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Metacognitive awareness and academic locus of control as the predictors of academic adjustment

Abstract: This study attempted to examine the impacts of academic locus of control and metacognitive awareness on the academic adjustment of the student participants. The convenient sampling was applied to select the sample of 368 participants comprising 246 internals with age ranging from 17 to 28 years ($M = 20.52$, $SD = 2.10$) and 122 externals with age spanning from 17 to 28 years ($M = 20.57$, $SD = 2.08$). The findings indicated that there were significant differences in the various dimensions of metacognition, academic lifestyle and academic achievement of the internals and externals except for academic motivation and overall academic adjustment. There were significant gender differences in declarative knowledge, procedural knowledge, conditional knowledge, planning, information management, monitoring, evaluation and overall metacognitive awareness. Likewise, the internals and externals differed significantly in their mean scores of declarative knowledge, procedural knowledge, conditional knowledge, planning, information management, monitoring, debugging, evaluation and overall metacognitive awareness, academic lifestyle and academic achievement. The significant positive correlations existed between the scores of metacognitive awareness and academic adjustment. It was evident that the internal academic locus of control and metacognitive awareness were significant predictors of academic adjustment of the students. The findings have been discussed in the light of recent findings of the field. The findings of the study have significant implications to understand the academic success and adjustment of the students and thus, relevant for teachers, educationists, policy makers and parents. The future directions for the researchers and limitations of the study have also been discussed.

Keywords: Metacognition, Academic Locus of Control, Academic Adjustment

Introduction

Metacognitive processes refer to knowledge of cognitive behaviour that stems from the self-monitoring of one's own cognition which is critical for providing input to self-directed control processes (Metcalf, 1996) and termination of attempts at retrieval (Nelson, Gerler, & Narens, 1984). The interest in studying metacognitive processes spans across different areas of psychology that includes memory (Johnson, Kounios, & Reeder, 1994), developmental psychology (Butterfield, Nelson, & Peck, 1988), aging (Backman & Lipinska, 1993), neuropsychology (Shimamura, 2000), social psychology (Schwarz, 2004), judgement and decision making (Winman & Juslin, 2005) and forensic psychology (Pansky, Koriat, & Goldsmith, 2005). Metacognition

comprises of a multidimensional set of skills that involve thinking about thinking. Metacognition is very important in learning and performance of the individuals. The use of metacognitive strategies ignites one's thinking and can lead to more profound learning and improved performance, especially among learners who are struggling (Swanson, 1990).

In essence, metacognition entails the ability to reflect upon, understand and control one's learning which comprises of two major components: knowledge about cognition and regulation of cognition (Brown, 1987; Flavell, 1987; Jacobs & Paris, 1987). The first component includes three sub-processes that facilitate the reflective aspect of metacognition: declarative knowledge (knowledge about self and about strategies), procedural knowledge (knowledge about how to use strategies) and conditional

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knowledge (knowledge about when and why to use strategies). Regulation of cognition includes a number of sub-processes that facilitate the control aspect of learning. The researchers have reported five regulation skills which include planning, information management strategies, comprehension monitoring, debugging strategies and evaluation (Artzt & Armour-Thomas, 1992; Baker, 1989). It has been argued that metacognition plays a pivotal role in communication, reading comprehension, language acquisition, social cognition, attention, self-control, memory, self-instruction, writing, problem-solving and personality development to mention a few (Rahman et al., 2010) which develop with learning and experience. It has also been argued that metacognitive processes are closely associated with academic achievement, learning outcomes and efficient ways to improve performance in work environments.

The locus of control is a generalized attitude, beliefs or expectancy regarding the nature of the causal relationship between one's own behavior and its consequences (Rotter, 1966). Rotter (1971) has argued that the individuals may carry either internal or external locus of control. The internals are those who believe their outcomes of life are regulated by their own efforts whereas the externals carry the belief that outcomes are caused by external factors. These differences in the locus of control lead the individuals to possess two different types of cognitive, affective and behavioural structuring which are very closely linked with the performance of various sorts. It has been argued that the internals and externals differ in their attributional styles, intrapersonal and personal cognitions, perceptions of control, dynamics of reinforcement and metacognitive abilities which constitute the major background in individual differences in performance. It has been posited that beliefs of the individuals that their actions will lead to the desired outcome is essential for both motivation (Bandura, 1989; Skinner, 1996; Goldsmith et al., 2000) and self-control (Rosenbaum, 1980). Applying the arguments of locus of control, Trice (1985) has defined academic locus of control as an expectation held by the learners that their behaviors have the capacity to impact academic success and adjustment. It also reflects the beliefs and expectations of the students about the individual and environmental factors which significantly determine the academic success and performance. It is a well established fact in psychological research that internal academic locus of control has facilitative role in academic achievement and learning (Anderson & Hamilton, 2005; Corno, Collins, & Capper, 1982; Harrison, 1991; Pintrich & De Groot, 1990). The researchers have argued that locus of control has close link with metacognitive knowledge and motivation of the individuals (Bergan, 1990; Grote & James, 1991) as it entails belief of the students about their ability to perform a task.

According to Baker and Siryk (1999), academic adjustment refers to the degree of success of the students meeting the various educational demands of the academic environment. The demand of academic adjustment may face new challenges as becoming a part of higher

education system initiates many changes in the life of the students and provides them an opportunity to develop self-dependency contrary to the previous life which is characterized by a complete dependency on the teachers and family members as well as coping with dissimilar cultural, social and psychological environment (Al-Shinawi & Abdurrahman, 1994). It has motivated many researchers to conduct scientific inquiry into the role of academic adjustment in higher education that has been supposed to be a strong predictor of academic success of the students, development of social relations and new personal goals (Al-nabhan, 2001; Saldern, 1992).

The review of available research works exhibited that previous studies have mostly focused on the relationship of metacognitive awareness and academic outcomes and fewer efforts have been devoted to understand the impacts of metacognitive awareness on academic adjustment of the students. In one of the limited studies is the study of Cazan (2012) who reported that as compared to self-regulated learning strategies, academic self-efficacy and test anxiety, metacognitive self-regulated strategies are the reliable predictors of academic adjustment of first year university students. Thus, the relationship between metacognition and academic adjustment remains insufficiently explored topic of research. In addition, there is lack of studies focusing the metacognitive differences in internal and external locus of control which significantly impacts academic success and academic adjustment.

The purpose of the present study was to understand the differences in the metacognitive awareness of internals and externals and to see the impacts of metacognitive awareness and academic locus of control on the academic adjustment of the male and female students. Most of the previous studies have been carried out involving the participants from American and Western socio-cultural settings. This study would contribute to the understanding the relationship among these variables in Indian socio-cultural milieu. It has been observed that most of the previous researches have been confined only to the study of the relationship between metacognitive awareness and academic outcome. Thus, the present study will help to understand the relationship among metacognitive awareness, academic locus of control and academic adjustment of the male and female participants.

Objectives of the Study

Following were the major objectives of the study:

1. To compare and contrast the metacognitive awareness and academic adjustment of the participants with internal and external academic locus of control.
2. To see the nature and extent of association between the metacognitive awareness and academic adjustment of the participants with internal and external academic locus of control.
3. To partial out the role of metacognitive awareness in predicting the academic adjustment of the participants with internal and external academic locus of control.

Hypotheses

Following hypotheses were framed to be tested through the findings of the study:

1. The mean scores of metacognitive awareness and academic adjustment of the participants with internal academic locus of control will be higher as compared to the externals.
2. The metacognition and its components will show positive correlations with academic adjustment of the internals and externals.
3. The metacognition and its components will account for significant variance in the scores of academic adjustment of the internals and externals.

Methods and Procedure

Participants

The convenient sampling method was used to choose the participants for the study. The undergraduate and postgraduate male and female students studying in different streams of science, arts and commerce were approached to take part in the study. Before the start of the actual collection of the data, written permissions were sought from competent authorities of the different departments of Doctor Harisingh Gour Vishwavidyalaya, Sagar, Madhya Pradesh, India. Initially, 550 undergraduate and postgraduate students were consulted for data collection but finally, data of only 522 were found correct and complete in all respect. The participants who scored 12 or below on Trice Academic Locus of Control Scale (Trice, 1985) were labelled as having internal academic locus of control whereas those who scored 16 or above on the scale were denoted as possessing external academic locus of control. Adopting this criteria, 246 participants age ranging from 17 years to 28 years were identified as internals ($M=20.52$, $SD=2.10$) comprising 133 males ($M=20.43$, $SD=2.03$) and 113 females ($M=20.64$, $SD=2.18$) whereas 122 participants age ranging 17 years to 28 years were found to be externals ($M=20.57$, $SD=2.08$) containing 61 males ($M=20.57$, $SD=2.30$) and 61 females ($M=20.57$, $SD=1.85$). In essence, the selection criteria of the participants were that the participants must be studying in either graduation or postgraduation and must possess apparent normal physical and mental health.

Tools

Following tools were employed to collect data for the study.

Metacognitive Awareness Inventory (MAI)

Metacognitive Awareness Inventory (MAI), standardized by Schraw and Dennison (1994) was used to measure the metacognitive awareness of the participants in the study. The MAI consists of 52 statements to which participants responded by marking a Likert scale with numbers from 1 ("not at all true of me") to 5 ("very true of me"). The statements represented two component categories of metacognition, knowledge and regulation. The knowledge

component covered declarative knowledge (knowledge about self and strategies), procedural knowledge (knowledge about strategy use), and conditional knowledge (when and why to use strategies). The regulation component covered planning (goal setting), information management (organizing), monitoring (assessment of learning and strategy), debugging (strategies to correct errors) and evaluation (analysis of performance and strategy effectiveness). The test-retest reliability of this scale is 0.95.

Trice Academic Locus of Control Scale

This scale was developed by Trice (1985) which was used to measure the internal and external academic locus of control of the students. This scale measured the locus of control regarding academic settings. This scale consists of 28 items. Responses were elicited on two-point scale: true or false. The range of scores was 0–28. The scores have been found to be significantly correlated with grade point average (Trice, 1985). Low scores on the scale have been reported to be associated with higher GPA and high scores are associated with lower GPA (Trice, 1985). Scores from 0–14 obtained on the scale indicate internal locus of control and scores above this range indicate external locus of control. The test-retest reliability of this scale for students has been reported to be 0.90 (Trice, 1985).

Academic Adjustment Scale

This scale measured academic adjustment of the students which has been designed by Anderson et al. (2016). The academic adjustment scale represented three dimensional construct of academic adjustment that comprised academic lifestyle, academic achievement and academic motivation. This scale comprises 9 items. Responses were elicited on five-point scale. The test-retest reliability of this academic adjustment scale was 0.84 (Anderson et al., 2016).

Procedure of Data Collection and Analysis

After the proposal was finalized, it was put before the ethical committee of the department for its approval and permission. Then, the procurement of the psychometric tools was ascertained. The participants were approached individually and debriefed about the basic goals of the study. The participants were made comfortable and the researchers established rapport with them followed by oral instructions about the methods of answering to the alternatives of the various items of the scales. Before the start of the study, the written consent was collected from each participant. The participants were supplied with a set of the scales. The participants were instructed to read the instructions carefully before giving their responses to the various items of the scales. They were also told that during and before the completion of the scales they can ask anything about it. The data so obtained were arranged according to the demand of the method of analysis. The mean, standard deviation (SD), t-test, Pearson Product Moment Method of Correlation and stepwise regression analysis were carried out on the obtained data of the study with the help of SPSS (Statistical Package for the Social Sciences), a software programme to analyze the data.

Results

The academic locus of control, metacognition and academic adjustment were measured with the help of standardized psychometric tools. Metacognition consisted of two components namely, knowledge and regulation. The knowledge component includes declarative knowledge, procedural knowledge and conditional knowledge. The regulation component covers planning, information management, monitoring, debugging and evaluation. Similarly, academic locus of control consists of two components: internal academic locus of control and external academic locus of control. Likewise, academic adjustment consisted of three components viz., academic lifestyle, academic achievement and academic motivation.

The mean scores of metacognition and its components of the male participants in terms of internal and external academic locus of control showed that the male participants with internal academic locus of control evoked higher

mean scores on declarative knowledge (Internal-M=30.19, SD=4.51; External-M=27.56, SD=5.26; $t=3.58$, $df=192$, $p=.000$), procedural knowledge (Internal-M=15.05, SD=2.55; External-M=13.41, SD=2.67; $t=4.09$, $df=192$, $p=.000$), conditional knowledge (Internal-M=20.00, SD=2.75; External-M=18.61, SD=3.36; $t=3.05$, $df=192$, $p=.003$), planning (Internal-M=28.67, SD=3.39; External-M=24.75, SD=5.24; $t=6.24$, $df=192$, $p=.000$), information management (Internal-M=38.54, SD=4.95; External-M=36.43, SD=5.27; $t=2.71$, $df=192$, $p=.007$), monitoring (Internal-M=26.46, SD=3.73; External-M=24.92, SD=4.15; $t=2.58$, $df=192$, $p=.011$), evaluation (Internal-M=23.41, SD=3.45; External-M=22.00, SD=3.84; $t=2.54$, $df=192$, $p=.012$) and overall metacognitive awareness (Internal-M=201.68, SD=19.22; External-M=186.26, SD=25.43; $t=4.67$, $df=192$, $p=.000$) as compared to the external males (Table 1).

The male participants with internal academic locus of control also demonstrated higher mean scores on

Table 1. Means, SDs and t-values of the scores of metacognition and its eight components, academic adjustment and its three components of the male participants with internal and external academic locus of control

S. No.	Measures	Academic Locus of Control	N	Mean	SD	t	df	p																																																																																																																																																							
1.	Declarative Knowledge	Internal	133	30.19	4.51	3.58	192	.000																																																																																																																																																							
		External	61	27.56	5.26				2.	Procedural Knowledge	Internal	133	15.05	2.55	4.09	192	.000	External	61	13.41	2.67	3.	Conditional Knowledge	Internal	133	20.00	2.75	3.05	192	.003	External	61	18.61	3.36	4.	Planning	Internal	133	28.67	3.39	6.24	192	.000	External	61	24.75	5.24	5.	Information Management	Internal	133	38.54	4.95	2.71	192	.007	External	61	36.43	5.27	6.	Monitoring	Internal	133	26.46	3.73	2.58	192	.011	External	61	24.92	4.15	7.	Debugging	Internal	133	19.38	3.01	1.65	192	.101	External	61	18.59	3.23	8.	Evaluation	Internal	133	23.41	3.45	2.54	192	.012	External	61	22.00	3.84	9.	Overall Metacognitive Awareness	Internal	133	201.68	19.22	4.67	192	.000	External	61	186.26	25.43	10.	Academic Life Style	Internal	133	8.73	2.32	4.03	192	.000	External	61	10.10	1.89	11.	Academic Achievement	Internal	133	10.94	2.22	2.43	192	.016	External	61	10.03	2.81	12.	Academic Motivation	Internal	133	12.38	2.16	0.57	192	.571	External	61	12.56	1.85	13.	Overall Academic Adjustment	Internal	133	32.05	4.73	0.90	192
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		External	61	32.69	4.39																																																																																																																																																										

academic achievement (Internal-M = 10.94, SD = 2.22; External-M = 10.03, SD = 2.81; $t = 2.43$, $df = 192$, $p = .016$) as compared to the external males. Conversely, the male participants with external academic locus of control achieved higher mean scores on academic lifestyle (Internal-M = 8.73, SD = 2.32; External-M = 10.10, SD = 1.89; $t = 4.03$, $df = 192$, $p = .000$) as compared to the internal males (Table 1).

On the other hand, the mean scores of metacognition and its components of the female participants in terms of internal and external academic locus of control showed that the female participants with internal academic locus of control exhibited higher mean scores on declarative knowledge (Internal-M = 30.42, SD = 4.06; External-M = 27.13, SD = 4.86; $t = 4.75$, $df = 172$, $p = .000$), conditional knowledge (Internal-M = 20.27, SD = 2.89; External-M = 18.21, SD = 3.13; $t = 4.36$, $df = 172$, $p = .000$), planning (Internal-M = 28.36, SD = 4.01; External-M = 25.75, SD = 5.15; $t = 3.70$, $df = 172$, $p = .000$),

information management (Internal-M = 39.28, SD = 4.42; External-M = 37.41, SD = 4.69; $t = 2.61$, $df = 172$, $p = .010$), monitoring (Internal-M = 27.06, SD = 3.62; External-M = 24.02, SD = 4.18; $t = 5.01$, $df = 172$, $p = .000$), evaluation (Internal-M = 24.03, SD = 3.33; External-M = 21.25, SD = 4.38; $t = 4.69$, $df = 172$, $p = .000$) and overall metacognitive awareness (Internal-M = 203.68, SD = 20.01; External-M = 186.75, SD = 22.86; $t = 5.06$, $df = 172$, $p = .000$) as compared to the external females. The female participants with internal academic locus of control also evoked higher mean score on academic achievement (Internal-M = 10.41, SD = 2.47; External-M = 8.71, SD = 2.31; $t = 4.43$, $df = 172$, $p = .000$) as compared to the external females. Conversely, the female participants with external academic locus of control did not show significant difference in any of the rest of the measures of metacognitive awareness and academic adjustment (Table 2).

Table 2. Means, SDs and t-values of the scores of metacognition and its eight components, academic adjustment and its three components of the female participants with internal and external academic locus of control

S. No.	Measures	Academic Locus of Control	N	Mean	SD	t	df	p																																																																																																																																																							
1.	Declarative Knowledge	Internal	113	30.42	4.06	4.75	172	.000																																																																																																																																																							
		External	61	27.13	4.86				2.	Procedural Knowledge	Internal	113	15.09	2.75	1.61	172	.109	External	61	14.41	2.45	3.	Conditional Knowledge	Internal	113	20.27	2.89	4.36	172	.000	External	61	18.21	3.13	4.	Planning	Internal	113	28.36	4.01	3.70	172	.000	External	61	25.75	5.15	5.	Information Management	Internal	113	39.28	4.42	2.61	172	.010	External	61	37.41	4.69	6.	Monitoring	Internal	113	27.06	3.62	5.01	172	.000	External	61	24.02	4.18	7.	Debugging	Internal	113	19.17	3.09	1.21	172	.229	External	61	18.57	3.11	8.	Evaluation	Internal	113	24.03	3.33	4.69	172	.000	External	61	21.25	4.38	9.	Overall Metacognitive Awareness	Internal	113	203.68	20.01	5.06	172	.000	External	61	186.75	22.86	10.	Academic Life Style	Internal	113	8.67	2.28	1.76	172	.080	External	61	9.31	2.37	11.	Academic Achievement	Internal	113	10.41	2.47	4.43	172	.000	External	61	8.71	2.31	12.	Academic Motivation	Internal	113	12.47	1.97	0.69	172	.493	External	61	12.69	2.08	13.	Overall Academic Adjustment	Internal	113	31.54	4.35	1.16	172
2.	Procedural Knowledge	Internal	113	15.09	2.75	1.61	172	.109																																																																																																																																																							
		External	61	14.41	2.45				3.	Conditional Knowledge	Internal	113	20.27	2.89	4.36	172	.000	External	61	18.21	3.13	4.	Planning	Internal	113	28.36	4.01	3.70	172	.000	External	61	25.75	5.15	5.	Information Management	Internal	113	39.28	4.42	2.61	172	.010	External	61	37.41	4.69	6.	Monitoring	Internal	113	27.06	3.62	5.01	172	.000	External	61	24.02	4.18	7.	Debugging	Internal	113	19.17	3.09	1.21	172	.229	External	61	18.57	3.11	8.	Evaluation	Internal	113	24.03	3.33	4.69	172	.000	External	61	21.25	4.38	9.	Overall Metacognitive Awareness	Internal	113	203.68	20.01	5.06	172	.000	External	61	186.75	22.86	10.	Academic Life Style	Internal	113	8.67	2.28	1.76	172	.080	External	61	9.31	2.37	11.	Academic Achievement	Internal	113	10.41	2.47	4.43	172	.000	External	61	8.71	2.31	12.	Academic Motivation	Internal	113	12.47	1.97	0.69	172	.493	External	61	12.69	2.08	13.	Overall Academic Adjustment	Internal	113	31.54	4.35	1.16	172	.247	External	61	30.71	4.83								
3.	Conditional Knowledge	Internal	113	20.27	2.89	4.36	172	.000																																																																																																																																																							
		External	61	18.21	3.13				4.	Planning	Internal	113	28.36	4.01	3.70	172	.000	External	61	25.75	5.15	5.	Information Management	Internal	113	39.28	4.42	2.61	172	.010	External	61	37.41	4.69	6.	Monitoring	Internal	113	27.06	3.62	5.01	172	.000	External	61	24.02	4.18	7.	Debugging	Internal	113	19.17	3.09	1.21	172	.229	External	61	18.57	3.11	8.	Evaluation	Internal	113	24.03	3.33	4.69	172	.000	External	61	21.25	4.38	9.	Overall Metacognitive Awareness	Internal	113	203.68	20.01	5.06	172	.000	External	61	186.75	22.86	10.	Academic Life Style	Internal	113	8.67	2.28	1.76	172	.080	External	61	9.31	2.37	11.	Academic Achievement	Internal	113	10.41	2.47	4.43	172	.000	External	61	8.71	2.31	12.	Academic Motivation	Internal	113	12.47	1.97	0.69	172	.493	External	61	12.69	2.08	13.	Overall Academic Adjustment	Internal	113	31.54	4.35	1.16	172	.247	External	61	30.71	4.83																					
4.	Planning	Internal	113	28.36	4.01	3.70	172	.000																																																																																																																																																							
		External	61	25.75	5.15				5.	Information Management	Internal	113	39.28	4.42	2.61	172	.010	External	61	37.41	4.69	6.	Monitoring	Internal	113	27.06	3.62	5.01	172	.000	External	61	24.02	4.18	7.	Debugging	Internal	113	19.17	3.09	1.21	172	.229	External	61	18.57	3.11	8.	Evaluation	Internal	113	24.03	3.33	4.69	172	.000	External	61	21.25	4.38	9.	Overall Metacognitive Awareness	Internal	113	203.68	20.01	5.06	172	.000	External	61	186.75	22.86	10.	Academic Life Style	Internal	113	8.67	2.28	1.76	172	.080	External	61	9.31	2.37	11.	Academic Achievement	Internal	113	10.41	2.47	4.43	172	.000	External	61	8.71	2.31	12.	Academic Motivation	Internal	113	12.47	1.97	0.69	172	.493	External	61	12.69	2.08	13.	Overall Academic Adjustment	Internal	113	31.54	4.35	1.16	172	.247	External	61	30.71	4.83																																		
5.	Information Management	Internal	113	39.28	4.42	2.61	172	.010																																																																																																																																																							
		External	61	37.41	4.69				6.	Monitoring	Internal	113	27.06	3.62	5.01	172	.000	External	61	24.02	4.18	7.	Debugging	Internal	113	19.17	3.09	1.21	172	.229	External	61	18.57	3.11	8.	Evaluation	Internal	113	24.03	3.33	4.69	172	.000	External	61	21.25	4.38	9.	Overall Metacognitive Awareness	Internal	113	203.68	20.01	5.06	172	.000	External	61	186.75	22.86	10.	Academic Life Style	Internal	113	8.67	2.28	1.76	172	.080	External	61	9.31	2.37	11.	Academic Achievement	Internal	113	10.41	2.47	4.43	172	.000	External	61	8.71	2.31	12.	Academic Motivation	Internal	113	12.47	1.97	0.69	172	.493	External	61	12.69	2.08	13.	Overall Academic Adjustment	Internal	113	31.54	4.35	1.16	172	.247	External	61	30.71	4.83																																															
6.	Monitoring	Internal	113	27.06	3.62	5.01	172	.000																																																																																																																																																							
		External	61	24.02	4.18				7.	Debugging	Internal	113	19.17	3.09	1.21	172	.229	External	61	18.57	3.11	8.	Evaluation	Internal	113	24.03	3.33	4.69	172	.000	External	61	21.25	4.38	9.	Overall Metacognitive Awareness	Internal	113	203.68	20.01	5.06	172	.000	External	61	186.75	22.86	10.	Academic Life Style	Internal	113	8.67	2.28	1.76	172	.080	External	61	9.31	2.37	11.	Academic Achievement	Internal	113	10.41	2.47	4.43	172	.000	External	61	8.71	2.31	12.	Academic Motivation	Internal	113	12.47	1.97	0.69	172	.493	External	61	12.69	2.08	13.	Overall Academic Adjustment	Internal	113	31.54	4.35	1.16	172	.247	External	61	30.71	4.83																																																												
7.	Debugging	Internal	113	19.17	3.09	1.21	172	.229																																																																																																																																																							
		External	61	18.57	3.11				8.	Evaluation	Internal	113	24.03	3.33	4.69	172	.000	External	61	21.25	4.38	9.	Overall Metacognitive Awareness	Internal	113	203.68	20.01	5.06	172	.000	External	61	186.75	22.86	10.	Academic Life Style	Internal	113	8.67	2.28	1.76	172	.080	External	61	9.31	2.37	11.	Academic Achievement	Internal	113	10.41	2.47	4.43	172	.000	External	61	8.71	2.31	12.	Academic Motivation	Internal	113	12.47	1.97	0.69	172	.493	External	61	12.69	2.08	13.	Overall Academic Adjustment	Internal	113	31.54	4.35	1.16	172	.247	External	61	30.71	4.83																																																																									
8.	Evaluation	Internal	113	24.03	3.33	4.69	172	.000																																																																																																																																																							
		External	61	21.25	4.38				9.	Overall Metacognitive Awareness	Internal	113	203.68	20.01	5.06	172	.000	External	61	186.75	22.86	10.	Academic Life Style	Internal	113	8.67	2.28	1.76	172	.080	External	61	9.31	2.37	11.	Academic Achievement	Internal	113	10.41	2.47	4.43	172	.000	External	61	8.71	2.31	12.	Academic Motivation	Internal	113	12.47	1.97	0.69	172	.493	External	61	12.69	2.08	13.	Overall Academic Adjustment	Internal	113	31.54	4.35	1.16	172	.247	External	61	30.71	4.83																																																																																						
9.	Overall Metacognitive Awareness	Internal	113	203.68	20.01	5.06	172	.000																																																																																																																																																							
		External	61	186.75	22.86				10.	Academic Life Style	Internal	113	8.67	2.28	1.76	172	.080	External	61	9.31	2.37	11.	Academic Achievement	Internal	113	10.41	2.47	4.43	172	.000	External	61	8.71	2.31	12.	Academic Motivation	Internal	113	12.47	1.97	0.69	172	.493	External	61	12.69	2.08	13.	Overall Academic Adjustment	Internal	113	31.54	4.35	1.16	172	.247	External	61	30.71	4.83																																																																																																			
10.	Academic Life Style	Internal	113	8.67	2.28	1.76	172	.080																																																																																																																																																							
		External	61	9.31	2.37				11.	Academic Achievement	Internal	113	10.41	2.47	4.43	172	.000	External	61	8.71	2.31	12.	Academic Motivation	Internal	113	12.47	1.97	0.69	172	.493	External	61	12.69	2.08	13.	Overall Academic Adjustment	Internal	113	31.54	4.35	1.16	172	.247	External	61	30.71	4.83																																																																																																																
11.	Academic Achievement	Internal	113	10.41	2.47	4.43	172	.000																																																																																																																																																							
		External	61	8.71	2.31				12.	Academic Motivation	Internal	113	12.47	1.97	0.69	172	.493	External	61	12.69	2.08	13.	Overall Academic Adjustment	Internal	113	31.54	4.35	1.16	172	.247	External	61	30.71	4.83																																																																																																																													
12.	Academic Motivation	Internal	113	12.47	1.97	0.69	172	.493																																																																																																																																																							
		External	61	12.69	2.08				13.	Overall Academic Adjustment	Internal	113	31.54	4.35	1.16	172	.247	External	61	30.71	4.83																																																																																																																																										
13.	Overall Academic Adjustment	Internal	113	31.54	4.35	1.16	172	.247																																																																																																																																																							
		External	61	30.71	4.83																																																																																																																																																										

Irrespective of gender, the participants with internal academic locus of control showed higher mean scores on declarative knowledge (Internal-M = 30.29, SD = 4.30; External-M = 27.34, SD = 5.04; $t = 5.84$, $df = 366$, $p = .000$), procedural knowledge (Internal-M = 15.07, SD = 2.64; External-M = 13.91, SD = 2.60; $t = 3.97$, $df = 366$, $p = .000$), conditional knowledge (Internal-M = 20.13, SD = 2.81; External-M = 18.41, SD = 3.24; $t = 5.24$, $df = 366$, $p = .000$), planning (Internal-M = 28.53, SD = 3.68; External-M = 25.25, SD = 5.20; $t = 6.97$, $df = 366$, $p = .000$), information management (Internal-M = 38.88, SD = 4.72; External-M = 36.92, SD = 5.00; $t = 3.69$, $df = 366$, $p = .000$), monitoring (Internal-M = 26.74, SD = 3.69; External-M = 24.47, SD = 4.17; $t = 5.32$, $df = 366$, $p = .000$), debugging (Internal-M = 19.28, SD = 3.04; External-M = 18.58, SD = 3.16; $t = 2.05$, $df = 366$, $p = .041$), evaluation (Internal-M = 23.69, SD = 3.40; External-M = 21.62, SD = 4.12; $t = 5.11$, $df = 366$, $p = .000$)

and overall metacognitive awareness (Internal-M = 202.60, SD = 19.58; External-M = 186.51, SD = 24.08; $t = 6.87$, $df = 366$, $p = .000$) as compared to the externals (Table 3).

Likewise, the participants with internal academic locus of control also demonstrated higher mean score on academic achievement (Internal-M = 10.70, SD = 2.35; External-M = 9.37, SD = 2.64; $t = 4.89$, $df = 366$, $p = .000$) as compared to the externals. Conversely, the participants with external academic locus of control demonstrated higher mean score on academic lifestyle (Internal-M = 8.70, SD = 2.30; External-M = 9.71, SD = 2.17; $t = 4.02$, $df = 366$, $p = .000$) as compared to the internals (Table 3).

The coefficients of correlation among the scores of various components of metacognition and academic adjustment in terms of internal and external academic locus of control of the male and female participants were computed. The results indicated that the positive and significant correlations existed among the scores

Table 3. Means, SDs and t-values of the pooled scores of metacognition and its eight components, academic adjustment and its three components of the participants with internal and external academic locus of control

S. No.	Measures	Academic Locus of Control	N	Mean	SD	t	df	p																																																																																																																																																							
1.	Declarative Knowledge	Internal	246	30.29	4.30	5.84	366	.000																																																																																																																																																							
		External	122	27.34	5.04				2.	Procedural Knowledge	Internal	246	15.07	2.64	3.97	366	.000	External	122	13.91	2.60	3.	Conditional Knowledge	Internal	246	20.13	2.81	5.24	366	.000	External	122	18.41	3.24	4.	Planning	Internal	246	28.53	3.68	6.97	366	.000	External	122	25.25	5.20	5.	Information Management	Internal	246	38.88	4.72	3.69	366	.000	External	122	36.92	5.00	6.	Monitoring	Internal	246	26.74	3.69	5.32	366	.000	External	122	24.47	4.17	7.	Debugging	Internal	246	19.28	3.04	2.05	366	.041	External	122	18.58	3.16	8.	Evaluation	Internal	246	23.69	3.40	5.11	366	.000	External	122	21.62	4.12	9.	Overall Metacognitive Awareness	Internal	246	202.60	19.58	6.87	366	.000	External	122	186.51	24.08	10.	Academic Life Style	Internal	246	8.70	2.30	4.02	366	.000	External	122	9.71	2.17	11.	Academic Achievement	Internal	246	10.70	2.35	4.89	366	.000	External	122	9.37	2.64	12.	Academic Motivation	Internal	246	12.42	2.07	0.91	366	.366	External	122	12.62	1.96	13.	Overall Academic Adjustment	Internal	246	31.81	4.56	0.23	366
2.	Procedural Knowledge	Internal	246	15.07	2.64	3.97	366	.000																																																																																																																																																							
		External	122	13.91	2.60				3.	Conditional Knowledge	Internal	246	20.13	2.81	5.24	366	.000	External	122	18.41	3.24	4.	Planning	Internal	246	28.53	3.68	6.97	366	.000	External	122	25.25	5.20	5.	Information Management	Internal	246	38.88	4.72	3.69	366	.000	External	122	36.92	5.00	6.	Monitoring	Internal	246	26.74	3.69	5.32	366	.000	External	122	24.47	4.17	7.	Debugging	Internal	246	19.28	3.04	2.05	366	.041	External	122	18.58	3.16	8.	Evaluation	Internal	246	23.69	3.40	5.11	366	.000	External	122	21.62	4.12	9.	Overall Metacognitive Awareness	Internal	246	202.60	19.58	6.87	366	.000	External	122	186.51	24.08	10.	Academic Life Style	Internal	246	8.70	2.30	4.02	366	.000	External	122	9.71	2.17	11.	Academic Achievement	Internal	246	10.70	2.35	4.89	366	.000	External	122	9.37	2.64	12.	Academic Motivation	Internal	246	12.42	2.07	0.91	366	.366	External	122	12.62	1.96	13.	Overall Academic Adjustment	Internal	246	31.81	4.56	0.23	366	.820	External	122	31.70	4.70								
3.	Conditional Knowledge	Internal	246	20.13	2.81	5.24	366	.000																																																																																																																																																							
		External	122	18.41	3.24				4.	Planning	Internal	246	28.53	3.68	6.97	366	.000	External	122	25.25	5.20	5.	Information Management	Internal	246	38.88	4.72	3.69	366	.000	External	122	36.92	5.00	6.	Monitoring	Internal	246	26.74	3.69	5.32	366	.000	External	122	24.47	4.17	7.	Debugging	Internal	246	19.28	3.04	2.05	366	.041	External	122	18.58	3.16	8.	Evaluation	Internal	246	23.69	3.40	5.11	366	.000	External	122	21.62	4.12	9.	Overall Metacognitive Awareness	Internal	246	202.60	19.58	6.87	366	.000	External	122	186.51	24.08	10.	Academic Life Style	Internal	246	8.70	2.30	4.02	366	.000	External	122	9.71	2.17	11.	Academic Achievement	Internal	246	10.70	2.35	4.89	366	.000	External	122	9.37	2.64	12.	Academic Motivation	Internal	246	12.42	2.07	0.91	366	.366	External	122	12.62	1.96	13.	Overall Academic Adjustment	Internal	246	31.81	4.56	0.23	366	.820	External	122	31.70	4.70																					
4.	Planning	Internal	246	28.53	3.68	6.97	366	.000																																																																																																																																																							
		External	122	25.25	5.20				5.	Information Management	Internal	246	38.88	4.72	3.69	366	.000	External	122	36.92	5.00	6.	Monitoring	Internal	246	26.74	3.69	5.32	366	.000	External	122	24.47	4.17	7.	Debugging	Internal	246	19.28	3.04	2.05	366	.041	External	122	18.58	3.16	8.	Evaluation	Internal	246	23.69	3.40	5.11	366	.000	External	122	21.62	4.12	9.	Overall Metacognitive Awareness	Internal	246	202.60	19.58	6.87	366	.000	External	122	186.51	24.08	10.	Academic Life Style	Internal	246	8.70	2.30	4.02	366	.000	External	122	9.71	2.17	11.	Academic Achievement	Internal	246	10.70	2.35	4.89	366	.000	External	122	9.37	2.64	12.	Academic Motivation	Internal	246	12.42	2.07	0.91	366	.366	External	122	12.62	1.96	13.	Overall Academic Adjustment	Internal	246	31.81	4.56	0.23	366	.820	External	122	31.70	4.70																																		
5.	Information Management	Internal	246	38.88	4.72	3.69	366	.000																																																																																																																																																							
		External	122	36.92	5.00				6.	Monitoring	Internal	246	26.74	3.69	5.32	366	.000	External	122	24.47	4.17	7.	Debugging	Internal	246	19.28	3.04	2.05	366	.041	External	122	18.58	3.16	8.	Evaluation	Internal	246	23.69	3.40	5.11	366	.000	External	122	21.62	4.12	9.	Overall Metacognitive Awareness	Internal	246	202.60	19.58	6.87	366	.000	External	122	186.51	24.08	10.	Academic Life Style	Internal	246	8.70	2.30	4.02	366	.000	External	122	9.71	2.17	11.	Academic Achievement	Internal	246	10.70	2.35	4.89	366	.000	External	122	9.37	2.64	12.	Academic Motivation	Internal	246	12.42	2.07	0.91	366	.366	External	122	12.62	1.96	13.	Overall Academic Adjustment	Internal	246	31.81	4.56	0.23	366	.820	External	122	31.70	4.70																																															
6.	Monitoring	Internal	246	26.74	3.69	5.32	366	.000																																																																																																																																																							
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of declarative knowledge and academic achievement ($r = .197, p = .023$), declarative knowledge and academic motivation ($r = .177, p = .042$), declarative knowledge and overall academic adjustment ($r = .203, p = .019$) along with procedural knowledge and overall academic adjustment ($r = .187, p = .031$) of the male participants with internal academic locus of control.

On the other hand, the results demonstrated that positive and significant correlations existed among the scores of declarative knowledge and academic achievement ($r = .243, p = .009$), planning and academic achievement ($r = .323, p = .000$), information management and academic achievement ($r = .252, p = .007$), overall metacognitive awareness and academic achievement ($r = .193, p = .040$) as well as declarative knowledge and overall academic adjustment ($r = .215, p = .022$) of the female participants with internal academic locus of control. Conversely, a negative and significant correlation was observed between the scores of evaluation and academic lifestyle ($r = -.208, p = .027$) of the female participants with internal academic locus of control. The positive and significant correlations existed among the scores of procedural knowledge and academic achievement ($r = .341, p = .007$) as well as monitoring and academic achievement ($r = .253, p = .049$) of the female participants with external academic locus of control.

Setting aside the impact of gender, there were positive and significant correlations among the scores of declarative knowledge and academic achievement ($r = .213, p = .001$), planning and academic achievement ($r = .238, p = .000$), information management and academic achievement ($r = .130, p = .042$), overall metacognitive awareness and academic achievement ($r = .163, p = .010$), declarative knowledge and academic motivation ($r = .156, p = .014$), declarative knowledge and overall academic adjustment ($r = .206, p = .001$), procedural knowledge and overall academic adjustment ($r = .141, p = .027$), planning and overall academic adjustment ($r = .127, p = .046$) and overall metacognitive awareness and overall academic adjustment ($r = .126, p = .049$) of the participants with internal academic locus of control. Conversely, a negative and significant correlation existed between the scores of evaluation and academic lifestyle ($r = -.123, p = .054$) of the participants with internal academic locus of control. Likewise, a positive and significant correlation existed between the scores of evaluation and academic achievement ($r = .184, p = .042$) of the participants with external academic locus of control.

The regression analyses were carried out assuming metacognition and its components as predictors and academic adjustment and its components as the criterion. Irrespective of gender, overall scores of declarative knowledge of the internals contributed 4.50%, 2.40% and 4.20% variance to the scores of the academic achievement ($R^2 = .045, F(1, 366) = 11.55, p = .001$), academic motivation ($R^2 = .024, F(1, 366) = 6.11, p = .014$) and overall academic adjustment ($R^2 = .042, F(1, 366) = 10.79, p = .001$) of the participants, respectively. The procedural knowledge contributed 2.00% variance in the scores of only overall

academic adjustment ($R^2 = .020, F(1, 366) = 4.96, p = .027$) of the internals. The planning component of metacognition contributed 5.60% and 1.60% variance to the scores of the academic achievement ($R^2 = .056, F(1, 366) = 14.59, p = .000$) and overall academic adjustment ($R^2 = .016, F(1, 366) = 4.03, p = .046$) of the internals, respectively. The information management contributed 1.70% variance in the scores of only academic achievement ($R^2 = .017, F(1, 366) = 4.17, p = .042$) of the internals. The evaluation contributed 1.50% variance in the scores of academic lifestyle ($R^2 = .015, F(1, 366) = 3.75, p = .054$) of the internals. The overall metacognitive awareness contributed 2.70% and 1.60% variance to the scores of academic achievement ($R^2 = .027, F(1, 366) = 6.70, p = .010$) and overall academic adjustment ($R^2 = .016, F(1, 366) = 3.93, p = .049$) of the internals, respectively. On the other hand, only evaluation component of metacognition contributed 3.40% variance in the scores of academic achievement ($R^2 = .034, F(1, 366) = 4.22, p = .042$) of the externals.

Discussion

The findings of the study demonstrated that internal and external academic locus of control denoted different cognitive and metacognitive structuring of the participants which, in turn, shaped their academic life style, academic achievement and academic motivation-the three parameters of academic adjustment-of the male and female participants. Further, the findings of the study evinced that the male and female participants with internal academic locus of control evoked higher mean scores on declarative knowledge, procedural knowledge, conditional knowledge, planning, information management, monitoring, debugging, evaluation and overall metacognitive awareness as compared to the externals. Likewise, the male and female participants with internal academic locus of control also exhibited higher mean scores on academic achievement measure as compared to their external counterparts whereas the male participants with external academic locus of control showed higher mean score on academic life style as compared to the internals. In essence, the internals exhibited significantly higher mean scores on majority of the dimensions of metacognition as compared to the externals irrespective of their gender. The findings of the study evinced that internal and external locus of control represent dissimilar metacognitive patterning with internals having better metacognitive awareness as compared to the externals which facilitated their academic adjustment. The previous findings have unequivocally reported that higher metacognitive awareness had positive correlations with internal academic locus of control which, in turn, facilitate performance on various indices (Arslan & Akin, 2014; Ghasemzadeh & Saadat, 2011; Jain, Tiwari, & Awasthi, 2017). The present series of results showed that internals and externals differed in the levels of their metacognitive awareness. These findings partially approved hypothesis 1 which conjectured that the mean scores of metacognitive awareness and academic adjustment of the participants

with internal academic locus of control will be higher as compared to the externals.

The differences in metacognitive structuring of the internals and externals were more pronounced in the correlational analyses which showed that there were positive and significant correlations among the scores of declarative knowledge and academic achievement, academic motivation and overall academic adjustment along with procedural knowledge and overall academic adjustment of the male participants with internal academic locus of control. On the other hand, the results also demonstrated positive and significant correlations among the scores of declarative knowledge and academic achievement, planning and academic achievement, information management and academic achievement, overall metacognitive awareness and academic achievement as well as declarative knowledge and overall academic adjustment of the female participants with internal academic locus of control. Irrespective of gender, the positive and significant correlations were observed among the scores of declarative knowledge, planning, information management, overall metacognitive awareness and academic achievement, declarative knowledge, academic motivation and overall academic adjustment, procedural knowledge, planning and overall academic adjustment, and overall metacognitive awareness and overall academic adjustment of the participants with internal academic locus of control. Previous studies have also reported facilitative role of metacognitive knowledge in performance of various sorts including academic adjustment (Al-Shinawi & Abdurrahman, 1994; Tiwari, 2015b). The findings demonstrated that external locus of control also carries some advantages regarding performance on some indices as compared to the internal locus of control. It was evinced by observed positive and significant correlations among the scores of procedural knowledge and academic achievement as well as monitoring and academic achievement of the female participants with external academic locus of control. Likewise, the positive and significant correlations existed between the scores of evaluation and academic achievement of the participants with external academic locus of control. These findings led to partially approve hypothesis 2 which presumed that the metacognition and its components will show positive correlations with academic adjustment of the internals and externals.

The metacognitive awareness evidently contributed to the various dimensions of academic adjustment of the participants. It was evident with the findings which corroborated that irrespective of gender, overall scores of declarative knowledge of the internals accounted for significant variance in the scores of the academic achievement, academic motivation and overall academic adjustment, the procedural knowledge to the overall academic adjustment, planning to academic achievement and overall academic adjustment, information management to academic achievement, the evaluation to academic lifestyle, and the overall metacognitive awareness to academic achievements and overall academic adjustment of the participants, respectively. Contrarily, only evaluation

component of metacognition contributed significantly to the academic achievement of the externals. The findings of regression analysis led also to approve partially hypothesis 3 which expected that the metacognition and its components will account for significant variance in the scores of academic adjustment of the internals and externals. Thus, it may be argued that the nature of academic locus of control (internal or external) seems to mediate the relationships of metacognitive awareness and academic adjustment of the students. In other words, the internals and externals have indicated to possess different kinds of metacognitive structuring and patterning which caused to achieve different levels of academic adjustment by the male and female participants.

The findings of the present study were supported by previous studies that have reported that metacognitive strategies shaped thinking and facilitated learning and academic performance (Jain et al., 2017; Swanson, 1990). The findings evinced that metacognition and academic locus of control played significant roles in shaping the nature and extent of the academic adjustment of the students. Previous researchers have found that locus of control shaped the metacognitive structuring of the participants and internal and external academic locus of control exhibited positive and negative correlations, respectively (Arslan & Akin, 2014). It was observed in the study that internals were more likely to adopt efficient metacognitive strategies as compared to the externals (Arslan & Akin, 2014). Similar observations were also evident in the previous studies which have shown that metamemory, an important component of metacognition, has significant implications for eyewitness memory performance (Tiwari, 2010a; Tiwari, 2010b; Tiwari, 2010c; Tiwari, 2011b; Tiwari, 2011c; Tiwari, 2011d; Tiwari, 2011e; Tiwari, 2012; Tiwari, 2013; Tiwari, 2015b).

Summary and Conclusions

The major conclusion of the study is that internal and external loci of control were associated with dissimilar nature and levels of metacognitive awareness and metacognitive structuring of the participants i.e., the internals carry higher metacognitive awareness. This higher metacognitive awareness of the internals facilitated their better performance on the academic adjustment measure. It was explicit in the findings of the study that the male and female participants with internal academic locus of control showed higher mean scores on declarative knowledge, procedural knowledge, conditional knowledge, planning, information management, monitoring, debugging, evaluation and overall metacognitive awareness as compared to their respective groups of externals. Likewise, the male and female participants with internal academic locus of control also demonstrated higher mean scores of academic achievement as compared to their external counterparts whereas the male participants with external academic locus of control showed higher mean scores on academic life style as compared to their respective groups of internals.

Directions for Future Researchers

The metacognitive awareness and academic locus of control constitute the motivational and self-system beliefs that have been successfully demonstrated to be associated with the academic performance and academic adjustment of the students. The future researchers may cross examine the findings of the study on different populations of students in terms of other variables. It has been argued that academic adjustment is not only determined by metacognitive awareness and locus of control but self-compassion (Verma & Tiwari, 2017a), personality structuring (Verma & Tiwari, 2017b), academic self-concept (Gujare & Tiwari, 2016b; Tiwari, 2011a), mental health symptoms (Gujare & Tiwari, 2016a) and emotional intelligence (Tiwari, 2016a) also contribute in shaping it. In addition, positive constructs like sustainable behaviors (Tiwari, 2016c), yogic practices (Tiwari, 2016b), positive body image (Jain & Tiwari, 2016a; Jain & Tiwari, 2016b; Tiwari & Kumar, 2015; Tiwari, 2014), emotion regulation (Tiwari, 2015a), self-forgiveness and life satisfaction (Mudgal & Tiwari, 2015; Mudgal & Tiwari, 2017) may also contribute to academic adjustment. The future researchers may involve the above mentioned variables to develop deeper understanding of the nature and dynamics of academic adjustment of the students. The future researchers may enhance their understanding by applying qualitative methods and mixed methods which will help to develop better understanding of the dynamics of academic adjustment. The future researchers may plan to carry out studies to uncover the basic metacognitive patterning of internals and externals with reference to cross-cultural populations of different developmental periods.

References

- Al-nabhan, M. (2001). Developing a tool to measure the satisfaction degree in educational faculty in Muta'a University. *Educational Research Center Journal*, 10(20), 101–145.
- Al-Shinawi, M., & Abdurrahman, M. (1994). *Relationship between social support and personality domains, self-evaluation and adjustment in university*. Cairo: Anglo-Egypt Press.
- Anderson, A., Hattie, J., & Hamilton, R. (2005). Locus of control, self-efficacy, and motivation in different schools: Is moderation the key to success? *Educational Psychology*, 25(5), 517–535.
- Anderson, J. R., Guan, Y., & Koc, Y. (2016). The academic adjustment scale: Measuring the adjustment of permanent resident or sojourner students. *International Journal of Intercultural Relations*, 54, 68–76.
- Arslan, S., & Akin, A. (2014). Metacognition: As a predictor of one's academic locus of control. *Educational Sciences: Theory and Practice*, 14(1), 33–39.
- Artzt, A., & Armour-Thomas, E. (1992). Development of a cognitive-metacognitive framework for protocol analysis of mathematical problem solving in small groups. *Cognition and Instruction*, 9, 137–175.
- Baker, L. (1989). Metacognition, comprehension monitoring, and the adult reader. *Educational Psychology Review*, 1, 3–38.
- Baker, R. W., & Siryk, M. A. (1999). *SACQ: student adaptation to college questionnaire manual*. Los Angeles, CA: Western Psychological Services.
- Bandura, A. (1989). Human agency in social cognitive theory. *Am Psychol*, 44(9), 1175–1184. doi: 10.1037/0003-066X.44.9.1175
- Bergan, J. (1990). Contributions of instructional psychology to school psychology. In: Gutkin, T. B., Reynolds, C. R. (Eds.), *The handbook of school psychology* (pp. 126–142). New York: John Wiley & Sons.
- Brown, A. L. (1987). Metacognition, executive control, self-regulation, and other more mysterious mechanisms. In: F. E. Weinert & R. H. Kluwe (Eds.), *Metacognition, motivation, and understanding* (pp. 65–116). Hillsdale, NJ: Lawrence Erlbaum.
- Butterfield, E. C., Nelson, T. O., & Peck, V. (1988). Developmental aspects of the feeling of knowing. *Developmental Psychology*, 24(5), 654–663.
- Cazan, A. M. (2012). Self regulated learning strategies – predictors of academic adjustment. *Procedia-Social and Behavioral Sciences*, 33, 104–108.
- Corno, L., Collins, K., & Capper, J. (1982, March). Where there's a way there's a will: Self-regulating the low-achieving student, Paper presented at the annual meeting of the American Educational Research Association, New York, NY.
- Flavell, J. H. (1987). Speculations about the nature and development of metacognition. In: F. E. Weinert & R. H. Kluwe (Eds.), *Metacognition, Motivation and Understanding* (pp. 21–29). Hillside, New Jersey: Lawrence Erlbaum Associates.
- Ghasemzadeh, A., & Saadat, M. (2011). Locus of control in Iranian university Student and its relationship with academic achievement. *Procedia – Social and Behavioral Sciences*, 30, 2491–2496.
- Goldsmith, A. H., Veum, J. R., & Darity, W. Jr. (2000). Motivation and labor market outcomes. In: S. Polachek & K. Tatsiramos (Eds.), *Research in Labor Economics* (pp. 109–146). Emerald Group Publishing Limited. doi: 10.1016/S0147-9121(00)19006-5
- Grote, G. F., & James, L. R. (1991). Testing behavioral consistency and coherence with the situation-response measure of achievement motivation. *Multivariate Behavioral Research*, 26, 655–691.
- Gujare, S. K., & Tiwari, G. K. (2016a). Mental health symptoms predict academic achievement of the female students. *The International Journal of Indian Psychology*, Volume 4, Issue 1, No.76, 93–111.
- Gujare, S. K., & Tiwari, G. K. (2016b). Academic self-concept and academic outcome of the graduate students: The mediating role of socioeconomic status and gender. *International Journal of Education and Psychological Research*, 4(5), 1–7.
- Harrison, C. (1991). Metacognition and motivation. *Reading Improvement*, 28(1), 35–39.
- Jacobs, J. E., & Paris, S. G. (1987). Children's metacognition about reading: Issues in definition, measurement, and instruction. *Educational Psychologist*, 22(3–4), 255–278.
- Jain, D., Tiwari, G. K., & Awasthi, I. D. (2017). Impact of Metacognitive Awareness on Academic Adjustment and Academic Outcome of the Students. *International Journal of Indian Psychology*, 5(1), 123–138. doi: 10.25215/0501.034
- Jain, P., & Tiwari, G. K. (2016a). Body image satisfaction and Life Satisfaction in HIV/AIDS patients. *The International Journal of Indian Psychology*, Vol. 3, Issue 2, No. 1, 81–90.
- Jain, P., & Tiwari, G. K. (2016b). Positive body image and general health: A Mixed Methods Study. *The International Journal of Indian Psychology*, Vol. 4, Issue 1, No. 76, 33–51.
- Johnson, M. K., Kounios, J., & Reeder, J. A. (1994). Time course studies of reality monitoring and recognition. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 20(6), 1409–1419.
- Metcalf, J. (1996). Metacognitive processes. In: E. L. Bjork & R. A. Bjork (Eds.), *Memory: Handbook of perception and cognition* (pp. 381–407). San Diego, CA: Academic Press.
- Mudgal, S., & Tiwari, G. K. (2015). Self-Forgiveness and Life Satisfaction in People Living with HIV/AIDS. *The International Journal of Indian Psychology*, Vol. 3, Issue 1, No. 10, 101–108.
- Mudgal, S., & Tiwari, G. K. (2017). High level of self-forgiveness facilitates quality of life in males and females. *Vaichariki-A Multidisciplinary Refereed International Research Journal*, 8(3), 154–166.
- Nelson, T. O., Gerler, D., & Narens, L. (1984). Accuracy of feeling-of-knowing judgments for predicting perceptual identification and relearning. *Journal of Experimental Psychology: General*, 113(2), 282–300.
- Pansky, A., Koriati, A., & Goldsmith, M. (2005). Eyewitness recall and testimony. In: N. Brewer & K. D. Williams (Ed.), *Psychology and law: An empirical perspective* (pp. 93–150). New York: Guilford Press.
- 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.

- Rahman, F. U., Jumani, N. B., Chaudry, M. A., Chisti, S. U. H., & Abbasi, F. (2010). Impact of metacognitive awareness on performance of students in chemistry. *Contemporary Issues in Education Research*, 3(10), 39–44.
- Rosenbaum, M. (1980). A schedule for assessing self-control behaviors: Preliminary findings. *Behavior Therapy*, 11, 109–121. doi: 10.1016/S0005-7894(80)80040-2
- Rotter, J. B. (1966). Generalized expectancies for internal versus external control of reinforcement. *Psychological Monographs*, 80, 1–28.
- Rotter, J. B. (1971). *Clinical Psychology* (2nd Ed.). Englewood Cliffs, NJ: Prentice Hall.
- Saldern, M. (1992). *Social climate in the classroom: Theoretical and methodological aspects*. NY: Waxmann studies.
- Schraw, G., & Dennison, R. S. (1994). Assessing metacognitive awareness. *Contemporary Educational Psychology*, 19(4), 460–475.
- Schwarz, N. (2004). Meta-cognitive experiences in consumer judgment and decision making. *Journal of Consumer Psychology*, 14(4), 332–348.
- Shimamura, A. P. (2000). Toward a cognitive neuroscience of metacognition. *Consciousness and Cognition*, 9(2), 313–323.
- Skinner, E. A. (1996). A guide to constructs of control. *J Pers Soc Psychol*, 71(3), 549–570. doi: 10.1037/0022-3514.71.3.549
- Swanson, H. L. (1990). Influence of metacognitive knowledge and aptitude on problem solving. *Journal of Educational Psychology*, 82(2), 306–314.
- Tiwari, G. K. (2010a). Personality and recall accuracy of witnessed events. *Perspectives in Psychological Researches*, 33(1), 225–231.
- Tiwari, G. K. (2010b). Personality differences in source-monitoring of witnessed details. *Anusilana*, XXXIX, 65–70.
- Tiwari, G. K. (2010c). Research in eyewitness memory: Issues and challenges. *Jigyasa*, III(4), 66–71.
- Tiwari, G. K. (2011a). Academic self-esteem, feedback and adolescents' academic achievement. *Anusilana*, XXXVII, 15–22.
- Tiwari, G. K. (2011b). Arousal differences in recall and source-monitoring accuracy of witnessed events. *Indian Journal of Social Science Researches*, 8(1–2), 29–35.
- Tiwari, G. K. (2011c). Personality and metamemory judgements in witnessed events. *United Journal of Awadh Scholars*, 5(2), 23–30.
- Tiwari, G. K. (2011d). Stress and human performance. *Indo-Indian Journal of Social Science Researches*, 7(1), 40–49.
- Tiwari, G. K. (2011e). The eyewitness suggestibility effect and source-attribution. *Jigyasa*, IV(1), 413–418.
- Tiwari, G. K. (2012). The misinformation effect and fate of witnessed minutiae. *Indian Journal of Community Psychology*, 8(1), 134–142.
- Tiwari, G. K. (2013). Emotional suppression and eyewitness memory. *JIGYASA*, VI(4), 196–203.
- Tiwari, G. K. (2014). Body image satisfaction enhances self-esteem. *VAICHARIKI*, IV(4), 7–11.
- Tiwari, G. K. (2015a). Chronic Physical Illness Affects Emotion Regulation Process: A Case of HIV/AIDS. *The International Journal of Indian Psychology*, Vol. 3, Issue 1, No. 8, 158–166.
- Tiwari, G. K. (2015b). Does judgement of learning predict accuracy of recall during emotional arousal? *Madhya Bharati*, 68(1), 175–190.
- Tiwari, G. K. (2016a). Mediating role of emotional intelligence in academic achievement of the graduate students. *The International Journal of Indian Psychology*, Vol. 4, Issue 1, No. 74, 49–59.
- Tiwari, G. K. (2016b). Yoga and mental health: An Underexplored relationship. *The International Journal of Indian Psychology*, Volume 4, Issue 1, No. 76, 19–31.
- Tiwari, G. K. (2016c). Sustainable Behaviors and happiness: An Optimistic Link. *The International Journal of Indian Psychology*, Vol. 4, Issue 1, No. 75, 127–136.
- Tiwari, G. K., & Kumar, S. (2015). Psychology and body image: A review. *Shodh Prerak*, 5(1), 1–9.
- Trice, A. D. (1985). An academic locus of control scale for college students. *Perceptual and Motor Skills*, 61, 1043–1046.
- Verma, Y., & Tiwari, G. K. (2017a). Self-Compassion as the Predictor of Flourishing of the Students. *The International Journal of Indian Psychology*, Vol. 4, Issue 3, 10–29.
- Verma, Y., & Tiwari, G. K. (2017b). Relative dominance of Sattva and Tamas Gunas (qualities) makes a difference in self-compassion and human flourishing. *International Journal of Education and Psychological Research*, Vol. 6, Issue 2, 67–74.
- Winman, A., & Juslin, P. (2005). "I'm m/n confident that I'm correct": Confidence in foresight and hindsight as a sampling probability. In: K. Fiedler and P. Juslin (Eds.), *Information sampling and adaptive cognition*. Cambridge, UK: Cambridge University Press.