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An Integrated Web Model Study of Behavioral, Emotional and Cognitive Engagement Factors Affecting the Academic Performance of High School Students through their Multidimensional Engagement in Learning Milieu: A Study of South Punjab, Pakistan

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Abstract:
The present study examines the integrated web model relationship between factors related with tripartite engagement dimensions and students' academic performance through their multidimensional engagement in learning milieu. A sample size of N=2758 high school students was selected from South Punjab, Pakistan. The bivariate statistical regression analysis revealed that cognitive engagement factors produce highest variance in students' academic performance, behavioral engagement and cognitive engagement. Additionally, students overall engagement and cognitive induction produce highest variance in their academic performance. In multivariate hierarchical linear regression modeling, it was evident that cognitive engagement factors have highest influence on students' academic performance while emotional integration factors produce highest variance in their multidimensional engagement levels. Results also indicated that students' overall engagement mediated the relationship between tripartite model of students' engagement factors and their academic performance.

Keywords: Behavioral Engagement, Emotional Engagement, Cognitive Engagement, Agentic Engagement, Learning Milieu, Academic Performance, Web Model, High School

I. Introduction

For decades, social scientists, educationists and researchers have been investigating Student Engagement (SE) in learning milieu and their resulting Academic

Performance (AP) in exams (Ladd & Dinella, 2009; Li et al., 2010). These two integrated constructs were highlighted due to increased failure rates, school dropouts, poor standardized test scores, behavioral distractions, emotional disengagement and mental inconsistencies of students during their high school era (Appleton et al., 2006). These empirical evidences also depicted that SE includes students' motivational states such as "attachment" "thoughtfulness" "partaking" "affection" and "participation" which acted as predictor, mediator and response variables in unison (Green et al., 2012; McNeely & Falci, 2004).

According to the preceding empirical evidences of Fredericks et al. (2004), SE is a meta-construct that comprises of tripartite dimensions, i.e. Behavioral Engagement (BE), Emotional Engagement (EE) and Cognitive Engagement (CE). Relating this, BE represents school participation, task-attention, homework completion and evasion of unethical behavior among high school students (Green et al., 2007) while EE forms a dyed model (BE-EE) which mainly comprises of interest, enjoyment, emotions, persistence and enthusiasm of students to avoid disaffection, boredom and school withdrawal (Skinner et al., 2008). Afterwards, CE was added which reflects students' mental efforts, cognitive restructuring and learning outcomes among high school students (Cadwallander et al., 2002; Skinner et al., 2009a). In the later years, this tripartite dimension was converted into spiral model with the addition of fourth aspect i.e. Agentic Engagement (AE). It mainly represents students' proactive learning commitment, input propositions for future knowledge aspirations, classroom betterment, background knowledge and abstract conceptualizations (Reeve & Tseng, 2011).

Although interest in SE becomes the central and debating point over the past few years due to its vague conceptualization in terms of quality, intensity and direction (Russell et al., 2005). But, to illustrate the distinction, the major point is to measure students' academic outcomes through their motivational aspects, success in exams, grades attained and academic productivity (Guthrie et al., 2000; Reeve et al. 2004). In consensus, it is believed that students who concentrate on the learning process, adhere to school rules and become emotionally attached to academics generally have higher academic outcomes (Wang & Holcombe, 2010). Henceforth, a recent innovation and novelty designated that AP of students cannot be measured without comprehending students' success in academics (Yonezawa et al., 2009).

In context of Pakistan, there is a dearth of empirical and authenticated data on the said constructs which leads towards issues of empirical generalizations [Pakistan Economic Survey (PES), 2010-2011]. In addition, the integrated web model approach (SE-AP) was not discussed in the previous literature. Furthermore, the weak theoretical and conceptual details regarding quality indicators, accurate conceptualization, authenticated instrument usage, and empirical methodology become the major concern to address this academic phenomenon (Farooq et al., 2011; Mushtaq & Khan, 2012). To address these study gaps, it is hypothesized that factors related with tripartite SE dimensions (BE-EE-CE) becomes the major predictors of students' academic outcomes (SE-AP). Moreover, SE along with its dimensions mediates the relationship between tripartite engagement dimensions and their AP in unanimity (Attawood & Croll, 2006; Wentzel et al. 2004).

II. Theoretical Framework and Hypothetical Model Construction

A. Self-determination theory

Preceding theoretical explanations of Self-Determination Theory (SDT) spotlighted that students sometimes show disillusionment, lack of self-motivation and inadequate classroom affections. These academic disengagements result in lack of concentration, inadequate grades attainment and poor performance in exams (Reeve et al., 2004). Therefore, classroom context interferes with students internal motivational conditions (such as behavioral, emotional and cognitive engagement) which directly affect their academic outcomes (Ryan & Deci, 2000). Moreover, the theory assumes that external factors such as rewards, punishments, school context, grade attainment and academic productivity triggers higher academic outcomes due to SE in studies. The nucleus of the theory spotlighted that all the students regardless of their background factors have certain stimulating predictors that academically engaged them towards studies and increases their performance in exams (Ryan & Deci, 2002). The theory is unique as it targeted the major behavioral conducts, emotional states and mental exertions of students towards academic outcomes (Ryan & Patrick, 2001).

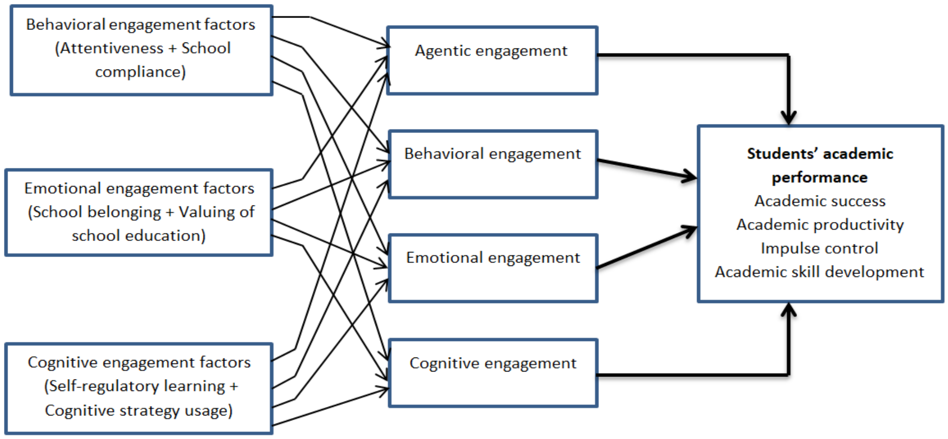
B. Motivational and participation identification models

Motivational models focuses on internal and external motivation of the students in school context. This motivation is influenced by students' background characteristics, academic domain, contextual factors and achievement stimulus which become the central hub for their future academic achievement (Furlong & Christenson, 2008). Afterwards, "Participation-Identification Model" developed by Finn (1989) focused on students identification with school and their resultant participation in academics. These two factors are scrutinize by these theories i.e. students' commitment and dedication towards learning process along with their role reinforcement in the specific context (Fredericks et al., 2004).

C. The Present Study

Previous academic literature is silent about the conversion of interactive and integrative linear relationship between the integrated variables [Tripartite ENG factors-ENG-AP] in a convoluted web (Ladd & Dinella, 2009). These prior laps indicated that underprivileged geographical regions of Pakistan in general and Southern Punjab in particular have poor students' performance due to behavioral misconduct, emotional disequilibrium and mental impairments (Wang & Holcombe, 2010). To address these research gaps, the major rationale of the present study was to assess behavioral, emotional and cognitive engagement factors as the major predictors of students' academic outcomes (SE-AP). Henceforth, there are threefold goals of this present study. Firstly, to find out the relationship of predictors related with tripartite engagement dimensions (BE-EE-CE) with students' AP through their engagement in studies (along with dimensions). Secondly, to study the relationship conversion of a linear model into convoluted integrated web through multiple dimensions of SE. Thirdly, to find out the variance produced by each predicting variable with addition of succeeding constructs. Based on these empirical facts, a hypothetical integrated model (see Figure I) is constructed in the present research study.

Figure 1: Hypothetical model depicting the relationship of students' engagement factors with their academic performance through their multidimensional engagement



III. Methods and Materials

The school structural pathology indicated that there are 28,664 high schools in Pakistan with second highest dropouts rates i.e. 5.1 million globally [Pakistan Economic Survey (PES), 2011-2012]. Keeping in consideration these pathological conditions, the first author designed this research as a part of her PhD dissertation. The ethical approval was given by the Institutional Review Board (IRB) of Institute of Social and Cultural Studies (ISCS), University of the Punjab, Lahore.

A. Participants and Procedure

A total of 2758 students (1753 male students and 1005 female students) participated in the study from n=347 affiliated high schools from Board of Intermediate and Secondary Education (BISE) of study locale. As per selection criterion, the selected participants who underwent the last annual examination of 8th or 9th grade and currently enrolled for one month/more in 9th or 10th grade were targeted.

As a part of regularly scheduled study hall, students filled the consent letter at the beginning of class time (period). In order to ensure likelihood, generalizability and precision of the data collection, we used multistage sampling technique (multiple step-wise order sampling). From the list of affiliated schools from BISE, the sample is derived through proportionate sampling procedure. Out of N_1=1083, N_2=778, N_3=836 registered high schools of Multan, Dera Ghazi (DG) Khan and Bahawalpur divisions respectively, a proportionate of n_1=135, n_2=103, n_3=109 schools were selected respectively.

Selection of schools was tracked by the selection of class section from each grade i.e. A, B and C in general. Afterwards, participants were selected from an average Pupil Teacher Ratio (PTR) in 9th and 10th grades, i.e. PTR: 31. Therefore, the total population of these selected grades based on 3 class sections on an average=6 sections/2 classes=246636 high school students. This average population was obtained from PTR with 3 sections and the total number of affiliated schools from BISE. Therefore, average population from 9th and 10th grades was 4932272 students from the study vicinity. Based on above-mentioned criterion for population estimation, the students from affiliated schools were estimated to be 32271x2=64542 students.

B. Measures

Participants self-reported their classroom engagement through various predicting factors such as Attentiveness (ATN), School Compliance (SC), School Belonging (SB), Valuing of School Education (VSE), Self-Regulatory Learning (SRL) and Cognitive Strategy Usage (CSU). They related these interactional factors with students' AP based on homework completion, memorizing, Academic Success (AS), Academic Productivity (APro), Impulse Control (IC) and Academic Skill Development (ASD) in exams. For this purpose, we divided the instrument in four major sections i.e. 1) Demographics 2) Independent variables (Predictors of BE-EE-CE) 3) Mediation variables (SE along with multidimensional aspects i.e. AE-BE-EE-CE) and 4) Response variable (AP through their AS, APro, IC and ASD).

For measurement of demographic variables, we used questions of sex, family type, family size, parental education, household head and geographical division. Afterwards, Behavioral Engagement Factors (BEF) were measured through two major subscales i.e. ATN and SC. In recent research of Wang et al. (2011), these two subscales represent students' acquiescence towards behavioral acts, negation from deviancy, compliance towards school rules, and fitting together with normative behavioral conducts in schools. Relating this, Emotional Engagement Factors (EEF) were measured through SB and VSE (see the relevant subscales of Eccles et al., 1993). These meta-constructs refer to students' enthusiasm, feelings, emotions, boredom, anxiety, happiness, attachment, belonging and isolation from the process of learning and instruction at the high school level. Afterwards, Cognitive Engagement Factors (CEF) refers to students' usage of mental abilities to master their art of learning which were measured through SRL and CSU (Wang & Eccles, 2013; Zimmer-Gembeck et al., 2006).

Subsequently, SE was used as a uniquely constructed variable that have multiple characteristics of predictor, mediator and response variables. We used four major dimensions of SE i.e. AE, BE, EE and CE. The coding scale ranges from 7 points i.e. "strongly disagree" to "strongly agree" (see Daly et al., 2009) with Cronbach's alpha values of 0.82, 0.94, 0.78 and 0.88 respectively (Jang, 2009; Reeve & Tseng, 2011).

In the subsequent section, we used Academic Performance Rating Scale (APRS) to assess the students' AP in high schools through wide-ranging, empirical indicators such as AS, APro, IC and ASD (Rosenshine, 1981). The scale is considered to be reliable as the Khappa value is 0.74 and internal consistency of the scale is presented through value of Cronbach's α=0.95.

C. Data Analysis

The data was analyzed by using SPSS (Version-21) for coding, transforming and recoding the variables in the data sheet. Firstly, the researchers used frequency and percentage for evaluating the demographics of the respondents. Afterwards, the relationship between predictor, mediator and response variables were evaluated via path models i.e. Path A: predictor (BEF+EEF+CEF)→response(AP), Path B: predictor (BEF+EEF+CEF)→mediator(SOE=AE+BE+EE+CE), and Path C: mediator (SOE=AE+BE+EE+CE)→response (AP) through simple linear regression analysis.

Simple linear regression analysis was then followed by hierarchical linear regression in which each independent variable is added one by one in subsequent models through forward step-wise method. We used this regression type as the objective of the study demanded the contribution of each independent variable and variance produced in remaining variables. The regression type was also checked with the same predicting path models i.e. Model-1: BEF (ATN+SC), Model-2: BEF (ATN+SC), EEF (SB+VSE), Model-3: BEF (ATN+SC), EEF (SB+VSE), CEF (SRL+CSU). Lastly, based on the linear regression models, Sobel test was used to assess the mediation analysis between the mentioned variables. The mediation variable was then checked through cumulative combination of differential dimensions of SE i.e. AE, BE, EE and CE. Moreover, these predictors and response variables were also checked with the segregated dimensions of AE, BE, EE and CE as mediation variables.

IV. Results

A. Demographic Statistics

A total of N=2758 high school students was used in the recent study. The sex ratio indicated that 1753 participants (63.6%) were male students while 1005 participants (36.4%) were female students. In approximation, 1077 participants (39.1%) have an average family size of 5-10 members and 1099 participants (39.9%) belonged to extended family size. The discussed locality has highest prevalence of secondary education among fathers i.e. N=735 (26.6%) and tertiary education among mothers N=791 (28.7%). The gender segregation is also evident when 1578 participants (57.2%) have father as the head of household while 940 participants (34.1%) have any other male as head of household (from social network from kinship). The geographical division also illustrated that N=1095 (39.7%) participants' belonged to Multan division while N=860 (31.2%) belonged to Bahawalpur division.

B. Simple Linear Regression

The results of the present analysis depicted that self-regulation and control over cognitive conceptualizations produces highest variance in students' AP i.e. CEF=SRL+CSU→AP: R2=72.7%, p=0.000<.001 (Path A: Table-1). Afterwards, SB and VSE produced highest variance in SOE i.e. EEF=SB+VSE→SOE: R2=90.4%, p=0.000<.001 and AE i.e. EEF=SB+VSE→AE: R2=91.3%, p=0.000<.001. The relevance also indicated that students mental efforts towards the process of learning (CEF i.e. SRL and CSU) becomes the highest variance producing factors for students' behavioral compliance towards school rules and avoidance of deviant behavior towards studies i.e. CEF=SRL+CSU→BE: R2=74.9%, p=0.000<.001 and CE i.e. CEF=SRL+CSU→CE: R2=82.6%, p=0.000<.001. Unfolding this fact, ATN and SC produces highest variance in students' emotional integration towards academics i.e. BEF=ATN+SC→EE: R2=79.5%, p=0.000<.001 (see Path B: Table-1). The third way directional models i.e. path C in the convoluted web empirically demonstrated that students who have higher academic productivity and success in exams (either through grades attained or academic skills) are more engaged in their studies i.e. SOE=SAE+SBE+SEE+SCE→AP: R2=99.1%, p=0.000<.001.

Table 1: Simple linear regression between behavioral, emotional and cognitive engagement predictors with students' academic performance through their overall engagement in studies and differential engagement dimensions (N=2758)

Behavioral, emotional and cognitive engagement predictors with AP of students' (Path A)								Behavioral, emotional and cognitive engagement predictors with SOE (Path Bi)							
Predictors	**Variable usage**	**R2**	**F**	**Std. β**	**t**	***p***	**Sig. level**	**Predictors**	**Variable usage**	**R2**	**F**	**Std. β**	**t**	***p***	**Sig. level**
BEF	ATN, SC	.416	43.497	.125	6.595	.000	<.01	BEF	ATN, SC	.501	38.298	.317	4.558	.000	<.01
EEF	SB, VSE	.687	57.989	.294	5.198	.000	<.001	EEF	SB, VSE	.904	96.523	.951	5.834	.000	<.001
CEF	SRL, CSU	.727	18.827	.082	4.339	.000	<.001	CEF	SRL, CSU	.528	80.317	.168	8.962	.000	<.001
Behavioral, emotional and cognitive engagement predictors with AE (Path Bii)								**Behavioral, emotional and cognitive engagement predictors with BE (Path Biii)**							
BEF	ATN, SC	.501	38.298	.317	4.558	.000	<.01	BEF	ATN, SC	.474	28.307	.271	4.788	.000	<.001
EEF	SB, VSE	.913	96.523	.951	5.834	.000	<.001	EEF	SB, VSE	.705	18.039	.852	5.331	.000	<.001
CEF	SRL, CSU	.528	80.317	.168	8.962	.000	<.001	CEF	SRL, CSU	.749	15.663	.221	2.910	.000	<.001
Behavioral, emotional and cognitive engagement predictors with EE (Path Biv)								**Behavioral, emotional and cognitive engagement predictors with CE (Path Bv)**							
BEF	ATN, SC	.795	12.847	.380	2.597	.000	<.001	BEF	ATN, SC	.353	75.025	.231	2.454	.000	<.01
EEF	SB, VSE	.757	21.791	.870	2.728	.000	<.001	EEF	SB, VSE	.799	29.161	.866	9.742	.000	<.001
CEF	SRL, CSU	.371	26.602	.285	5.614	.000	<.001	CEF	SRL, CSU	.826	74.040	.162	8.605	.000	<.001

Notes: AP=Academic Performance, SOE=Students' Overall Engagement, Std. β stands for standardized coefficient, R2=Coefficient of determination, AE=Agentic Engagement, BE=Behavioral Engagement, EE=Emotional Engagement, CE=Cognitive Engagement, BEF=Behavioral Engagement Factors, EEF=Emotional Engagement Factors, CEF=Cognitive Engagement Factors, ATN=Attentiveness, SC=School Compliance, SB=School Belonging, VSE=Valuing of School Education, SRL=Self-Regulatory Learning, CSU=Cognitive Strategy Usag

Table 2: Hierarchical linear regression modeling through forward stepwise method (N=2758)

Behavioral, emotional and cognitive engagement predictors with students AP (Path A)							Behavioral, emotional and cognitive engagement predictors with SOE (Path B-i)						
Predictors	**Variables used**	**Std. β**	***p***	**Sig. of variable**	**F value, *p* value**	**Sig. of model**	**Predictors**	**Variables used**	**Std. β**	***p***	**Sig. of variable**	**F value, *p* value**	**Sig. of model**
BEF	ATN+SC	.478	.000	<.001	47.228, *p*=0.000	<.001	BEF	ATN+SC	.373	.000	<.001	52.005, *p*=0.000	<.001
BEF EEF	ATN+SC SB+VSE	.440 .633	.049 .000	<.01 <.001	52.049, *p*=0.000	<.01	BEF EEF	ATN+SC SB+VSE	.450 .851	.002 .000	<.01 <.001	43.832, *p*=0.000	<.001
BEF EEF CEF	ATN+SC SB+VSE SRL+CSU	.488 .728 .817	.000 .000 .000	<.001 <.001 <.001	51.046, *p*=0.000	<.001	BEF EEF CEF	ATN+SC SB+VSE SRL+CSU	.581 .736 .627	.000 .000 .000	<.001 <.001 <.001	36.623, *p*=0.000	<.001
Behavioral, emotional and cognitive engagement predictors with students' AE (Path B-ii)							**Behavioral, emotional and cognitive engagement predictors with students BE (Path B-iii)**						
BEF	ATN+SC	.440	.000	<.001	15.369, *p*=0.000	<.01	BEF	ATN+SC	.638	.000	<.001	28.387, *p*=0.000	<.001
BEF EEF	ATN+SC SB+VSE	.537 .870	.001 .000	<.001 <.001	60.471, *p*=0.000	<.001	BEF EEF	ATN+SC SB+VSE	.666 .845	.000 .000	<.001 <.001	23.791, *p*=0.000	<.001
BEF EEF CEF	ATN+SC SB+VSE SRL+CSU	.614 .386 .767	.000 .000 .000	<.01 <.001 <.001	39.223, *p*=0.000	<.001	BEF EEF CEF	ATN+SC SB+VSE SRL+CSU	.662 .836 .327	.000 .000 .000	<.001 <.001 <.001	26.647, *p*=0.000	<.001
Behavioral, emotional and cognitive engagement predictors with students EE (Path B-iv)							**Behavioral, emotional and cognitive engagement predictors with students CE (Path B-v)**						
BEF	ATN+SC	.481	.000	<.001	30.945, *p*=0.000	<.001	BEF	ATN+SC	.190	.000	<.001	32.386, *p*=0.000	<.001
BEF EEF	ATN+SC SB+VSE	.483 .877	.008 .000	<.001 <.001	30.786. *p*=0.000	<.01	BEF EEF	ATN+SC SB+VSE	.187 .870	.000 .000	<.001	29.324, *p*=0.000	<.001
BEF EEF CEF	ATN+SC SB+VSE SRL+CSU	.646 .846 .342	.004 .000 .010	<.001 <.001 <.001	31.658, *p*=0.000	<.001	BEF EEF CEF	ATN+SC SB+VSE SRL+CSU	.386 .670 .741	.000 .000 .001	<.001 <.001 <.001	31.385, *p*=0.000	<.001

Table 3: Mediation analysis between behavioral, emotional and cognitive engagement predictors with students' academic performance through their multidimensional engagement in learning milieu (N=2758)

Behavioral engagement factors and its relationship with students' AP through multidimensional engagement in learning milieu						
BEF→AE	0.174<.001	AE→AP	0.215<.001	0.179<.001	BEF→AP by CMV with AE	Mediation
BEF→BE	0.360<.001	BE→AP	0.127<.001		BEF→AP by CMV with BE	Mediation
BEF→ EE	0.323<.001	EE→AP	0.235<.001		BEF→AP by CMV with EE	Mediation
BEF→CE	0.286<.001	CE→AP	0.602<.001		BEF→AP by CMV with CE	Mediation
BEF→SOE	0.371<.001	SOE→AP	0.642<.001		BEF→AP by CMV with SOE	Mediation

Emotional engagement factors and its relationship with students' AP through multidimensional engagement in learning milieu						
EEF→AE	0.869<.001	AE→AP	0.215<.001	0.334<.001	EEF→AP by CMV with AE	Mediation
EEF→BE	0.845<.001	BE→AP	0.127<.001		EEF→AP by CMV with BE	Mediation
EEF→ EE	0.877<.001	EE→AP	0.235<.001		EEF→AP by CMV with EE	Mediation
EEF→CE	0.870<.001	CE→AP	0.602<.001		EEF→AP by CMV with CE	Mediation
EEF→SOE	0.952<.001	SOE→AP	0.642<.001		EEF→AP by CMV with SOE	Mediation
Cognitive engagement factors and its relationship with students' AP through multidimensional engagement in learning milieu						
CEF→AE	0.254<.001	AE→AP	0.215<.001	0.223<.001	CEF→AP by CMV with AE	Mediation
CEF→BE	0.009 Ns	BE→AP	0.127<.001		CEF→AP by CMV with BE	No mediation
CEF→ EE	0.232<.01	EE→AP	0.235<.001		CEF→AP by CMV with EE	Mediation
CEF→CE	0.341<.001	CE→AP	0.602<.001		CEF→AP by CMV with CE	Mediation
CEF→SOE	0.461<.001	SOE→AP	0.642<.001		CEF→AP by CMV with SOE	Mediation

Notes: CMV=Controlling Mediation Variable, Ns=Not significant, BEF=Behavioral engagement factors, EEF=Emotional engagement factors, CEF=Cognitive engagement factors

Table 4: Hierarchical linear regression between students' engagement (along with dimensions) in studies with their academic performance (N=2758)

Predictors	Std. B	*p* of variable	Sig. of variable	*F* of Model	*p* of model	Sig. of model
Relationship between multidimensional aspects of SE and their AP (Path C)						
AE	.245	.000	<.001	17.465	0.000	<.001
AE	.378	.000	<.001	78.444	0.009	<.001
BE	.309	.000	<.001			
AE	.207	.000	<.001	64.329	0.009	<.001
BE	.495	.009	<.001			
EE	.778	.000	<.001			
AE	.471	.000	<.001	88.565	0.000	<.001
BE	.535	.000	<.001			
EE	.782	.000	<.001			
CE	.849	.000	<.001			

B. Hierarchical Linear Regression Modeling (Path-A and Path-B)

In compliance with our hypothetical statements, it is evident that BEF (ATN+SC) is the significant predictor for students' performance in academics i.e. BEF=ATN+SC→AP: Std. β=.478, p=0.000<.001. In extension, differential factors related with emotional attachment and behavioral compliance acts decreases the magnitude of school compliance acts to some folds i.e. BEF=ATN+SC→AP: Std. β=.440, p=0.049<.01; EEF=SB+VSE→AP: Std. β=.633, p=0.000<.001. The third model induces factors related with students' CE and emotional integration. This addition demonstrated that although CEF becomes the significant predictor for students' AP i.e. CEF=SRL+CSU→AP: Std. β=.817, p=0.000<.001, but it also increases the influential power of BEF and EEF in determining students' AP as compared to previous models (see Path A-Table-2).

Afterwards, we used SOE along with its multiple dimensions i.e. AE, BE, EE and CE as the response variables for fulfilling the hypothetical statements of the said convoluted web. As evident from the results, when predictors of EE were added i.e. EEF=SB+VSE→AP: Std. β=.851, p=0.000<.001 in addition to ATN and SC, then magnitude of BEF increases i.e. BEF=ATN+SC→SOE: Std. β=.450, p=0.002<.01 in comparison with previous model. It also illustrates that behavioral compliance becomes significantly greater in presence of students emotional attachment towards the process of learning i.e. BEF=ATN+SC→SOE: Std. β=.373, p=0.000<.001. Afterwards, with the addition of said factors related with students cognitive capabilities i.e.

CEF=SRL+CSU→SOE: Std. β=.627, *p*=0.000, the magnitude of behavioral compliance acts increases, but emotional integrative factors towards learning decreases (also remains significant at <.001 level of significance i.e. BEF=ATN+SC→SOE: Std. β=.581, *p*=0.000, EEF=SB+VSE→SOE: Std. β=.736, *p*=0.000) (see Path B-i-Table-2).

As the hypothetical web model demands the testing of the said predictors with differential dimensions of SOE, therefore first of all AE was used as response variable. The results indicated that with the addition of EEF, the magnitude of behavioral compliance factors increases (Std. β=.537, *p*=0.001<.001). In addition, when CEF is added i.e. CEF=SRL+CSU→AE: Std. β=.767, *p*=0.000<.001, BEF increases but EEF decreases to manifolds in relation with students' contribution during the flow of instruction i.e. BEF=ATN+SC→AE: Std. β=.614, *p*=0.000<.01; EEF=SB+VSE→AE: Std. β=.386, *p*=0.000<.001.

Subsequently, BE was used as the major response variable which fluctuates the previous results and indicated that with addition of emotional attachment factors i.e. EEF=SB+VSE→BE: Std. β=.845, *p*=0.000 (Model-2-Path-Biii), the magnitude of behavioral compliance acts increases i.e. BEF=ATN+SC→BE: Std. β=.666 at the significance level of <.001. In converse, with the addition of mental efforts for the process of learning i.e. CEF=SRL+CSU→BE: Std. β=.327, *p*=0.000 decreases behavioral compliance of the students towards learning as well as their emotional integration and school attachment in the study vicinity i.e. BEF=ATN+SC→BE: Std. β=.662, *p*=0.000; EEF=SB+VSE→BE: Std. β=.836, *p*=0.000 at <.001 significance level (see Path B-ii & iii).

The empirical facts and hypothetical statements also demanded EE and CE as response variables. In this regard, the addition of emotional attachment factors towards EE i.e. EEF=SB+VSE→EE: Std. β=.877, *p*=0.000 produces a negligible variance in behavioral compliance factors i.e. BEF=ATN+SC→EE: Std. β=.483, *p*=0.008 at <.001 in comparison with previous model BEF=ATN+SC→EE: Std. β=.481, *p*=0.000<.001. Afterwards, the inclusion of CEF for determining students' mental efforts for the learning process increases the magnitude of BEF and decreases the variance produced by EEF as compared to the previous model i.e. BEF=ATN+SC→EE: Std. β=.646, *p*=0.004, EEF=SB+VSE→EE: Std. β=.846, *p*=0.000 at <.001. Afterwards, by taking CE as response variable and inclusion of factors related with students mental efforts for the process of learning i.e. CEF=SRL+CSU→CE: Std. β=.741, *p*=0.001 demonstrated that the magnitude of BEF increases i.e. BEF=ATN+SC→CE: Std. β=.386, *p*=0.000 while EEF decreases i.e. EEF=SB+VSE→CE: Std. β=.670, *p*=0.000 as compared to the previous model i.e. BEF=ATN+SC→CE: Std. β=.187, *p*=0.000, EEF=SB+VSE→CE: Std. β=.870, *p*=0.000 but still remains significant at <.001 level of significance.

C. Hierarchical Linear Regression Modeling (Path-C)

In Table-4, Path C demonstrated the relationship between differential dimensions of SE with students' AP as the response variable. The results demonstrated that with addition of BE in second model, the magnitude of AE becomes high i.e. AE→AP: Std. β=.378, *p*=0.000; BE→AP: Std. β=.309, *p*=0.000 at <.001 (significance level) in comparison with previous model i.e. AE→AP: Std. β=.245, *p*=0.000<.001. Afterwards, the third model incorporate EE which decreases the magnitude of AE as compared to both previous models AE→AP: Std. β=.207, *p*=0.000<.001; BE→AP: Std.

β=.495, *p*=0.009<.001; EE→AP: Std. β=.778, *p*=0.000<.001. Afterwards, the addition of CE in last model endorsed that it has the highest determining magnitude for students CE→AP: Std. β=.849, *p*=0.000<.001. Moreover, this variable also increases the magnitude of AE, BE and EE as compared to previous models i.e. AE→AP: Std. β=.471, *p*=0.000, BE→AP: Std. β=.535, *p*=0.000; EE→AP: Std. β=.782, *p*=0.000 (at <.001 level of significance).

D. Mediation Analysis

In accordance with the major hypothetical findings, it is evident that when SOE along with its dimensions i.e. AE, BE, EE and CE are controlled for, then it mediates the relationship between factors related with behavioral compliance acts in academics i.e. BEF→AP by CMV with AE, BE, EE, CE→0.179<.001→Mediation. In extension, the mediating variables such as SOE (along with its dimensions i.e. AE, BE, EE and CE) are controlled, then it mediates the relationship between EEF and students' AP i.e. EEF such as SB and VSE i.e. EEF→AP by CMV with AE, BE, EE, CE→0.334<.001→Mediation. Afterwards, with the controlled effect of mediation variables i.e. SOE along with AE, EE and CE, it mediates the relationship between CEF (SRL and CSU)→AP→0.223<.001→Mediation. Conversely, the results shows that control effects of BE shows no mediation between CEF→AP in the study vicinity. It means that there was no mediation between students' mental efforts for mastering lesson contents and their AP by controlling their behavioral compliance (see Table-3).

V. Discussion and Conclusion

As per our expectations of the research findings, it is evident that engagement related with behavioral acquiescence ensures positive school conduct and students' participation in academic activities. Moreover, it also plays an imperative role in avoidance of unethical behavior through school compliance acts and attentiveness across studies. These findings are consistent with the empirical evidence of Wigfield & Eccles (2000). Moreover, emotional aspect of adolescent engagement also proved to have the linear, significant and high magnitude relationship with students' performance in academics. Relating this, two major factors i.e. SB and VSE were used that shows the highest positive directional path with SE and their AP in the study vicinity (Kuperminc et al., 2008; Sanchez et al., 2005). Moreover, the findings also endorsed the cognitive concentration of high school students through various paths i.e. behavioral-emotional, emotional-cognitive, behavioral-cognitive etc. (Christenson et al., 2011; Ladd & Dinella, 2009).

The third major domineering dimension of SE meta-construct was CE that depicts students' mental efforts, deep conceptualization, commitment and persistence towards the process of learning (Osterman, 2000; Ryan & Deci, 2000). The findings of the study also revealed that CEF along with CE proved to be the major predictors for constructive learning outcomes, motivation towards grades attained and students' mental efforts for mastering the complex ideas (also see Cadwallander et al., 2002; Marks, 2000). In compliance with the study findings, the recent dimension of AE depicted the deliberate, preemptive and dynamic contribution of the students during their instruction hours which accelerates their academic outcomes. This scale in the mediation variable depicted students' expression of opinions and autonomy supportive attitude during instruction hours (Jang et al., 2009; Reeve et al., 2004).

The supportive theoretical frameworks used in the present study are SDT along with motivational and participation identification models (also see the relevance in studies of Deci & Ryan, 1985a; Ryan & Deci, 2002). These theoretical frameworks become the base of the present hypothetical model used in research. Relating this, SDT highlighted the multiple aspects of interpersonal and environmental experiences that have identified students behavioral compliance, emotional attachment and cognitive integration with school (also see the relevance in studies of Furrer & Skinner, 2003; Roeser et al., 2000; Walls & Little, 2005). Evidences also endorsed that students' success in exams provides the structural and predictable environment which experiences competence and control over academic needs (Brand et al., 2003).

We also used SE as the major meta-construct to get a holistic viewpoint about its multifaceted nature in terms of predictors and mediation variables (see the relevance studies of Daly et al., 2009; You & Sharky, 2009). For protruding these pondering points, SE was used as an integrated construct with AP (Glanville & Wildhagen 2007). In consistence with previous findings, these integrated constructs demonstrated the behavioral compliance acts, emotional integration, mastering conceptualizations, memorization as well as success, productivity and skill development across academics. The dynamic relationship is also endorsed by various empirical facts such as Green et al. (2012); Li & Lerner (2013); Wang & Eccles (2013); which was also confirmed to integrate and relate differential engagement prerequisites.

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