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The Motivation toward Learning among Czech High School Students and Influence of Selected Variables on Motivation

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Abstract

Motivation toward learning is crucial factor for the students from the beginning of their education and motivation toward learning is changing during education of students and the motivation is influences by many factors. The main aims of the research was to find out the motivation of high school students toward learning, the personality traits of high school students and also relationship between motivation and personality traits. The research was also focused on the examining of variables like gender, grade level and achievement on the motivation and personality of students. The sample size was created from the high school students (n = 201). In the research were used two research tools Academic Motivation Scale and NEO Five-Factor Inventory. The gender and achievement of students had got an influence on the motivation toward learning. The relationship was detected between some subscales of motivation and some personality traits. In conclusion are presented some implications for pedagogical practice and suggestion for further research.

Keywords: academic motivation scale; high school students; motivation toward learning; NEO Five-Factor Inventory.

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Introduction

The learning process is one the most important activity in the life of child. The learning process is connected with the achievement and achievement influences the life satisfaction of children and also all humans. The next very important thing is the motivation toward any activity. If people are not motivated, they do not achieve good results in any activity. In the mean of pupils, they are not successful in the learning process. Motivation toward learning is crucial factor for the students from the beginning of their education and motivation toward learning is changing during education of students and the motivation is influences by many factors. The problems with motivation have got teachers nearly every class, so for the teachers is very important to know how to motivate students. The small obstacle is, every pupil is individual and it is different from other schoolmates in teaching process, personality, motivation and others. It is important to orientate in these individual differences and create for students the creative conditions, which can lead to the better work and communication of students.

The problematic of motivation is relatively common among researchers; for example Gottfried (1985) and Vallerand, Fortier & Guay (1995) quoted the intrinsic motivation had got positive effect on the achievement of students in the case of mathematics. The similar findings were possible to find in the work of Christophel (1990), who showed the positive relationship between intrinsic motivation and teaching of students. Similarly, Yahaya *et al*. (2010) focused on the pupils' motivation toward learning of mathematics. Authors found out higher level of extrinsic motivation in comparison with intrinsic. Hardre *et al*. (2006) examined relationship between motivation and teaching and also the latent variables, which can influenced the motivation. As the most significant variable was detected the personality of teacher and also the school climate was the significant factor. Hardre *et al*. (2006) also found out, which factors could have the influence on the motivation at high school students from the village environment in comparison with high school students from the town environment. The factor of residence was insignificant. But authors showed, that there was detected other significant factor – school climate. The similar results were possible to find in studies of DeBacker *et al*. (2004) and Greene *et al*. (2005). Ahmad, Abdullah & Ghani (2014) examined level of pupils' motivation from Malaysia by the learning of foreign language, in this case English language, from the teachers view. The teachers confirmed higher level of extrinsic motivation in comparison with intrinsic. The motivation of pupils toward learning is depend on their relationship with parents, residence of pupils and other factors also can influence motivation toward learning. Potvin & Hasni (2014) focused on the analysis of research studies, and also the motivation toward learning of science subjects was taking in account. The authors showed, similarly in previous studies, the dominance of extrinsic motivation toward learning of science subject in comparison with intrinsic motivation at elementary and high school pupils.

The gender was presented as significant variable; the boys had got higher intrinsic motivation in comparison with girls in the case, when the relationship toward learning was on higher level and also if the boys saw the importance of the subject for then. The girls learned because of demands of her parents or due to be the best in the class. The girls had got higher extrinsic motivation in comparison with boys (Eccles *et al*., 1989, Findley, & Cooper 1983; Liem & Martin, 2012; Litalien, Guay & Morin, 2015; Shekhar & Devi, 2012; Tavani, & Losh 2003). Gjesme (1979) mentioned about higher orientation on success at girls. Girls have got higher motivation to avoid of failure and it can be from inner conviction, the success at compulsory school attendance could lead into success in adulthood. The higher motivation at girls was justified by Githua & Mwangi (2003) by the effort of to equal to boys at a success in the subjects requiring abstract thinking.

The grade level was also examined and in any cases it has got a significant influence on the level of motivation toward learning. Liem & Martin (2012) quoted the decreasing of motivation toward learning in the switch of pupils from elementary to high school. It showed that the highest percentage of motivated pupils was at first grade at high school. Gottfried, Fleming & Gotfried (2001) by the realization of longitudinal research found out on the stability of motivation toward learning at pupils. The research was realized on the one group of pupils from the beginning of elementary school till the end of high school.

Zsolnai (2002) focused on the determination of relationship between motivation toward learning and achievement at school. The higher level of motivation was fund out pupils with better achievement. Author stated the dominance of intrinsic motivation in comparison with extrinsic motivation. The similar results were found out at other studies (e.g. Cleary & Chen, 2009; Covington, 2000). Johnson *et al*. (2014) analyzed more than 600 research studies from 26 different countries. The studies were focused on relationship between achievement and motivation, all analyzed studies said about positive relationship between these two variables. Also other studies quoted the significant and positive variable between these two variables (Amrai *et al*., 2011; Broussard & Garrisson 2004; Li & Pan, 2009; Martin & Dowson, 2009).

The other type of research studies is focused on the relationship of motivation and personality (Big Five). This kind of studies is relatively rare, for example Clark & Schroth (2010) found out a relationship between these two variables (motivation and Big Five personality traits). They wrote strong relationship between intrinsic motivation with conscientiousness, extraversion, openness to experience and agreeableness. The extrinsic motivation had got significant relationship with agreeableness, extraversion, neuroticism and conscientiousness. Amotivation was connected with conscientiousness and agreeableness in negative way. Komarraju, Karau, & Schmeck (2009) found out positive correlation between intrinsic motivation with extraversion and openness to experience. The conscientiousness and agreeableness correlated in negative way with amotivation. The similar findings was possible to find out in other studies from authors Deci,

& Ryan (1985); Kaufman, Agars, & Lopez-Wagner (2008); Phillips, Abraham, & Bond (2003); Sheldon, & Elliot (1998); Sung, & Choi (2014); Kim & Cho, (2016); Lay, & Chandrasegaran, (2016). Major, Turner & Fletcher (2006) investigated links between the Big Five, proactive personality, and motivation to learn. Authors found out that proactive personality, openness, extraversion, and conscientiousness predicted motivation to learn. In addition, motivation to learn was positively related to objectively assessed development activity. Proactive personality, extraversion, and openness had significant indirect links to development activity. Hart *et al*. (2007) examined the relationship between the Big Five and a two-factor model of achievement motivation. Authors found out Conscientiousness, openness, and extraversion was positively associated with intrinsic achievement motivation, whereas extraversion, conscientiousness, and neuroticism were positively related to extrinsic achievement motivation. Agreeableness was also found to be negatively associated with extrinsic achievement motivation. Conscientiousness was anomalous in that it was positively related to both intrinsic and extrinsic motivation.

The main aims of the research was to find out the motivation of high school students toward learning, the personality traits of high school students and also relationship between motivation and personality traits. The research was also focused on the examining of variables like gender, grade level and achievement on the motivation and personality of students.

Methods

Research sample

The sample size was created from the high school students (n = 201). The age of respondents was between 15 – 19 years. The reason of high school pupils choosing was their imagination about their future life. The choosing of respondents was conventional; the sample size is adequate for the research. The observed power was calculated for every value of ANOVA. Its value was between 0.75 and 0.86, it signalized the sufficient sample for the study and also the availability of the using ANOVA (for the detailed explanation see MacCallum, Browne, & Sugawara, 1996 and others). The table 1 included basic demographic characteristic of the respondents of research. Students were divided into three groups regarding to achievement. In the Czech Republic is numerical evaluation of high school students, the best mark is 1 and the worst mark is 5. The students calculated mean of their marks at the end of previous school year from the all subject.

Table 1. Basic demographic characteristic of respondents

demographic variables		absolute and relative amount
gender	girls	140 (30 %)
	boys	61 (70 %)
grade level	1. (15 – 16 years)	49 (24 %)
	2. (16 – 17 years)	52 (26 %)
	3. (17 – 18 years)	29 (15 %)
	4. (18 – 19 years)	71 (35 %)
achievement	1	22 (11 %)
	2	90 (45 %)
	3	89 (44 %)

Research tools

The research tool was divided into three parts. The first part included demographic variables presented in previous subchapter. The second part of research tool was NEO- Five Factor Inventory (Costa, & McCrae 1989; McCrae, & Costa 2004) and third part was academic motivation scale (Vallerand *et al*., 1992). Before administration of the research tool the pilot study was realized. The research tools were filled by some teachers from high school, whose knew cognitive level of their students. The stylistic modification was done, but the content was not changed.

Motivation scale. The Academic Motivation Scale (AMS) with 28 items was used in our study oriented on high school students. The questionnaire was translated into Czech language with the assistance of linguist. First, the scale was translated from English to Czech. This was done with the parallel back-translation procedure. Back translation included translating the scale from the original to the target language with the assistance of linguist. This translation is then translated back to the original language without the use of the original scale. In the case that the original version was appropriately retranslated, it was possible to use the scale. This scheme is recommended by many authors (e.g. Vallerand, 1989). The scale is divided into seven motivational subscales assessing three types of intrinsic motivation (intrinsic motivation to know, to accomplish things and to experience stimulation), three types of extrinsic motivation (external, introjected and identified regulation) and amotivation.

NEO – Five Factor Inventory. The 60-item NEO Five-Factor Inventory (NEO-FFI) was developed to provide a concise measure of the five basic personality factors (Costa, & McCrae 1989). For each scale, 12 items were selected from the pool of 180 NEO Personality Inventory (NEO-PI) items, chiefly on the basis of their correlations with validimax factor scores (McCrae, & Costa 1989). The instrument uses a five-point Likert response format. The NEO-FFI has been translated into several different languages and shown validity and utility in a number of different contexts; it is one of the most widely used measures of the Five-Factor Model (Hrebickova *et al*., 2002; Pytlik Zillig, Hemenover & Dienstbier, 2002). The NEO- FFI included 60 items divided into 5 dimensions: Neuroticism; Extraversion; Openness to experience; Agreeableness; Conscientiousness. Each dimension contained from 12 items.

Data analysis

After data recoding according manual the reliability of both instruments was determined by the using of Cronbach's alpha coefficient. The value for AMS was $\alpha = 0.79$ and value for NEO-FFI was $\alpha = 0.84$. The values for individual subscales and dimensions were 0.55 – 0.82. The similar results were possible to see in the works of (Costa, & McCrae 1992; Fairchild *et al*., 2005; Saucier, 1998).

For the determination of differences between groups of demographic variables the analysis of variance (ANOVA) was used, for the detailed determination of the differences the Tukey post-hoc test was used. The Pearson product moment was used for the determination of relationship between motivation and personality.

The result part included these abbreviations: AM – amotivation; IM-kn – intrinsic motivation to know; IM-ac – intrinsic motivation to accomplish things; IM-st – intrinsic motivation to experience stimulation; EM-ex – external regulation; EM-in – introjected regulation; EM-id – identified regulation.

Results

The Czech high school students had got dominant extrinsic motivation. More than half of examined students (55 %) achieved highest score at EM-ex, the second was EM –id (20 %), the third one was EM-in (12 %). Other types of motivation were represented below 10 % of students. In the next part the influence of variables like gender, grade level and achievement is evaluated. As it is possible to see on the figure 1, in the nearly all subscales achieved higher score girls in comparison with boys, but the highest differences were observed in the subscales of extrinsic motivation. The boys had got higher score in comparison with girls in subscale amotivation and the difference was significant ($F = 5.98$; $p < 0.05$).

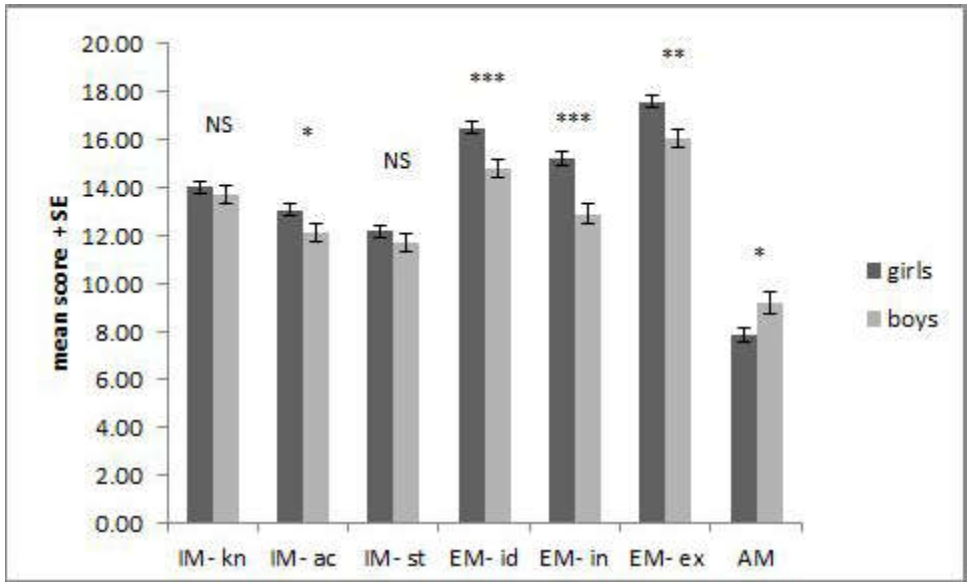

Figure 1. The mean score in subscales of motivation with respect to gender

NS – non-significant difference
* - $p < 0.05$, ** - $p < 0.01$, *** - $p < 0.001$

The effect of grade level was insignificant in all subscales of motivation. As it is possible to observe in figure 2, the score was inconsistent, but it is possible to see, that students of 4th grade achieved lowest score in all subscales of motivation and these students achieved highest score in the subscale called "amotivation".

The influence of achievement of students was significant nearly in all subscales except of IM-ac and IM-st. It is possible to see, the results were consistent. The students with the best achievement in the schools achieved higher score in all subscales of motivation and students with the worst achievement achieved the lowest score (*Figure 3*). Only in the subscale EM-in is possible to see, that the lowest score was detected at student with mark 2. The Tukey post-hoc test revealed statistically significant differences among groups of variables. It was detected at IM-kn type of motivation between pupils with average mark 1 and pupils with average mark 3 ($p < 0.05$). The similar finding was detected at type of motivation EM-id ($p < 0.01$). Also in the type of motivation EM-in was detected statistically significant differences among pupils with average mark 1 and average mark 2 ($p < 0.05$) and among pupils with average mark 1 and average mark 3 ($p < 0.05$). The type of motivation EM-ex was also influenced by achievement of pupils. The

statistically significant difference was detected among pupils with average mark 1 and average mark 3 ($p < 0.01$) and also among pupils with average mark 2 and average mark 3 ($p < 0.001$). By the last type of motivation (AM) was found out statistically significant differences among same groups as previous case, but in both cases was $p < 0.001$.

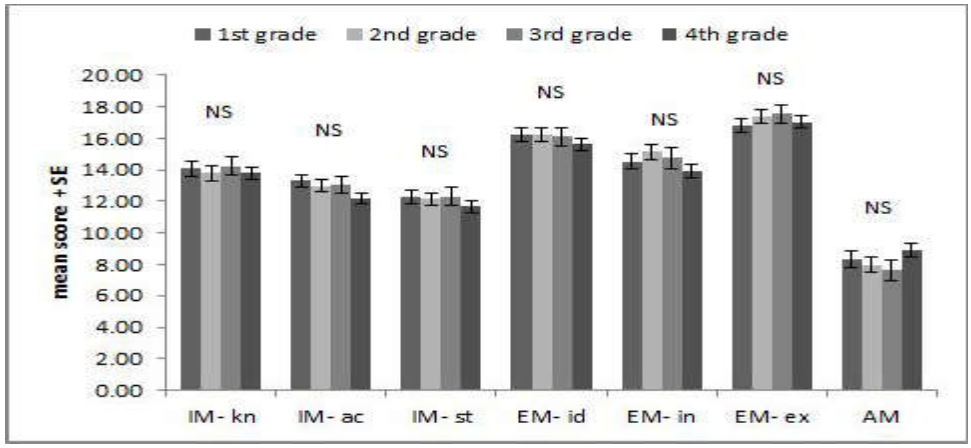

Figure 2. The mean score in subscales of motivation with respect to grade level

NS – non-significant difference

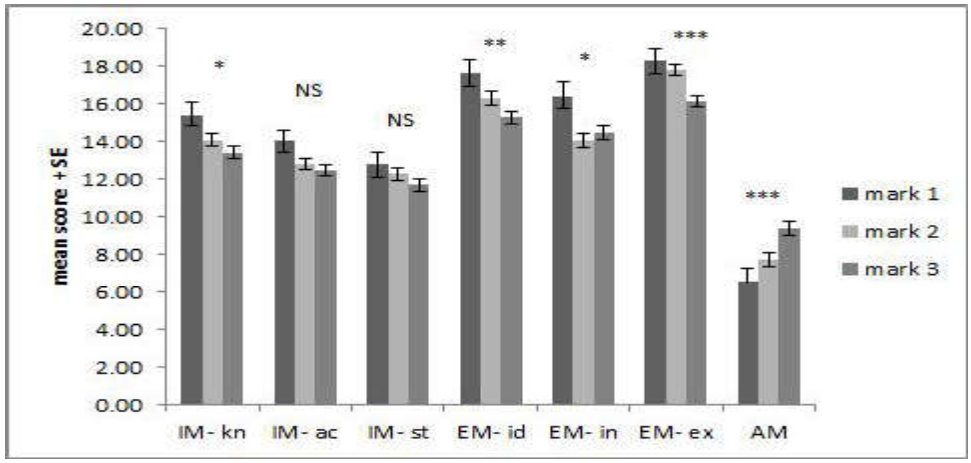

Figure 3. The mean score in subscales of motivation with respect to achievement

NS – non-significant difference
* - $p < 0.05$, ** - $p < 0.01$, *** - $p < 0.001$

The last statistical evaluation was the determination of the relationship between motivation and personality. The values of correlation are presented (*Table 2*) it is possible to see that amotivation negatively significantly correlated with agreeableness and conscientiousness and positively with neuroticism. The agreeableness positively significantly correlated with IM-kn, EM-id and EM-ex. The last significant correlation was detected between conscientiousness and EM-id. The other relationships between variables were not significant and they were low.

Table 2. The correlation between motivation and personality

	neuroticism	extraversion	openness to experience	agreeableness	conscien-tiousness
IM- kn	-0.11	-0.01	-0.01	0.20*	0.07
IM- ac	-0.07	0.01	-0.01	0.09	0.05
IM- st	0.01	-0.09	0.02	0.01	-0.03
EM- id	-0.11	-0.03	-0.03	0.32*	0.21*
EM- in	0.10	-0.04	0.08	0.03	0.01
EM- ex	0.05	0.01	0.01	0.25*	0.12
AM	0.14*	0.03	-0.03	-0.15*	-0.17*

* $p < 0.05$

Discussion

Our research showed that at Czech high school students the extrinsic motivation dominated. As research tools were used two instruments, one of the was NEO – Five Factor Inventory and the second was Academic Motivation Scale (AMS) prepared for high school students, which have got 7 subscales, three related to extrinsic motivation, three to intrinsic motivation and one regarding to amotivation.

The extrinsic motivation was dominating at high school students. The highest score students achieved at EM-ex, this is type of motivation, where the behavior is regulated through external sources, these sources are represented for example by reward or punishment. Lepper, Corpus & Iyengar (2005) published opposite findings, that students achieved higher score at intrinsic motivation in comparison with extrinsic motivation. The extrinsic motivation was on high level in comparison with intrinsic motivation in the case, where the human qualities were also examined. For example Mills & Blankstein (2000) found out the extrinsic motivation was dominating at students had got marked as self-oriented perfectionists. These students were oriented, how others perceived them. Their motivation was not

oriented on their own successes, but on the view of other people. So, in the case of Czech republic are two possibilities, the first one is, that students are self-oriented perfectionist, the second one is, that the educational system in Czech republic is more oriented on the achievement of students for the needs of parents and needs of other institutions (e.g. universities). The students were learning not for the better knowledge and discovering of the world, but for the better marks and for the others. Probably, the second choice is offering the truth.

The gender influenced on the motivation as the important variable, mainly in the extrinsic motivation, where girls achieved in all types significantly higher score in comparison with boys. The studies regarding to this problematic showed, the girls had got higher level of extrinsic motivation in comparison with boys; the girls are more focused on the reward in comparison with boys, so the extrinsic motivation is dominating. These kinds of information are possible to find in many literary sources and Baer (1998) added one important information, that boys liked creativity, not memorization of facts and they are more motivated to learn any subject, if the creativity was positively evaluated. Velayutham, Alldridge & Fraser (2012) found out also significantly effect of gender on the motivation to learn, but authors examined only motivation to learn science subjects and they found out higher intrinsic motivation to learn these subjects at boys. It is also possible to find some information, which is not in concordance with our findings. For example, Teo *et al*. (2015) found out, the boys achieved higher score in comparison with girls all types of motivation. But these studies are relatively rare. Martin (2012) found out girls achieved higher score nearly in all types of motivation in his research. The similar result is possible to find in study of Shekhar & Devi (2012).

The influence of grade level was insignificant; the highest score was achieved at the subscale of motivation achieved EM-ex. The potential explanation is, that majority of students had got lack of intrinsic motivation. Martin (2012) examined the influence of grade level and he said, the lowest level motivation toward learning is on the start of high school, in the next grades the level of extrinsic and also intrinsic motivation is increasing. Author also wrote that the highest level of amotivation was in the first grade of high school. In our research the students of the last (fourth) grade had got highest level of amotivation. Our results also demonstrated similar level of amotivation, extrinsic motivation and intrinsic motivation in all grades. The reason, why extrinsic motivation was dominating in all grades is probably in the school system of Czech Republic, which is focused on the reward, not on the development of creativity and taste of knowledge. Maybe, the declining of motivation and increasing of amotivation could be caused by other factors like puberty of students, cognitive growth and others. These factors are also described in the study of MacIntyre *et al.* (2002).

The achievement of students had got significant influence on the motivation of students. The students with best achievement achieved highest score in all types of motivation and achieved the lowest score in amotivation. The students with the worst achievement (mark 3). This is relatively logical result, because students

could be motivated from our internal reasons or also from external reason like parents. The similar results are possible to read in many sources (Uguroglu & Walberg 1979; Zsolnai 2002).

The last examined relationship was between motivation and personality types. The majority of relationships were insignificant. Only several relationships were significant; the amotivation negatively significantly correlated with agreeableness and conscientiousness; positively with neuroticism. The agreeableness positively significantly correlated with IM-kn, EM-id and EM-ex. The last significant correlation was detected between conscientiousness and EM-id. The studies, which examined these variables, brought different results in relationships between motivation and personality. In many cases amotivation correlated in negative way with all personality types except of neuroticism. This relationship was awaited, because amotivated students are not willing to learn new things, their level of creativity are on the minimal level. These students have got fear from the all school subjects; they are frustrated and other characteristics. The similar results were possible to find in studies from authors like Clark & Schroth (2010) or Hart *et al.* (2007) and others.

Conclusion

The research showed interesting results, which can lead to many implications to pedagogical practice. For example as it is possible to see the extrinsic motivation is dominating in comparison with intrinsic motivation. The teachers could teach not only for reward and not punish students for bad answers on their questions. But teachers could try to increase an interest about subjects, do not punish students, but try to explain or repeat the explanation of things, which were wrong answered by students. It can increase intrinsic motivation among boys and girls. The amotivation had got relatively strong position among students of the last grade level, so the incorporation of new methods of teaching in the last grade should increase of motivation about learning and students could understand that knowledge from all school subjects are important for students.

Our study offers possibilities to further research. This is only small part of the examination of students' motivation to learn. We used only basic demographic variables; it is possible also to focus on the influence of parents, peers, SES and other factors on the motivation. The other research design could also bring new results, for example longitudinal research or interview with couple of students. On the basis of their answers it is possible to determine, why extrinsic motivation is increasing and also amotivation is increasing in last grade.

References

Ahmad, I.S., Abdullah, H., & Ghani, M.F.A. (2014). Attitudes and motivation toward learning the English language among students from Islamic education system background: Exploring the views of teachers. *Journal of Education and Learning*, *8*(3), 195-208.

Amrai, K., Motlagh, S.E., Zalani, H.A., & Parhon, H. (2011). The relationship between academic motivation and academic achievement students. *Procedia – Social and Behavioral Sciences*, *15*, 399-402.

Baer, J. (1998). Gender differences in the effects of extrinsic motivation on creativity. *The Journal of Creative Behavior*, *32*(1), 18-37.

Broussard, S.C., & Garrisson, M.E.B. (2004). The relationship between classroom motivation and academic achievement in elementary-school-aged children. *Family & Consumer Sciences*, *33*(2), 106-120.

Christophel, D.M. (1990). The relationships among teacher immediacy behaviors, student motivation, and learning. *Communication Education*, *39*(4), 323-340.

Clark, M.H., & Schroth, C.A. (2010). Examining relationships between academic motivation and personality among college students. *Learning and Individual Differences*, *20*(1), 19-24.

Cleary, T.J., & Chen, P.P. (2009). Self-regulation, motivation, and math achievement in middle school: Variations across grade level and math context. *Journal of School Psychology*, *47*(5), 291-314.

Costa, P.T., & McCrae, R.R. (1989). *The NEO-PI/NEO-FFI manual supplement*. Odessa, FL: Psychological Assessment Resources.

Covington, M.V. (2000). Goal theory, motivation, and school achievement: An integrative review. *Annual Review of Pychology*, *51*, 171-200.

DeBacker, T.K., Miller, R.B., Walker, C.O., & Mansell, R. (2004). *Perceptions of classroom climate, student motivation, and achievement: Changes and interrelationships across an academic year*. Paper presented at the Ninth International Conference on Motivation, Lisbon, Portugal.

Deci, E.L., & Ryan, R.M. (1985). *Intrinsic motivation and self-determination human behavior*. New York: Plenum.

Eccles, J.S., Wigfield, A., Flanagan, C.A., Miller, C., Reaman, D.A., & Yee, D. (1989). Self-concepts, domain values, and self-esteem: Relations and changes at early adolescence. *Journal of Personality*, *57*(2), 283-310

Fairchild, A.J., Horst, S.J., Finney, S.J., & Barron, K.E. (2005). Evaluating existing and new validity evidence for the Academic Motivation Scale. *Contemporary Educational Psychology*, *30*(3), 331-358.

Findley, M.J., & Cooper, H.M. (1983). Locus of control and academic achievemnt: A literature review. *Journal of Personaloty & Social Psychology*, *44*(2), 419-427.

Githua, B.N., & Mwangi, J.G. (2003). Students' mathematics self-concept and motivation to learn mathematics: Relationship and gender differences among Kenya's secondary-school students in Nairobi and Rift Valley provinces. *International Journal of Educational Development*, *23*(5), 487-499.

Gjesme, T. (1979). Future time orientation as a function of achievement motives, ability, delay of gratification, and sex. *Journal of Psychology*, *101*(2), 173-188.

Gottfried, A.E. (1985). Academic intrinsic motivation in elementary and junior high school students. *Journal of Educational Psychology*, *77*(6), 631-645.

Gottfried, A.E., Fleming, J.S., & Gottfried, A.W. (2001). Continuity of academic intrinsic motivation from childhood through late adolescence: A longitudinal study. *Journal of Educational Psychology*, *93*(1), 3-13.

Greene, B.A., Miller, R.B., Crowson, H.M., Duke, B.L., & Akey, K.L. (2005). Predicting high school students' cognitive engagement and achievement: Contributions of classroom perceptions and motivation. *Contemporary Educational Psychology*, *29*(4), 462-482.

Hart, J.W., Stasson, M.F., Mahoney, J.M., & Story, P. (2007). The Big Five and achievement motivation: Exploring the relationship between personality and a two-factor model of motivation. *Individual Differences Research*, *5*(4), 267-274.

Hrebickova, M., Urbanek, T., Cermak, I., Szarota, P., Fickova, E., & Orlicka, L. (2002). The NEO Five-Factor Inventory in Czech, Polish, and Slovak contexts. In R. R. McCrae, & J. Allik (Eds.), *The Five-Factor Model of personality across cultures* (53–78). New York: Kluwer Academic/Plenum Publishers.

Johnson, D.W., Johnson, R.T., Roseth, C., & Shin, T.S. (2014). The relationship between motivation and achievement in interdependent situations. *Journal of Applied Social Psychology*, *44*(9), 622-633.

Kaufman, J.C., Agars, M.D., & Lopez-Wagner, M.C. (2008). The role of personality and motivation in predicting early college academic success in non-traditional students at a Hispanic-serving institution. *Learning and Individual Differences*, *18*(4), 492-496.

Kim, M.K., & Cho, M.K. (2016). Pre-Service Elementary Teachers' Motivation and Ill-Structured Problem Solving in Korea. *EURASIA Journal of Mathematics, Science and Technology* Education, *12*(6), 1569-1587.

Komarraju, M., Karau, S.J., & Schmeck, R.R. (2009). Role of the Big Five personality traits in predicting college students' academic motivation and achievement. *Learning and Individual Differences*, *19*(1), 47-52.

Lay, Y.F., & Chandrasegaran, A.L. (2016). The predictive effects of motivation toward learning science on TIMSS grade 8 students' science achievement: A comparative study between Malaysia and Singapore. *EURASIA Journal of Mathematics, Science and Technology Education, 12*(12), 2949-2959.

Lepper, M.R., Corpus, J.H., & Iyengar, S.S. (2005). Intrinsic and extrinsic motivational orientations in the classroom: Age differences and academic correlates. *Journal of Educational Psychology*, *97*(3), 184-196.

Li, P., & Pan, G. (2009). The relationship between motivation and achievement: A Survey of the study motivation of english majors in Qingdao Agricultural University. *English Language Teaching*, *2*(1), 123-128.

Liem, G.A.D., & Martin, A.J. (2012). The motivation and engagement scale: Theoretical framework, psychometric properties, and applied yields. *Australian Psychologist*, *47*(1), 3-13.

Litalien, D., Guay, F., & Morin, A.J.S. (2015). Motivation for PhD studies: Scale development and validation. *Learning and Individual Differences*, *41*(1), 1-13.

MacCallum, R.C., Browne, M.W., & Sugawara, H.M. (1996). Power analysis and determination of sample size for covariance structure modeling. *Psychological Methods*, *1*(2), 130-149.

Major, D.A., Turner, J.E., & Fletcher, T.D. (2006). Linking proactive personality and the Big Five to motivation to learn and development activity. *Journal of Applied Psychology*, *91*(4), 927-935.

Martin, A.J., & Dowson, M. (2009). Interpersonal relationships, motivation, engagement, and achievement: Yields for theory, current issues, and educational practice. *Review of Educational Research*, *79*(1), 327-365.

McCrae, R.R., & Costa, P.T. (1989). Rotation to maximize the construct validity of factors in the NEO Personality Inventory. *Multivariate Behavioral Research*, *24*(1), 107-124.

McCrae, R.R., & Costa, P.T. (2004). A contemplated revision of the NEO Five-Factor Inventory. *Personality and Individual Differences*, *36*(3), 587-596.

Mills, J.S., & Blankstein, K.R. (2000). Perfectionism, intrinsic vs extrinsic motivation, and motivated strategies for learning: a multidimensional analysis of university students. *Personality and Individual Differences*, *29*(6), 1191-1204.

Phillips, P., Abraham, C., & Bond, R. (2003). Personality, cognition, and university students‘ examination performance. *European Journal of Personality*, *17*(6), 435-448.

Potvin, P., & Hasni, A. (2014). Interest, motivation and attitude towards science and technology at K-12 levels: a systematic review of 12years of educational research. *Studies in Science Education*, *50*(1), 85-129.

Pytlik Zillig, L.M., Hemenover, S.H., & Dienstbier, R.A. (2002). What do we assess when we assess a Big 5 trait? A content analysis of the affective, behavioral, and cognitive processes represented in Big 5 personality inventories. *Personality and Social Psychology Bulletin*, *28*(6), 847–858.

Saucier, G. (1998). Replicable item-cluster subcomponents in the NEO Five-Factor Inventory. *Journal of Personality Assessment*, *70*(2), 263-276.

Shekhar, C., & Devi, R. (2012). Achievement motivation across gender and different academic majors. *Journal of Educational and Developmental Psychology*, *2*(2), 105-109.

Sheldon, K.M., & Elliot, A.J. (1998). Not all personal goals are personal: Comparing autonomous and controlled reasons for goals as predictors of effort and attainment. *Personality and Social Psychological Bulletin*, *24*(5), 546-557.

Sung, S.Y., & Choi, J.N. (2014). The role of individual differences and innovation properties in multiple forms of innovation implementation. *Social Behavior and Personality*, *42*(7), 1211-1230.

Tavani, C.M., & Losh, S.C. (2003). Motivation, self-concidence, and expectations as predictors of the acaemic performances among our high school students. *Child Study Journal*, *33*(3), 141-151

Teo, E.W., Khoo, S., Wong, R., Wee, E.H., Lim, B.H., Rengasamy, S.S. (2015). Intrinsic and extrinsic motivation among adolescent ten-pin bowlers in Kuala Lumpur, Malaysia. *Journal of Human Kinetics*, *45*(1), 241-251.

Uguroglu, M.E., & Walberg, H.J. (1979). Motivation and achievement: A quantitative synthesis. *American Educational Research Journal*, *16*(4), 375-389.

Vallerand, R.J. (1989). Toward a cross-cultural validation methodology for psychological scales: Implications for research conducted in French language. *Canadian Psychology*, *30*(4), 662-680.

Vallerand, R.J., Fortier, M.S., & Guay, F. (1997). Self-determination and persistence in a real life setting: Toward a motivational model of high school dropout. *Journal of Personality and Social Psychology*, *72*(5), 1161-1176.

Vallerand, R.J., Pelletier, L.G., Blais, M.R., Briere, N.M., Senecal, C., & Vallieres, E.F. (1992). The Academic motivation scale: A measure of intrinsic, extrinsic, and amotivation in education. *Educational and Psychological Measurement*, *52*(4), 1003-1017.

Yahaya, N., Yahaya, A., Ramli, J., Hashim, S., & Zakariya, Z. (2010). The effects of extrinsic motivational factors in learning among students in secondary school in Negeri Sembilan. *International Journal of Psychological Studies*, *2*(1), 128-136

Zsolnai, A. (2002). Relationship between children's social competence, learning motivation and school achievement. *International Journal of Experimental Educational psychology*, *22*(3), 317-329.