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Relations among sensitivity, anxiety, self-efficacy and the use of metacognitive strategies in writing: a structural equation modeling

Nihat Bayat[a]*, Gizem Uyumaz[b]

[a] *Akdeniz University, Faculty of Education, Antalya 07058, Turkey*
[b] *Giresun University, Faculty of Education, Giresun 28200, Turkey*

Abstract

The goal of this study is to set up a model of structural equation model about the process of writing through specification of relations among sensitivity in writing, writing anxiety, self-efficacy in written expression and metacognitive awareness of writing strategies. Participants of the research within the associative model are composed of 225 prospective teachers who are studying at different class levels of Turkish Teaching Department. The data of the research are collected through four different instruments. These instruments are Scale of Metacognitive Awareness of Writing Strategy, Writing Sensitivity Scale, Self-Efficacy for Writing Scale (SEWS) and Writing Anxiety Scale. Confirmatory factor analyses and structural path analyses are employed during data analysis. Consequently, it is confirmed that writing self-efficacy affects writing sensitivity and the use of metacognitive strategy, writing sensitivity affects writing metacognitive strategy use, and the use of metacognitive strategy affects writing anxiety. Taking into account these findings, it is observed that the constituted model is verified. Relying on these findings, researches on new models including other writing variables are proposed.

Keywords: Writing sensitivity, writing self-efficacy, writing anxiety, metacognitive strategies, structural equation model.

1. Introduction

Writing functions in relation to many variables. Prerequisite for a well-developed text is to identify and inspect variables affecting writing correctly. The surplus of variables and the difficulty in handling them make writing more complicated in

* Nihat Bayat. Tel.: +0-532-176-4952
E-mail address: nihatbayat@gmail.com

comparison to other language skills. Many researchers underline the fact that writing is a skill that is acquired hard. (Archibald, & Jeffery, 2000; Grami, 2010; Heaton, 1991). During the process of composing a written text, generating and organizing relevant ideas as well as transforming ideas into consistent readable text, is challenging series of processes for individuals. However, knowing which variable affects the other might transform the writing into easier functioning production.

Writing models are one of significant references which indicate variables in the act of writing. Many models are suggested, which represent what type of process writing has (Flower & Hayes, 1981; Bereiter & Scardamalia, 1987; Hayes, 1996; Kellogg, 1996; Chenoweth & Hayes, 2001; Hayes, 2012). One of the most comprehensive models is the one proposed by Hayes in 2012. The model, which is composed through developing former models and adding absent variables, is accepted as a model that is quite understandable (Leijten, Van Waes, Schriver and Hayes, 2014). Variables at all levels are present in the model, along with the resource that composes the content of the text, writing process, control of the text and social environment (Hayes, 2012). Three levels of the model involve 16 variables in total which have specific roles in the act of writing. Each variable affects one another. For instance, variables of attention, long-term memory, working memory and reading skill are reflected as units which play role on composing the text content.

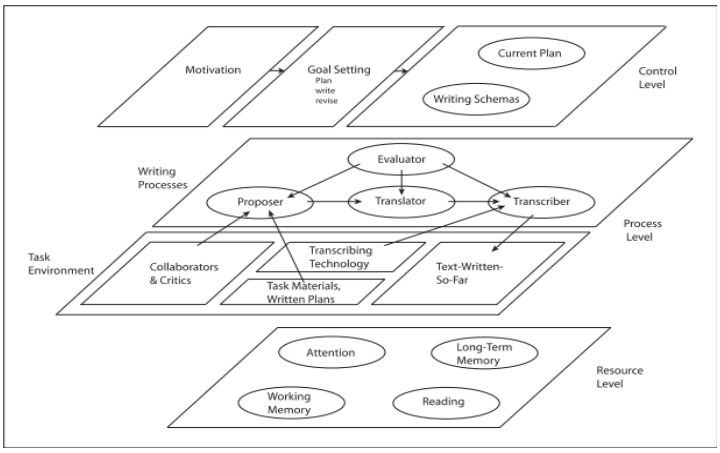

Chart 1. Writing Model of Hayes (2012)

Even though each variable functions in an important way, the focus of the act of writing is *writer*. The text is generated by writer; hence several characteristics of writer have priority during the process of text generating. Writer's knowledge of language, discourse, and world determine the duration, quality and eligibility level of the text coming forward. Therefore, writer's psychological competencies affecting the production play role on written text within various cohesions. In particular cognitive, metacognitive, emotional and social competencies are essential considerations in learning language

skills (Olivares-Cuhat, 2010). Each one of all has different impacts on the process of writing.

Success of the writer in writing is related to his/her eligibility in several aspects of language such as grammar, vocabulary, conceptualizing, and rhetoric (Zhang and Chen, 1989). Besides, writer's psychological characteristics and knowledge are other decisive components on writing skill. Cognitive activities, which provide writer to keep relevant variables under control, are at the center of writing (Nunan, 1989). Characteristics stemming from writer such as writing anxiety, writing sensitivity, and metacognitive skills for writing constitute the main base for creating a good text.

Anxiety is one of the important emotional factors preventing achievement in writing. Writing anxiety refers to individual's state of writing in terms of imminence or abstention (Daly and Wilson, 1983). It has long been known that individuals with high writing anxiety are less successful and avoid writing activities (Daly & Miller, 1975b; Shang, 2012). Individuals, whose writing experiences result in failure in general, have high writing anxiety and tend to avoid writing since they are anxious about failure. Anxiety restrains individuals to implement their writing potentials.

Writing anxiety creates feelings of overanxiety, self-evaluation, fear of other's judgements and causes spending excessive time (Cheng, 2004; Horwitz, Horwitz and Cope, 1986; MacIntyre & Gardner, 1994). Writing anxiety creates a certain amount of fear for the individual. Above all, fear arising from the concern of being evaluated, directly influences performance of writing (Cheng and et.al., 1999). Individual, in a state of fear and anxiety, starts stumbling at different aspects of writing (Shang, 2012). This situation leads to inadequacy of the text that is composed.

Another variable determining the quality of the text produced is writing sensitivity. Writing sensitivity requires awareness of variables which have certain functions during text production. Individuals, who pay attention to components like *reader, message, context, language and use of words*, and attempt structuring the text accordingly, are considered as sensitive writers (Bayat and Şekercioğlu, 2014). Writing sensitivity is described as paying attention to writing components, structuring the text according to the target that is designated with regards to these components, and correcting anything that hinders in the text during the revision phase. Writing sensitivity involves knowledge of writing components and processing them for well-structured text creation (Bayat and Şekercioğlu, 2014).

Writing sensitivity that requires considering every unit in text production is implemented on internal and external components of the text. While internal components include coherence and cohesion within the concrete of the text, external components are comprised of communication environment, reader and probable feedback about the text. Attitudes stemming from sensitivity in writing become apparent during the process of writing. At the first phase of writing process, which consists of planning, textualizing,

and revising the content is produced and organized (Graham, 2006; Kellogg, 1994). During the phase of textualizing, planned content is verbalized. In the meantime, writer deals with choosing words, constituting sentences and accuracy of grammar. At the revision phase, on the other hand, it is controlled whether the text is being raised according to the plan and mechanical mistakes are corrected (Flower and Hayes, 1981). During the process of writing, individuals with high sensitivity in writing are expected to give necessary responses to relevant units.

Self-efficacy is another psychological factor affecting text composition. Self-efficacy is a term introduced by Bandura (1997a) and used in relation with all kinds of learning. Individuals with high self-efficacy are more successful since they are more comfortable in fulfilling a task. Self-efficacy is the conviction of possessing the ability of organizing and applying indispensable series of action in order to achieve success. When adapted in writing, individuals, who believe that they can produce a written text, are considered as having high self-efficacy.

Individuals with high self-efficacy, often and easily employ strategies which are required during the process of writing (Heidari, Izadi, & Ahmadian, 2012). Individuals, who feel comfortable rather than anxious, make accurate decisions within definite phases of composing text. However, individuals with low self-efficacy are unwilling to write and generate inaccurate or incomplete texts in general (Bandura, 1994). There are quite few studies, which discover high correlation between writing and self-efficacy (Bruning & Horn, 2000; Pajares, 2003; Pajares & Johnson, 1996). Self-efficacy is an important indicative of employing side-skills about writing. Level of self-efficacy functions independent in proportion to other variables about writing (Pajares and Valiante, 2001). In other words, self-efficacy is a different psychological outfit that corresponds to writing requirements.

Further point which provides the success of writing process is about the use of metacognitive strategies for writing. Metacognitive strategies connote not only the knowledge and awareness about cognitive attitudes but also watching and monitoring awareness and information to organize the process (Brown, & Smiley, 1977; Flavell, 1979; Brown, 1980; Wellman, 1985; Beyer, 1987; White, 1988). Hence knowledge, awareness, watching and monitoring are basic concepts of metacognitive strategies. From the perspective of writing, metacognitive strategies are deliberate proceedings used by the individual in order to monitor the development of his/her writing skill (Schmidt, 2001). Monitoring process for writing is made towards different strategies during the writing process.

As indicated above, the process of writing is made up of certain phases. Respective phases advance through a recursive process instead of a linear structure (Bereiter, & Scardamalia, 1987; Hayes, & Nash, 1996; Torrance, Thomas, & Robinson, 2000). During the proceeding of written text, phases of planning, textualizing and revising recur

frequently, and updates required are made. During the time of writing, individuals with metacognitive strategies not only monitor the work perpetually but also take into consideration what kind of monitoring is being done. Wiles (1997) defines metacognition from the perspective of monitoring learning and self-regulation with respect to planning, watching and revising skills. Hence, metacognitive strategies are discussed as the basic components of a good writer (Oxford, 2011). The use of metacognitive strategy is of great importance in correcting mistakes that are faced during the process of writing.

Beside anxiety, self-efficacy, sensitivity and metacognitive strategies, there are other variables affecting the success of writing. Some of these variables are motivation, manner, teacher-student relation and environment. Nevertheless, variables discussed in this study are of distinct significance due to the fact that they are directly related to the writer and they are more decisive over the quality of the text. Therefore variables, which are subject to this study, are narrowed down to anxiety, self-efficacy, sensitivity and the use of metacognitive strategies. The idea of finding out the type of relations among them is the starting point of the study. Consequently, the goal of the study is to set up a structural equation model upon the process of writing with relevant variables, through identifying relations among sensitivity in writing, writing anxiety, self-efficacy in written expression and metacognitive awareness of writing strategies of individuals.

Processes of regression analysis and factor analysis are intimate within structural equation model. Precursor structural relations and latent factor structures are examined by single analysis. The aim is to examine underlying process among latent structures (Sümer, 2000). In the model that is designed by researchers, direct and indirect relations among variables are examined according to the body of literature (Çokluk, Şekercioğlu, and Büyüköztürk, 2014). Validity of the model, designed by testing initially measuring models, later structural model, is debatable (Kaplan, 2000; Kline, 2005). Within structural equation model, the model is described, expedient data are collected, the model is analyzed, model adaptation is evaluated respectively (Kline 2005; Schumacker and Lomax, 2010). This method is followed in the study.

2. **Method**

This study is a correlational research, which examines relations among variables of sensitivity in writing, writing anxiety, self-efficacy in written expression and metacognitive awareness of writing strategies.

2.1. Participants

The study group is composed of 225 prospective Turkish teachers. The range of participants according to class levels and gender is presented in Table-1.

Table 1. The range according to class level and gender

			Class				
			1	2	3	4	Total
Gender	Female	N	29	55	38	29	151
		%	13,0	24,7	17,0	13,0	67,7
	Male	N	20	19	18	15	72
		%	9,0	8,5	8,1	6,7	32,3
Total		N	49	74	56	44	223
		%	22,0	33,2	25,1	19,7	100,0

Table 1 indicates that 151 participants (67.7%) are female, 72 participants (32.3%) are male; 49 participants (22%) are first year students, 74 participants (33.2%) are second year students, 56 participants (25.1%) are third year students, and 44 participants (19.7%) are fourth year students.

2.2. Data Collection Instruments

Within the scope of the study, four scales developed by different researchers and personal information survey developed by researchers are used.

1. *The Scale of Metacognitive Awareness of Writing Strategies*: This scale is developed by Uyumaz, Aydın, İnnalı and Uyumaz (2018). The scale was initially developed over secondary school students in 2017; subsequently, employability of the scale was researched over prospective Turkish teachers in 2018. For this research, data was collected from 258 prospective Turkish teachers. Five-level Likert-type scale, which was made up of 40 items, was implemented on them. Then, factor analysis was implemented on the data that was collected from this scale. Consequently, it was found out that the eigenvalue of the single factor structure was 14,141 and the contribution of items that was made to total variance was 35.354%. According to the exploratory factor analysis, Cronbach's alpha internal consistency ratio was 0.952. On the other hand, according to the confirmatory factor analysis, Cronbach's alpha internal consistency ratio was 0.944. As a result of analyses in this research, which aimed at detecting the employability of the scale over prospective Turkish language teachers, Cronbach's alpha internal consistency ratio of the data that was collected from prospective Turkish language teachers was calculated as 0.961. Thereby, Metacognitive Awareness of Writing Strategies was proved to be highly valid and reliable to be used over prospective Turkish teachers.

2. *Writing Sensitivity Scale:* Writing Sensitivity Scale was developed by Bayat and Şekercioğlu (2014). Scale with single factor structure was five-level Likert-type and was composed of 37 items. In order to find out the internal consistency ratio of the scale, which was improved by data that is collected from 375 prospective Turkish teachers, Cronbach's alpha ratio was calculated and alpha ratio of .96 was reached. Thus, it might be said that the scale was highly valid and reliable. This value puts forward the fact that writing sensitivity scale is employable for the participants of this study.
3. *Self-Efficacy for Writing Scale*: Scale, which is used to find out the level of self-efficacy for writing, was developed by Aydın, İnnalı, Batar and Çakır (2013). Required data in order to develop the scale was collected from prospective teachers, who are studying at first and fourth classes. Following the factor analysis, a new scale, which had three-factor structure and explained 44.7% of total variables, was achieved. While internal consistency ratio of the scale was decisive at .70, it was seen that alpha ratio of first factor was .96, second factor is .88 and third factor was .89. The alpha ratio of the whole scale was .96. Therefore, the scale is highly reliable both for each of the factors and the whole of the scale.
4. *Writing Anxiety Scale*: Writing Anxiety Scale, which is used in the research, was developed by Karakaya and Ülper (2011). The scale developed according to the data collected from 202 prospective teachers included 35 items. There was single aspect within five-level Likert-type scale. Internal consistency ratio of the scale was .97. Writing Anxiety Scale is highly reliable just as other scales that are subject to the research.

2.3. Data Analysis

Research data were collected from students of Turkish Teaching Department at single session. Data, collected from 258 people, were subject to lost value analysis and extreme value analysis. Participants, who possess lost value (lost values do not form a pattern) and participants who happen to be extreme values (33 participants in total), were removed from the data set. Analyses were executed with the existence of remaining 225 participants. Reliability was drawn upon calculations of Cronbach's alpha internal consistency ratio and item-total correlation ratio. Scale models were tested by confirmatory factor analysis and structural path analysis model.

3. Results

Cronbach's alpha internal consistency ratios and item-total correlation ratios, which are calculated in order to find out credibility predictions regarding numbers coming out of scale implementation, are shown in Table 2.

Table 2. Credibility Ratio

	WSE	MAWS	WS	WA
Cronbach Alpha	0.954	0.961	0.946	0.979
Item-Total	0.237-0.708	0.440-0.683	0.230-0.724	0.520-0.839

As Cronbach's alpha internal consistency ratios in Table 2 are examined, it is concluded that reliability of numbers coming out of scales are high (Özdamar, 2004). Item-total test correlations calculated by Pearson correlation ratio are accepted statistically significant ($p<0.05$).

As a requirement of setting up structural equation model, four scales used within the research, are initially tested by confirmatory factor analysis (CFA). Standardized loadings related to measuring models (Second level for MAWS and first level CFA for others), t values, error variance, range of change for explained variances and fit indices are shown in Table 3.

Table 3. Statistical data regarding measurement models

	WSE	MAWS	WS	WA
Standardized Loadings	0.49-0.86	0.45-0.72	0.41-0.74	0.49-0.87
t values	6.00-10.41	7.29-13.01	6.64-13.50	8.18-17.21
Error Variances	0.054-0.68	0.30-0.70	0.24-3.75	0.41-1.01
R^2	0.32-0.95	0.20-0.52	0.17-0.55	0.24-0.75
χ^2/sd	3012.97/1374= 2.19	3020.18/740= 4.08	2036.01/629= 3.24	2433.10/560= 4.34
RMSEA	0.073	0.110	0.095	0.140
SRMR	0.069	0.073	0.063	0.068
GFI	0.67	0.62	0.69	0.57
IFI	0.95	0.94	0.96	0.96
NNFI	0.95	0.94	0.96	0.96
CFI	0.95	0.94	0.96	0.96

According to Table 3, no item is found in scales with less than 0.30 standardized loading. There is not any item with less than 0.10 explained variance ratio (R^2). When error variances of variables are observed, there are three items (WSES30, WS13, WA6) with very high error variance (>0.90). T values of items within scales are found significant ($t>2.58$) at the level of 0.01. P values in CFAs are found significant at the level of 0.01. Fit indices are examined in order to specify whether measurement models are

confirmed or not. χ^2/sd ratio at ≤3 shows perfect fit (Kline, 2005), at ≤5 shows medium level fit (Sümer, 2000). Perfect fit for WSE and good fit for others are reached. RMSEA ≤0.05 shows perfect fit, ≤ 0.08 good fit (Sümer, 2000), ≤ 0.10 weak fit (Tabachnick and Fidell, 2001). WSE coincides with good fit while WS corresponds to weak fit. Other two scales are below weak fit criteria. SRMR ≤0.08 is equal to good fit. (Brown, 2006; akt: Çokluk, Şekercioğlu and Büyüköztürk, 2014). For GFI, CFI, NNFI and IFI ≥ 0.95 is perfect fit, ≥ 0.90 is good fit (Tabachnick and Fidell, 2001) ≥0.85 is acceptable fit (Yılmaz and Çelik, 2009). CFI, NNFI and IFI values correspond to perfect fit. GFI values are below acceptable criteria. The evaluation of all statistical data altogether concludes that measurement models are confirmed.

After the testing of measurement models by confirmatory factor analysis, path analysis is done to ensure testing of structural model. Tested model within the study is presented at Chart 2.

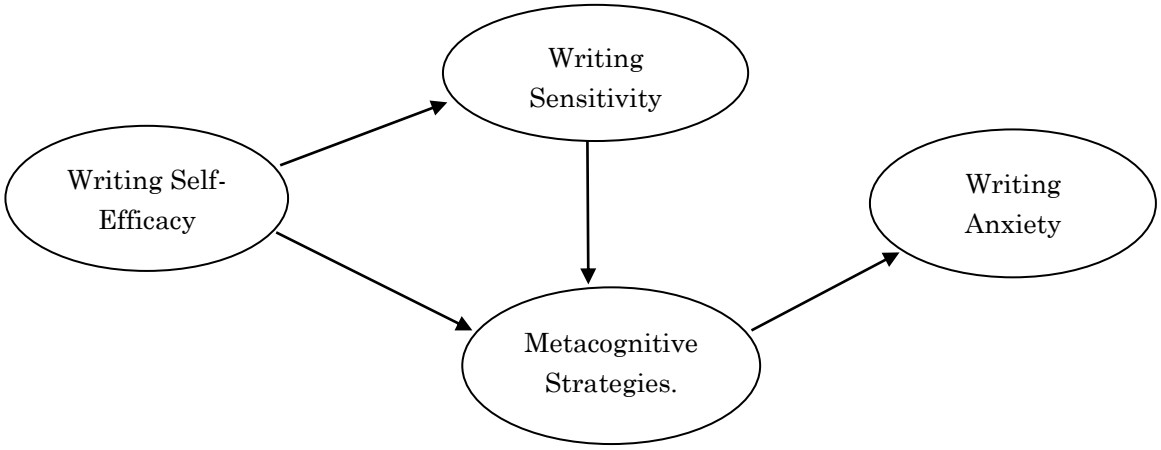

Chart 2: Tested Model

Path diagram, which shows t values, is presented at Chart 3.

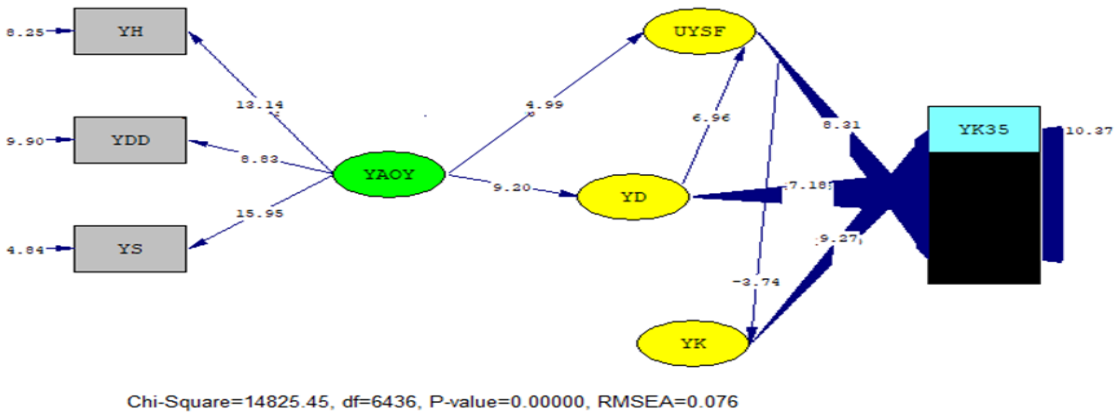

Chart 3: Path Diagram (t values)

Chart 4 indicates path diagram, which shows standardized loading value.

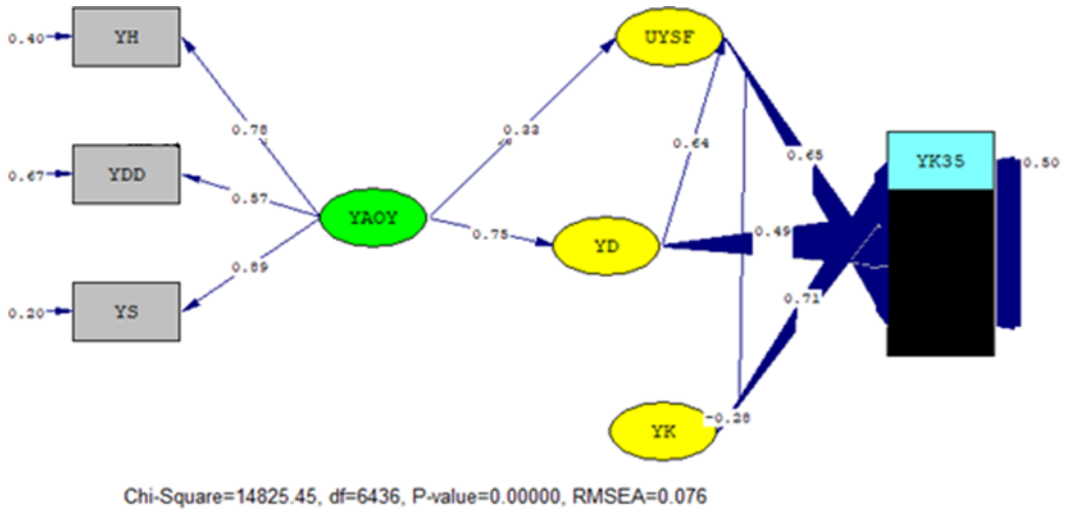

Chart 4: Path Diagram (Standardized Loading Value)

As a consequence of path analysis, all t values at 0.01 level are found significant (t>2.58). p value is significant at 0.01 level. Fit indices; χ^2/sd=14825.45/6436=2.30 ratio (≤3) corresponds to perfect fit (Kline, 2005). RMSEA=0.076 (≤0.08) shows good fit (Sümer, 2000). SRMR=0.071 (≤0.08) is equal to good fit (Brown, 2006; akt: Çokluk, Şekercioğlu and Büyüköztürk, 2014). CFI=0.96, NNFI=0.96 and IFI= 0.96 values (≥0.95) indicate perfect fit (Tabachnick and Fidell, 2001). GFI=0.46 value is below acceptable fit criteria (≥0.85) (Yılmaz and Çelik, 2009). The evaluation of statistical data, as a whole, results in confirmation of tested structural model.

4. Discussion and Conclusion

This research is originated from the idea of establishing a structural equation model with respect to writing sensitivity, writing anxiety, self-efficacy for writing and metacognitive awareness of writing strategy conditions of prospective students of Turkish Teaching. Analyses concluded that established model is working. In this regard, during the process of writing, self-efficacy for writing provides sensitivity in writing, while influencing awareness for the use of metacognitive strategies. Writing sensitivity, as well, affects awareness for the use of metacognitive strategies. Writing anxiety level decreases in individuals, who gain awareness for the use of metacognitive strategies.

Functioning of self-efficacy, in relation with sensitivity in writing, is a perceptible finding. Self-efficacy tells about self-judgement and beliefs of individuals towards their writing skills. Self-efficacy, which is peculiar to the job done (Zimmerman, 1995), at the same time depends on the target that individual sets for oneself (Walker, 2003). On the

other hand, targets that are set during writing arise through awareness of components of the written text. Individuals making sentences and develop paragraphs through taking into consideration reader, message, context, language and the use of words are sensitive individuals (Bayat and Şekercioğlu, 2014). Individuals with high level of self-efficacy are able to identify their criteria for success properly and can endeavor for the target. Bandura (1997b) points out that individual with high self-efficacy is more patient and motivated in achieving difficult tasks. Individuals with high writing sensitivity are able to set accurate and rational goals during the process of writing and can easily reach their goals as they have sufficient self-efficacy.

Various researches are executed, which indicate that self-efficacy affects other variables of motive such as self-respect, self-regulation, anxiety and concept of ego (Pajares and Cheong 2003; Lane and et. al., 2004; Garcia and de Caso, 2006). To put it another way, self-efficacy makes individuals more motivated in certain cases. Motivated individuals are more successful. From this perspective, one can say that self-efficacy both affects behavior and increases by the effect of behavior. Hence, while self-efficacy influences sensitivity in writing, increased level of sensitivity supports self-efficacy level as well.

Self-efficacy has impact on the use of metacognitive strategy, beside variables about motive. Metacognitive strategies refer to actions of planning, organizing and evaluating (Oxford, 1990). The use of metacognitive strategies, which is extremely important in the learning process, enables individuals to control the process (Anderson, 2003). Challenges that are faced during the process of writing might be cleared out through analyzing whether the correct method is used. Awareness of metacognitive strategy use is one of the factors providing that advantage. There are studies, showing that individuals with high self-efficacy are more successful in using metacognitive strategies (Li & Wang, 2010; Rahimi & Abedi, 2014; Nosratinia, Saveiy & Zaker, 2014; Taghinezhad, Dehbozorgi & Esmaili, 2015). Same result is confirmed by findings of this study.

The effect of writing self-efficacy on metacognitive strategy is thought to be indirect. This is because of the indirect effect of self-efficacy on writing. High-level of self-efficacy ensures more focus and more effort for individuals during writing (Pajares & Valiante, 1997). Equal influence of self-efficacy level over other variables confirms this deduction (Andrade, Wang, Du & Robin, 2009; Dewaele, Petrides & Furnham, 2008). Nevertheless, in addition to the awareness level of individual towards the process of writing and the goal that is set, metacognitive strategies in relation with writing involve emotion, opinion and actions and self-regulation behaviors related to them (Wong, 1999). Level of self-efficacy functions as a predictor for the use of metacognitive strategies (Sungur, 2007), whereas metacognitive strategies are affective on writing skill (Englert et al., 1988; Mayo, 1993; Raphael et al., 1989) In other words, individuals with low-level of self-

efficacy might not display the behavior of employing any strategy when they face difficulty in writing.

Due to the model that is confirmed by research findings, there is a meaningful connection between writing sensitivity and the use of metacognitive strategies. It is argued that the influence of sensitivity in writing over the use of metacognitive strategies stems from awareness of relevant units about writing. While creating a decisive text, individuals, who effectively use planning, textualizing, and revising in parallel to the process of writing, might think about composing relations of coherence and cohesion in the text, choosing convenient discourse patterns according to the characteristics of the reader, etc. These behaviors and essential supervisory activities are done through metacognitive strategies. Metacognition is individuals' responses to information and control on their own cognitive processes (Allen and Armour-Thomas, 1993). Cognitive process deals with more simple problems, whereas metacognitive process requires accurate comprehension of necessary procedures to be able to solve these problems (King, 2004). Individuals with high sensitivity in writing recognize units and activities that are required by the act of text composing and employ metacognitive strategies for each of them.

The use of metacognitive strategies is a variable decreasing writing anxiety as well. Even though there are various reasons for this, one of the prior reasons is that metacognitive strategies for writing is an instrument to control, systematize and rationalize mind (Hayes, 1996). Writing anxiety occurs in mind as an emotional factor related to writing. Anxiety is an internal tendency which emerges when there is an encounter with a component about writing (Woodrow, 2011). Anxiety affecting writing in a negative way causes emotions like stress, tension and rage (Martinez, Kock and Cass, 2011; Sanders-Reio and et. al., 2014). These emotions result in diminishing the success of writing. In order to overcome these emotions it is crucial to refer to metacognitive strategies.

The use of metacognitive strategies means that individuals lead their own writing processes. Processes of writing are done through cognitive activities. Metacognitive strategies, on the other hand, control actions of cognitive processes (O'Malley & Chamot, 1990) and overcome the problem by using different strategies to fix the error. Solving problems also decreases writing anxiety. Individuals, who lead their writing process through strategies, get used to more self-sufficiency, learner autonomy and self-regulation (Hsiao and Oxford, 2002). These qualifications might provide the individual with self-confidence against the act of writing.

Writing, which is a complicated and multicomponent linguistic production, is a skill that is hard to learn. However, finding out how components of writing affects each other and identifying what type of network connections they have, might facilitate overcoming

difficulties. Therefore, research on how other variables of writing affect each other is suggested for further studies.

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