacy were more likely to experience lower writing apprehension ([Erkan & Saban, 2011](#); [Sanders-Reio et al., 2014](#)). As the writing process of an undergraduate thesis potentially takes a long time and several revisions to achieve standardized writing, ones with high confidence in their writing ability will find it easier to face the writing process. Also, as prior research highlighted the role of self-efficacy in reducing writing anxiety (e.g., [Alberth, 2019](#); [Ardi et al., 2024](#); [Djarmika et al., 2022](#); [Huerta et al., 2016](#)). Consequently, the current study further validates previous findings by [Alberth \(2019\)](#) and [Nurkamto, Prihandoko, Primasita et al. \(2024\)](#) whose studies empirically confirm the inverse relationship, clearly indicating that enhanced writing self-efficacy is associated with reduced writing apprehension among undergraduate thesis writers.

Regarding the external factors, our analysis shows a positive and significant relationship between supervisory problem and academic writing competence ($\beta=0.424$, $p=0.000$) and between supervisory problem and writing self-efficacy ($\beta=0.259$, $p=0.001$). These findings then highlight the importance of effective supervisory practices to increase students' academic writing competence and build their writing self-efficacy as well as to reduce their writing apprehension. This finding is in accordance with prior studies' findings emphasizing the importance of supervisor support and guidance in fostering students' confidence and competence in thesis writing (e.g., [Ädel et al., 2024](#); [Neupane Bastola & Hu, 2023](#)).

Our study further revealed the interplay relationships among different expectations, limited support, personal conflict, personal relationship, and research interest variables, which significantly affect the supervisory problem. These results indicate that considering these factors positively affects the supervisory practices, which subsequently enhance students' academic writing competence and self-efficacy and then lower their writing apprehension. This finding also emphasized the supervisory practices in avoiding these factors by considering the main roles of students and supervisors. In [Ädel et al.'s \(2024\)](#) study, the students' and supervisors' roles needed to be adjusted so that the adjustment outcome caters to the main goal of the supervisory practices. They noted that the students were proficient in having interactional supervisory practices, but the supervisors occasionally emphasized transactional ones in which they only provided direction to the students' writings. Also, to maintain their positive relationship, the students needed to have regular supervisory meetings, at least once a week ([Seeber & Horta, 2021](#)). As their relationship remains positive, their supervisory practices potentially go effectively.

Second, the diversity of the interrelation between male and female students, the PLS-SEM MGA results revealed significant gender-based differences in the impact of various academic

variables among EFL students. Drawing on the path analysis, it revealed a significant difference in the variables' impacts between male and female students. Regarding male students, only a few paths (i.e., different expectation and limited support, different expectation and personal relationship, limited support and personal conflict, personal conflict and supervisory problem, personal relationship and personal conflict, and writing self-efficacy and writing apprehension) were statistically significant ($p < 0.05$). Meanwhile, regarding female students, all paths were statistically significant ($p < 0.05$), indicating that the same variables may interact differently upon gender differences. One possible explanation could be rooted in the distinct socio-cultural experiences and expectations of male and female students (Al Hilali & McKinley, 2021). Also, males' expectations for academic writing may be more directly correlated with interpersonal relationships and external supports (Umamah et al., 2022; Wu et al., 2022), explaining our findings that different expectations brought a significant impact on limited support and personal relationships. It possibly implies that male students are potentially more sensitive to institutional support and interpersonal relationships, leading to writing apprehension as the expectations are not fulfilled (Kelly et al., 2022). Furthermore, the impact of personal conflict on supervisory problems could suggest that male students may perceive a more direct impact of interpersonal conflicts on supervisory issues (Cayley, 2020), leading to increased writing apprehension.

The expectations of female students, however, had an impact on each examined variables, subsequently indicating a wider range of concerns affecting writing apprehension. It is reasonable to speculate that female students may perceive a more intricate web of relationships among these parameters because of possibly different socialization processes and academic experiences. Furthermore, the relationship between supervisory problems and academic writing competence may reflect female students' increased awareness of the significance of the supervisory role in their academic writing competence. As reported by Buirski (2022), supportive supervisory practices potentially lead to successful thesis writing as students and supervisors maintain their mutual respect and trust during the supervisory process. However, it is also important to note that some relationships in the model, such as the relationship between different expectations and limited support, personal conflict, and interpersonal relationships, were not significantly different between male and female students. These results potentially imply that the influence of different expectations on these variables is comparable for both genders. On the practical front, the results emphasize the necessity of a gender-sensitive approach in addressing the academic writing needs of EFL students, highlighting significant disparities in writing apprehension among genders and the interconnectedness of various influencing factors. The role of supervisors is underlined as pivotal; their understanding of potential conflicts and adeptness at providing feedback and fostering effective communication can substantially enhance academic writing outcomes. Furthermore, the study suggests that institutions shoulder a critical responsibility in crafting targeted support mechanisms, such as workshops, tutoring, and additional resources designed specifically for EFL students. This support should extend to creating environments that provide positive interpersonal relationships and open dialogue about research interests and expectations, ultimately aligning students' academic endeavors with their personal and professional aspirations, thereby mitigating the adverse impacts of writing apprehension.

6. CONCLUSION

This current study provides meaningful findings on the relationship between external factors, particularly supervisory practices, and internal factors, namely writing self-efficacy and academic writing competence, and how these variables influence EFL students' writing apprehension in writing their undergraduate thesis. Our findings mainly highlight the significant role of academic writing competence, writing self-efficacy, and supervisory practices in anticipating EFL students' writing apprehension. Furthermore, our study also emphasizes the importance of considering gender differences in the relationships among these variables, as it was empirically found that male and female students experienced these relationships differently.

The implications of our study lie in the significant roles of supervisors, writing instructors, and institutions in reducing students' writing apprehension. First, thesis supervisors are encouraged to adopt supportive and personalized supervisory techniques to provide constructive feedback that potentially leads to lower writing apprehension. Also, as gender diversity is significant in writing apprehension, they need to choose specific approaches to meet individual needs for both male and female students. Second, writing instructors need to build students' writing self-efficacy to lower writing apprehension through targeted intervention, such as providing workshops and guided exercises, and fostering a positive learning environment to support students' writing improvement. Last, institutions could take part in developing a writing center, offering counselling services, and providing training programs for students, supervisors, and writing instructors. The program development should consider gender diversity to maximally enhance students' writing self-efficacy and writing performance.

While our study provides significant implications for thesis supervisors, writing instructors, and institutions in understanding how to enhance EFL students' academic writing, some limitations need to be noted. The sample used in the study was limited to undergraduate EFL students finishing their thesis writing, which limits the generalizability of the findings to other EFL students with different backgrounds, such as graduate students or secondary students. Hence, further studies may involve EFL students from different academic levels and various cultural backgrounds to expand the generalizability of the results. Furthermore, it is also worthwhile to conduct research with a similar topic in a longitudinal design to better understand the causal relationships. Also, as research with qualitative methods potentially results in deeper insights, particularly on EFL students' experiences and the effectiveness of interventions to improve writing apprehension and competence, such a qualitative-based research method is recommended to be employed in future research. Last, this study contributes to the literature on writing apprehension among EFL students and emphasizes the need for additional research to explore the complexity of these relationships and how they may be influenced by other personal traits or environmental circumstances. Future studies should continue to clarify these complications and suggest targeted strategies to support EFL students' academic writing performances.

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