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Metacognition: As a Predictor of One's Academic Locus of Control

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Abstract

The purpose of this study is to examine the effect of metacognition on one's academic locus of control. The study's sample group consists of 451 university students enrolled in various programs at Sakarya University, Turkey. In this study, the Metacognitive Awareness Inventory and the Academic Locus of Control Scale were used. The correlations and path analysis were examined. The hypothesis model was tested through path analysis. The findings of the path analysis reveal that while an internal academic locus of control was predicted to have a positive relation with metacognition, an external academic locus of control was predicted to have a negative relation. In conclusion, the research indicates that metacognition affects academic locus of control in that students whose internal academic locus of control is high are more likely to adopt metacognition than are students whose external academic locus of control is high. Therefore, the current findings act to increase our understanding of the different relationships between metacognition and academic locus of control.

Key Words

Academic Locus of Control, Metacognition, Path Analysis, Sakarya University, University Students.

Recently, metacognition has attracted an increasing amount of attention within educational and psychological research. The historical roots of the concept of metacognition trace their beginnings to cognitive psychology, itself being an element of cognitive research since the 1970s (Nelson, 1996). In order to explain the contract of metacognition, a number of separate efforts have been attempted in the research literature, such as Garrison (1997) and Swanson (1990), which have given rise to a variety of definitions for metacognition. Flavell (1979), who first introduced the term of metacogniton, indicated that it is an umbrella term that describes several sets of mental processes. Metacognition consists of the two following components (Flavell, 1979; Otani & Widner, 2005; Schraw & Dennison, 1994): Knowledge about cognition (metacognitive knowledge) and regulation of cognition (metacognitive regulation).

Metacognitive knowledge, described as the knowledge, awareness, and deeper understanding of one's own cognitive processes and products, may be expanded through reflection on learning experiences. In addition, it can be used while planning progressive learning tasks (Desoete, 2008). This knowledge influences strategy use which in turns affects the metacognitive experience (Mevarech, 1999; Schraw & Dennison, 1994).

Metacognitive knowledge is comprised of three different kinds of metacognitive awareness (Garner & Alexander, 1989; Schraw, Crippen, & Hartley,

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2006): (1) Declarative knowledge, (2) procedural knowledge (Coutinho, 2008; Schraw & Moshman, 1995). Declarative knowledge refers to the knowledge one has of himself as a learner, meaning that the person is cognizant of which factors that have an effect on his/her performance while also being aware of which learning strategies work for him/her and which ones do not. Procedural knowledge, however, is concerned with the ability to utilize one's skills and conceive strategies suitable for the situation at hand (Garner, 1990; Jimenez, Puente, Alvarado, & Arrebillaga, 2009; Lorch & Klusewitz, 1993).

Jacobs & Paris (1987) and Wittrock (1983) claim that the use of metacognition appears to be related to academic achievement and enhanced learning outcomes. Also, Watkins and Hattie (1992) reported that students of high academic achievement tend to utilize strategies congruent with their own motivational states more than lower achieving students. From a developmental perspective, Biggs (1987) suggested that there is a positive correlation between age, capacity to understand, metacognitive knowledge, and strategies (Biggs, 1987; Otero, Hopkins, & Campanario, 1992).

Academic Locus of Control

Locus of control involves the belief that one is able to perform a task. Therefore, it may be related to metacognition (Landine & Stewart, 1998). As a construct related to attribution, locus of control examines people's control belief as to what extent they perceive themselves in control or not in control of what happens to them (Lefcourt, Miller, Ware, & Sherk, 1981). Within a theory of social learning, Rotter (1971) indicated that there are two frames of mind, terming them as the internal locus of control and the external locus of control. He added that people who believe that they make choices which affect their life circumstances are considered to have an internal locus of control, while people who believe their circumstances are controlled by external forces are described as having an external locus of control.

Trice (1985) defined the academic locus of control as an expectation held by an individual that his or her behavior can influence academic outcomes, adding that such a mindset reflects students' beliefs about whether factors within or without themselves determine academic success. Findley and Cooper (1983) concluded in their research that the relationship between academic achievement and locus of control proved that individuals with an internal locus of control experience a higher level of academic achievement than those with an external academic locus of control, and that this relationship is much stronger in male students compared to females. Kalechstein and Nowicki (1997) concluded that one's locus of control predicts significant differences in academic achievement. Specifically, they found that an internal locus of control is both significantly and positively related to academic success.

Individuals with an internal academic locus of control excert a greater amount of effort than those with an external locus of control because they are of the belief that they are able to control the outcomes of both their own and of others' actions. Moreover, such individuals are proud of their achievements while feeling ashamed when they experience failure. Hans (2000) and Mearns (2009) found that individuals with an external academic locus of control experience little emotional change in both situations. Similarly, Anderson and Hamilton (2005) found that students were more likely to be highly motivated if they had an internal locus of control. In addition, these students performed better academically than those with an external locus of control.

The Present Study

Previous studies have indicated that two of the most important internal motivational factors correlated with academic success are metacognition and locus of control (Sisney et al., 2000).

Specifically, both metacognition and locus of control are self-system beliefs, which can act as an interpersonal resource that individuals create about themselves and their interactions with their social environment(s) (Haine, Ayers, Sandler, Wolchik, & Weyer, 2003).

In the light of the previous studies, we can say that metacognition and academic locus of control are key features of academic performance. Thus, the purpose of this study is to examine the effect that metacognition exerts on one's academic locus of control. Based on the interpretation of previous research, it is expected that an external academic locus of control be associated negatively with metacognition whereas an internal academic locus of control is expected to be associated positively with metacognition.

Method

Participants

Convenience sampling was used during the selection of participants. Convenience sampling is a non-probability sampling technique in which participants are selected out of convenience due to their proximity to and ease of accessibility for the researcher (Bryman, 2004). For this reason, it is not within the scope of this study for the results to make inferences based on the population, a reality which led to a decrease in external validity. The participants of the study totaled 451 university students, of which 261 [58%] were female and 190 (42%), male, enrolled in various undergraduate programs at the Sakarya University Faculty of Education, Turkey.

Of the participants, 130 were first-year students, 120 were second-year students, 105 were third-year students, and 96 were fourth-year students. Their ages ranged from 17 to 27 and the mean age of the participants was 22.6 (± 1.40).

Measures

Metacognitive Awareness Inventory: The Metacognitive Awareness Inventory (Akin, Abacı, & Cetin, 2007) is a 52-item self-report scale using a five-point Likert scale (1=never to 5= always). This scale has two sub-scales: knowledge of cognition (seventeen items, e.g., "I understand my intellectual strengths and weaknesses") and regulation of cognition (thirty thirty-five items, e.g., "I ask myself questions about the material before I begin"). The results of the exploratory factor analysis have demonstrated that the items are loaded on eight factors; being: (1) declarative knowledge, (2) procedural knowledge, (3) conditional knowledge, (4) planning, (5) monitoring, (6) information management, (7) debugging, and (8) evaluation. Factor loadings ranged from .49 to .72 for declarative knowledge, .36 to .63 for procedural knowledge, .35 to .74 for conditional knowledge, .38 to .65 for planning, .32 to .83 for monitoring, .35 to .70 for evaluation, .32 to .55 for debugging, and .32 to .75 for information management. The internal consistency of the Metacognitive Awareness Inventory was found to be .95 for the entire scale, ranging between .93 and .98 for subscales. The findings also demonstrated that the corrected item-total correlation ranged from .35 to .65. For each factor and each item, the differences between the mean scores of the upper 27% and the lower 27% of the groups are significant. The test-retest reliability coefficient of the Metacognitive Awareness Inventory over the three-week period was .95.

Academic Locus of Control Scale: The Academic Locus of Control Scale (Akin, 2007) is a 17-item self-report scale using a five-point Likert scale (1=strongly disagree to 5=strongly agree). This scale has two sub-scales: external academic locus of control (11 items, e.g., "There are some subjects in which I could never do well") and internal academic locus of control (six items, e.g., "When I am unsuccessful, it is usually my own fault"). While the amount of total variance explained by the two factors was 72%, factor loadings ranged from .72 to .95 for the internal academic locus of control and from .61 to .93 for the external academic locus of control. Internal consistencies were ascertained to be .95 and .94 while the three-week test-retest reliability estimates were found to be .93 and .97 for the two subscales, respectively. Higher scores for the external academic locus of control subscale indicate higher levels of an external academic locus of control whereas higher scores for the internal academic locus of control subscale indicate higher levels of an internal academic locus of control.

Procedure

Permission for student participation was obtained from the related chief departments and students voluntarily participated in the research. Completion of the scales was anonymous coupled with a guarantee of confidentiality. The scales were administered to the students in groups within their classrooms. The measures were counterbalanced during administration. Prior to administrating the measures, all participants were informed about the purposes of the study. In this research, both the Pearson correlation coefficient and structural equation modeling were utilized to determine the relationships between metacognition and academic locus of control. These analyses were carried out via LISREL 8.54 (Jöreskog & Sorbom, 1996) and SPSS 11.5.

Results

Descriptive Data and Inter-correlations

Table 1 shows the means, descriptive statistics, inter-correlations, and internal consistency coefficients of the variables used.

Table 1.
Descriptive Statistics, Alphas, and Inter-correlations of the Variables

Variables	MAI	EALOC	IALOC
MAI[a]	1.00		
EALOC[b]	-.55*	1.00	
IALOC [c]	.60*	-.398*	1.00
Mean	63.70	24.35	24.76
SD	6.89	6.33	3.74

Note. [a]MAI = Metacognitive Awareness Inventory
[b]EALOC = External academic locus of control,
[c]IALOC = Internal academic locus of control.
*p<.01

As shown in Table 1, there are significant relationships between the metacognition and academic locus of control. While IALOC correlated positively with metacognition (r = .60, p<.01), there was a negative relationship between EALOC and metacognition (r = -.55, p<.01).

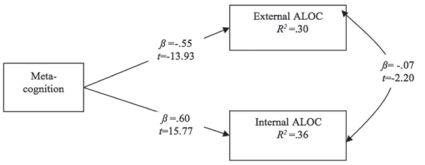

Figure 1.
Path Analysis between Metacognition and Academic Locus of Control

Before applying path analysis, the assumptions of path analysis were investigated. Multivariate normality tests which check a given set of data for similarity to the multivariate normal distribution were conducted via LISREL. The results of the multivariate normality tests indicated that there was sufficient evidence that the data are multivariate normally distributed. Multivariate outliers were investigated using the Mahalanobis distance. Here, the influential outliers are concerning because they have the potential not only to bias the model, but also to affect the major assumptions. Specifically, ten cases for dimensions of burnout were a significant distance from the model. Box's M test for equality of variance-covariance matrices was used to test for homoscedasticity. Based on a statistically significant (p<.05), the Box's M test indicates a homoscedasticity assumption violation (Stevens, 2002), indicating that the data meet the criteria for homoscedasticity.

In order to test the hypothesis model of whether EALOC would be associated negatively and whether IALOC would be associated positively with metacognition, a path analysis was used. Using path analysis, all the parameters of models can be tested simultaneously in a single step. The specifications on the model were to search for direct paths from metacognition to academic locus of control. The results of the test as to whether metacognition has a direct effect on academic locus of control are presented in Figure 1.

Figure 1 shows that the model is saturated (i.e., there are no unused degrees of freedom). Consequently, the fit of the model (Hu & Bentler, 1999) is necessarily perfect (χ2= .36, p=.036, GFI=.99, AGFI=.99, CFI=.99, NFI=.98, IFI=.99, RFI=.99, SRMR=.014, and RMSEA=.040) with the model accounting for 30% of EALOC and 36% of IALOC variance. It can be seen that metacognition has both significant and negative effects (β=–0.55, t=-13.93) on EALOC. On the other hand, IALOC was predicted positively by metacognition (β=0.60, t=15.77).

Discussion and Recommendations

This study is to examine the effect of metacognition on academic locus of control. Correlations and path analysis confirm the hypothesis, showing that metacognition is positively associated with the dimensions of an internal academic locus of control. Moreover, the goodness of fit indexes indicated that the model was acceptable and that correlations among measures were explained by the model (Hu & Bentler, 1999).

Metacognition was predicted positively by an internal academic locus of control and negatively by an external academic locus of control. The positive correlation between metacognition and internal academic locus of control is in line with the findings of Landine and Stewart's study (1998) in which they found a significant positive relationship between metacognition and academic success. In addition, Kurtz and Borkowski (1984) and others (Biggs, 1985; Stipek, 1982) suggested a positive relationship between the use of metacognition and academic achievement. This positive relationship suggests that as use of metacognition increases, regardless of the approach, one's academic average increases. In a number of recent studies, a relationship was found between academic performance and students' metacognitive knowledge characteristics (Romainville, 1994). In addition, it was revealed that high achieving students seem to be aware of more cognitive rules and to evoke metacognitive knowledge about cognitive processes and cognitive results. They have also been found to be able to

describe more frequently, in comparison with their low achieving counterparts, their cognitive strategies. Other authors (Corno, Collins, & Capper, 1982; Harrison, 1991; Pintrich & De Groot, 1990) stated that internal academic locus of control also account for a portion of the relationship between academic achievement and learning. Studies on academic locus of control and achievement have indicated that individuals with an internal locus of control experience higher academic achievement than those with an external locus of control and that while an internal locus of control has been found to be a positive predictor of academic achievement, an external locus of control is a negative predictor of academic achievement (Eachus & Cassidy, 1997; Findley & Cooper, 1983). Moreover, students have found that an internal locus of control has a direct and positive relationship with the educational achievement of students (Ghasemzadeh & Saadat, 2011). Other studies (Arslan & Çardak, 2012; Arslan, Akın & Çitemel, 2013; Findley & Cooper, 1983; Hans, 2000; Satıcı, Uysal, & Akın, 2013) have revealed that academic achievement correlates moderately with more internal beliefs; therefore indicating a positive relation between metacognition and an internal academic locus of control to be reasonable.

This study has several implications for future research. Firstly, further research investigating the relationships between metacognition, academic internal locus of control, and academic external locus of control are needed in order to reinforce the findings of this study. Also, future studies can examine these relationships with structural equation modeling, establishing a mediating or latent variable. One of the implications of this research for educators involves their work with students. A future researcher should consider a number of variables, including the use of metacognition and academic locus of control when working with students wishing to improve their performance. Some students typically hold the belief that their own academic achievement is caused by ability whereas others might have a tendency to rely on explanations of effort, task difficulty, or luck to explain success. While some elements may lead student to work harder, others may be maladjusted. Researchers focusing on these variables will help students approach their learning tasks with skills and attitudes conducive for academic success.

The results of this study should be interpreted in light of a number of limitations. First of all, because this research was intended to build a model rather than to test a pre-existing model, the findings from the research are of explanatory quality. Therefore, if these findings are not tested on another sample, it is wise to avoid interpreting the findings as definite. Secondly, as the samples presented here were limited to university students, generalizability of the findings is restricted. For this reason, it is critical for a future researcher to investigate the variables studied in this research on sample groups composed of non-university students. In conclusion, this research reports that metacognition affects academic locus of control. Students high in an internal academic locus of control are more likely to adopt metacognition than are students who rate high in an external academic locus of control. Therefore, the current findings increase our understanding of the relationships between metacognition and academic locus of control.

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