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Metacognitive writing and self-regulatory efficacy for writing among university students: Development and validation of the Metacognitive Writing Scale

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ABSTRACT

Although there are various measurement tools in the literature for measuring metacognition, measurement tools that are specifically designed to measure the metacognition of adults in writing are limited. In this context, the main purpose of the current study is to develop a metacognitive writing scale for university students whose native language is Turkish. Participants were 805 Turkish university young adults in Turkey. Exploratory factor analysis results revealed that the scale consisted of 19 items and four dimensions. These factors were identified as writing knowledge, planning, monitoring, and evaluation. The findings obtained from confirmatory factor analysis showed that the four-factor model was replicated. This data suggests that the scale can be used as a valid and reliable measurement tool for determining the metacognition of university students in writing. In this study, the predictive power of metacognitive writing on self-regulation in writing was also examined. The results showed that students' self-regulation competencies in writing were significantly and positively predicted by writing knowledge, planning, and monitoring.

Introduction

Traditional theoretical models view writing as a linear and relatively simple process. However, contemporary models position writing within a more complex framework that encompasses physical, cognitive, emotional, behavioral, and social components (Harris, Santangelo & Graham, 2010; McCutchen, 2006; Zimmerman & Risemberg, 1997a). Within this context, writing is a skill that demands a high level of self-regulation and metacognition (Scardamelia & Bereiter, 1987; Kellogg, 1987; McCutchen, 2006; Zimmerman & Bandura, 1994). This is because writers typically work independently, planning and executing their tasks on their own. They set personal goals, employ various strategies, motivate themselves, seek feedback, and continually revise their work and methods (Zimmerman & Bandura, 1994; Zimmerman & Risemberg, 1997a, 1997b). Throughout the writing process, writers monitor their own performance and make adjustments as needed.

Not only from a theoretical standpoint, but also empirical evidence suggests that metacognition and self-regulation are crucial characteristics that distinguish successful writers from others. There is a strong correlation between metacognition, self-regulation, and writing performance (Balta, 2018; Çam, 2023; Devine et al., 1993; Englert et al., 1988; Farahian & Avarzamani, 2018; Graham et al., 2017; Perdana et al., 2023; Saddler & Graham, 2007; Teng & Yue, 2023; Teng et al., 2022). For example, Saddler and Graham (2007) found that skilled writers possess more MK compared to their peers. Farahian and Avarzamani (2018) stated that proficient second language writers benefit from higher metacognitive awareness and that this awareness is positively correlated with writing proficiency. Graham and colleagues (2017) determined that strategy use is one of the significant variables predicting the writing performance of fourth-grade students. Balta (2018) found a significant and positive correlation between the argumentative writing skills of secondary school students and their metacognitive awareness. Teng and Yue (2023) determined that metacognitive strategies are one of the predictive factors of university students' academic writing performance. As seen, metacognition plays a significant role in writing performance across different target groups, both in the native language and in foreign languages.

To measure the structure of metacognition, which plays a key role in writing performance, measurement tools are required. Measuring metacognition can help learning processes and facilitate the development of high-quality instructional practices. As Kansızoğlu (2020) highlights, determining students' current status using appropriate assessment tools can contribute to the systematic implementation of metacognitive training. Moreover, evaluating students' metacognitive abilities is essential to understand their growth and provide necessary support. Teachers can devise strategies to identify students' metacognitive competencies and adapt their teaching methods and materials to meet individual student needs (Okoza & Aluede, 2013; Pintrich, 2002). Based on these considerations, assessing students' metacognitive competencies in writing can foster their awareness of writing knowledge and processes. Furthermore, it can assist teachers in delivering a high-quality writing education tailored to their students' specific needs.

While there are some limitations in measuring metacognition, scales are one of the most commonly used measurement tools and evaluation methods (Pintrich & De Groot, 1990; Pintrich et al., 2000; Schraw & Dennison, 1994; Sperling et al., 2002; Tobias & Everson, 2009; Weistein et al., 1987). As will be explained in detail under the heading "Measuring Metacognition in Writing", some scales have been developed. However, the target audience of these measurement tools varies between adult foreign language learners and secondary school students learning in their native language. The lack of a metacognition scale for native-speaking university students has necessitated this study. In this context, the main purpose of the research is to develop a metacognitive writing scale for university students in the Turkish sample. In addition, this study examined whether metacognition in writing predicts self-regulation in writing. In this direction, it is thought that this study will contribute to the relevant literature.

Metacognition and metacognition in writing

In literature, metacognition is often presented as a multi-layered and complex concept. However, when considered within the context of learners and their environment, metacognition can be defined as a concept that emphasizes their cognition. It refers to their ability to think about how they know and perform a skill (Dinsmore et al., 2008; Flavell, 1979; Negretti, 2009). While various arguments about metacognition have been made in the past, the contemporary foundations were laid by Flavell.

Flavell (1979) defined metacognition as "thinking about thinking" and operationalized it into four fundamental areas that interact in complex ways. Following Flavell, various researchers have proposed models that expanded the scope of metacognition. However, at the core of the structures presented in these models, there are two fundamental elements (Harris et al., 2009; Scott & Levy, 2013). These two elements, which form the basis of this study examining metacognition in the context of writing, are presented in Figure 1.

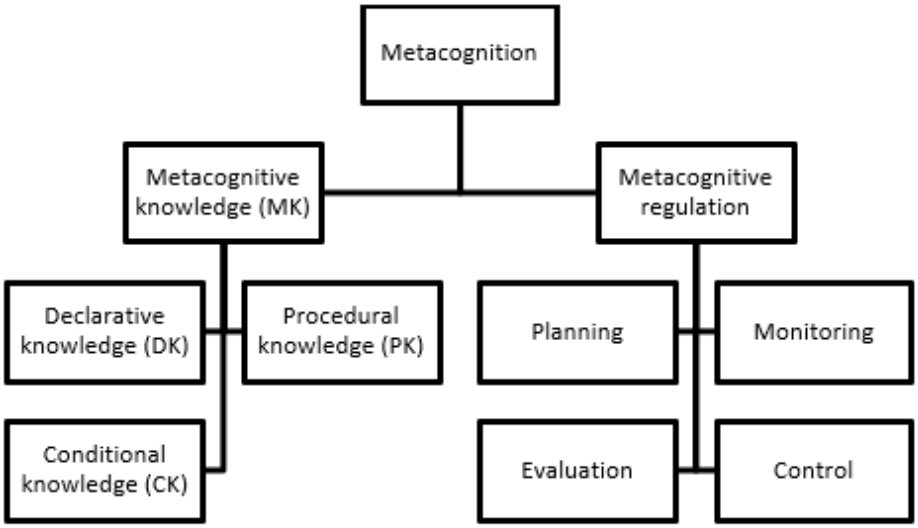

Figure 1 Metacognition model adopted in the study

Figure 1, when examined in more detail, WK is a significant predictor of writing performance and constitutes the first structure of metacognition. DK refers to the conceptual knowledge about the skills, processes, strategies, etc., required to complete a task, and also includes knowledge of which factors can affect one's performance (Bruning et al., 2014; Zimmerman & Risemberg, 1997a, 1997b). In the context of writing, DK includes knowledge about the writing topic, purpose, reader characteristics and needs, text types and structural features, and writing processes and strategies (planning, drafting, revising). It also encompasses the writer's understanding of the factors that may impact their performance during the task, as well as their awareness of their own motivation (Harris et al., 2010). PK is about knowing how to apply or process DK, while CK is about knowing under what conditions (why and when) to apply it (Bruning et al., 2014). In the context of writing, PK is about knowing how to apply specific strategies during the writing process. CK, in the context of writing, refers to determining which skills and strategies will best achieve the goals for the task (Harris et al., 2010). In this context, CK means the writer knowing which strategy to use based on the task characteristics (time, writing purpose, etc.), text structure, and type.

The second main structure of metacognition involves consciously planning, monitoring, and evaluating cognitive activities and all contemporary models of writing (e.g., Hayes & Flower, 1980; Bereiter & Scardamalia, 1986; Zimmerman & Risemberg, 1997a) explicitly or implicitly acknowledge the critical role of self-regulatory processes (Harris et al., 2010). According to these models, writers use various self-regulation strategies to create a quality composition. The most important of these are cognitive strategies used in the basic processes of writing, including planning, translating into text, and reviewing. Cognitive strategies include conducting research on the topic, determining the text type and structure and the reader, using idea-generation strategies such as mind maps/word webs, creating a draft of the text using graphic organizers,

and reviewing and revising one's writing (Hayes & Flower, 1980; Zimmerman & Kitsantas, 2007). In addition to cognitive strategies, writers also use self-regulation strategies such as self-instruction (the writer thinking aloud or silently about what they will do, voluntarily or involuntarily), focusing attention and organizing the environment (e.g., the writer creating a productive time and writing environment), modeling (e.g., modeling a teacher, a skilled writer, and a text that fits the target text structure), seeking social support (e.g., getting help from friends, family, etc. when encountering a problem during the writing process), self-evaluation (e.g., determining whether or not they have reached their goal), record-keeping and self-monitoring (e.g., noting areas for improvement), self-reinforcement (e.g., rewarding oneself for achieving writing goals), and imagery (e.g., visualizing what one will write) (Graham & Harris, 2000; Harris et al., 2010; Zimmerman & Kitsantas, 2007; Zimmerman & Martinez-Pons, 1986; Zimmerman & Risemberg, 1997a).

Measuring metacognition in writing

Measuring metacognition is quite difficult due to its complex nature and the fact that it cannot be directly observed as it is related to an individual's internal thoughts and strategies (Flavell, 1979; Pintrich, 2002; Schraw & Moshman, 1995). In addition, while a person may have very good metacognitive skills in a certain area or situation, they may not have the same skills in another area, which makes measuring metacognition difficult and necessitates the development of measurement tools specific to each task and situation. Commonly used measurement tools to assess individuals' metacognitive awareness and regulation in different tasks and situations include self-report instruments such as surveys, semi-structured interviews, reflective journals, and micro-analytic interviews, as well as observations, think-aloud protocols, performance ratings, and error detection (Alt & Raichel, 2020; Cleary et al., 2015; Cleary & Zimmerman, 2001; Dinsmore et al., 2008; Pintrich et al., 2000). However, the most economical and efficient way to assess metacognition is through self-report surveys (Craig et al., 2020; Dinsmore et al., 2008; Schraw & Dennison, 1994; Sperling et al., 2002).

In the literature, metacognitive writing scales have generally been developed for secondary school and university students. For secondary school students, De Kruif (2000) developed a scale with five dimensions—planning, process monitoring, product monitoring, reviewing, and help-seeking—based on 665 fourth and fifth graders, comprising 45 items. In the Turkish literature, for secondary school students, Kansızoğlu (2020) developed a five-factor scale with 23 items, Erol and Kavruk (2023) developed a single-factor scale with 35 items, and Aydın, İnnalı and Uyumaz (2017) developed a 40-item scale. When the scales developed for university students are examined, Farahian (2017) developed the Metacognitive Awareness Writing Questionnaire (MAWQ) as a complement to his previous studies (Maftoon et al., 2014; Farahian, 2015). This questionnaire, which was prepared for EFL learners, consists of 10 subcategories under two main categories and has 36 items. In similar research, Ramadhanti and Yanda (2023), Zang and Qin (2018), and Escorcia and Gimenes (2020) constructed multi-factorial scales. These scales comprised 40, 23, and 15 items, respectively.

The purpose of current study

Previous studies assist the idea that “metacognition” and “self-regulation” are important factors in writing skills across age groups. Given the importance of metacognition in writing, there is a need to develop a reliable and valid instrument to assess this construct. However, there are limited measurement tools that can measure metacognitive writing in university students who are taught in their native language. Therefore, the aim of this study is to develop and pre-validate a self-report measure to assess metacognition in writing in university students. The development

of this scale will fill the gap in the literature. The aim of the current study is to examine the predictive power of metacognition in writing on self-regulation in writing in the context of reliability measurements and to help develop effective intervention programs.

Method

Participants

Convenience sampling was used in this study. A total of 805 Turkish university young adults took part in this study. There were 586 women, 219 men. Participants ranged in age between 18 to 30 years with a mean age of 20.82 (SD = 2.61). All students were university students: freshman (37.3%), sophomore (23.0%), junior (19.3%), and senior (20.5%).

Metacognitive writing awareness scale

This scale was developed by the researchers of the study. The scale consists of 19 items answered according to the 5-point Likert scale. Higher scores mean that awareness is at a high level. In the process of developing the scale, the relevant literature was first reviewed, the theoretical background and the scales previously developed in relation to the subject were examined in detail. Then, open-ended questions were posed to the target group (undergraduate students) and their content analysis was performed. At the end of this process, an item pool consisting of 42 items was created. Then, the opinions of 3 experts (1 expert in psychological counselling and guidance, 1 in measurement and evaluation, and 1 in Turkish language) were taken to be evaluated in terms of scope. After the items of the scale were completed, the application stages were started. All items were scored using a 5-point Likert-type scale decoupled between I never do (1) and I always do (5). After all the applications, a valid and reliable measurement tool that can be used for university students has been developed.

Perceived self-regulatory efficacy scale

This scale originally developed by Zimmerman and Bandura (1994), was adapted into Turkish by Çelikkaleli and Yıldırım (2015). This 7-point Likert scale consists of 25 items, with response options ranging from 1 "Strongly Disagree" to 7 "Strongly Agree." This scale has a unidimensional structure, accounting for 38% of the variance, and exhibits high internal consistency with Cronbach's alpha coefficients of .93 and .90 in the first and second samples, respectively. This scale has been used to establish criterion validity.

Data analysis

Prior to the main analysis, we first investigated whether the proposed measurement model developed for the purpose of this study indicated an appropriate representation of responses to developed scale. This was indeed done to examine the factor structure of the MW. To end that, participants were randomly split into two subsamples of roughly equal size: Sample 1 (n=402) and Sample 2 (n=403). Sample 1 was used for Exploratory Factor Analysis (EFA) and Sample 2 was used for Confirmatory Factor Analysis. Criterion validity was tested using the whole sample (n=805). Cronbach’s alpha was calculated to report internal consistency reliability. All data were analysed using SPSS version 25 and LISREL 8.8 for Windows.

Results

Exploratory factor analysis

EFA was used to clarify the factor structure of developed scale. Several criteria were taken into account for extraction of a number of factors. Firstly, one of the commonly used criteria for determining the number of factors is to extract factors with eigenvalues greater than 1 (Kaiser, 1960). Secondly, a factor loading of less than .40 is utilized as the cut-off point for interpretation of the respective factor, meaning that any items which had factor loadings of less than .40 were avoided (Stevens, 2012). To address cross-loading, items with factor loadings which are greater than .40 in more than one factor are removed (Hair et al., 2002). Finally, Scree plot was considered in the selection of factor on the scale.

We firstly run EFA on 42 items. Kaiser-Meyer-Olkin measures of sampling adequacy were .93 and Bartlett's tests of sphericity were 7977.64 ($p < .001$). The EFA generated 9 factors with eigenvalue greater than 1 (eigenvalue ranged between 1.05 and 13.54). However, there were some cross-loading and items with poor factor loadings. Therefore, based on the above-mentioned criteria for the EFA, an iterative process was carried out to minimize cross loading items and those with low factor loading scores until the acceptable factors were obtained. Following these two approaches, 23 items were removed from the initial pool of items.

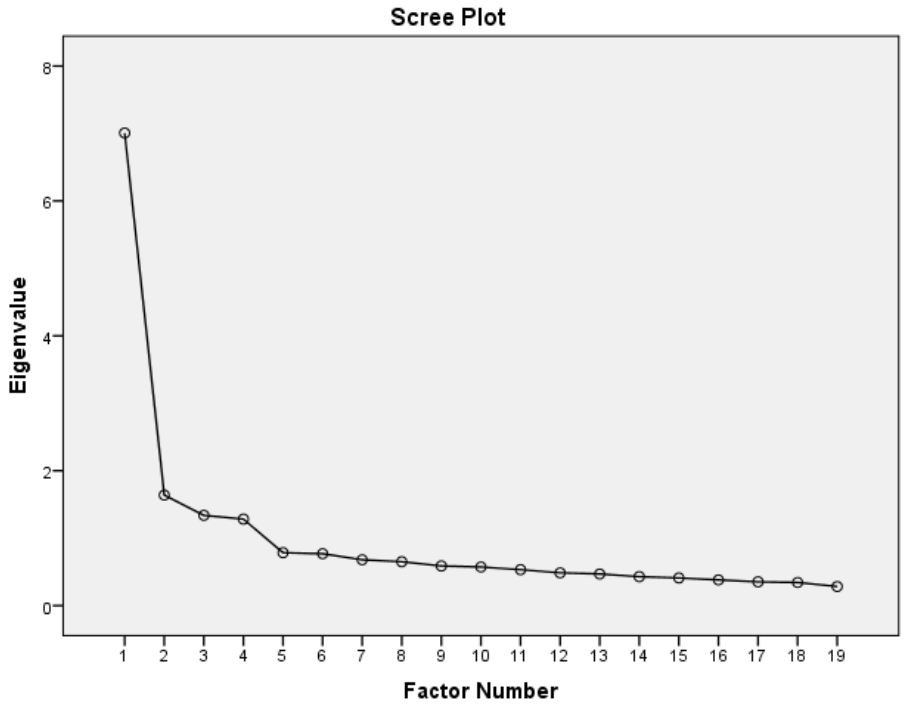

Figure 2 Scree plot indicating the factor structure of the measure

The results of EFA with remaining 19 items showed that the Kaiser-Meyer-Olkin measures of sampling adequacy were .91 and Bartlett's tests of sphericity were 2997.10 ($p < .001$), respectively. Also, EFA on the Sample 1 yielded only four factors with eigenvalues above 1, which accounted for 36.88 for Factor 1 (eigen value = 7.0), 8.63 for Factor 2 (eigen value = 1.64), 7.04 for Factor 3 (eigen value = 1.34), and 6.75 for Factor 4(eigen value = 1.28). This four-factor structure was also confirmed by examination of the Scree plot (see Figure 1). The factor loadings for each factor are presented in Table 1. As shown in Table 1, absolute values of the factor loadings of the 19 items were all positive and more than .40. More specifically, factor ladings ranged between .50 and .74

for Factor 1, .47 and .88 for Factor 2, .53 and .79 for Factor 3, and .51 and .79 for Factor 4. Factor 1 is “metacognitive knowledge”, Factor 2 is “planning”, Factor 3 is “monitoring” and Factor 4 is “evaluation”.

Table 1 The results of exploratory factor analysis

Item	Factor 1 Metacognitive Knowledge	Factor 2 Planning	Factor 3 Monitoring	Factor 4 Evaluation
MW2	0.50			
MW3	0.63			
MW4	0.63			
MW5	0.54			
MW7	0.74			
MW8	0.57			
MW17		0.47		
MW19		0.57		
MW20		0.88		
MW21		0.56		
MW22		0.74		
MW 25			0.60	
MW26			0.53	
MW28			0.79	
MW29			0.73	
MW35				0.72
MW36				0.51
MW37				0.79
MW38				0.58

Note 1. Extraction Method: Maximum Likelihood. Rotation Method: Promax with Kaiser Normalization.

Confirmatory factor analysis

EFA has showed the structure of four dimensions. For complex models with multiple levels of structure, it is critical to investigate each level separately to assure that the identification can be confirmed (Byrne, 2001). The developed scale has a multi-dimensional structure comprising of four dimensions measured by 19 items. CFA was conducted with LISREL 8.8 software on the Sample 2 using the 19-item scale based on the four-factor structure suggested by the EFA. To evaluate goodness of fit, the non-normed fit index (NNFI), comparative fit index (CFI), incremental fit index (IFI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR) were reported. Acceptable fit is shown by NNFI, CFI, and IFI of at least .90, and RMSEA statistic from .05 to .08 and SRMR less than .08 (Tabachnick & Fidell, 2007). All indexes of goodness of fit indicated that the fit for the proposed model was good – $\chi 2 = 429.84$, $df = 146$, $p < .001$, IFI = .96, CFI = .96, NNFI = .96, SRMR= .056, RMSEA (95% CI) = .070 (.062, .077).

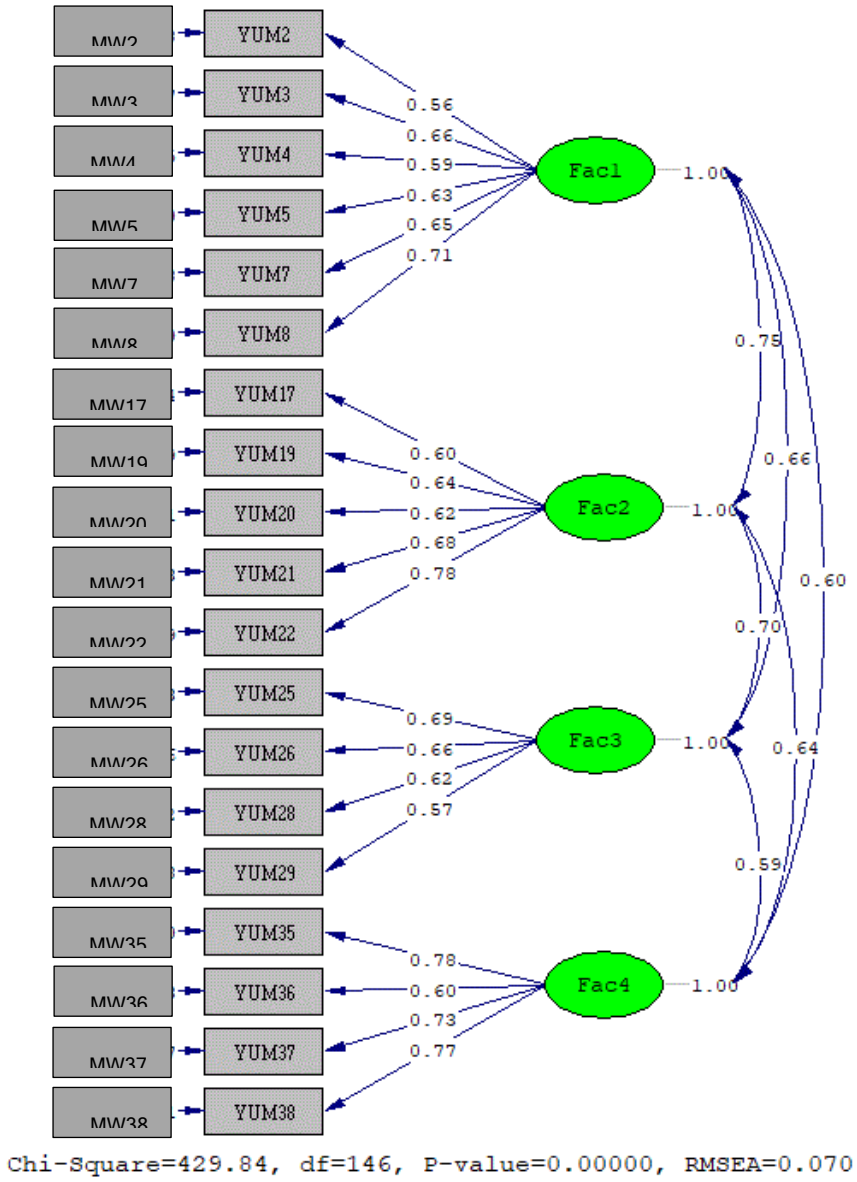

Figure 3 Confirmatory factor analysis

Reliability

Cronbach's alpha coefficient is computed to assess the internal consistency reliability for the factors determined, with the value of .70 as the minimum acceptable value. The results of analysis showed that Cronbach's alpha coefficients for Sample 1 were .82 for Factor 1, .81 for Factor 2, .79 for Factor 3, and .81 for Factor 4 while Cronbach's alpha coefficients for Sample 2 were .80 for Factor 1, .80 for Factor 2, .73 for Factor 3, and .81 for Factor 4. These results suggest that internal consistency reliabilities for each dimension ranged between acceptable to good.

Convergent validity

To provide evidence of criterion validity, we correlated the YUM with ODM. We expected a positive correlation between the newly developed scale and the scale used for criterion validity. This is important in terms of showing whether the new scale has criterion validity with extant scale in the literature. We based this analysis on the data of the full sample of 805 Turkish young adults. To do this analysis, a total score was created for each dimension of YUM and ODM. The results of the analysis based on overall sample (n=805) are reported in Table 2.

As shown in Table 1, skewness and kurtosis values for the four subscales and ODM fall within the criteria of |2|, representing acceptable symmetry of a normal distribution (Curran et al., 1996). The results of correlation analysis showed that all factors were significantly and positively correlated with total ODM and the correlation coefficients ranged between .48 and .61.

Table 2 Descriptive statistics and correlation results

	Descriptive statistics				Correlation				
Variable	Mean	SD	Skewness	Kurtosis	1.	2.	3.	4.	5.
1.Metacognitive Knowledge	23.90	3.91	-0.49	0.11	—	.58**	.50**	.52**	.61**
2. Planning	19.32	3.80	-0.62	0.36		—	.50**	.53**	.54**
3. Monitoring	17.28	2.58	-1.14	1.68			1	.47**	.50**
4. Evaluation	15.47	3.26	-0.55	-0.09				1	.48**
5. Total MW	128.31	21.83	-0.32	0.29					1

**

We finally conducted a path analysis to examine the predictive effect of metacognitive writing awareness on self-regulatory efficacy for writing among university Turkish students. The path model had good data model fit statistics $-\chi 2 = 664.79$, df = 161, $p < .001$, IFI = .97, CFI = .97, NNFI = .97, SRMR= .048, RMSEA (95% CI) = .062 (.058, .067). Findings from path analysis with total sample of the study also revealed that students' self-regulatory efficacy for writing was significantly and positively predicted by methodological knowledge (β = .44, p<.001), planning (β = .12, p<.05), and monitoring (β = .18, p<.001) but was not predicted by evaluation (β = .07, p>.05), as seen in Figure 3.

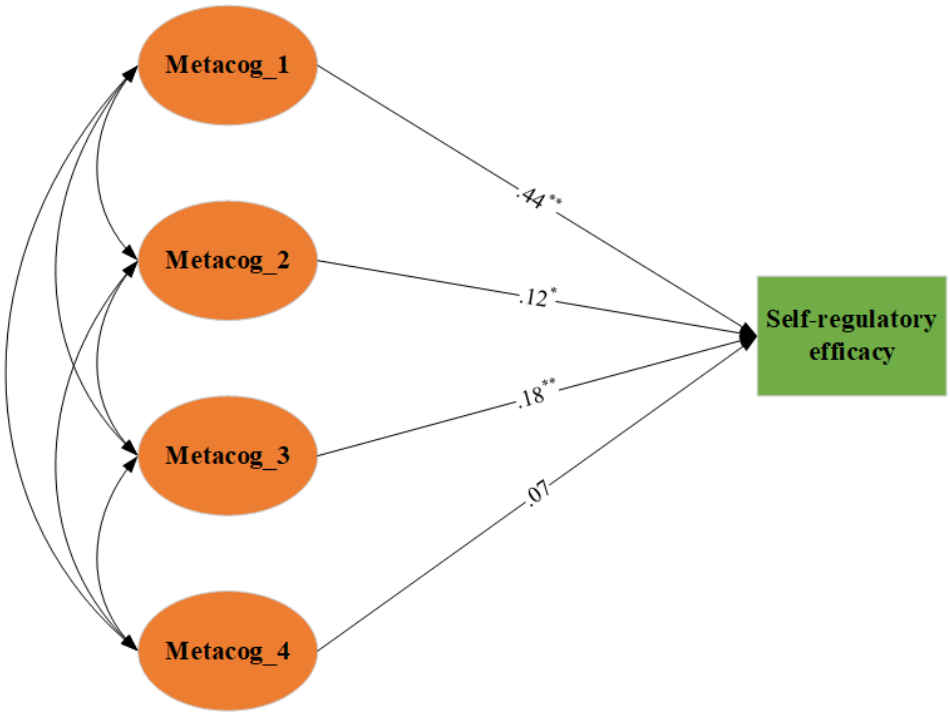

Figure 4 The predictive effects of metacognitive writing awareness on students' self-regulatory efficacy for writing

Discussion and conclusion

The purpose of this study is to develop a metacognitive writing scale for university students. Exploratory factor analysis results revealed that the scale has a four-factor structure consisting of "metacognitive knowledge", "planning", "monitoring", and "evaluation" and comprises 19 items. The total variance explained by the four-factor model is 59.30%. Confirmatory factor analysis results also indicated that this measurement tool can be used as a valid and reliable instrument to measure university students' metacognitive awareness and regulation in writing.

When the scales developed in the literature to measure metacognition in writing are examined, the current study also overlaps with Farahian's study. Because the "metacognitive knowledge" dimension in this study overlaps with the "metacognitive knowledge" dimension in Farahian's study. In addition, other sub-dimensions included in this study are similar to the cognitive regulation in Farahian's study. On the other hand, Zang and Qin's (2018) study consisted of 23 items across three factors: planning, monitoring, and evaluation. The current study differs from Zang and Qin's only in the metacognitive knowledge dimension. Kansızoğlu's (2020) study yielded a five-factor structure. The planning dimension of the current study overlaps with the planning dimension of Kansızoğlu's study. The "monitoring" and "evaluation" dimensions of the current study are combined into a single dimension, "monitoring-evaluation-debugging", in Kansızoğlu's study. The "metacognitive knowledge" in the current study encompasses the first three dimensions of Kansızoğlu's study. Although the current study is similar in terms of scope, it differs from Erol and Kavruk's (2023) single-factor scale with its four-factor structure. The fact that the four-factor structure in the current study is comprised of only 19 items is also valuable in terms of the literature. It can be said that it is a measurement tool that measures metacognitive writing awareness with the fewest items and the most factors.

From the point of view of the target audience addressed by the measurement tool, it can be said that this study differs from the study developed by Aydin et al. (2017), Kansizoglu (2020), Erol and Kavruk (2023) for secondary school students; it has similarities with Farahian (2015) and Zang Qin (2018).

Although candidate items related to text type and structure and strategies that can be used before starting to write were created in the current study, as a result of the analyses, items related to this were not included in the scale. It is believed that this situation is related to the Turkish sample. The concept of text structure is given limited scope in Turkish textbooks, and the majority of students have limited knowledge of text type and structure (Müldür & Şimşek, 2020; Uğur, 2017).

This study also found that metacognitive writing awareness and metacognitive regulation significantly and positively predicted self-regulated learning for writing. Additionally, it revealed that university students' self-regulated learning abilities were significantly and positively predicted by methodological knowledge, planning, and monitoring but not by evaluation. This finding is generally consistent with the literature on the relationship between metacognition and self-regulated learning. However, the failure of the evaluation dimension to predict self-regulated learning is an unexpected result. It is thought that this situation may be due to the limited number of items related to the evaluation dimension in the scale used. When the 25-item Perceived Self-Regulatory Efficacy Scale used in the study was examined, it was observed that there were a limited number of items related to evaluation. Therefore, it is thought that the result of the study may be related to this limitation. Further research is needed on this topic.

This study has several limitations that should be addressed in future studies. Since a cross-sectional approach was used in the study, participants reported on a single time period. Due to the use of appropriate sample in the research, it limits the generalizability of the findings to other populations. Therefore, different studies can be conducted using different sampling methods.

In this study, a metacognitive writing scale was developed for university students, with writing being considered in a general context. It is expected that this focus group will write more argumentative and academic texts. In this direction, a metacognitive writing scale specifically for academic writing can be developed. Additionally, this research does not include writing multi-media texts. In line with today's world where digital literacy is of great importance, a metacognitive writing scale that includes multi-media texts can be developed.

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Disclosure statement

No potential conflict of interest was reported by the author(s).

Ethics statements

This study was approved by the Süleyman Demirel University Social and Human Sciences Ethics Committee with the decision numbered 99/4 dated 30.11.2020.

References

Alt, D., & Raichel, N. (2020). Reflective journaling and metacognitive awareness: Insights from a longitudinal study in higher education. *Reflective Practice*, *21*(2), 145-158. https://doi.org/10.1080/14623943.2020.1716708

Aydın, İ. S., İnnalı, H. Ö., & Uyumaz, G. (2017). Üstbilişsel yazma stratejileri farkındalık ölçeği'nin geliştirilmesi ve psikometrik özelliklerinin belirlenmesi [Developing metacognitional writing strategies awareness scale and determining psychometric characteristics]. *Turkish Studies, 12*(25), 169-192. http://dx.doi.org/10.7827/TurkishStudies.12198

Balta, E. E. (2018). The relationships among writing skills, writing anxiety and metacognitive awareness. *Journal of Education and Learning*, *7*(3), 233-241. https://doi.org/10.5539/jel.v7n3p233

Bereiter, C., & Scardamalia, M. (1986). Levels of inquiry into the nature of expertise in writing. *Review of Research in Education*, 13, 259-282.

Bruning, H. R., Schraw, G. J., & Norby, M. M. (2014). *Bilişsel psikoloji ve öğretim*. (Z. N. Ersözlü & R. Ülker, Çev.). Ankara: Nobel.

Byrne, B. M. (2001). *Structural equation modeling with AMOS: Basic concepts, applications, and programming*. Lawrence, Erlbaum Associates, London, UK.

Celikkaleli, O., & Yildirim, K. (2015). Adaptation of perceived self-regulatory efficacy scale for writing into Turkish language. *International Online Journal of Educational Sciences*, *7*(4). http://dx.doi.org/10.15345/iojes.2015.04.015

Cleary, T. J., & Zimmerman, B. J. (2001). Self-regulation differences during athletic practice by experts, non-experts, and novices. *Journal of Applied Sport Psychology*, *13*(2), 185-206. https://doi.org/10.1080/104132001753149883

Cleary, T. J., Callan, G. L., Malatesta, J., & Adams, T. (2015). Examining the level of convergence among self-regulated learning microanalytic processes, achievement, and a self-report questionnaire. *Journal of Psychoeducational Assessment*, *33*(5), 439-450. https://doi.org/10.1177/0734282915594739

Craig, K., Hale, D., Grainger, C., & Stewart, M. E. (2020). Evaluating metacognitive self-reports: systematic reviews of the value of self-report in metacognitive research. *Metacognition and Learning*, *15*, 155-213. https://doi.org/10.1007/s11409-020-09222-y

Curran, P. J., West, S. G., & Finch, J. F. (1996). The robustness of test statistics to nonnormality and specification error in confirmatory factor analysis. *Psychological Methods, 1*(1), 16–29.

Çam, E. (2023). An investigation into the relationship between metacognitive knowledge and writing achievement of turkish efl learners. *Journal of Language Research*, *7*(1), 49-64. https://doi.org/10.51726/jlr.1374408

De Kruif, R. E. L. (2000). *Self-regulated writing: examining students' responses to questions about theirknowledge, motivation, and strategies for writing.* (Publication No. 304629535). [Doctoral dissertation, The University of North Carolina at Chapel Hill]. ProQuest Dissertations and Theses Global.

Devine, J., Railey, K., & Boshoff, P. (1993). The implications of cognitive models in L1 and L2 writing. *Journal of Second Language Writing*, *2*(3), 203-225. https://doi.org/10.1016/1060-3743(93)90019-Y

Dinsmore, D. L., Alexander, P. A., & Loughlin, S. M. (2008). Focusing the conceptual lens on metacognition, self-regulation, and self-regulated learning. *Educational Psychology Review, 20*, 391–409. http://doi.org/10.1007 /s10648-008-9083-6

Englert, C. S., Raphael, T. E., Fear, K. L., & Anderson, L. M. (1988). Students' metacognitive knowledge about how to write informational texts. *Learning Disability Quarterly*, *11*(1), 18-46. https://doi.org/10.2307/1511035

Erol, T., & Kavruk, H. (2023). Üstbilişsel yazma stratejilerini kullanma eğilimi ölçeği [The questionnaire of metacognitive writing strategies awareness]. *Bingöl Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, (25), 170-187. https://doi.org/10.29029/busbed.1207930

Escorcia, D., & Gimenes, M. (2020). Metacognitive components of writing: construction and validation of the metacognitive components of planning writing self-inventory (MCPW-I). *European Review of Applied Psychology*, *70*(1), 100515. https://doi.org/10.1016/j.erap.2019.100515

Farahian, M. (2015). Assessing EFL learners' writing metacognitive awareness. *Journal of Language and Linguistic Studies*, *11*(2), 39-51. Retrieved October 08, 2022, from https://dergipark.org.tr/en/pub/jlls/issue/36118/405575

Farahian, M. (2017). Developing and validating a metacognitive writing questionnaire for EFL learners. *Issues in Educational Research, 27*(4), 736–750. Retrieved March 09, 2024, from https://www.iier.org.au/iier27/farahian.pdf

Farahian, M., & Avarzamani, F. (2018). Metacognitive awareness of skilled and less-skilled EFL writers. *Asian-Pacific Journal of Second and Foreign Language Education*, *3*(1), 1-17. https://doi.org/10.1186/s40862-018-0052-4

Flavell, J. H. (1979). Metacognition and cognitive monitoring: A new area of cognitive–developmental inquiry. *American Psychologist, 34*(10), 906-911. https://doi.org/10.1037/0003- 066X.34.10.906

Graham, S., & Harris, K. R. (2000). The role of self-regulation and transcription skills in writing and writing development. *Educational Psychologist*, *35*(1), 3-12. https://doi.org/10.1207/S15326985EP3501_2

Graham, S., Harris, K. R., Kiuhara, S. A., & Fishman, E. J. (2017). The relationship among strategic writing behavior, writing motivation, and writing performance with young, developing writers. *The Elementary School Journal*, *118*(1), 82-104. https://doi.org/10.1086/693009

Hair, J. F., Anderson, R. E., Tatham, R. L., & Black, W. C. (2002). *Multivariate data analysis*. Prentice Hall, Upper Saddle River, NJ, USA.

Harris, K. R., Graham, S., Brindle, M., & Sandmel, K. (2009). Metacognition and children's writing. In Hacker, D., Dunlosky, J., Graesser, A. (Eds.), *Handbook of metacognition in education* (pp. 131-153). Mahwah, NJ: Lawrence Erlbaum.

Harris, K. R., Santangelo, T., & Graham, S. (2010). Metacognition and strategies instruction in writing. In H. S. Waters, & W. Schneider (Eds.), *Metacognition, strategy use, and instruction* (pp. 226–256). The Guilford Press.

Hayes, J., & Flower, L. (1980). Identifying the organization of writing processes. In L. Gregg & E. Steinberg (Eds.), *Cognitive processes in writing* (pp. 3-30). Hillsdale, NJ: Lawrence Erlbaum.

Kaiser, H. F. (1960). The application of electronic computers to factor analysis. *Educational and Psychological Measurement*, *20*(1), 141-151. https://awspntest.apa.org/doi/10.1177/001316446002000116

Kansızoğlu, H. B. (2020). Ortaokul öğrencilerinin üstbilişsel yazma farkındalık düzeylerinin ölçülmesi: Bir literatür inceleme ve ölçek geliştirme çalışması [Measuring metacognitive writing awareness levels of secondary school students: a literature review and scale development study]. *Ondokuz Mayis University Journal of Education Faculty*, *39*(2), 123-152. https://doi.org/10.7822/omuefd.777043

Kellogg, R. T. (1987). Effects of topic knowledge on the allocation of processing time and cognitive effort to writing processes. *Memory & Cognition*, *15*(3), 256-266. http://dx.doi.org/10.3758/BF03197724

Maftoon, P., Birjandi, P., & Farahian, M. (2014). Investigating Iranian EFL learners' writing metacognitive awareness. *International Journal of Research Studies in Education, 3*(5), 37–51. https://doi.org/10.5861/ijrse.2014.896

McCutchen, D. (2006). Cognitive factors in the development of children's writing. In C. A. MacArthur, S. Graham, & J. Fitzgerald (Eds.), *Handbook of writing research* (pp. 115–130). New York: Guilford Press.

Müldür, M., & Şimşek, N. D. (2020). Türkçe ders kitaplarındaki bilgilendirici metinlerin ve yapılarının incelenmesi üzerine bir araştırma [An investigation on the expository text types and their structural analyses in Turkish course books]. *Ana Dili Eğitimi Dergisi*, *8*(3), 843-867. https://doi.org/10.16916/aded.723246

Negretti, R. (2009). *Metacognitive awareness in developmental writing students*. (Publication No. 3367918) [Doctoral dissertation, University of Hawai'I, Manoa]. ProQuest Dissertations and Theses Global.

Okoza, J., & Aluede, O. (2013). Understanding metacognitive awareness among teachers in the school system: issues and benefits. *Inkanyiso*, *5*(1), 64-71. Retrieved June 14, 2024, from https://www.ajol.info/index.php/ijhss/article/view/94070

Perdana, I., Bungai, J., Wihastyanang, W. D., Budhiono, R. H., & Tanate, V. L. (2023). The relationship between undergraduate students' writing knowledge and writing performance. *International Journal of Language Education*, *7*(2), 291-303. https://doi.org/10.26858/ijole.v7i2.40041

Pintrich, P. R. (2002). The role of metacognitive knowledge in learning, teaching, and assessing. *Theory into Practice*, *41*(4), 219-225. https://doi.org/10.1207/s15430421tip4104_3

Pintrich, P. R., & De Groot, E. V. (1990). Motivational and self-regulated learning components of classroom academic performance. *Journal of Educational Psychology*, *82*(1), 33-40. https://doi.org/10.1037/0022-0663.82.1.33

Pintrich, P. R., Wolters, C., & Baxter, G. (2000). Assessing metacognition and self-regulated learning. In G. Schraw, & J. Impara (Eds.), *Issues in the measurement of metacognition* (pp. 43–97). Lincoln, NE: Buros Institute of Mental Measurements.

Ramadhanti, D., & Yanda, D. P. (2023). Self-report to investigate metacognition growth in writing. *Journal of Applied Studies in Language*, *7*(1), 75-85. https://doi.org/10.31940/jasl.v7i1.75-85

Saddler, B., & Graham, S. (2007). The relationship between writing knowledge and writing performance among more and less skilled writers. *Reading & Writing Quarterly*, *23*(3), 231-247. http://dx.doi.org/10.1080/10573560701277575

Scardamalia M., & Bereiter C. (1987). Knowledge telling and knowledge transforming in written composition. In Rosenberg S. (Ed.), *Advances in applied psycholinguistics: Vol. 2. Reading, writing, and language learning* (pp. 142–175). Cambridge University Press.

Schraw, G., & Dennison, R. S. (1994). Assessing metacognitive awareness. *Contemporary Educational Psychology*, *19*(4), 460–475. http://dx.doi.org/10.1006/ceps.1994.1033

Scott, B. M., & Levy, M. G. (2013). Metacognition: Examining the components of a fuzzy concept. *Educational Research eJournal*, *2*(2), 120-131. http://dx.doi.org/10.5838/erej.2013.22.04

Sperling, R. A., Howard, B. C., Miller, L. A., & Murphy, C. (2002). Measures of children's knowledge andregulation of cognition. *Contemporary Educational Psychology, 27*(1), 51–79. https://doi.org/10.1006/ceps.2001.1091

Stevens, J. P. (2012). *Applied multivariate statistics for the social sciences*. Routledge.

Tabachnick B. G., & Fidell L. S. (2007). *Using multivariate statistics*. Boston, MA: Allyn and Bacon.

Teng, M. F., & Yue, M. (2023). Metacognitive writing strategies, critical thinking skills, and academic writing performance: A structural equation modeling approach. *Metacognition and Learning*, *18*(1), 237-260. http://dx.doi.org/10.1007/s11409-022-09328-5

Teng, M. F., Wang, C., & Zhang, L. J. (2022). Assessing self-regulatory writing strategies and their predictive effects on young EFL learners' writing performance. *Assessing Writing*, *51*, 100573. http://dx.doi.org/10.1016/j.asw.2021.100573

Tobias, S., & Everson, H. T. (2009). *Knowing what you know and what you don't: Further research on metacognitive knowledge monitoring.* College Board.

Uğur, F. (2017). Ortaokul 7. sınıf öğrencilerinin bilgilendirici metin yapısı unsurlarını belirleme düzeyleri [The level of ability of 7th grade secondary school students to determine the structural elements of an informative text]. *Mustafa Kemal Üniversitesi Sosyal Bilimler Enstitüsü Dergisi, 14*(39), 200-222. https://dergipark.org.tr/tr/pub/mkusbed/issue/31632/329300

Weinstein, C. E., Palmer, D. R., & Schulte, A. C. (1987). *Learning and study strategies ınventory (LASSI): User's manual.* H & H Publishing Company.

Zang, L. J., & Qin, T. L. (2018). Validating a questionnaire on EFL writers' metacognitive awareness of writing strategies in multimedia environments. In A. Haukas, C. Bjørke & M. Dypedahl (Eds.), *Metacognition in language learning and teaching* (pp. 157-178). NY: Routledge.

Zimmerman, B. J., & Bandura, A. (1994). Impact of self-regulatory influences on writing course attainment. *American Educational Research Journal*, *31*(4), 845-862. https://doi.org/10.3102/00028312031004845

Zimmerman, B. J., & Kitsantas, A. (2007). A writer's discipline: The development of selfregulatory skill. P. Boscolo & S. Hidi (Eds.), *Writing and motivation* (pp. 51-69), Oxford: Elsevier.

Zimmerman, B. J., & Pons, M. M. (1986). Development of a structured interview for assessing student use of self-regulated learning strategies. *American Educational Research Journal*, *23*(4), 614-628. https://doi.org/10.3102/00028312023004614

Zimmerman, B. J., & Risemberg, R. (1997a). Becoming a self-regulated writer: A social cognitive perspective. *Contemporary Educational Psychology*, *22*(1), 73-101. http://dx.doi.org/10.1006/ceps.1997.0919

Zimmerman, B. J., & Risemberg, R. (1997b). Caveats and recommendations about self-regulation of writing: A social cognitive rejoinder. *Contemporary Educational* Psychology, *22*(1), 115-122. http://dx.doi.org/10.1006/ceps.1997.0921