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Self-efficacy and Metacognition as the Mediated Effects of Growth Mindset on Academic Writing Performance

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ABSTRACT

Background: Various studies have highlighted the theoretical roles of growth mindset, self-efficacy, and metacognition in academic writing. However, the clarity regarding which variables act as mediators in this context remains underexplored.

Purpose: This study investigates how self-efficacy and metacognition mediate the effects of a growth mindset on academic writing performance among EFL students. It aims to clarify the mediating roles of these variables, directing the development of four research hypotheses and a conceptual model.

Method: The study employed a structural equation modelling (SEM) method using the PLS-SEM analysis. Participants included 464 EFL undergraduate students from 28 provinces in Indonesia, who were working on their theses. They completed a series of valid and reliable scales online.

Results: Analysis revealed that growth mindset significantly influences self-efficacy for ideation and metacognition. Further, self-efficacy in ideation, convention, and self-regulation, along with metacognition, effectively mediated the relationship between growth mindset and academic writing performance.

Conclusion: The findings suggest that growth mindset significantly impacts academic writing performance through its influence on self-efficacy and metacognition. This underscores the importance of these mediators in enhancing academic writing competence. Consequently, EFL writing lecturers and thesis supervisors should focus on interventions that strengthen these attributes. Future research should continue to explore effective strategies to enhance metacognition and self-efficacy, thereby contributing to the broader field of EFL education.

KEYWORDS

academic writing performance, EFL undergraduate thesis, growth mindset, metacognition, self-efficacy

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INTRODUCTION

Academic writing involves in-depth scholarly discussion between a writer and readers, aimed at providing reliable information (Cahyono et al., 2024). For a writer, academic writing represents a logical and intellectual activity that involving the digestion and communication of information. Compared to other genres of writing, academic writing is more complicated due to its sequential processes of generating ideas, planning, creating ideational frameworks, drafting, editing, and revising (Csizér & Tankó, 2017). Among the crucial aspects in aca-

ademic writing are the argumentation and logical reasoning (Aqeel et al., 2020; Latifi & Noroozi, 2021).

Defined as the presentation of statements with strong reasoning supported by valid evidence (Gorrostieta & López-López, 2016), argumentation is necessary to clearly explain concepts and persuade readers of the claims. Basically, argumentation is related to the social constructivist theory of meaning-making, which holds that in authentic activities, writers engage with contentious problems, adopt views, negotiate meaning, and become aware of the issues at stake



(Jonassen & Kim, 2010). Meanwhile, claims are meaningless unless they are supported by solid logical reasoning. Logical reasoning is what we might do before making an argument, and our argument shows some of our best reasoning (Govier, 2019). Thus, in the academic writing process, the writer defends their ideas using arguments, reasons, and evidence.

By using reasoning and argumentation skills, writers can critically analyze many aspects of the current issue and engage in in-depth cognitive processing of the course material. Based on Toulmin's widely used model of argumentation, there are six elements of argumentation namely claim, data, counterargument claim, counterargument data, rebuttal claim, and rebuttal data (Toulmin, 2003). These elements need to be considered in to produce high quality argumentative writing. However, literature has shown that students still find challenges in providing good quality writing due to their lack of argumentation knowledge and abilities to provide strong reasoning and logic in their arguments (Latifi & Noroozi, 2021; Shahsavar & Kourepaz, 2020).

The aforesaid challenges have resulted in teacher dissatisfaction with students' writing, especially when they come to the process of thesis writing (Gorrostieta & López-López, 2016). To enhance students' argumentative writing skill, strategies such as peer feedback have been proven effective by the previous studies (Latifi & Noroozi, 2021; Valero et al., 2019). Peer feedback allowed students to evaluate the quality of their peers' writing, identify areas needing improvement, and make recommendations for modifications, which in turn encourages them to participate in the learning process (Noroozi et al., 2016). Therefore, this strategy is also effective for university students' thesis writing. Among undergraduate students at the tertiary level, academic writing is usually connected to research-based writing or thesis writing, the final task they must complete to earn their bachelor's degrees (Weaver et al., 2016). This bachelor's thesis is regarded as a significant component of the curriculum since it requires that students locate pertinent materials, think critically, process complex information, apply scientific reasoning, and work independently. The six general components of a bachelor's thesis for undergraduate students in Indonesia typically include an introduction, literature review, methodology, findings and discussions, conclusion and suggestions, and references (Prihandoko et al., 2022). Each of these components has different moves (Moreno & Swales, 2018) that should be taken into account. In writing a bachelor's thesis, students are also required to develop the argumentation and logical reasoning in their introduction, literature review, results, and data discussion.

However, students frequently face difficulties which stem from inadequate or inconclusive data to support their arguments, a lack of understanding of academic writing styles, and inefficient compositions, especially in the areas of concept organization and language structures (Jonassen & Kim, 2010; Zaki & Yunus, 2015). Furthermore, the presentation

and discussion of research data, which demands critical thinking skills, often cause students to struggle with rumination in academic writing. Therefore, students' ongoing and active participation in all stages of academic writing determine the quality of their written works (Altınmakas & Bayyurt, 2019). According to Guraya and Guraya (2017), the quality of students' academic writing is influenced by their proficiency in academic writing and their comprehension of research ethics.

Certain external elements, such as tutoring, supervisory interventions, and peer review, have been identified in previous studies as contributing to the improvement of students' academic writing performance. Adamson et al. (2019) conducted a study that emphasized the importance of supervisors' involvement in assisting students with theses-based academic writing. According to their study, critical elements that support students' academic writing performances include supervisors' roles, which involve scaffolding students, having ongoing conversations with them to help them deal with English and non-English resources, providing direct corrective and metalinguistic feedback, and helping students map their concepts. Research by Kuiken and Vedder (2020) found that the academic writing performances of students who have not reached the required level of proficiency can be improved by offering them a comprehensive remedial program. Miller and Pessoa (2016) argued for explicit instructions to help students organize their thoughts for writing effectively. Suen (2021) highlighted that an academic writing workshop can help students improve their academic writing performance. Writing approaches such as peer-feedback have also been proven to enhance students' abilities to build argumentation and logical reasoning. A study by Valero et al. (2019) showed that peer review enables students to improve students abilities to notice, diagnose, and resolve writing issues. Additionally, it allows students to broaden and deepen their analytical and critical thinking around the topic (Yang, 2010).

Beside external elements, the complex nature of academic writing necessitates strong internal elements. These internal components include the growth mindset, self-efficacy, and metacognition factors (Shen et al., 2020; Vincent et al., 2021). The first variable, growth mindset, refers to the idea that intelligence may be improved and developed with consistent effort. Truax (2018) discovered that the provisions of growth mindset feedback and objective evaluation increase students' motivation to write. Regarding second variable, self-efficacy, is a component of a person's motivational dimension and person's belief in their ability to generate or attain desired outcomes through hard work (Mitchell et al., 2021). Vincent et al. (2021) explained that increasing one's self-efficacy to write is a critical step toward improving one's writing performance. In respect of the third variable, metacognition is defined as students' awareness of their own mental activities and their competencies to reflect on and regulate their own knowledge and thinking skills for the

sake of achieving learning objectives (Karlen, 2017). As a higher-order cognitive activity, metacognition significantly impacts writing outcomes by teaching students how to develop and apply unique strategies for each stage of the writing process (Pitenoe & Modaberi, 2017).

Research on the variables of growth mindset, self-efficacy, metacognition, and academic writing performance has provided substantial knowledge and data on the potential interconnections between these factors. However, previous studies have typically investigated these variables in isolation rather than examining them collectively (Grenner et al., 2021; Howe & Wig, 2017). Some research has focused on two of these variables, such as metacognition in writing and self-efficacy in writing (Colognesi et al., 2020; Vincent et al., 2021). Other studies have explored the relationships between some of these four variables and additional external factors, such as writing metacognition in the context of online thesis supervision or the development of assessment tools (Chakma et al., 2021; Puryantoa et al., 2021).

To the best of our knowledge, no prior studies have conducted an exploratory investigation into the interplay among growth mindset, self-efficacy, metacognition, and academic writing performance while also identifying possible mediating variables. Furthermore, no similar research aimed at this objective has been found in the publications of Indonesian academics to date. Therefore, this study seeks to address this gap by exploring the interrelationships among growth mindset, self-efficacy, metacognition, and academic writing performance among Indonesian tertiary students working on undergraduate theses. Additionally, this research aims to highlight the potential mediating variables within the proposed model based on the exploratory study.

LITERATURE REVIEW

Growth Mindset

The nature of mindset is fluid in the sense that it can change and be controlled as desired (Truax, 2018). Hence, students may choose to have growth mindset in a specific domain to achieve optimal mastery or otherwise. Growth mindset is defined as the belief that intelligence can be developed and enhanced through hard work, and it is a strong predictor of learning (Lou & Noels, 2019). After evaluating their most recent learning outcomes, students' growth mindsets may drive their academic development by encouraging them to be more confident in their ability to study. The concept of growth mindset is vital to writing because the complexity of writing processes (e.g., planning, drafting, proofreading, and editing) can cause students to give up if they find those phases challenging. Students with growth mindset will see difficult writing processes as the stages of learning they

must engage in because growth mindset is proven to predict learners' belief in their learning process (Amalia et al., 2023). Moreover, Truax (2018) demonstrated that motivating talks and written comments from instructors may help students develop growth mindset. Furthermore, if students develop a growth mindset, they may direct their self-directed learning efforts toward improving their writing skills (Bai et al., 2020).

Self-Efficacy

Self-efficacy serves as a pivotal motivator for learning readiness (Hwang, 2020). It influences how students approach writing tasks, affecting their confidence and competence (Callinan et al., 2018). Writing self-efficacy, encompassing beliefs about one's capabilities in various writing skills and techniques, is essential for improving writing performance (Mitchell et al., 2017; Vincent et al., 2021). Bruning et al. (2013) broke down writing self-efficacy into three components: ideation, convention, and self-regulation. The first illustrates self-efficacy in terms of formulating and shaping the concepts, tenets, and logic that form the basis of written expression. The second illustrates self-efficacy in enhancing language skills, including the use of language, grammatical constructions, and discourse organization. The third, which involves assessments of the writer's linguistic and cognitive abilities, shows how effectively the writer manages their emotions and behavior. Empirical studies have linked high levels of self-efficacy with better writing skills, motivation, and performance (Sabti et al., 2019; Sun & Wang, 2020; Vincent et al., 2023). Additionally, Ardi et al. (2024) demonstrated a positive correlation between self-efficacy and enjoyment of writing.

Metacognition

Metacognition refers to awareness and control over one's cognitive processes, which is essential for effective learning (Wafubwa & Csíkos, 2020). In academic writing, metacognition helps students to strategize, monitor, and refine their writing methods, thereby enhancing their ability to construct solid arguments and coherent texts (Chen & Hapgood, 2021). It is a higher-order cognitive skill that significantly affects writing outcomes by helping students to tailor strategies for each phase of the writing process (Pitenoe & Modaberi, 2017; Sato & Lam, 2021). Strong metacognition enables learners to formulate persuasive arguments, engage in productive exchanges, and defend their opinions, all of which are required in writing (Teng et al., 2021). Additionally, students proficient in metacognitive skills can produce texts that meet genre expectations and reflect sophisticated understanding of the content and structure required (Aliyu et al., 2016; Escorcia & Ros, 2019). Recent studies have also connected metacognition with enhanced critical thinking in writing contexts (Teng & Yue, 2023).

Self-efficacy and Metacognition as the Mediating Predictors between Growth Mindsets and Academic Writing Performances

Many studies have demonstrated possible correlative patterns among growth mindset, self-efficacy, and metacognition, which can be used to explain similar patterns in the context of academic writing. According to Zander et al. (2018), high levels of self-efficacy are more common in those who have a growth mindset. According to Dweck (2012), self-efficacy in the context of writing is divided into three categories. These categories include self-efficacy for ideation, convention, and self-regulation. If interpreted and applied in the context of academic writing, the patterns demonstrated by Zander et al. (2018) and Dweck (2012) suggest that someone with growth mindset in academic writing will likely have high self-efficacy in academic writing. In other words, their growth mindset will enhance their self-efficacy in academic writing for ideation, convention, and self-regulation. The correlation between growth mindset and self-efficacy is further supported by a study conducted by Hass et al. (2016), demonstrating that the assessment of growth mindset as a research variable should include the theoretical constructs of self-efficacy. In the context of writing, Mitchell and McMillan (2018) demonstrated that those with low self-efficacy tend to have low writing performance, leading to the absence of engagement in writing programs. This suggests that self-efficacy in academic writing contributes to the enhancement of academic writing performance.

A growth mindset also correlates with metacognition. According to Bai and Wang (2020), a motivating variable, such as growth mindset, has been shown to significantly predict self-regulated learning whose theoretical constructs are linear to those of metacognition. This pattern suggests that a growth mindset in academic writing can enhance one's

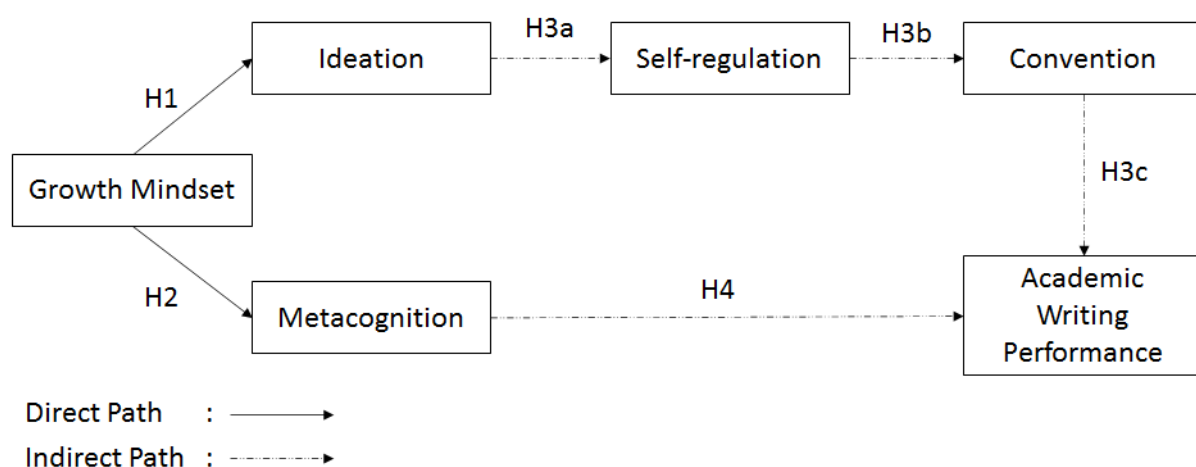
metacognition in academic writing. According to Escorcía and Ros (2019), written products that satisfy readers' expectations in terms of genre goals and material flow will be produced by students who are adept at applying metacognitive skills. They will also comprehend numerous characteristics and conceptual frameworks of excellent writing (Aliyu et al., 2016). These studies suggest that higher metacognition in academic writing leads to better academic writing performance.

The theoretical interactions among growth mindset, self-efficacy, and metacognition allow us to develop several hypotheses with self-efficacy and metacognition as the mediating variables between growth mindset and academic writing performance. No previous research in the field of undergraduate thesis academic writing has examined the comprehensive interrelationships among these variables and their sub-variables. To create comprehensive hypotheses, we consider the division of the academic writing self-efficacy variable into three sub-variables: ideation, convention, and self-regulation, as described by Yeager and Dweck (2012).

Thus, we propose four hypotheses to be scientifically examined. The proposed hypotheses for the study include both direct and specific indirect effects. The direct effects hypothesize that a growth mindset positively influences self-efficacy for ideation (H1) and metacognition (H2). For specific indirect effects, it is hypothesized that a growth mindset enhances self-efficacy for ideation, which in turn improves self-efficacy for self-regulation and self-efficacy for convention, ultimately leading to better academic writing performance (H3). Additionally, it is hypothesized that a growth mindset positively affects metacognition, which subsequently enhances academic writing performance (H4).

Figure 1

Conceptual Model



METHOD

Sample and Data Collection

Using a purposive sampling technique, this study involved seventh semester (and above) students who were writing their theses in the English departments of various universities in Indonesia. There were 464 student participants from 28 provinces, with ages ranging from 20 to 24 years. The data were obtained through a closed questionnaire distributed online via the Google Form in June 2021. A consent form detailing the nature of the study, its goals, the data collection method, respondents' rights, and the confidentiality and anonymity of the responses was included with the online questionnaire. Respondents could only access the questionnaire by moving to the next form step and giving their digital approval. The Google Form link was given to the heads of the English departments at the universities where the student participants studied English.

Measurement Scale

The measurement scale used in this study was adapted from existing instruments. There were six variables used to formulate the model. Growth mindset was used as an exogenous variable. This scale was adapted from Cooper et al. (2020), that contained 4 items. For the mediated variables, the writing self-efficacy scale was adapted from Bruning et al. (2013), and the metacognition scale was adapted from Karlen (2017). In detail, the writing self-efficacy scale was divided into three sub-variables: self-efficacy for ideation, convention, and self-regulation, with a total of 11 items. Meanwhile, the metacognition scale subsumed 5 items. Furthermore, as the endogenous variable, the academic writing performance scale was adapted from Iwasaki et al. (2019) and contained 5 items. For the purpose of scoring, we used five-point Likert scales ranging from 1 (very inappropriate) to 5 (very appropriate). The validity and reliability of the adopted instruments were tested before they were compiled into a questionnaire and distributed to the respondents. Face validation was the initial step, involving two professors of linguistics and English as a Foreign Language. The professors evaluated the contents of the instruments on a scale of 1 to 5. The results of face validation showed an average score of 4.4. Next, we conducted pilot testing involving 60 students majoring in English from the provinces of Central Java and Papua. The pilot testing results were analyzed to assess the reliability and validity scores using SPSS 23. The reliability test resulted in a Cronbach's Alpha of .823, which is categorized as a good degree of reliability. Subsequently, the validity test produced in the *r* scores ranging from .61 to .83. These scores exceeded the *r*-table of .138. This indicated that the questionnaire items were valid.

Data Analysis

To test the hypotheses, this study deployed PLS-SEM due to its suitability for a relatively small number of respondents with complex hypothesis modeling (Hair et al., 2014). Before testing the hypotheses, the PLS-SEM procedure involved model specification, outer model evaluation, and inner model evaluation. In the first stage, we constructed the inner and outer models and determined the exogenous and endogenous constructs. In the second stage, we conducted a factor analysis or outer model evaluation by computing composite reliability, convergent validity, and discriminant validity. In the third stage, the inner model evaluation was carried out using a collinearity test. The analysis proceeded to test the hypotheses by performing a path coefficient analysis.

RESULTS

In this study, we applied PLS-SEM to examine both the direct and indirect (mediated) relationships among growth mindset, writing self-efficacy (encompassing ideation, self-regulation, and convention), and metacognition, as well as their collective impact on the academic writing performance of EFL undergraduate students. The assessment of the measurement model yielded strong indicator loadings and composite reliability, validating the convergent validity of our constructs. Discriminant validity was also confirmed, indicating minimal overlap among the constructs. The evaluation of the structural model revealed no issues of multicollinearity, and the path analysis supported all the hypothesized relationships. Notably, it emphasized the significant positive effect (both direct and indirect) of growth mindset, mediated by writing self-efficacy and metacognition, on the academic writing performance at the undergraduate level, specifically in the context of thesis writing.

Based on the conceptual model (see Figure 2), growth mindset is an exogenous construct, and academic writing performance is an endogenous construct. Constructs acting as both exogenous and endogenous constructs are self-efficacy for ideation, self-efficacy for convention, self-efficacy for self-regulation, and metacognition. The designed model is called a reflective model. Through confirmatory factor analysis, we computed factor loading values to assess the feasibility of items related to the constructs. Based on the recommended minimum threshold of .50 (Hair et al., 2016), we eliminated one item within the construct of self-efficacy for self-regulation because the value of factor loading did not exceed the minimum threshold. After this elimination, the factor loading values of all constructs ranged from .644 to .865. This demonstrated that the factor loading benchmarks had been established.

After formulating the model, an outer model evaluation was conducted to examine the reliability and validity of each construct. The computation results can be seen in in Table 1.

Computations were performed to obtain the values of Cronbach’s alpha, composite reliability, and average variance extracted (AVE). Construct reliability was assessed using internal consistency reliability with the recommended thresholds

of Cronbach’s alpha of > .7 (Njegić et al., 2020) and composite reliability of .7 - .95 (Hair et al., 2019). The computations showed that the values of Cronbach alpha ranged from .729 to .824, and the composite reliability values ranged from .828 to .886. These computations indicated that the reliability of indicators had been achieved. We subsequently examined the model’s validity by computing convergent validity and discriminant validity. The benchmarks for convergent validity were the values obtained from the Average Variance Extracted (AVE) analysis (see Table 1). Based on the AVE re-

sults, the constructs’ values ranged from .544 to .721, with a recommended threshold of .50 (Kline, 2015).

The outer model evaluation proceeded to conceptually ensure that the constructs did not overlap. To this end, we conducted a discriminant validity analysis to obtain the heterotrait-monotrait ratio (HTMT) value. To guarantee that each construct in the model differ conceptually from one another, the recommended threshold was < .85 (Henseler et al., 2015). Based on the analysis of discriminant validity (see Table 2), the HTMT results ranged from .424 to .775, demonstrating that discriminant validity had been achieved.

Furthermore, the last stage of analysis before testing the hypothesis was to perform a collinearity test to obtain the values of variance inflation factors (VIF). The threshold was < 3.3 (Hair et al., 2021; Kock, 2016). Based on the VIF computation (see Table 3), the obtained values ranged from 1.000 to 1.500. The values met the specified threshold requirements.

Figure 2
Confirmatory Factor Analysis Algorithm

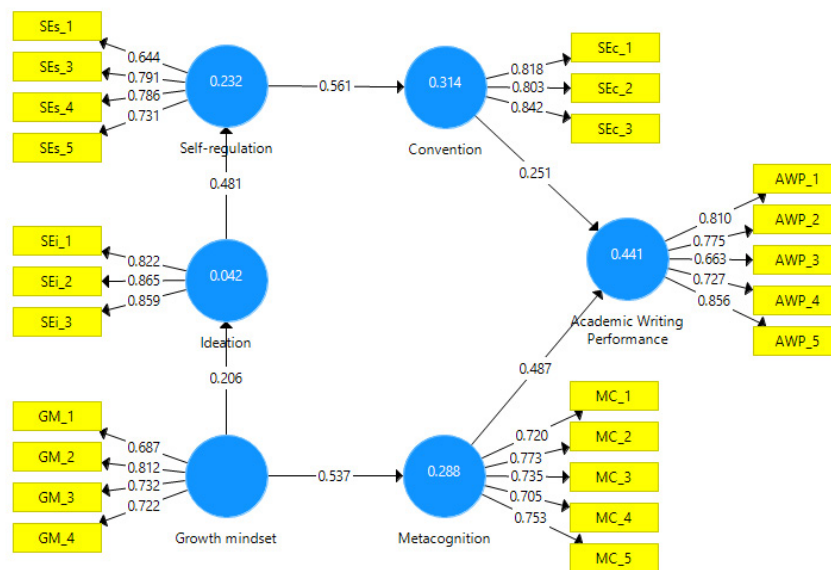


Table 1
Construct Validity and Reliability

Construct	Cronbach’s Alpha	rho_A	Composite Reliability	(AVE)
AWP	0.824	0.823	0.878	0.592
Sec	0.759	0.763	0.861	0.675
GM	0.733	0.774	0.828	0.547
Sei	0.806	0.806	0.886	0.721
MC	0.791	0.796	0.856	0.544
SEs	0.729	0.748	0.828	0.548

Note. AWP (Academic writing performance); SEc (Self-efficacy for convention); GM (growth mindset); SEI (Self-efficacy for ideation); MC (Metacognition); SEs (Self-efficacy for self-regulation)

Table 2
Heterotrait-Monotrait-Ratio (HTMT)

	AWP	AWP	SEc	GM	SEi	MC	SEs
SEc		0.669					
GM		0.633	0.424				
SEi		0.541	0.837	0.239			
MC		0.775	0.739	0.663	0.623		
SEs		0.611	0.736	0.472	0.605	0.751	

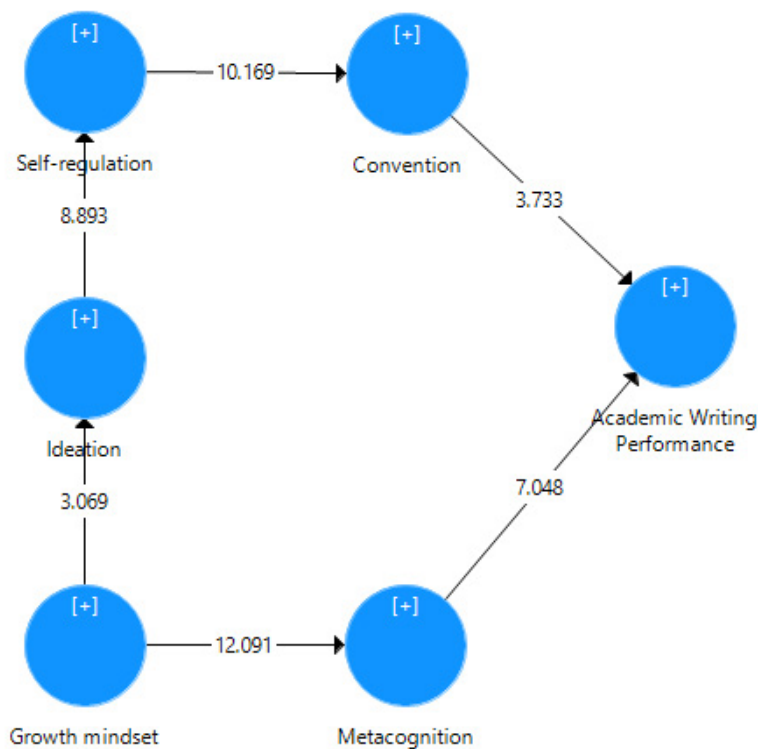
Note. AWP (Academic writing performance); SEc (Self-efficacy for convention); GM (growth mindset); SEi (Self-efficacy for ideation); MC (Metacognition); SEs (Self-efficacy for self-regulation)

Table 3
Variance Inflation Factor (VIF)

	AWP	SEc	GM	Sei	MC	SEs
AWP						
Sec	1.500					
GM				1.000	1.000	
Sei						1.000
MC	1.500					
SEs		1.000				

Note. AWP (Academic writing performance); SEc (Self-efficacy for convention); GM (growth mindset); SEi (Self-efficacy for ideation); MC (Metacognition); SEs (Self-efficacy for self-regulation)

Figure 3
Bootstrap Results for Path Analysis



Thus, it could be concluded that there was no issue of multicollinearity in the model specification. The existence of multicollinearity could affect reliability and validity, leading to potential bias in the path significance test used to examine hypotheses (Hair et al., 2019; Kock, 2016).

The analysis continued to test the hypotheses using the path coefficient by performing the bootstrap procedure. The values of the standardized path coefficient (see Figure 3) showed that the relationships among constructs were generally strong and positive (+1) (Hair et al., 2021). We applied a significance level of 0.05 during bootstrapping so that the threshold of t-value for acceptable hypotheses was > 1.96 (Wong, 2013).

Referring to the threshold, it was worth declaring that the four hypotheses (see Table 4) were accepted. In detail, direct relationships existed between growth mindset and self-efficacy for ideation and between growth mindset and metacognition. These relationships were positively significant at ($\beta = 0.206$; $p < 0.05$; $t = 3.069$; supporting H1) and ($\beta = 0.537$; $p < 0.05$; $t = 12.091$; supporting H2). For the mediated effect, growth mindset (indirectly through self-efficacy for ideation, self-regulation, and convention) had a positive and significant relationship with academic writing performance at ($\beta = 0.068$; $p < 0.05$; $t = 2.923$; supporting H3). Finally, growth mindset through metacognition had an indirect, positive, and significant relationship with academic writing performance at ($\beta = 0.261$; $p < 0.05$; $t = 6.003$; supporting H4). Using a margin of error at 5%, we were confident about the significant and positive results of testing the hypotheses with a 95% confidence level.

DISCUSSION

Numerous empirical studies have examined the direct relationships among self-efficacy, metacognition, and academic writing performance (e.g., Bai et al., 2020; Bruning et al., 2013; Chakma et al., 2021; Grenner et al., 2021; Howe & Wig, 2017; Sultan & Moqballi, 2020; Vincent et al., 2021). However, there is a notable lack of research on how a growth mindset,

indirectly through self-efficacy and metacognition, can impact academic writing performance. Additionally, research focusing on academic writing performance among undergraduate students in EFL (English as a Foreign Language) countries remains insufficient. Therefore, this study aims to address these gaps.

The study presents four key findings. First, the participants indicated that a growth mindset positively affected their self-efficacy for ideation. Second, it was evident that the participants' growth mindset influenced their metacognitive strategies in writing. Third, three types of writing self-efficacy - self-efficacy for ideation, convention, and self-regulation - mediated the relationship between growth mindset and academic writing performance. Fourth, metacognition also mediated the relationship between growth mindset and academic writing performance.

These findings provide a comprehensive understanding that enhancing academic writing competence, particularly in the context of EFL undergraduate theses, begins with students' beliefs in the value of their learning investments in writing. Over time, these beliefs shape their confidence in generating ideas, using proper English, managing behavior and decisions, and employing controlled strategies during writing. This continuum ultimately leads to improved academic writing performance.

Growth Mindset Affected Students' Self-Efficacy for Ideation

This study demonstrated a direct, positive, and significant relationship between growth mindset and self-efficacy for ideation ($\beta = 0.206$, $p = 0.002$). This finding indicates that students' beliefs in their persistent learning investments (Bai & Guo, 2018) contribute to their increasing confidence in generating ideas during writing. The process of idea generation in writing involves prolonged and continuous cognitive activities, which are associated with competencies such as reading resources, mapping the information read, co-constructing a mental map between newly acquired information and pre-existing knowledge, and translating the prod-

Table 4
Results of Paths Analysis

	Path	Beta Value	Std. Error	t- Value	p- Values	Results
Direct Effects						
H1	GM -> SEi	0.206	0.065	3.069	0.002	Supported
H2	GM -> MC	0.537	0.045	12.091	0.000	Supported
Specific Indirect Effects						
H3	GM -> SEi -> SEs -> SEc -> AWP	0.068	0.023	2.923	0.004	Supported
H4	GM -> MC -> AWP	0.261	0.044	6.003	0.000	Supported

Note. AWP (Academic writing performance); SEc (Self-efficacy for convention); GM (growth mindset); SEi (Self-efficacy for ideation); MC (Metacognition); SEs (Self-efficacy for self-regulation)

ucts of idea mapping into coherent written words (Crossley et al., 2016). This study specifically suggests that students' confidence in these processes of idea generation is influenced by the extent of their growth mindset.

Previous studies have addressed similar issues, highlighting the influence of a growth mindset on writing self-efficacy (Bai et al., 2020; Zander et al., 2018). However, those studies viewed writing self-efficacy as a single variable. In contrast, the present study categorizes writing self-efficacy into three domains: ideation, convention, and self-regulation. By examining writing self-efficacy in greater detail, this study underscores the contribution of a growth mindset to writing self-efficacy for ideation.

Growth Mindset Influenced Students' Metacognition in Writing

Further data analysis reveals that students' growth mindset had a direct, positive, and significant impact on metacognition in writing ($\beta = 0.537$, $p = 0.000$). This result means that students' beliefs in the strengths of their persistent learning investments (Bai & Guo, 2018) lead to their effective control over writing knowledge, strategies, and management (Sultan & Moqbali, 2020). In the discourse of writing metacognition, Briesmaster (2017) elucidated that both knowledge of cognition and cognition regulation in writing act as a problem-solving competence for students to cope with the complexities of writing. The present study confirms Bai and Wang's (2020) finding that motivation variable, such as growth mindset, significantly predicts the enhancement of self-regulated learning, whose theoretical components align with those of metacognition.

Writing Self-Efficacy Mediated the Relationship between Growth Mindset and Academic Writing Performance.

Furthermore, three types of writing self-efficacy, i.e., self-efficacy for ideation, convention, and self-regulation, mediated the relationship between growth mindset and academic writing performance ($\beta = 0.068$, $p = 0.004$). The aforesaid mediating variables rest upon the categories in Bruning's et al. (2013) theory on the interplay among writing self-efficacy for ideation, convention, and self-regulation. Thus, the present study's data on these mediating variables are also correlative in nature. It indicates that students' confidence in their skills, strategies, and insights for generating and refining ideas while writing affected their confidence in using all the tools available to them for academic writing, such as vocabulary, grammar, mechanics, language features, morphological awareness, and genres. Subsequently, their confidence in using academic writing tools backed up their confidence in control over writing knowledge and strategies.

The interplay among writing self-efficacy for ideation, convention, and self-regulation in writing has also been highlighted by other studies. For instance, Crossley et al. (2016) found that the usages of linguistic aspects in writing, such as difficult words, various units of words, non-repetitive terms, and semantic understanding, are triggered by the quality of idea generation. According to their findings, students who are good at generating ideas during writing are also good at using language patterns referred to by Bruning et al. (2013) as writing convention. Writing self-efficacy is not a static. It is something fluid that can also be improved through strategic practices with good management (Mitchell et al., 2017). Thus, the quality of writing convention triggered by idea generation should be maintained by good self-regulated learning. The present study's third result explains that students' beliefs in the power of learning investments (Bai & Guo, 2018) may contribute to their academic writing performance if they have sufficient writing self-efficacy for ideation, convention, and self-regulation.

Metacognition Mediated the Connection between Growth Mindset and Academic Writing Performance.

The fourth result of this study showed that metacognition mediated the connection between growth mindset and academic writing performance ($\beta = 0.261$, $p = 0.000$). It means that students' beliefs in the power of learning investment (Bai & Guo, 2018) may contribute to their academic writing performance if the students have effective control over writing knowledge, strategies, and management (Sultan & Moqbali, 2020). The current study, which examines the relationship between metacognition and academic writing performance, confirms earlier research showing that students with sufficient metacognitive abilities can produce written works that meet readers' expectations in terms of genre goals and written content flow (Escorcia & Ros, 2019). Additionally, they will understand the various traits and theoretical underpinnings of excellent writing (Aliyu et al., 2016).

The significance of writing self-efficacy and metacognition as mediators enhancing the relationship between growth mindset and academic writing performance cannot be overstated. This mediation offers meaningful insights for EFL writing instructors and thesis supervisors. It is crucial for educators to assess students' levels of growth mindset and actively encourage its development through motivational input. Additionally, they should implement specific learning interventions aimed at boosting students' self-efficacy and metacognitive abilities.

Prior research has highlighted various effective interventions for enhancing writing self-efficacy. These include a self-efficacy intervention incorporating psychological el-

ements from cognitive behavioral therapy (Daniels et al., 2020), wiki-collaborative writing intervention (Rahimi & Fathi, 2021), the use of computer-based self-efficacy feedback (Sherafati & Mahmoudi Largani, 2022), team-based learning (Zha et al., 2021), and self-efficacy-based written corrective feedback (Tsao, 2021).

Regarding metacognition in writing, several studies have demonstrated effective interventions. These interventions include the use of reflective writing journals to foster deeper self-reflection (Loughlin & Griffith, 2020; Ramadhanti et al., 2020), the integration of active learning and metacognitive feedback (Zhang & Li, 2021), web-based instructional strategies (Arroyo González et al., 2021), metacognitive support groups (Teng, 2020), cooperative–metacognitive instructional approach (Teng, 2020), mobile-assisted language learning tools (Kessler, 2021), metacognitive prompts to enhance awareness (Teng, 2021), and the flipped classroom model to invert traditional learning environments (Kansizoğlu & Bayrak Cömert, 2020).

These interventions are supported by scientific research and offer vicarious experiences that can significantly aid EFL writing instructors and thesis supervisors in helping students enhance their writing self-efficacy and metacognition. Employing such interventions can foster an ideal correlation between growth mindset and superior academic writing performance.

Limitations

The current study is not free from limitation. Although this study could reach student participants from 28 provinces in Indonesia, the total number of participants who were willing to take part were only 464 EFL students. The covid-19 situation hindered us to distribute the study's instrument directly to students, so the instrument was distributed online with limited control. If the instrument had been distributed offline, we could have managed to reach more participants. A greater number of participants might reveal different results. However, with such limitation, we had made serious efforts in data analysis to reduce bias. We used PLS-SEM program to obtain accurate results of data analysis. In addition, this study dominantly worked on the aspects of students' psychological and working competences in the context of academic writing performances. Such competences are growth mindset, self-efficacy, and metacognition. However, it is crucial to emphasize that this study did not work in-depth on detailed and specific skills of academic writing, such as the areas of assessing students' argumentation abilities and critical reasoning skills. The foregoing areas, argumentation abilities and critical reasoning skills, are the voids that further studies could surf scientifically. Further studies working on the foregoing voids will serve more knowledge

for academicians and readers who are consistently interested in the issue of academic writing.

CONCLUSION

This study aimed to explore the interplay among growth mindset, self-efficacy, metacognition, and academic writing performance, highlighting possible mediating variables. The findings demonstrate that a growth mindset directly and positively influences self-efficacy for ideation and metacognition, which subsequently enhance academic writing performance. These findings contribute to a meaningful conception that the enhancement of academic writing competence, in the context of EFL undergraduate theses, is initiated by students' beliefs in the power of their learning investments in writing. Over time, such beliefs in learning investments shape their confidence in generating ideas, using good English, managing behavior and decisions, and using controlled strategies during writing. This continuum results in the improvement of their academic writing performance. Specifically, this study reveals that three types of writing self-efficacy (ideation, convention, and self-regulation) mediate the relationship between growth mindset and academic writing performance. The results of this study are well-expected and not only support the proposed hypotheses but also demonstrate that a growth mindset significantly impacts self-efficacy and academic writing performance through the hypothesized pathways. This indicates that the study has successfully achieved its objectives and provides strong empirical evidence of the influence of a growth mindset in the investigated context. These findings contribute new insights and reinforce existing theories on the relationship between growth mindset, self-efficacy, metacognition, and academic writing performance. These results can be used to design educational interventions focused on developing a growth mindset to enhance students' self-efficacy and academic writing performance.

Further studies are expected to conduct experimentations by testing various interventions potential to boost students' self-efficacy and metacognition, especially in the context of EFL undergraduate theses. Such studies will be useful as vicarious experiences for educators majored in EFL education. Also, since the present study did not specifically focus on the areas of argumentation abilities and critical reasoning skills as some internal parts of academic writing skills, it is recommended that future studies probe these areas. Research-based data on students' argumentation abilities and critical reasoning skills can serve as the basis for developing relevant techniques or strategies which can be adopted by academic writing teachers to help students boost their academic writing competence.

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DECLARATION OF COMPETING INTEREST

None declared.

AUTHORS' CONTRIBUTION

Lastika Ary Prihandoko: Conceptualization; Data curation; Formal analysis; Methodology; Project administration; Resources; Software; Writing – original draft; Writing – review & editing.

Ruly Morganna: Conceptualization; Investigation; Methodology; Validation; Writing – original draft; Writing – review & editing.

Suci Nugrah Amalia: Conceptualization; Methodology; Supervision; Validation; Writing – original draft; Writing – review & editing.

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