Predicting Undergraduate Students' Metacognitive Skills with Self-Construal*

Research Article

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ARTICLE INFO	ABSTRACT
Article History: Received 22.10.2018 Available online 17.02.2019	This study aimed at determining whether university students' metacognitive skills were predicted by self-construal. Study group of the research consisted of a total of 413 university students attending Faculty of Education. In this study conducted in correlational model, and "Metacognitive Awareness Scale" and "Six-fold Self-Construal Scale" were used to collect research data. As for data analysis, multiple regression analysis was used. Findings obtained from the research have revealed that, as university students' knowledge and regulation of cognition, and total metacognitive scores increased, their relational vertical self, relational horizontal self, collective horizontal self, collective vertical self, humanistic self and personal self-construal scores increased. Besides personal self-construal was the most powerful predictor of total score obtained from knowledge and regulation of cognition, and metacognitive skills, it was followed by relational-vertical self-construal and humanistic self-construal (except knowledge of cognition). It was observed that relational-horizontal self, collective-horizontal self, and collective vertical self, the criterion variables, were not significantly predicted metacognitive skills. In conclusion, culture has an effect on metacognitive skills. **Keywords:** culture, metacognition, self-construal, undergraduate students

Introduction

Culture has got the attention of various disciplines due to its effect on different dimensions of human life. While different disciplines defined culture in different ways, in the field of psychology Matsumoto and Juang (2013) defined culture "*as a unique meaning and information system, shared by a group and transmitted across generations, that allows the group to meet basic needs of survival, pursue happiness and well-being, and derive meaning from life*"*(p. 15)*. Self-construal, as an individual dimension of culture, was defined as total of an individual's relations with others and his/her emotions, thoughts and behaviors related to his/her own self (Singelis, 1994).

Markus and Kitayama (1991) indicated that self-construal affected individual's cognition, emotion and motives as a result of interaction between self and culture. This view has offered researchers an opportunity to study effects of self on individuals' different experiences. Self affects individuals' way of perceiving the world, their values, attitudes, self and social roles that guide their behaviors (Markus and Kitayama, 2003). Singelis (1994) defined self, one of the most important concepts in the field of behavioral sciences, as *"a structure generally functioning in organization of cognitive and emotional processes and in regulation of behaviors"*. Markus and Kitayama (1991) used two concepts to define different self-perceptions; independent self-construal to express self in western and individualist societies, and described as independent self. On the other hand, they used mutually interdependent self to describe self in non-western collectivist cultures, and they defined this concept as having mutual dependence with people around individuals and inseparable from social context. In Western societies, while separateness of individuals is emphasized, importance is given to individual's self-recognition, realization and personal objectives, in eastern society individuals fulfill expectations of society, harmony with society is encouraged.

Harb and Smith (2008) described self at four different levels. The first level is personal or individualized dimension, "personal self". This self is generally discussed in Western studies, and they are based on Markus and Kitiyama (1991)'s independent self. Personal self tries to differentiate with others and achieves this through distinctive and independent self presentations. The second type of self is relational or interpersonal self, this self covers close relationships or more intimate, closer and sincere interactions (such as family). The third level of self is collectivist self, such self occurs by mutual model taking within large groups (such as social and political group membership). Collective self adopts and accepts roles and norms related to groups it belongs. As is the case of relational self, interaction patterns are not questioned. The final level of self is humanistic self. In this type, individuals are interested in problems concerning all humanity, and they react by evaluating in terms of all humanity (Harb and Smith, 2008). Relational and collective self measured in two dimensions as being vertical and horizontal relational, collective self. In this research, the model that was developed by Harb and Smith (2008) and that measures self-construal in six dimensions was used.

Kağıtçıbaşı (2017) described self-construal as a construct consisting of intrinsic properties belonging to individuals that cover their requirements, abilities, motives and rights. In addition self-construal also affects all feelings, thoughts and behaviors constituting the foundation of our existence with determining how we see and perceive world, others and ourselves (Markus and Kitiyama, 1991). Kağıtçıbaşı (2005) presented a three-type self-construal to explain self in Turkish culture. These types included autonomous self, relational self and autonomous-relational self. Family changes emerging as a result of socio-economic developments led to emergence of autonomous-relational self that combined autonomy and relationality. She added a new dimension to independent and dependent self dimensions existing in the literature. Relationality described as state of self in which close relationships with others is important and individual defines his/her self with people around him/her (such as family, kids). In the autonomous self, on the other hand, individual considers his/her own interest, needs and objectives as the motive of the self (Kağıtçıbaşı, 2017). Which dimension of self-construal would be the more dominant is affected by the culture in which individuals live in (Kağıtçıbaşı, 2005; Matsumoto and Juang, 2013).

Another important factor bearing a significant role in an individual's intellectual process and behaviors is metacognition. Described as individuals' awareness and regulation of their cognitive processes (Flavell, 1979), metacognition also brings along skills such as awareness in learning process, planning and choosing strategies, monitoring learning process, ability to fix errors, ability to control used strategies are whether useful or not, and ability to change learning method and strategies if required (Özsoy, 2007). Metacognition consists of two basic elements including knowledge and regulation of cognition (Baker and Brown, 1984; Schraw and Dennison, 1994). Knowledge of cognition is students' understanding and comprehending their own thinking

processes. Knowledge of cognition contains three types of metacognitive awareness. These are declarative knowledge, procedural knowledge and situational knowledge. Declarative knowledge is an individual's knowledge on his/her own, his/her strategies to be used and performance as a learning person. Procedural knowledge is information about which strategies will be used and how they would be used. Situational knowledge is information related to when and why strategies would be used (Schraw and Dennison, 1994; Schraw and Moshman, 1995). Regulation of cognition includes behaviors that allow controlling and using of knowledge of cognition. Regulation of cognition consists of stages such as planning to reach intended objective by means of selected strategies, correct assessment of progress, monitoring for implementing changes based on these assessments, and assessment of objectives, learning and these processes (Jacobs and Paris, 1987).

In the field of psychology, culture is usually considered as cognitive representations of the person's world (Matsumoto and Juang, 2013). Hofstede (1980) regards culture as a computer software, and culture is the source of personal and social differences although hardware are the same that is humans having same characteristics. Norms, ideas, beliefs, values and world perspective are all products of cognitive processes (Matsumoto and Juang, 2013). Culture is an information system that is created by individuals which contains inferences about how to live. Unlike other species, culture created by human has human-specific cognitive processes in its foundations (Matsumoto and Juang, 2013). Contents and origins of metacognition is inherently social; metacognition consists of cognitive elements and it is subjected to principles and laws that apply to human thoughts in general (Jost, Kruglanski and Nelson, 1998). Ang and Van Dyne (2008) specified four main dimensions feeding cultural intelligence including metacognition, cognition, motivation and behavior. Jost and, etc. (1998) indicated that there was a need to study the relationship between metacognition and cultural structures with a view to reveal the relationship between metacognitive structures and culture. In addition, the influence of culture on metacognition is a relatively new topic (Güss and Wiley, 2007). There has been limited number of studies addressing the relationship between culture and metacognition in the international field literature, and these limited numbers of studies are conducted towards comparing metacognitive characteristics of individuals from different countries (Güss, Tuason and Gerhard, 2010; Güss and Wiley, 2007; Carr, Kurtz, Schneider, Turner, and Borkowski, 1989). In Turkish literature, on the other hand, there were no studies that measure the relationship between metacognition and culture. The Turkish studies on this topic are mainly on relationship between metacognition and reading comprehension (Baydık, 2011; Bozkurt and Memiş, 2013), critical thinking (Başbay, 2013), problem solving (Karakale, 2012), academic self-efficacy (Koç and Arslan, 2017; Tunca and Akın-Şahin, 2014) and academic achievements (Bağçeci, Döş and Sarıca, 2011; Sökmen and Kılıç, 2016). Thus, there was need for studies to be conducted towards determining the relationship between metacognitive skills and self-construal that is personal dimension of culture. In this context, the relationship between metacognition and culture constituted the main focus of this study. The aim of this study was to determine whether university students' metacognitive skills to be predicted by self-construal.

Method

In this study correlational design was applied. The study's criterion variable was dimensions of self-construal and predicted variable was metacognitive skills. Correlational research design was conducted to investigate the relationship between university students' metacognition skills and their self-construal (Fraenkel, Wallen and Hyun, 2012).

Participants

The participants of the study were 413 university students who were attending the Faculty of Education at Adıyaman University in Turkey. Participants were selected from faculty of educational because of attainability. Programs were chosen according to fields of verbal, quantitative and equally weighted. As being verbal field Turkish Language Teaching, quantitative field Secondary School Math Teaching and, equally

weighted field Guidance and Psychological Counseling were selected. Out of 413 university students in the study, 65% of them (269) were female and 35% of them (144) were male. 45% of participants (184) consist of students attending guidance and psychological counseling program; 29% of them (120) consist of students from secondary mathematics teacher education program, and 26% of them (110) consist of students attending Turkish language teaching program. 27% of them (112) were 3rd grade students, 27% of them (111) were 2nd grade students, 25% of them (102) were 4th grade students and 21% of them were 1st grade students.

Table 1. Demographic Information of Participants of the Study (N=413)

Demographic Variables	Category	n	Percentage (%)
Gender	Female	269	65.1
	Male	144	34.9
Program	Guidance and Psychological Counseling	184	44.6
	Secondary School Math Teaching	119	28.8
	Turkish Language Teaching	110	26.6
Grade	1st grade university students	88	21.3
	2nd grade university students	111	26.9
	3rd grade university students	112	27.1
	4th grade university students	102	24.7

Instruments

Metacognitive Awareness Scale: This scale was developed by Schraw and Dennison (1994) and adapted to Turkish by Selçioğlu-Demirsöz (2010). Measuring university students use their cognitive values and metacognitive strategies; the scale was prepared in 5-point Likert type. The 47-item scale has two dimensions, knowledge of cognition and regulation of cognition. The knowledge of cognition dimension consists of items a total of fifteen items, the regulation of cognition dimension consists of items a total of thirty-two items.

As a result of expletory factor analyses (EFA) conducted on two dimensions separately for structure validity of Metacognitive Awareness Scale, variance explained by knowledge of cognition sub-dimension was 28%, and variance explained by regulation of cognition dimension is 22% (Selçioğlu-Demirsöz, 2010). Cronbach's Alpha coefficient of scale total was found as 0.93, Cronbach's Alpha internal consistency coefficient of knowledge of cognition dimension was found as 0.82, and Cronbach's Alpha internal consistency coefficient of regulation of cognition sub-dimension was found as 0.91. Test-retest reliability of the Metacognitive Awareness Scale applied on 94 prospective teachers in fifteen-day intervals was found as r=0.54 in knowledge of cognition dimension and r=0.79 in regulation of cognition dimension (Selçioğlu-Demirsöz, 2010). These results indicate that the measurement tool is a valid and reliable measurement tool for Turkish sample.

Six-fold Self-Construal Scale (SSCS): This scale was developed by Harb and Smith (2008) and adopted into Turkish culture by Özcan (2017) to measure self-construal. SSCS is a 7-point Likert scale that has a total of 30 items which aims to measure self-construal in six dimensions; personal, relational vertical, relational horizontal, collectivist horizontal, collectivist vertical, and humanistic. Participants are asked to rate their agreement or disagreement to the items of scale from 1to 7. Minimum and maximum scores that can be obtained for each dimension of the scale vary between 5 and 35. In the scale, family context was used to measure relational vertical self, context of friends was used to measure relational horizontal self, context of school friends was used to measure collectivist horizontal self, social group context was used to measure

collectivist vertical self, humanity context was used to measure humanistic self, and finally selfhood context was used to measure personal self.

For the adaptation of the scale, the DFA and reliability studies were conducted by Özcan (2017) with 330 undergraduate students. Results obtained from DFA are as follows: χ2/sd=2.95, RMSEA=.07, CFI=.93, NNFI=.92 and, SRMR=.05. Cronbach's Alpha coefficient was found as α=.73 for relational horizontal self-construal, α=.84 for relational horizontal self-construal, α=.90 for collectivist horizontal self-construal, α=.94 for collectivist vertical self-construal, α=.82 for humanistic self-construal and α=.84 for personal self-construal. To test consistency of SSCS, test-retest reliability coefficient was calculated over data obtained from application that was carried out on 45 students in 15-day interval. Correlation coefficient results were found as r=.70 (p<.01) for relational vertical self-construal, r=.77 (p<.01) for relational horizontal self-construal, r=.80 (p<.01) for collectivist horizontal self-construal, r=.82 (p<.01) for collectivist vertical self-construal, r=.76 (p<.01) for humanistic self-construal, and r=.75 (p<.01) for personal self-construal (Özcan, 2017). These results indicate that the measurement tool is a valid and reliable measurement tool for Turkish sample.

Results

Correlation between dependent and independent variables

The relationship between university students' scores obtained from six dimensions of self-construal (relational vertical self-construal, relational horizontal self-construal, collectivist horizontal self-construal, collectivist vertical self-construal, humanistic self-construal and personal self-construal) and metacognitive skills, knowledge and regulation of cognition scores were investigated. Descriptive statistics related to means, standard deviations, correlation values of variables entering into regression equality were presented in Table 2.

Table 2. Descriptive statistics and correlations related to dependent and independent variables

	1	2	3	4	5	6	7	8	9
Relational vertical self (1)	1.00								
Relational horizontal self (2)	.45**	1.00							
Collectivist horizontal self (3)	.29**	.61**	1.00						
Collectivist vertical self (4)	.32**	.59**	.54**	1.00					
Humanistic self (5)	.27**	.34**	.33**	.46**	1.00				
Personal self (6)	.28**	.17**	.10	.20**	.34**	1.00			
Knowledge of cognition (7)	.33**	.21**	.17**	18**	.24**	.32**	1.00		
Regulation of cognition (8)	.30**	.21**	.20**	.20**	.28**	.36**	.84**	1.00	
Metacognition total (9)	.32**	.21**	.20**	.20**	.28**	.36**	.93**	.98**	1.00
Mean	**29.29**	**24.65**	**20.44**	**22.94**	**23.55**	**26.27**	**56.27**	**118.54**	**174.81**
SD	**5.09**	**5.53**	**6.37**	**6.28**	**6.23**	**6.28**	**7.54**	**15.12**	**21.84**

* p<.05, ** p<.01

As seen at Table 2, there were significant relationship between knowledge of cognition scores, the dependent variable of the research, and scores of relational vertical self-construal (r=.33, p<.01), relational horizontal self-construal (r=.21, p<.01), collectivist horizontal self-construal (r=.17, p<.01), collectivist vertical self-construal (r=.18, p<.01), humanistic self-construal (r=.24, p<.01) and personal self-construal (r=.32, p<.01). These findings indicated that when university students' knowledge of cognition scores increased, their relational vertical self, relational horizontal self, collectivist horizontal self, collectivist vertical self, humanistic self and personal self-construal scores increased too.

In addition, there were significant relationship between regulation of cognition, which and relational vertical self-construal (r=.30, p<.01), relational horizontal self-construal (r=.21, p<.01), collectivist horizontal self-construal (r=.20, p<.01), collectivist vertical self-construal (r=.20, p<.01), humanistic self-construal (r=.28, p<.01) and personal self-construal (r=.36, p<.01). These findings indicated that when university students'

regulation of cognition scores increased, their relational vertical self, relational horizontal self, collectivist horizontal self, collectivist vertical self, humanistic self and personal self-construal scores increased too.

Another significant relationships were observed between metacognitive skills and relational vertical self-construal ($r=.32$, $p<.01$), relational horizontal self-construal ($r=.21$, $p<.01$), collectivist horizontal self-construal ($r=.20$, $p<.01$), collectivist vertical self-construal ($r=.20$, $p<.01$), humanistic self-construal ($r=.28$, $p<.01$) and personal self-construal ($r=.36$, $p<.01$). These findings indicated that when university students' metacognitive skills scores increased, their relational vertical self, relational horizontal self, collectivist horizontal self, collectivist vertical self, humanistic self and personal self-construal scores increased.

Findings on Prediction of Knowledge of Cognition

Multiple hierarchical regression analysis was used to determine criterion variables that predict university students' knowledge of cognition. Findings on correlation and multiple coefficients of determination related to knowledge of cognition scores were presented in Table 3. Multiple regression coefficients (R) related to regression, multiple numbers of determination (R^2), regression coefficients related to the model (β) and F values and significance levels for the final model were presented at Table 3. Under the table, regression equality related to the model was presented.

Table 3. Multiple hierarchical regression analysis results for prediction of knowledge cognition score

Predictor Variables	B	Standard Error	β	t	p
Constant	35.62	2.32		15.34	.00
Relational vertical self	.33	.08	.22	4.26	**.00**
Relational horizontal self	.02	.09	.01	.22	.82
Collectivist horizontal self	.07	.07	.06	1.03	.30
Collectivist vertical self	-.02	.07	-.02	-.33	.74
Humanistic self	.11	.07	.09	1.65	.09
Personal self	.27	.06	.23	4.60	**.00**

$R=.42$, $R^2=.18$, $F_{(6-406)}=14.45$, $p<.01$

According to Table.3, relational vertical self and personal self-construal significantly predicted knowledge of cognition score ($R=.42$, $R^2=.18$, $F_{(6-406)}=14.45$, $p<.01$). This finding indicated that relational vertical and personal self-construal variables explained 18% of the total variance related to knowledge of cognition. According to findings of standardized regression coefficient (β) in 't' test results related to knowledge of cognition, personal self-construal ($\beta=.23$) was the most powerful predictor of knowledge of cognition and it was followed by relational vertical self-construal ($\beta=.22$). On the other hand, relational horizontal, collectivist horizontal, collectivist vertical and humanistic self-construal were not significant predictors of knowledge of cognition.

Findings on prediction of regulation of cognition

Multiple hierarchical regression analysis was used to determine variables that predict university students' regulation of cognition. Findings on correlation and multiple coefficients of determination related to regulation of cognition scores were presented in Table 4. The table showed multiple regression coefficients (R) related to regression, multiple numbers of determination (R^2), regression coefficients related to the model (β) and F values and significance levels for the final model. Under the table, regression equality related to the model was presented.

Table 4. Multiple hierarchical regression analysis results for prediction of regulation of cognition score

Predictor Variables	B	Standard Error	β	t	p
Constant	76.17	4.60		16.56	.00
Relational vertical self	.53	.15	.18	3.49	**.00**
Relational horizontal self	-.05	.18	-.02	-.26	.79
Collectivist horizontal self	.22	.14	.09	1.56	.12
Collectivist vertical self	.00	.15	.00	.02	.98
Humanistic self	.27	.13	.11	2.14	**.03**
Personal self	.65	.12	.27	5.53	**.00**

R=.44, R^2=.20, $F_{(6-406)}$=16.62, p<.01

Table 4 showed that relational vertical, humanistic and personal self-construal significantly predicted regulation of cognition score (R=.44, R^2=.20, $F_{(6-411)}$=16.62, p<.01). This finding indicated that relational vertical, humanistic and personal self-construal variables explained 20% of the total variance related to regulation of cognition. Relative order of significance among predictor variables on regulation of cognition according to standardized regression coefficient (β) included personal (β=.27), relational vertical (β=.18) and humanistic self-construal (β=.11) respectively. On the other hand, relational horizontal, collectivist horizontal, collectivist vertical self-construal were not significant predictors of regulation of cognition.

Findings on prediction of metacognitive skills

Multiple hierarchical regression analysis was used to determine variables that predict university students' metacognitive skills. Findings on correlation and multiple coefficients of determination related to metacognitive skill scores were presented in Table 5. The table showed multiple regression coefficients (R) related to regression, multiple numbers of determination (R^2), regression coefficients related to the model (β) and F values and significance levels for the final model. Under the table, regression equality related to the model was presented.

Table 5. Multiple hierarchical regression analysis results for prediction of metacognitive skills score

Predictor Variables	B	Standard Error	β	t	P
Constant	111.79	6.62		16.90	.00
Relational vertical self	.86	.22	.20	3.92	**.00**
Relational horizontal self	-.03	.25	-.01	-.11	.91
Collectivist horizontal self	.29	.20	.08	1.44	.15
Collectivist vertical self	-02	.21	-.01	-.10	.92
Humanistic self	.38	.18	.11	2.07	**.03**
Personal self	.92	.17	.26	5.48	**.00**

R=.45, R^2=.20, $F_{(6-406)}$=17.30, p<.01

According to Table 5, relational vertical and personal self-construal significantly predicted metacognitive skills (R=.45, R^2=.20, $F_{(6-406)}$=17.30, p<.01). This finding indicated that relational vertical, personal, and humanistic self-construal explained 18% of the total variance related to metacognitive skills. Relative order of significance among predictor variables on regulation of cognition scores according to standardized regression coefficient (β) included personal (β=.26), relational vertical (β=.20) and humanistic self-construal (β=.11) respectively. On the other hand, relational horizontal, collectivist horizontal, and collectivist vertical self-construal were not significant predictors of metacognitive skills.

Discussion and Conclusion

According to results of this study, personal self and relational-vertical self-construal significantly predicted knowledge of cognition, regulation of cognition and total metacognition. Besides, humanistic self

predicted regulation of cognition and total metacognition. On the other hand, while there was significant positive relationship between sub-dimension of self-construal and regulation of cognition and total metacognition, it was observed that relational horizontal self, collectivist horizontal self and collectivist vertical self were not significant predictors of knowledge of cognition, regulation of cognition and total metacognition. These findings show that personal self, relational vertical self and humanistic self-construal have effects on metacognition.

Analyzing participants' self-construal mean scores, it was seen that the highest mean was in relational vertical self-construal, and it was followed by personal self, relational horizontal self, humanistic self, collectivist vertical self and collectivist horizontal self-construal as presented in Table 2. It can be seen that the most powerful predictors of metacognition among Turkish university students are relational vertical self and personal self-construal. The results of this study is consistent with Kağıtçıbaşı (2017) which emphasizes that relational self is important in Turkish society but the autonomous self has been increasing among educated people due to change, transformation and increase in level of education in Turkish society. While relationality is important in collectivist cultures, individuals' aims and objectives are important in individualist cultures. Considering the fact that Turkey is a developing country, while the country maintains values belonging to a set of collectivist cultures, it is also influenced by individualist values that Western societies provide. Both relational self that is predominant in collectivist cultures and personal self that expresses individualistic culture are predictors of metacognition.

The culture of a society affects individuals' characteristics, cognition, emotions and behaviors. Behaviors are in mutual interaction with cognitive processes (Güss and Willey, 2007). Analyzing studies conducted, there are studies available that reveal differences among cultures in the use of metacognitive skills (Davidson and Freebody, 1988; Güss & Wiley, 2007; Carr, Kurtz, Schneider, Turner, & Borkowski, 1989). For example, in a study conducted by Davidson and Freebody (1988), researchers determined that there was differentiation at metacognitive knowledge level among Australian ethnic groups. Moreover, Güss and Wiley (2007) compared metacognitive strategies that American, Brazilian and Indian students used to solve their problems. In the study, it was observed that there were differences and similarities among cultures in frequent, effectiveness and proper use of metacognitive strategies. In this study, an intercultural comparison of metacognitive skills was not included but effect of culture on metacognitive skills was examined. Individuals do not only use metacognition to succeed in reading, writing and other academic fields. Individuals' metacognitive skills, namely their awareness of cognitive processes and regulating these processes are also reflected in their relationships in the society. Individual exhibit objected behaviors thanks to metacognition monitor their own behaviors and establish effective relationships by evaluating behaviors. There were two remarkable points here. The first one is cognitive processes that allow individuals to exhibit these behaviors; the second one is culture affecting behaviors at social or individualistic level. Metacognition serves as a bridge between two elements while individuals realize these processes. As a result of this research, it was not surprising that both personal and relational self-construal came into prominence among Turkish students. Based on the results of this study, it can be stated that while education and social change bring individualism to forefront, at the same time, Turkish culture with collectivist structure in which these university students live ensures that they live within the framework of these two dimensions self-construal. These two dimensions of self-construal affect Turkish university students' metacognition skills.

Participants of this study were undergraduate students studying in field of education in a university. This fact has limited generalization of obtained findings. It is suggested to carry out studies with students from different universities and different age groups. Furthermore, the relationship between self-construal and metacognition might be different in different cultures and countries.

In conclusion, personal self, humanistic self and relational-vertical self-construal have effect on metacognition skills. On the contrary, relational horizontal self, collectivist horizontal self and collectivist vertical self have not effect on knowledge of cognition, regulation of cognition and metacognition. In fact culture has an effect on metacognitive skills.

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