

Aleksandra Gojkov Rajić

Teacher Training Faculty, University of Belgrade and Preschool Teacher Training College
“Mihailo Palov” Vršac¹

Jelisaveta Šafranj

Faculty of Technical Sciences, University of Novi Sad²

Jelena Prtljaga

Preschool Teacher Training College “Mihailo Palov” Vršac and Teacher Training Faculty
University of Belgrade³

Original scientific paper

UDC: 37.03

DOI: 10.5937/IstrPed2201186G

=====

PREDICTIVE VALUES OF THE STRUCTURE OF THE SELF-REGULATORY CONSTRUCT IN L2 LEARNING OF THE GIFTED

Abstract: The aim of this meta-analysis is to take a small step forward from the separate observation of the self-regulatory construct and the relationship of variables that seek to explain it, define its structure more clearly and make it available in practice. For this purpose, the question arises regarding the relationship between personality traits and motivation as variables, which are shown in a number of studies as important for self-regulation in terms of its contribution to success in mastering a foreign language (L2). As mentioned, meta-analysis was used as a method. The selection of studies included in the meta-analysis is as follows: Out of 175 research papers dealing with the topic of self-regulation in learning L2 that covered 49.821 students, 17 papers were selected in the second round, which covered 4.263 students who were academically gifted and learned L2. In the third step of selection, only three papers remained, which could be compared by characteristics (goals, sample, variables, respondents...), and which examined issues relevant to this paper, i.e. the relationship between personality traits, motivation to learn L2 and achievements in a language for specific purposes. The total number of respondents was 1.263, with 711 of them being academically gifted students who were learning a Language for Specific Purposes (LSP).

The theoretical context of the research is the Self-Determination Theory, i.e., an understanding of the spontaneous development of the individual's predispositions (intrinsic motivation and internalization) when basic psychological needs are met in the function of interpersonal dynamics and social settings (Deci & Ryan, 1985) and Sternberg's Theory of Mental Self-Government.

Previous reflections and comparisons with theoretical assumptions and research findings are partly the basis for answering the questions posed in this analysis, as they provide a framework for understanding the structure of the self-regulatory construct. Thus, the quest for the state of relations between the observed variables, which are important for self-regulation and sufficient to formulate a model of self-regulation, did not provide sufficient indications that they could be considered safe in assessing the effects of defining self-regulation constructs. Also, the relationships between the gifted and others were researched, starting from the observation of the relationship between personality traits and motivation. The intention was to determine how many personality traits have proven to be good predictors for self-regulation of learning (success - average and in L2) of gifted and

¹aleksandrigojkovrajic@gmail.com

²savetas@uns.ac.rs

³vsvasdirektor@hemo.net

other students. Related to the above is the observation of the issue of their mutual relationship and scope in terms of their predictive value for opportunities to encourage the gifted and other students to realize achievements in learning a language for specific purposes. Thus, it could be concluded, that the dimensions of motivation generally achieve correlations of the highest intensity with *Intellect* and *Agreeableness*, while relations with other dimensions are somewhat weaker. This supports the conclusion that *Intellect* and *Agreeableness* as personality traits are important for the construct of self-regulation, and supports the aforementioned theoretical positions of Sternberg within the Theory of Mental Self-Government, for which these findings are only the initial step, indicating that it would be worth going in that direction.

Keywords: gifted, self-regulation, language for specific purposes, meta-analysis.

Introduction

Self-regulated learning as a construct and motivation as its important element have been in the focus of researchers' interest for several decades, and the enigma of this construct continues to attract equal attention from researchers and practitioners seeking answers to many questions that would enable individuals to reach self-realization and support teachers on their way towards that goal. It would also be an incentive to check the existing and formulate better models of encouraging self-regulation in the individual's development. The basis of this construct is the Self-Determination Theory, i.e. the view of the spontaneous development of individual predispositions, that is, intrinsic motivation and internalization, when basic psychological needs are met in the function of interpersonal dynamics and social settings (Deci & Ryan, 2000). When looking at the construct of self-regulation in L2 learning, the theoretical framework includes the settings of Cognitive Evaluation Theory (CET), in which Deci and Ryan (1985) seek to specify the factors in the social context that are relevant to intrinsic motivation, with the assumption that CET, as a sub-theory of Self-Determination Theory, clarifies the effects of interpersonal communication in learning and its structure (rewards, communications, feedback, etc.), which are important for a sense of competence during learning and encourage intrinsic motivation for certain learning activities as they affect the basic psychological need for competence. It is important to note that proponents of the CET sub-theory (Vallerand & Reid, 1984) suggest that autonomy is important for the sense of competence, without which intrinsic motivation cannot be strengthened. It could be said that the Theory of Self-Regulation has brought a new direction to learning and a new status to the student, in which his responsibility is emphasized, and this implies self-organization. According to Zimmerman (2001, 2002), the theory of self-regulated learning believes that students can regulate their own learning abilities by adopting meta-cognitive and motivational learning strategies; they can structure a stimulating learning environment; and it is particularly important that they can self-determine the amount, pace, and manner of learning. Thus, it could be concluded that self-regulation is a construct of the highest order, which essentially has the same characteristics as other concepts - hypothetical constructs of the higher order (intelligence, cognitive style, etc.), and it is their hypothetical nature that is considered the essential determinant of this, and after all, other style constructs in psychology. It essentially refers to "established individual characteristics and differences in the ways of perceiving, thinking, learning, and solving problems, and whose common task is to compile a large number of mental functions under the same theoretical model and determine their common area and manner of manifestation" (Radovanović & Kvaščev, 1976), which is in line with the understandings of earlier authors, from whom these views and the term itself originate (Allport, 1961). Thus, Allport (1961) emphasizes the existence of a surplus meaning as one of the important determinants of the term construct, and this surplus meaning is hypothetical by nature. In psychological terms, as Radonjić (1981) suggests,

this inoperative surplus meaning often consists of a certain general, more or less indeterminate theoretical hypothesis (Radonjić, 1981, 1985, Pušina, 2014). Similar to Allport (1961) and Sternberg (1997), style is understood as a general psychological construct from which other concepts are derived (cognitive style, learning style, teaching style, thinking style, affective style, etc), based on its broad psychological nature and scientific-theoretical and practical orientation.

The above review of the characteristics of the construct is important to mention because these characteristics are also valid for the construct of self-regulation, which is tested as a construct in this meta-analysis. Therefore, in the further presentation of steps in sketching the methodological design of meta-analysis in the field of learning L2 and in the presentation and discussion of findings, we should keep in mind what was previously mentioned in defining the construct and self-regulation itself. The same goal is found in the fact that the tasks for this meta-analysis were chosen so that they could come, at least a little, closer to a more reliable framework that would be sufficient to define didactic procedures more clearly, and thus enable teachers to use more knowledge in practice on the importance of certain variables that more reliably define the construct of self-regulation, especially today when a holistic approach to teaching, personalization, and mentoring in self-regulated learning is increasingly advocated, which has autonomy in definition as its basic determinant, with the assumption of mentoring in teaching.

Findings from numerous previous studies on self-regulation in learning and teaching LSP build on the above definition of the construct of self-regulation in learning. The main reasons for this research design lie in the difficulty of finding more effective models of self-regulation, conflicting findings on the importance of factors, and ambiguities in the search for a general construct, which would bring us closer to a holistic approach to learning and teaching foreign languages, and thus also to personalization of proceedings, which would lead to higher efficiency in learning. Namely, the findings testify to the different statuses of individual variables in research that, according to several basic characteristics, was aimed at the same goal. This goal was to consider the importance of factors that contribute to success in learning and teaching, especially in students with high academic achievement, who were treated as academically gifted because they achieved high self-achievement in general (an average grade above 9.00, and in several studies, even above 9.70). It is also important that numerous variables, such as self-confidence, often stand out as important factors, which, in cooperation with other observed factors, contribute to the self-regulation of gifted students in learning L2. Among the findings, there are also other variables with this status. The findings emphasize the importance of relationships between different types of motivation and a sense of personal commitment, perseverance, more positive self-perception, and better quality of engagement, making it difficult to create a more reliable picture of a model that would be useful in practice (Šafran, 2017, 2018; Šafran et al., 2018; Šafran & Gojkov-Rajić, 2019; Stojanović & Gojkov, 2021; Gojkov-Rajić, 2020). Findings of the research, which focused on the question of the scope of variables that are usually included the composite that observes the construct of self-regulation, support the conclusion that more variables enable a more versatile, holistic approach to the phenomenon and more efficient didactic work in the personalization of the approach to the gifted (Gojkov-Rajić et al., 2021a; Gojkov-Rajić et al., 2021b). This also includes the question of their mutual relationship and scope in terms of their predictive value for opportunities to encourage reaching achievements in learning L2, or LSP in academically gifted students. Also important is the conclusion that numerous factors (meta-cognition, motivation, personality traits, self-confidence, memory, and reasoning competencies) are in a significant intertwined correlative relationship (Gojkov-Rajić et al., 2021c; Gojkov-Rajić et al., 2020), which makes the picture even less clear.

To illustrate this, an example is given of research into the complexity of the phenomenon of self-confidence that found differences between overlapping concepts of self-efficacy, self-confidence, and self-esteem (Oney & Oksuzoglu-Guven, 2015). Self-efficacy is defined as the individual's belief in his own ability to influence events in his own life, and thus as a success in resolving practical, real-life situations (Bandura, 1991). Self-confidence has a different meaning, being understood as awareness of one's own values and attitudes towards the individual's dignity in terms of valuing his personal qualities in accordance with self-realization. From the above, it can be concluded that self-esteem refers to a personal belief in one's own worth at present time, while self-efficacy refers to the individual's awareness based on self-assessment, which implies a belief directed towards the future, i.e. the ability to act in future situations that may arise. Also, self-confidence is believing in oneself (Benabou & Tirole, 2002). It is also defined as *the individual's expectations regarding performance and self-evaluation of ability and previous performance* (Lenney, 1981; Lenney & Gold, 1983). An essential determinant of this term is the *individual's confidence in his own abilities, capacities, and assessments, or the belief that he can successfully face everyday challenges and demands* (Colman, 2008). Self-confidence is related to confidence in one's own abilities, satisfaction with those abilities and success, and it is also related to the energy and motivation to take action and achieve goals. The fact that researchers do not make a clear distinction between the above concepts creates ambiguity, and they see self-efficacy as an *individual's belief in his abilities in relation to a specific task, while they see self-confidence as a broader and more stable feature of an individual's perception of overall ability*. Research has also established the mutual relations between the abovementioned success factors, as well as the individual relationship with knowledge in the field of LSP through the mediating function of motivation (Noels, 2009). This extends the self-regulation model to more factors and makes it less possible to expect that a construct will soon be found that would lead to a reliable definition of self-regulation as the basis for acting in practice. This is how we understand the thinking of Kleitman and Stankov (2007), who find that self-confidence is a broad psychological trait that intersects different cognitive domains. This is interesting for this research to include in the composite of variables which seeks to answer the question regarding their relationship and their individual contribution to achievements in L2, to help teachers and students form meta-cognitive strategies in mastering L2.

And this is exactly the core of the interest in the meaning of this phenomenon in the structure of other cognitive and non-cognitive constructs, important for learning L2.

As it can be seen from the previous brief sketches of theoretical and design issues of the use of factor recording instruments that would define the construct of self-regulation in learning L2 more reliably, there is still much room for further research on the ways to make these more effective in the field of encouraging self-regulated learning in students, which testifies the findings of the mentioned and many other studies; conflicting findings or unresolved issues; differences in the same variables; checking the stability of findings of several studies, etc. (White, 2007).

A particular stumbling block is the difficulty in structuring the modeling components in order to personalize the learning experience. This remains an open methodological issue that certainly has consequences in practice. Researchers are further searching for a set of characteristics whose unification would bring them closer to the needs of individuals in using learning strategies to encourage self-regulated learning and, above all, motivation to learn LSP (Šafranji et al., 2018). This was the reason for accepting meta-analysis for the research design.

The objectives of the studies included in the meta-analysis relate to the following:

- Examining the complexity of the construct of self-regulation and the relationships between the variables within it, as well as their influence on the success of learning L2 in gifted students (*variables: predictors: types of motivation (intrinsic, extrinsic, and subclasses of amotivation: amotivation, external incentives, integrated incentives, identified regulation, intrinsic motivation - knowledge, intrinsic motivation - fulfillment, intrinsic motivation - stimulation); meta-cognition, personality traits, self-confidence, memory and reasoning competencies; criterion: success on the L2 test, average grade in studies above 9.70 as an indicator of giftedness, moderators: gender, residence in the native speaker's country, length of learning LSP;*
- Determining the patterns of *relationships between types of motivation and willingness to communicate* (*variables: meta-cognition, personality traits, self-confidence, memory and reasoning competencies; criterion: success on the LSP test;*
- Identifying the role of self-confidence, meta-cognition, personality traits and motivation (predictive variables), in LSP learning success;
- Determining *mutual relations and scopes in terms of predictive value for opportunities to encourage students to achieve success in L2 learning, and self-regulation; predictive variables: types of motivation, meta-cognition, personality traits, self-confidence, memory and reasoning competencies; criterion: L2 test success; average grade in studies above 9.00 as an indicator of giftedness; moderator: gender.*

We opted for meta-analysis as a statistical method of testing the obtained findings in order to arrive at more reliable estimates of the results of previously conducted research. Although with the modest range of selected research studies for this type of analysis, meta-analysis was conducted based on its main purpose of formulating more effective estimates of the actual size ratios, i.e. to test the accuracy of obtained relationships in a higher number of previously conducted studies. In this modest-sized meta-analysis, we started from the questions that remained open and unexplained in the findings of several studies, that is, with differences in their findings and interpretations. Thus, the questions - tasks for the meta-analysis were as follows:

- Identifying patterns that agree or that are sufficient to define the basics of self-regulation. On this basis, a basis for didactic action could be formed in terms of encouraging the improvement of self-regulation in L2 learning.

This task seeks answers to the following questions:

- What is the relationship between the observed variables that are important for self-regulation and which of the observed variables are significant or sufficient to formulate a model of self-regulation, and what are the relationships between the gifted and other students in this regard? This includes the question: to what extent have personality traits proved to be a good predictive factor for self-regulated learning (average success and success in L2) of gifted and other students? Thus, assessing as far as possible the effects and capacity of personality traits and other included variables for more efficient consideration of the construct of self-regulation in learning LSP or determining the scope of variables that are usually included in the composite that considers the construct of self-regulation and thus studying the issue of their mutual relationship and scope in terms of their predictive value for opportunities to encourage achievements in learning L2 or LSP in students. Testing the same for moderating variables: gender, residence in the native speaker's country, years of learning L2; how important are these moderating variables for the average grade in studies, i.e., self-regulation?
- Identifying patterns and models among research results and sources of disagreement among those results. We will achieve this by comparing samples, comparing outcome

data, and observing sources of heterogeneity between the gifted and other students, as well as by examining sources of heterogeneity among studies.

Method

Selection of papers

Out of 175 research papers dealing with the topic of self-regulation in L2 learning that covered 49.821 students, 17 papers were selected in the second round, which covered 4.263 students who were academically gifted and learned L2. In the third step of selection, only three works remained, which could be compared by characteristics (goals, sample, variables, respondents, etc.), and which examined issues relevant to this paper, that is, the relationship between personality traits, motivation to learn L2 and achievements in LSP. The total number of respondents was 1.263, with 711 of them being academically gifted students who were learning LSP. There are many difficulties in choosing papers for meta-analysis, starting from different, insufficiently clearly presented research designs, differences in the application of instruments, undefined metric characteristics, undefined samples, research methods, procedures, and incomplete data on which statistical analyses could be performed. The meta-analysis included the following studies: *Self-Confidence in Meta-Cognitive Processes in L2 Learning* (Gojkov-Rajić et al., 2022), *Self-regulation of gifted students in L2 learning: Predictive value of variables in the complexity of self-regulation construct*, (Gojkov-Rajić et al., 2021c) and *Motivation for Foreign Language Communication* (Šafranj et al., 2021). The study included 26 predictor variables, 6 criterion variables, and 3 moderators chosen out of 12.

Tools

Personality traits. In all studies, the big five personality traits were measured using the IPIP simulation of the *Big Five personality traits questionnaire* from the International Personality Database (Goldberg, 2001). The 50-item questionnaire is intended to assess the big five personality traits, namely *Extraversion, Emotional Stability, Intellect, Agreeableness and Conscientiousness*.

In all papers, L2 learning motivation is measured using the scale of orientations in language learning (LLOS, Noels et al., 2000). The questionnaire consisted of 21 items on the five-point Likert scale intended to measure 7 types of motivation for L2 learning. Types of motivation are: *amotivation, external regulation, introjected regulation, identified regulation, motivation for knowledge, motivation for achievement, motivation for stimulation*. One of the above papers used the intrinsic motivation scale, which includes motivation for knowledge, achievement, and stimulation, and the results of this scale were used for these three subscales in the case of that research.

Success in L2 is measured using various achievement tests that examine the knowledge of L2 that students learn (language skills: speaking, writing, and comprehension).

Procedure and data analysis

The statistical procedure for the meta-analysis was conducted using the JASP open-source statistical software, which applies statistical procedures based on the metaphor project for the R programming language (Viechtbauer, 2010). For all analyses, Pearson's correlation coefficient (r) was used as the effect size. The random effects analysis model with a restricted maximum likelihood estimator (REML) was applied. The random effects model has been suggested in the

case of meta-analysis in social sciences (Field & Gillet, 2010), because, unlike the fixed effects model, it does not assume that all studies come from the same population, but that studies come from different populations that belong to a super population, which allows for a broader generalization of findings. Among the results were the following: **an estimated effect size with a 95% confidence interval, the model coefficient test (z-test)**, which examines whether the tested effect size differs from 0, as well as the **effect size heterogeneity test (Q)**, whose significance indicates that effect sizes differ among studies, that is, they are heterogeneous. Two groups of meta-analyses were conducted. **The first group examined the relationships between various aspects of motivation for L2 learning and the big five personality traits. The second group examined relations between aspects of motivation for L2 learning and L2 success.**

The following moderators were examined in the meta-analysis: 1) Gender, a continuous variable representing the proportion of female and male respondents in the sample. Higher values indicate a larger number of women in the sample, with a possible range of values being between 0 and 1. 2) Country, i.e., whether respondents in the sample resided in the country of native speaker. This is a continuous variable that represents the ratio of respondents who did and those who did not reside in the country of native speaker. Higher values indicate a larger number of respondents who have resided in the country of native speaker, with a possible range of values being between 0 and 1. 3) The length of time spent learning L2 in years. The value for each study represents the average length of L2 learning in the sample expressed in years. Each moderator was examined independently, in a separate model for each moderator. The potential publication bias was examined using Egger's test (Egger, Smith, Schneider & Minder, 1997), the significance of which indicates the potential existence of publication bias, and the file drawer problem analysis (Rosenthal, 1979), which indicates the number of papers with statistically insignificant results needs to be added to the sample in order to reduce the p level of statistical significance to a marginal level of significance ($p = 0.05$).

Results of a meta-analysis of motivational learning styles and personality traits and discussions

Average effect sizes, confidence intervals, z-test and effect size heterogeneity tests are shown in Table 1: *Basic parameters of the meta-analysis between motivation to learn L2 and personality traits*. The findings are as follows:

Amotivation is in significant negative correlation with the traits of *Extraversion*, *Intellect*, *Agreeableness* and *Conscientiousness*. In all cases, the effect size heterogeneity test is insignificant, indicating that there are no large differences between effect sizes and that they are homogeneous. All correlations are mild to moderate in intensity, with the highest negative correlation being with the dimension of *Intellect*.

External regulation achieves a significant correlation only with the dimension of *Intellect*, which is a very slight positive correlation.

- *Motivation for stimulation* has significant correlations with all dimensions, a negative correlation with *Emotional stability*, and positive correlations with other dimensions.
- In the case of the dimensions of *Intrinsic motivation* (motivation for knowledge, achievement, and stimulation), the effect size heterogeneity test is not significant, indicating that there are no large differences between effect sizes and that they are homogeneous.
- *Dimensions of motivation* generally achieve the highest intensity correlations with *Intellect* and *Agreeableness*, while correlations with other dimensions are somewhat weaker.

Table 1. Basic parameters of meta-analysis between L2 learning motivation and personality traits

		Extraversion	Emotional stability	Intellect	Agreeableness	Conscientiousness
Amotivation	r	-0.12	-0.04	-0.22	-0.11	-0.16
	95% CI	-0.17, -0.06	-0.09, 0.01	-0.28, -0.16	-0.17, -0.04	-0.21, -0.11
	Z (p)	-4.36 (< .001)	-1.51 (0.131)	-7.27 (< .001)	-3.35 (< .001)	-5.89 (< .001)
	Q(df, p)	0.05 (2, 0.975)	0.84 (2, 0.657)	2.85 (2, 0.240)	2.96 (2, 0.228)	0.43 (2, 0.806)
External regulation	r	0.01	0.00	0.07	-0.00	0.03
	95% CI	-0.03, 0.07	-0.14, 0.14	0.016, 0.126	-0.17, 0.15	-0.02, 0.08
	Z (p)	0.69 (0.489)	0.01 (0.985)	2.51 (0.012)	-0.11 (0.912)	1.05 (0.292)
	Q(df, p)	2.01 (2, 0.366)	12.2 (2, 0.002)	1.54 (2, 0.463)	15.7 (2, <.001)	2.04 (2, 0.360)
Introjected regulation	r	-0.04	-0.10	-0.07	0.05	-0.07
	95% CI	-0.11, 0.02	-0.15, -0.04	-0.16, 0.01	-0.09, 0.20	-0.29, 0.14
	Z (p)	-1.18 (0.238)	-3.58 (< .001)	-1.56 (0.119)	0.73 (0.460)	-0.69 (0.489)
	Q(df, p)	3.38 (2, 0.184)	2.19 (2, 0.334)	5.26 (2, 0.072)	12.4 (2, 0.002)	27.4 (2, <.001)
Identified regulation	r	0.02	-0.00	0.21	0.17	0.08
	95% CI	-0.04, 0.10	-0.06, 0.04	0.15, 0.26	0.08, 0.278	-0.02, 0.19
	Z (p)	0.69 (0.485)	-0.21 (0.828)	7.71 (< .001)	3.54 (< .001)	1.58 (0.114)
	Q (df, p)	3.60 (2, 0.165)	1.13 (2, 0.567)	0.56 (2, 0.756)	6.12 (2, 0.047)	7.00 (2, 0.030)
Motivation for knowledge	r	0.09	-0.13	0.20	0.18	0.074
	95% CI	0.01, 0.17	-0.20, -0.06	0.14, 0.25	0.13, 0.23	0.01, 0.12
	Z (p)	2.37 (0.018)	-3.95 (< .001)	7.01 (< .001)	6.63 (< .001)	2.64 (0.008)
	Q(df, p)	4.18 (2, 0.123)	3.08 (2, 0.214)	2.43 (2, 0.296)	0.87 (2, 0.645)	1.13 (2, 0.568)
Motivation for achievement	r	0.10	-0.13	0.16	0.17	0.09
	95% CI	0.04, 0.17	-0.27, 0.00	0.10, 0.21	0.12, 0.23	0.03, 0.14
	Z (p)	3.21 (0.001)	-1.85 (0.064)	5.75 (< .001)	6.36 (< .001)	3.29 (< .001)
	Q(df, p)	3.02 (2, 0.221)	11.5 (2, 0.003)	1.07 (2, 0.583)	1.36 (2, 0.506)	1.89 (2, 0.387)
Motivation for stimulation	r	0.06	-0.12	0.15	0.19	0.06
	95% CI	0.00, 0.12	-0.20, -0.03	0.09, 0.20	0.14, 0.25	0.00, 0.11
	Z (p)	2.22 (0.026)	-2.88 (0.004)	5.42 (< .001)	7.08 (< .001)	2.21 (0.0027)
	Q(df, p)	2.17 (2, 0.337)	4.47 (2, 0.107)	0.58 (2, 0.747)	0.37 (2, 0.828)	1.09 (2, 0.580)

Note: r – average effect size (correlation); 95% CI – confidence interval of 95%; z (p) – z-test (p level); Q (df, p) – effect size heterogeneity test (degree of freedom, p level).

Perhaps the data will be clearer if only *r* is extracted - average effect size (correlation). Table 2 shows the parameters that indicate the correlation between L2 learning motivation and personality traits.

Table 2. *R*- parameter indicating the correlation between L2 learning motivation and personality traits

		Extraversion	Emotional stability	Intellect	Agreeableness	Conscientiousness
Amotivation	<i>r</i>	-0.12	-0.04	-0.22	-0.11	-0.16
External regulation	<i>r</i>	0.01	0.00	0.07	-0.00	0.03
Introjected regulation	<i>r</i>	-0.04	-0.10	-0.07	0.05	-0.07
Identified regulation	<i>r</i>	0.02	-0.00	0.21	0.17	0.08
Motivation for knowledge	<i>r</i>	0.09	-0.13	0.20	0.18	0.074
Motivation for achievement	<i>r</i>	0.10	-0.13	0.16	0.17	0.09
Motivation for stimulation	<i>r</i>	0.06	-0.12	0.15	0.19	0.06

Note: *r* – average effect size (correlation); 95% CI – confidence interval of 95%; *z* (*p*) – *z*-test (*p* level); *Q* (*df*, *p*) – effect size heterogeneity test (degree of freedom, *p* level).

Previous findings, as well as these, clearly indicate that only intrinsic types of motivational regulation are important for practical aspects. Thus, if this group includes *Identified Regulation*, which due to its practical aspect is on the border with *Intrinsic Regulation*, the subject is forced to accept self-regulation in the expected direction, understand the practical aspects, include it in its goals, and accept it as a form of self-regulation. Therefore, it is important for teachers to know that all types of external regulation (grades, praise, etc.) can hardly initiate self-regulation, but accepting the need for mastering LSP, some practical circumstances can also be strong motivators. Therefore, in that sense, they should look for ways to take this difficult but effective path of autonomy of motivation (Allport, 1961).

A clearer picture of the previous findings is provided by Figures 1-26

Amotivation

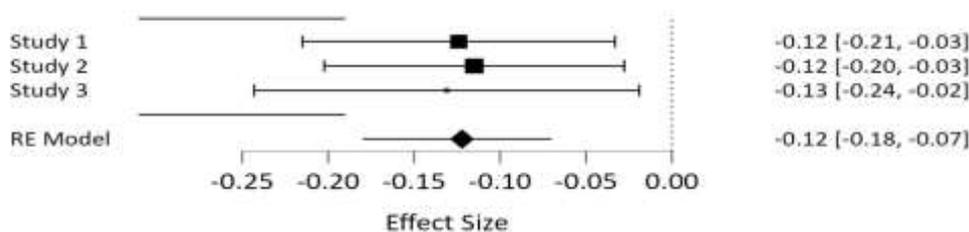


Figure 1. Forest plot of meta-analysis of Amotivation and Extraversion

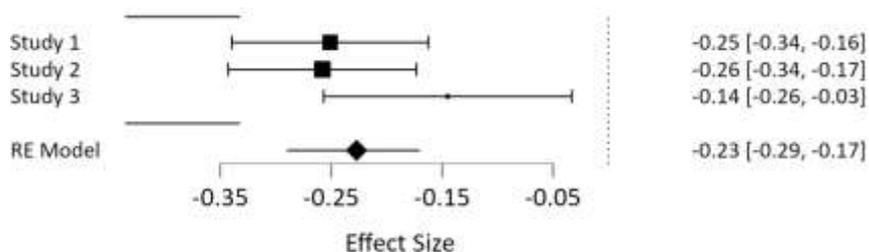


Figure 2. Forest plot of meta-analysis of Amotivation and Intellect

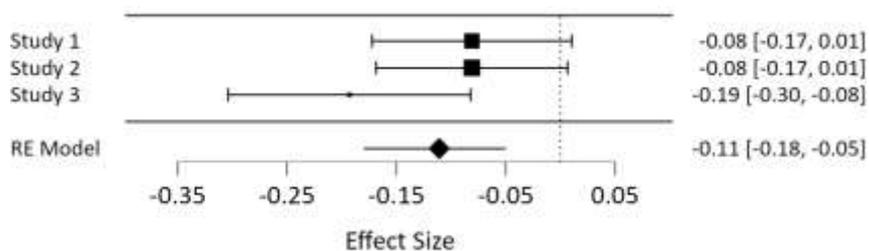


Figure 3. Forest plot of meta-analysis of Amotivation and Agreeableness

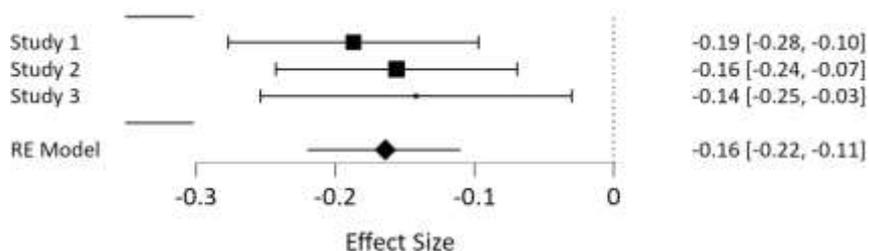


Figure 4. Forest plot of meta-analysis of Amotivation and Conscientiousness

External regulation

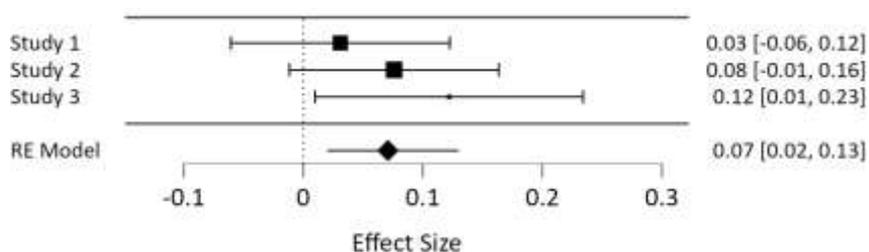


Figure 5. Forest plot of meta-analysis of External regulation and Intellect

Introjected regulation

Introjected regulation achieves a mild negative correlation with Emotional stability.

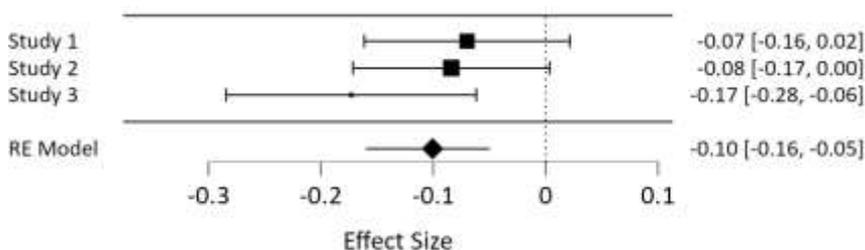


Figure 6. Forest plot of meta-analysis of Introjected regulation and Emotional stability

Identified regulation

Identified regulation achieves significant correlations with two dimensions: *Intellect* and *Agreeableness*. These correlations are positive in direction and mild in intensity.

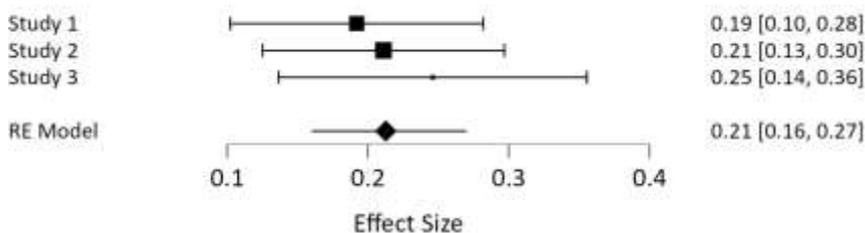


Figure 7. Forest plot of meta-analysis of Identified regulation and Intellect

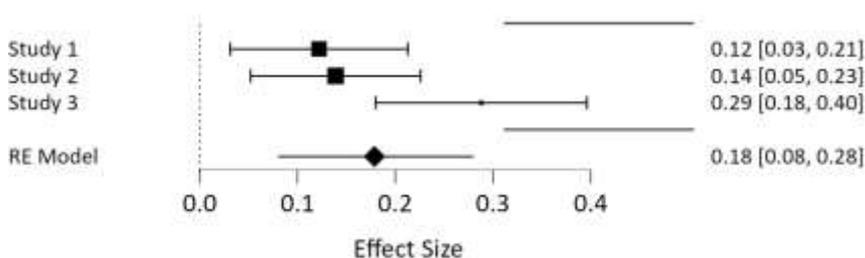


Figure 8. Forest plot of meta-analysis of Identified regulation and Agreeableness

In the case of *Agreeableness*, as in previous effect size tests in other observed relationships between personality traits and motivational components, significant is the effect size heterogeneity test, which indicates that there are differences between effect sizes among studies in the case of these constructs. On the basis of these data, the cause cannot be determined with

certainty, but it is indicative and necessitates a new meta-analysis, which will be particularly focused on these constructs.

Motivation for knowledge

Motivation for knowledge achieves significant correlations with all dimensions. All correlations are of mild intensity and positive for all dimensions except for *Emotional stability*, with which the motivation for knowledge has a negative correlation, which can be clearly seen from the following graph. The same is the situation with *Extraversion and Motivation for Knowledge*. And, as it can be seen from the graphical presentations (Figure 28. *Funnel plot of meta-analysis of Identified regulation and Agreeableness*, and Figure 29. *Funnel plot of meta-analysis of Motivation for stimulation and Emotional stability*), *Extraversion* has a negative correlation with *Motivation for stimulation*, which indicates the possibility of creating a negative defensive deviation, a depressive self-handicapping pattern (Lončarić, 2014).

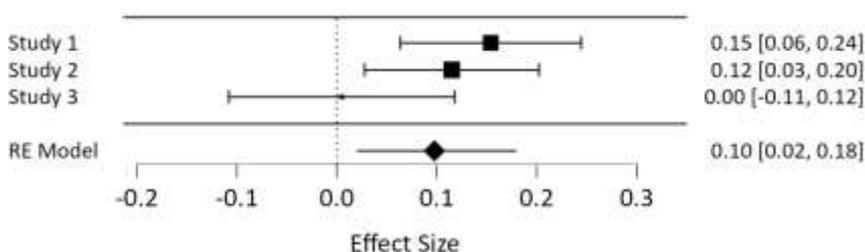


Figure 9. Forest plot of meta-analysis of Motivation for knowledge and Extraversion

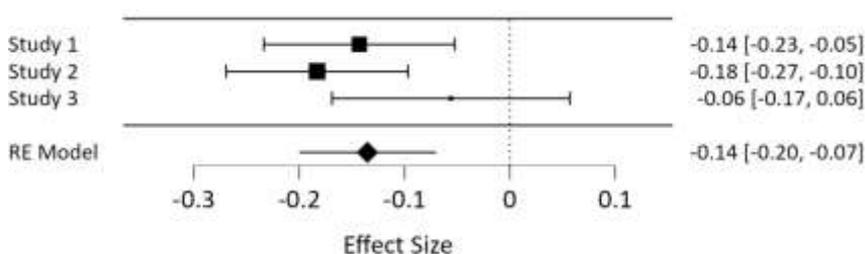


Figure 10. Forest plot of meta-analysis of Motivation for knowledge and Emotional stability

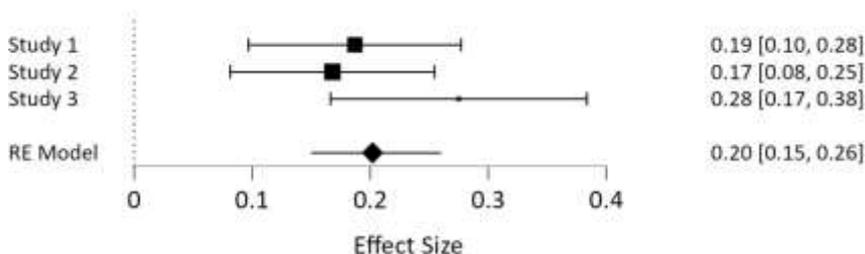


Figure 11. Forest plot of meta-analysis of Motivation for knowledge and Intellect

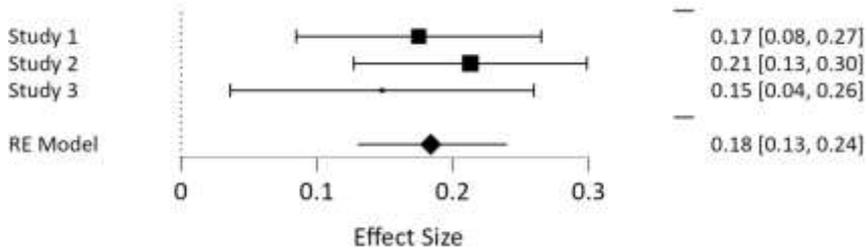


Figure 12. Forest plot of meta-analysis of Motivation for knowledge and Agreeableness

Motivation for achievement has a mild but significant positive correlation with the dimensions of Extraversion, Intellect, Agreeableness and Conscientiousness.

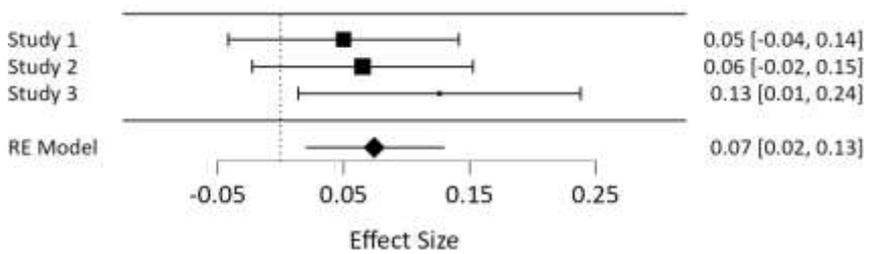


Figure 13. Forest plot of meta-analysis of Motivation for knowledge and Conscientiousness

Motivation for achievement

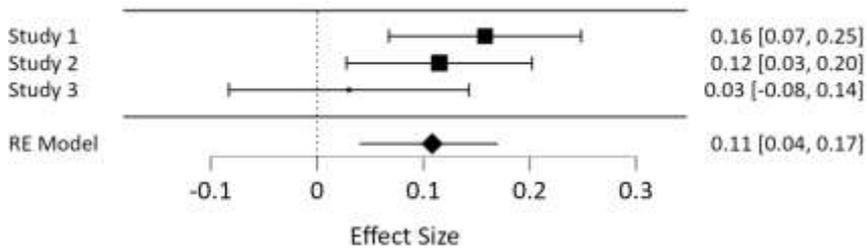


Figure 14. Forest plot of meta-analysis of Motivation for achievement and Extraversion

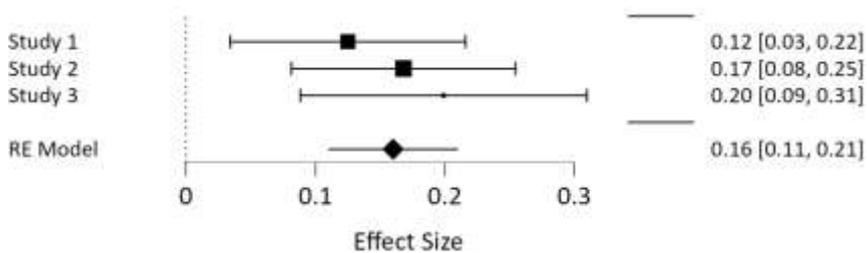


Figure 15. Forest plot of meta-analysis of Motivation for achievement and Intellect

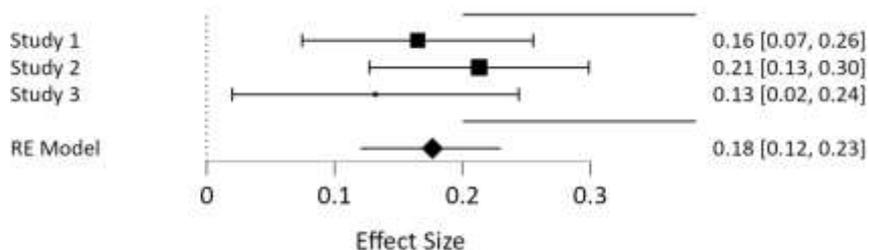


Figure 16. Forest plot of meta-analysis of Motivation for achievement and Agreeableness

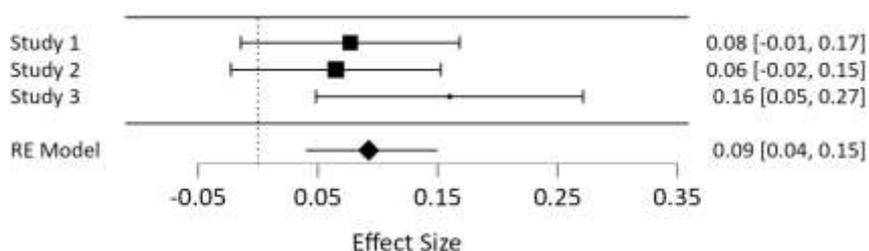


Figure 17. Forest plot of meta-analysis of Motivation for achievement and Conscientiousness

Motivation for stimulation

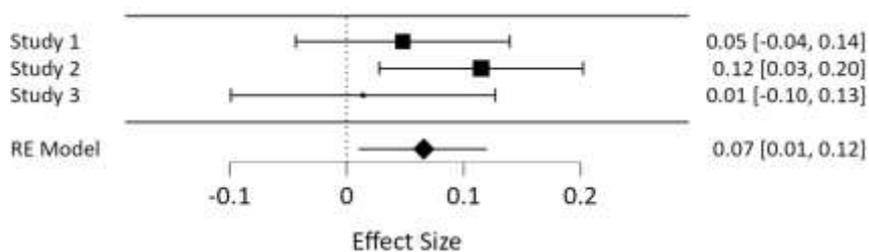


Figure 18. Forest plot of meta-analysis of Motivation for stimulation and Extraversion

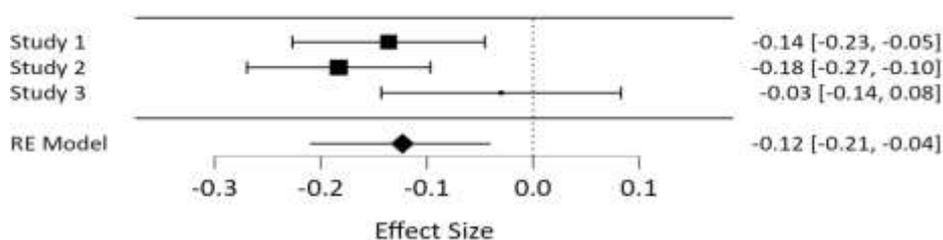


Figure 19. Forest plot of meta-analysis of Motivation for stimulation and Emotional stability

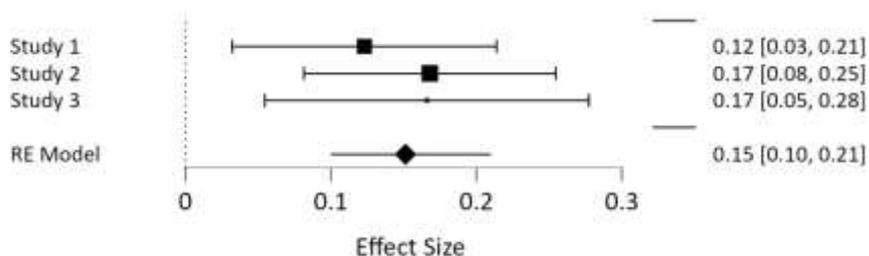


Figure 20. Forest plot of meta-analysis of Motivation for stimulation and Intellect

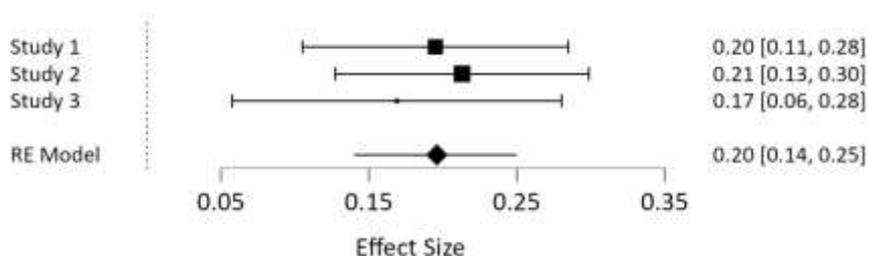


Figure 21. Forest plot of meta-analysis of Motivation for stimulation and Agreeableness

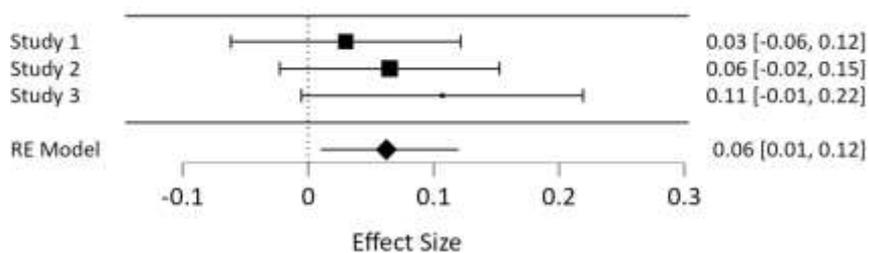


Figure 22. Forest plot of meta-analysis of Motivation for stimulation and Conscientiousness

Motivation and L2 test success

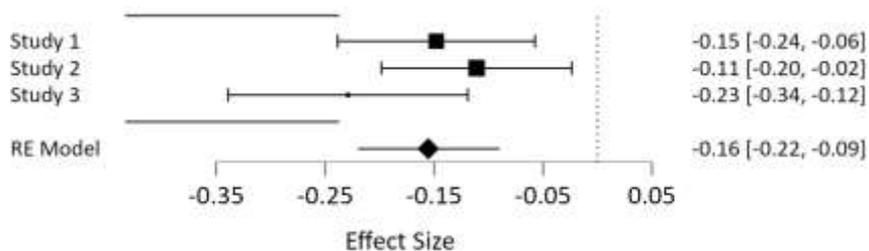


Figure 23. Forest plot of meta-analysis of Amotivation and L2 test success

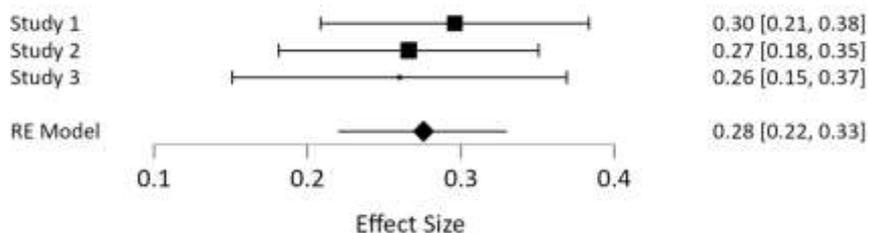


Figure 24. Forest plot of meta-analysis of Identified regulation and L2 test success

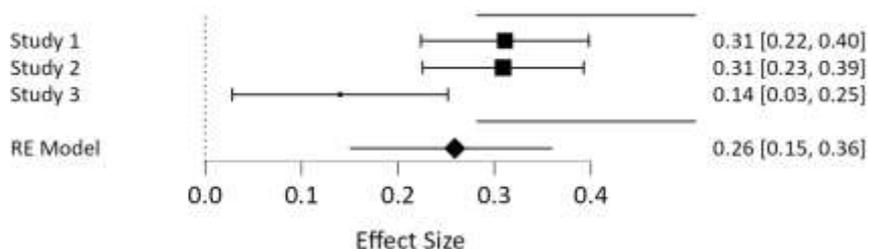


Figure 25. Forest plot of meta-analysis of Motivation for knowledge and L2 test success

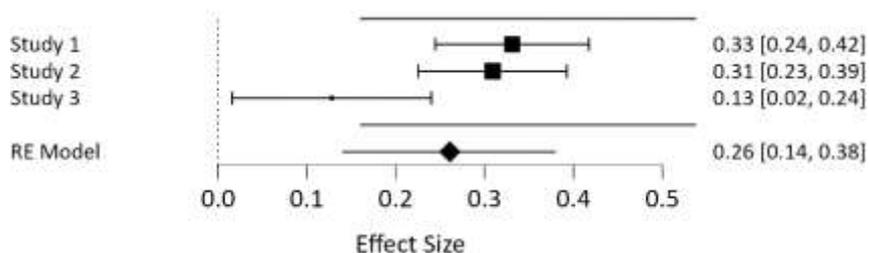


Figure 26. Forest plot of meta-analysis of Motivation for achievement and L2 test success

Motivation for stimulation and L2 test success

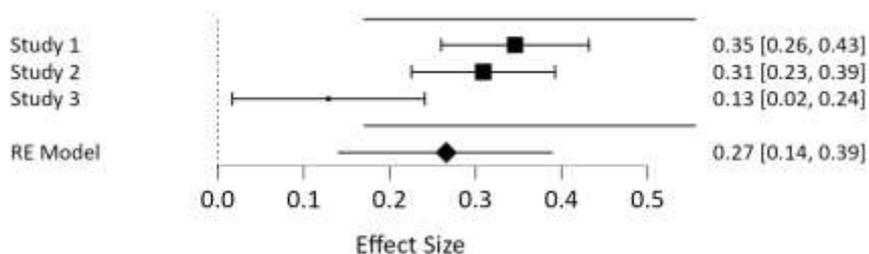


Figure 27. Forest plot of meta-analysis of Motivation for stimulation and L2 test success

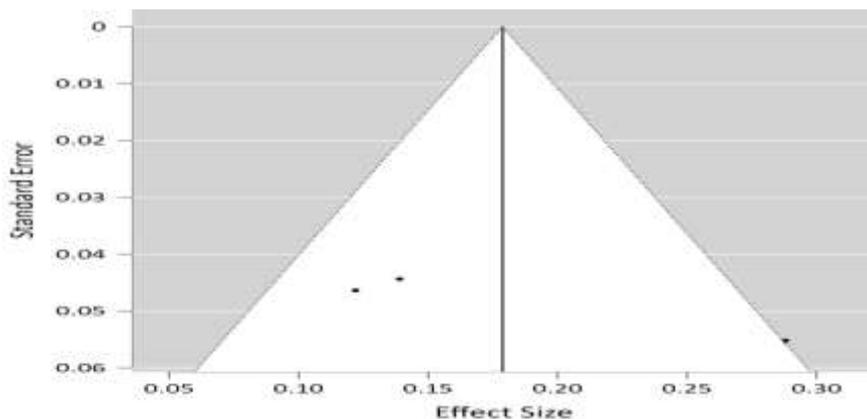


Figure 28. Funnel plot of standard error and effect size of meta-analysis of Identified regulation and Agreeableness

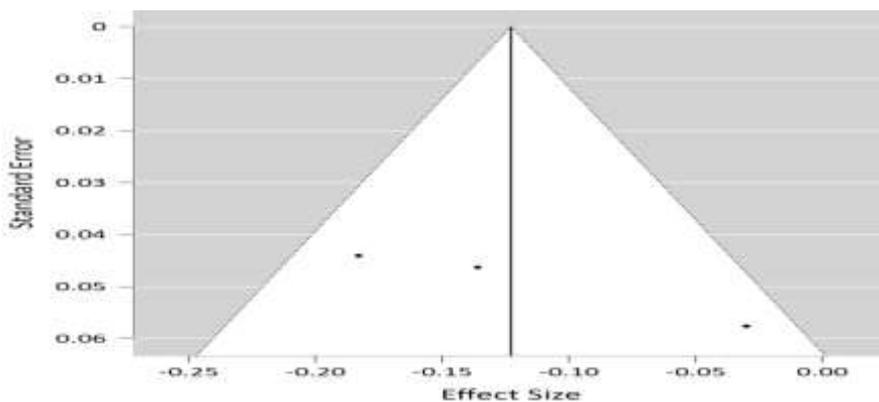


Figure 29. Funnel plot of standard error and effect size of meta-analysis of Motivation for stimulation and Emotional stability

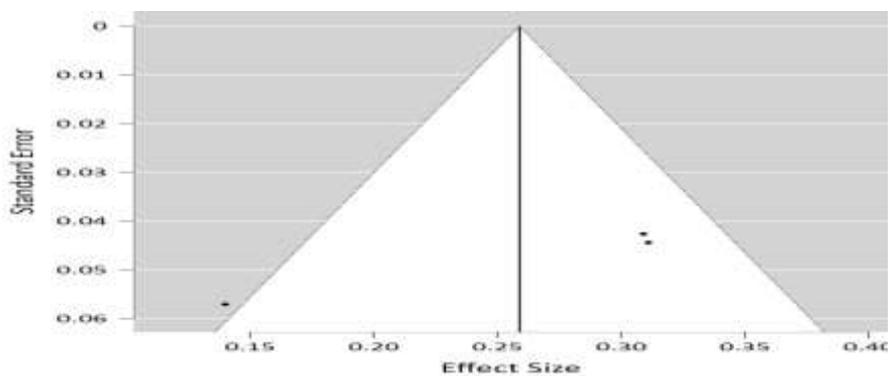


Figure 30. Funnel plot of standard error and effect size of meta-analysis of Motivation for knowledge and L2 test success

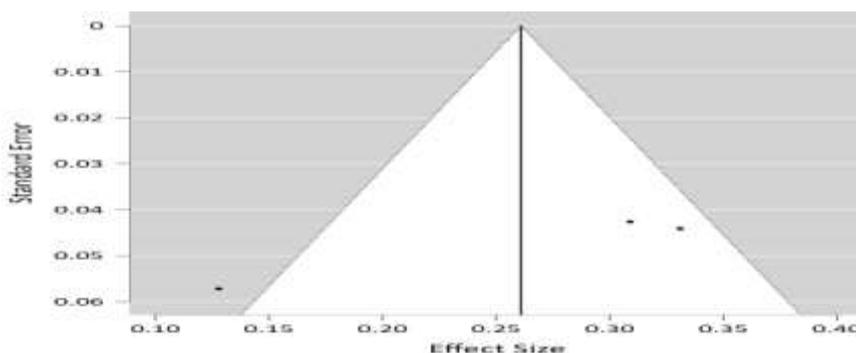


Figure 31. Funnel plot of standard error and effect size of meta-analysis of Motivation for achievement and L2 test success

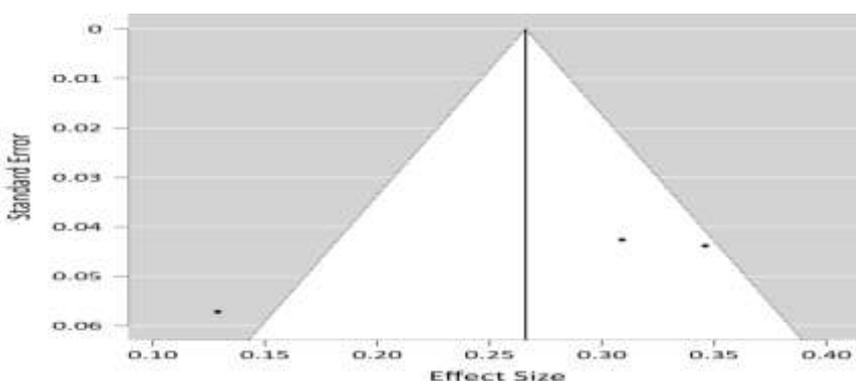


Figure 32. Funnel plot of standard error and effect size of meta-analysis of Motivation for stimulation and L2 test success

Data in funnel plots indicates mediocre relationships between the observed motivation variables and L2 test success. Figure 29. *Funnel plot for meta-analysis of Motivation for Stimulation and Emotional stability* clearly shows a negative effect size or a negative correlation between personality traits and motivational components, which can be an indicator of a negative pattern.

Moderation analysis

A moderation analysis was conducted, where the significance of the three moderators (gender, country, and years of study) in all significant meta-analytical models was examined separately. No specific a priori hypotheses were set for the moderators, and all moderation analyses were exploratory. The significant moderation analyses are shown in Table 3. *Moderation analysis*.

- In the case of the correlation between *Identified regulation* and *Agreeableness*, gender, country, and years of learning were found to be significant moderators. Their relationships can be interpreted as follows: in the case of gender, a higher percentage of female respondents in the sample was associated with a lower intensity of correlation between *Identified regulation* and *Agreeableness*; in the case of country, a lower percentage of respondents who resided in a country of native speaker showed a higher intensity of correlation between *Identified regulation* and *Agreeableness*; in the case of learning length, a longer average learning length was associated with a higher intensity of correlation between *Identified regulation* and *Agreeableness*.

- In the case of the correlation between *Motivation for knowledge* and *Extraversion*, gender proves to be a significant moderator, with a higher proportion of women in the sample being associated with a higher correlation between the two constructs.
- Years of learning and living in the country of the native speaker moderate the correlation between motivation for stimulation and *Emotional stability*. In the case of residing in the country of native speaker, a higher percentage of respondents who resided in the country of native speaker is associated with a stronger intensity of the (negative) correlation between *Motivation for stimulation* and *Emotional stability*, while the longer average years of L2 learning in the sample is associated with a lower intensity of this correlation.

Table 3. Moderation analysis

Model	Moderator	Z	p	Effect assess m.	95% CI
Identified regulation x Agreeableness	Gender	-2.47	0.010	-0.91	-1.64, -0.19
	Country	-2.46	0.010	-7.78	-13.97, -1.58
	Learning	2.46	0.010	0.39	0.08, 0.70
Motivation for knowledge x Extraversion	Gender	2.03	0.042	0.77	0.02, 1.51
Motivation for stimulation x Emotional stability	Country	-1.99	0.046	-6.49	-12.89, -0.10
	Learning	1.98	0.047	0.32	0.00, 0.64

Note: Gender - proportion of female respondents in the sample; Country - proportion of respondents who resided in the country of native speaker; Learning - Average length of learning in years; z - z-test; p - p level; Effect assessment - moderator effect size; 95% CI - confidence interval of 95%.

Publication bias analysis

For all significant models, publication bias was tested using Egger's test and file drawer analysis (fail-safe N). According to Rosenthal (1979), publication bias is unlikely if fail-safe N is greater than $5 \times k$ (number of papers) + 10. Since all results were based on the meta-analysis of 3 papers, the limit value for this criterion was set at 25.

The results of the publication bias analysis are shown in Table 4. *Publication bias analysis*.

- In the case of *Amotivation*, there were no significant Egger tests, indicating that there was no publication bias. In the case of fail-safe N, the limit value is exceeded in the case of correlation with *Intellect* and *Conscientiousness*, while the fail-safe N is lower for *Extraversion* and *Agreeableness*.
- *External regulation* has only one correlation, and that is with *Intellect*. File drawer analysis indicates that 5 insignificant results would be required for the meta-analysis result to become insignificant.
- In the case of *Identified regulation*, the Egger test is significant in the case of *Agreeableness*, which indicates that there is a certain publication bias for these findings. The file drawer analysis shows that it would take 42 and 64 papers, respectively, in order for the correlation between *Identified Regulation* and *Agreeableness*, and *Identified Regulation* and *Intellect*, to become statistically insignificant, which is above the proposed limit.
- *Motivation for knowledge* has significant correlations with all dimensions, and the file drawer analysis shows that the most stable correlation is with *Intellect*, where 58 insignificant findings are needed and with *Agreeableness*, where 44 insignificant findings are needed, for the meta-analytical result to become insignificant.

- With other dimensions, fail-safe N does not exceed the proposed limit of 25.
- Motivation for achievement achieves significant correlations with all dimensions except *Emotional stability*, and in the case of dimensions of *Intellect* and *Agreeableness*, fail-safe N exceeds the proposed limit of 25 papers. In the case of motivation for stimulation and *Emotional stability*, Egger's test was significant, indicating that there is a certain publication bias for these findings. As far as fail-safe N is concerned, the correlation of stimulation with *Intellect* and *Agreeableness* exceeds the proposed limit, while with the remaining 3 dimensions it is below the limit.

Table 4. Publication bias analysis

	Egger's test		File drawer analysis (fail-safe N)
	z	p	
Amotivation x Extraversion	-0.19	0.843	19
Amotivation x Intellect	1.68	0.090	70
Amotivation x Agreeableness	-1.69	0.090	15
Amotivation x Conscientiousness	0.37	0.711	35
External regulation x Intellect	0.89	0.374	5
Introjected regulation x Emotional stability	-1.40	0.160	13
Identified regulation x Intellect	0.61	0.536	64
Identified regulation x Agreeableness	2.36	0.018	42
Knowledge x Extraversion	-1.85	0.065	11
Knowledge x Emotional stability	1.72	0.084	22
Knowledge x Intellect	1.56	0.119	58
Knowledge x Agreeableness	-0.81	0.414	44
Knowledge x Conscientiousness	0.98	0.325	6
Achievement x Extraversion	-1.49	0.134	13
Achievement x Intellect	0.64	0.517	35
Achievement x Agreeableness	-1.01	0.309	40
Achievement x Conscientiousness	1.37	0.169	10
Stimulation x Extraversion	-1.22	0.224	3
Stimulation x Emotional stability	2.08	0.037	19
Stimulation x Intellect	0.15	0.873	30
Stimulation x Agreeableness	-0.58	0.558	52
Stimulation x Conscientiousness	0.78	0.431	3

The results of a meta-analysis of motivational learning styles and L2 success

Average effect sizes, confidence intervals, z-test and effect size heterogeneity tests are shown in Table 5. *Basic parameters of the meta-analysis between L2 learning motivation and L2 success.*

- 5 out of 7 types of motivation achieve significant correlations with L2 success. Weak negative correlation is achieved by *amotivation*, while moderate positive correlations with achievement are realized by *Identified regulation*, *Motivation for knowledge*, *Motivation for achievement*, and *Motivation for stimulation*. The results indicate that a higher level of motivation is associated with poorer L2 success. Higher levels of the other mentioned motivations are associated with greater L2 success.
- In the case of the dimension of *intrinsic motivation* (motivation for knowledge, achievement, and stimulation), the effect size heterogeneity test is significant,

indicating that there are significant differences between effect sizes in different studies and that they are heterogeneous.

Table 5. Basic parameters of meta-analysis between L2 learning motivation and L2 success

	Achievement (grade) in L2			
	r	95% CI	Z (p)	Q (df, p)
Amotivation	-0.15	-0.21, -0.09	-4.89 (<.001)	2.73 (2, 0.255)
External regulation	0.01	-0.05, 0.09	0.46 (0.643)	3.73 (2, 0.155)
Introjected regulation	0.07	-0.09, 0.15	1.73 (0.082)	4.42 (2, 0.109)
Identified regulation	0.27	0.22, 0.32	10.17 (<.001)	0.337 (2, 0.845)
Motivation for knowledge	0.26	0.15, 0.36	4.82 (<.001)	6.87 (2, 0.032)
Motivation for achievement	0.26	0.14, 0.38	4.23 (<.001)	8.85 (2, 0.012)
Motivation for stimulation	0.26	0.13, 0.39	4.12 (<.001)	9.69 (2, 0.008)

Note: r – average effect size (correlation); 95% CI – confidence interval of 95%; z (p) – z-test (p level); Q (df, p) – effect size heterogeneity test (degrees of freedom, p level).

Moderation analysis

Moderation analyses were conducted where the significance of the three moderators (gender, country, and years of study) in all statistically significant meta-analytical models was examined. No specific a priori hypotheses were set for the moderators, and all moderation analyses were exploratory. Significant moderation analyses are shown in Table 6. *Moderation analysis.*

The three moderators significantly moderate the relationships between intrinsic types of motivation, i.e., Motivation for knowledge and success, Motivation for achievement and success, and Motivation for stimulation and success. In all cases, the influence of the moderator has a similar pattern. In the case of gender, a higher proportion of female respondents and a higher proportion of those who resided in the country of the native speaker in the sample are associated with a higher intensity of these constructs, while the average length of learning in the sample is associated with a lower intensity of this relationship. The importance of gender is often taken as a variable moderator in studies, suggesting the possibility of influence of this variable, but nevertheless, there are often situations where this variable is a significant moderator. Thus, a finding is cited from a meta-analysis dealing with a similar topic and also stating the importance of gender as a moderating variable (White, 2007).

Table 6. Moderation analysis

Model	Moderator	Z	p	Effect assessm.	95% CI
Motivation for knowledge x success	Gender	2.58	0.010	0.96	0.23, 1.70
	Country	2.62	0.009	8.41	2.12, 14.71
	Learning	-2.62	0.009	-0.42	-0.74, -0.10
Motivation for achievement x success	Gender	2.97	0.003	1.11	0.37, 1.84
	Country	2.95	0.003	9.48	3.18, 15.77
	Learning	-2.95	0.003	-0.47	-0.79, -0.16
Motivation for stimulation x success	Gender	3.11	0.002	1.16	0.43, 1.89
	Country	3.04	0.002	9.78	3.49, 16.08
	Learning	-3.05	0.002	-0.49	-0.81, -0.17

Note: Gender – share of female respondents in the sample; Country – share of those who resided in the country of the native speaker; Learning – average length of L2 learning; z – z-test; p – p level; Effect assessment – moderator effect size; 95% CI – confidence interval of 95%.

Examination of publication bias

For all significant models, publication bias was tested using Egger's test and file drawer analysis (file-safe N). According to Rosenthal (1979), publication bias is unlikely if fail-safe N is greater than $5 \times k$ (number of papers) + 10. Since all results were based on a meta-analysis of 3 papers, the limit value for this criterion was set at 25. The results of these analyses are shown in Table 7. *Results of publication bias analysis.*

The results of file drawer analysis indicate that the findings are quite stable. The least file-safe N is in the case of the correlation between *amotivation* and L2 success, where 33 insignificant findings would be needed to make the result of the meta-analysis insignificant, while in the case of other types of motivation, file-safe N is higher than 100. Egger's test is significant in the cases of *Motivation for knowledge*, *Motivation for achievement*, and *Motivation for stimulation*, which indicates the existence of a certain publication bias.

Tabela 7. *Results of publication bias analysis*

	Egger's test		File drawer analysis (file-safe N)
	z	p	
Amotivation x success	-1.62	0.105	33
Identified regulation x success	-0.259	0.795	110
Knowledge x success	-2.59	0.010	101
Achievement x success	-2.89	0.004	104
Stimulation x success	-2.98	0.003	109

Interpretation of findings

In an attempt to answer the questions posed in this meta-analysis, the data will be clearer and easier to interpret if viewed in sections. Thus, only r - average effect size (correlation), Table 2, a parameter that indicates the correlative relations in the meta-analysis between L2 learning motivation and personality traits, indicates several important aspects, which touch on the very essence of the self-regulation concept and relate to the following statements and possible explanations.

There are obvious positive and negative correlations between the observed relations between personality traits and motivation, as significant variables in the self-regulation construct of gifted students. This is to be expected, because we observed types of motivation from both genders (from intrinsic, through extrinsic, to amotivation). It is important that the levels of correlation are not high, i.e., these are not so strong correlations, and their relations are influenced by other variables that contribute to the manifestation of the construct of self-regulation, and which are sought by this meta-analysis. It is obvious that, although with a modest positive correlation, motivation realizes the most correlations with *Intellect* and *Agreeableness*. Only *amotivation* and *Introjected regulation*, as types of lack of motivation, or negative motivation, are in negative correlation, which is clear and expected. *Identified regulation* and *motivation for knowledge* are from two motivational fields (intrinsic-extrinsic), indicating that motivators in L2 learning are not only internal, but also external. *Identified motivation* is an external motivator, which indicates that students self-regulate in accordance with their needs. They seek to identify with and adopt their needs. They learn foreign languages because of real needs, and this should be kept in mind in didactic approaches to these issues. Thus, *Identified regulation* is manifested as greater autonomy, conscious evaluation of the personally significant goal that the student chooses, and creates a sense of self-determination

as a reward for activity and satisfaction with engaging in certain activities during the learning process. An interpretation of this finding could be sought in Vinney's (2020) view of the construct of self-regulation, which essentially contains the idea that these are important components of self-regulation that Sternberg, in his Theory of mental self-government (Sternberg & Grigorenko, 1993, 1995, 1997), also associates with the term of meta-cognition. He describes it as the regulation of intellectual functioning. It was a turning point at which the cognitive system and its development were seen as self-modifying systems, and learning was seen as "self-regulated learning". This helped to understand the cognitive development mechanisms - *contextual intelligence*, an important component of giftedness. Thus, these understandings paved the way for understanding self-determination in learning. In the Triarchic Theory of Intelligence, Sternberg (Sternberg et al., 2007) took the context into account and thus adopted a "contextual approach". Thus, he shifted the focus from studying the ability to learn and results to the capacity of students to regulate their learning and the ability of teachers to create an appropriate learning environment, which is confirmed by the findings presented here as an essential capacity for academic success. The idea of Lončarić and Peklaj (Lončarić, 2014; Lončarić & Peklaj, 2008) can also be taken as an interpreter. Initiated by the abovementioned idea of Sternberg (2009), Lončarić considers the concept of a general, dispositional style of self-regulation in learning. He does this with the aim of forecasting general success in school, or self-regulation, self-realization, etc.

The criteria for selecting papers for this meta-analysis were high, so we think that the small number of studies included in this meta-analysis is not considered such a big shortcoming because they all have the same methodological design, respondents are from the same group, they use the same instruments, and the verification of metric characteristics was the same. Due to the limited number of studies in this meta-analysis, which could be considered a pilot analysis, it can only be stated here that guidelines and directions are indicated, which is better than having no indication at all, i.e., it is a glimmer of hope and a signpost for further studies. And, the previous reflections and comparisons with theoretical assumptions and research findings are partly a concept for answering the first and second questions because they provide a framework for understanding the structure of the construct of self-regulation. Thus, questions about the relations between the observed variables that are important for self-regulation and those that further open room to questions that are important for the observed variables or sufficient to formulate a model of self-regulation, did not provide sufficient indications to be considered reliable in the assessment of effects for defining the construct of self-regulation. Also an issue is the relationship between gifted and other students in this regard, starting from observing the relationship between personality traits and motivation, in order to determine the extent to which personality traits have proven to be a good predictive factor for self-regulation of learning (success - average and in L2) of the gifted and other students. This includes the question of their mutual relationship and scope in terms of their predictive value for opportunities to encourage achievement in L2 learning, or LSP in gifted and other students. We can conclude, as previously stated in the review of findings, that the dimensions of motivation generally realize correlations of the highest intensity with *Intellect* and *Agreeableness*, while correlations with other dimensions are somewhat weaker. This supports the conclusion that *Intellect* and *Agreeableness* as personality traits are important for the construct of self-regulation, although not all studies see them as such (White, 2007).

The findings are also important for practitioners, as they show patterns, models, and sources of disagreement among these results by comparing samples, comparing outcome data, or observing sources of heterogeneity between the gifted and others. Examining the sources of heterogeneity among studies, especially findings on negative correlations between dimensions of motivation and personality traits (*amotivation in relation to Extraversion, Intellect,*

Agreeableness and Conscientiousness; external motivation in relation to Intellect; motivation in relation to stimulation; negative correlation with Emotional stability, external regulation) indicates a significant correlation only with the dimension of *Intellect*. Therefore, it is more reliable to choose motivational measures as an incentive for L2 learning.

Analyses of moderation and bias in observing the issue of the relationship between motivation and personality traits also led to different findings. *Gender* and *Agreeableness*, although with lower influences, appeared as significant predictors of the relationship between *Identified Regulation* and *Agreeableness*. The length of L2 learning and residing in the country of a native speaker has a slightly higher influence. It is the same with the relation between *motivation for knowledge* and *extraversion*, where *gender*, as well as *residing in the country of the native speaker* were shown to be significant moderators between these two constructs. The situation is the opposite when it comes to the correlation between *motivation for stimulation* and *Emotional stability*. It could be stated that moderation analysis also revealed large differences in the relations between the observed variables and the previously mentioned issues. This also indicates the need for a different methodological structure or a different approach to the construct of self-regulation. A larger number of studies and the implied strict selection of studies with the structure of all observed and significant elements might result in different situations.

Based on the results of *meta-analyses of motivational learning styles and L2 success*, it can be concluded that there are significant correlations, which are achieved by 5 of the 7 types of motivation. Weak negative correlation is achieved by *amotivation*, while moderate positive correlations with achievement are achieved by *identified regulation*, *motivation for knowledge*, *motivation for achievement*, and *motivation for stimulation*. The results indicate that a higher level of motivation is associated with poorer L2 achievement, while higher levels of the other above-mentioned motivations are associated with better L2 success.

In the case of dimensions of *Intrinsic motivation* (*motivation for knowledge, achievement, and stimulation*), the *effect size heterogeneity test* is significant, which indicates that there are significant differences between the effect sizes from different studies and that they are heterogeneous.

Also important in the interpretation of findings of this meta-analysis is the issue of publication bias. As indicated by the test results, as seen in the previous presentation of findings, the number of studies included in the meta-analysis led to reduced bias. Since this meta-analysis was based on the selection of specific subsets that were focused on academically gifted students, the heterogeneity in the synthesis of results was reduced. Also, the inferential potential for future syntheses has increased. This does not reduce the need for including a larger number of studies in future research steps, but only explains the situation and provides further opportunities for reflection on these findings. Future meta-analyses could focus on specific subsets, thus giving preference to practical aspects of meta-analysis in terms of effect size, which is otherwise an advantage of meta-analysis over the statistical significance of individual studies. The data show that publication bias is mainly a result of the small number of studies involved, resulting in unsatisfactory limit values in file drawer analysis. About a third of the tests lacked file-safe *N* and they are almost equally distributed. Thus, if there is no publication bias, file-safe *N* is missing, i.e., the limit value is exceeded in the case of correlation. However, the impression is that the results of the file drawer analysis are acceptable, especially when they indicate that the findings are quite stable, mainly in the analysis of motivation and L2 success. The least file-safe *N* is in the case of *correlation between amotivation and L2 success*, where 33 insignificant findings are needed for the result of the meta-analysis to be insignificant,

while in the case of other types of motivation, file-safe N is higher than 100. Causes of bias should be further investigated, given that in this meta-analysis, the criteria for selection took into account all rules and all indications for caution, except for the number of studies included. This, however, led to the conclusion that it is worth conducting a meta-analysis because of its ability to obtain a more reliable estimate of the final integration of effect size based on multiple studies. This was the basic motive of this meta-analysis, i.e. answering the questions asked, explaining the causes of possible heterogeneity among studies, justifying the criteria for the selection of studies, assessing the stability of meta-analysis, that is, testing whether the combined effect changes significantly by adding a new one to the analysis and calculating the number needed to be treated - NNT (Borenstein et al., 2009; Ilić, 2009).

No similar works were found to compare the findings of similar topics of this meta-analysis, which may not mean that they do not exist. A meta-analysis is cited conducted by White (2007), which was important for comparison in this meta-analysis, at least to the extent that it compares methodological aspects, weaknesses, and shortcomings and recognizes the next steps. However, other studies in this area may be important for further research in terms of comparing the findings. It is worth mentioning the findings of Šafranĳ et al. (2018), which indicate the presence of students' *Identified motivation* in their willingness to communicate in a language for specific purposes, as the closest to internal/intrinsic type of motivation. This was also found in this analysis, which speaks of the good self-regulation of students. This finding confirms the views according to which external motivation differs significantly in its relative autonomy, and therefore it can maintain external control, or true self-regulation, which makes it interesting in encouraging to learn a foreign language. This points to the importance of a favorable environment and helping students to sustain their efforts in meeting new challenges and fostering a sense of confidence in their own abilities. The same study reached the conclusion that emerges also in this meta-analysis; it refers to the finding that types of motivation have not exhausted all the factors that affect the willingness in students to communicate in a foreign language. This is indicated by the finding that it explains only 7% of the variance. It was also found that two of the observed variables (gender and residing in the country of a native speaker) influenced this relationship and proved to be significant moderators. The question arises as to which other variables should be included in order for the model explaining the relationship between types of motivation and readiness for self-regulated learning to be satisfactory in terms of opportunities for teachers (Stanković & Blažić, 2015; Gojkov & Stojanović, 2020), as well as students who can and should self-regulate their learning, which would result with a more reliable model for practical steps (Rončević & Blažić, 2009) in the personalization of strategies in learning and teaching a language for specific purposes. The same conclusion was drawn after the meta-analysis presented in this study. Similar comparisons with the findings of other studies are seen in Kulik and associates (1990) and Jeffrey (2007).

Conclusions

Despite its significant shortcoming in terms of the modest number of studies and research subjects, the above review of findings of meta-analyses provides a lot of data for thinking and concluding on further steps. This would bring us closer to the structure and understanding of the phenomenon of self-regulation of L2 learning, and in this case also to academically gifted students. This was the goal of this meta-analysis, which is still being sought in studies. Some of the characteristics of studies that were included based on the rather strict criteria of this type of statistical analysis, are important to mention in this section because they can direct us towards further steps of interpretation and understanding of findings. These refer to the following: all students/respondents are coming from the same cultural space; structures of research design are based on the same theoretical and methodological bases. This also applies

to the instruments - the same instruments were used, with high levels of metric characteristics. This should be taken into account when observing the findings, especially when it comes to publication bias etc.

The question, which is in the basis of this meta-analysis, is aimed at identifying a pattern that could define the basics of self-regulation, i.e. to determine the factors by which it could be more reliably determined. This primarily means that it could form a basis for didactic action in terms of encouraging the strengthening of self-regulation in LSP learning. This was the direction in searching for answers to questions about the relationship between the observed variables (personality traits, motivation, and success in L2 learning), in order to formulate a more reliable model of self-regulation. This was especially true of academically gifted students. For this purpose, the scopes of personality traits were observed as a factor influencing motivation for learning, and thus self-regulation, which in other studies have proven to be a good predictor in self-regulation of learning (success - average and in L2) of the gifted and other students. Thus, the answer was sought to the question regarding the scope of personality traits in terms of their predictive value for the possibility of encouraging achievements in learning LSP in gifted and other students. Studies selected for this meta-analysis allowed to also include motivation, and compare their relationships and contribution to self-regulation in L2 learning. Reliability in this step was provided by testing this in relation to moderating variables, which were shown to be significant in the above studies (gender, residing in the country of a native speaker, years of L2 learning; how important these moderating variables are for average grade in studies, i.e. self-regulation). This implied the application of a meta-analysis structure, tests that validated them (Jeffrey, 2007; Hartung et al., 2008), among which several basic conclusions were stood out: There are obviously positive and negative correlations between the observed relationships between personality traits and motivation, as significant variables in the construct of self-regulation of gifted students, therefore, students express types of motivation from both ends (intrinsic, extrinsic through amotivation). Correlation levels are not high, so it can be concluded that their relationships are influenced by other variables, which can be considered to contribute to the manifestation of the construct of self-regulation, which this meta-analysis sought to find. It is obvious that, although with a modest positive correlation, the connection of motivation is achieved with *Intellect* (as an aspect of *Openness to experience*) and *Agreeableness* of the highest correlation. Only amotivation and introjected regulation, as types of amotivation, or negative motivation, are in negative correlation. *Identified regulation* and *motivation for knowledge* are from two motivational fields (intrinsic and extrinsic), which indicates the fact that motivators in foreign language learning are not only internal but also external. *Identified motivation* indicates the fact that students self-regulate in accordance with their needs, they work on identifying with their needs and adapt and accept them. They acquire L2 as a result of real needs and this should be kept in mind in didactic approaches to these issues. Thus, *identification regulation* manifests as higher autonomy, conscious evaluation of personally significant goal, which the student chooses and creates a sense of self-determination as a reward for activity, finding satisfaction in certain activities during learning. In the interpretation of this finding, we can accept Sternberg's (Sternberg & Grigorenko, 1993, 1995, 1997) previously mentioned understanding of the construct of self-regulation, which essentially contains the idea that these are important components of self-regulation. In his Theory of Mental Self-Government (Sternberg et al., 2007), he relates them with the term meta-cognition, describing it as the regulation of intellectual functioning.

The above finding is challenging because it goes deeper into the possibility of observing based on the idea of Lončarić and Peklaj (Lončarić, 2014; Lončarić & Peklaj, 2008), which, initiated by Sternberg's previously mentioned idea, considers the idea of the concept of general, dispositional style of self-regulation of learning in order to predict general school success, or

we can call it self-realization, self-realization, etc. In spite of limitations imposed by the number of studies included in this meta-analysis, which could be considered a pilot analysis, it still indicates the guidelines and directions that should be addressed. That is more than not having any indications, that is, it is a glimmer of hope and a signpost for further search in the mentioned direction, which Lončarić also saw as an idea worth paying attention to.

The above reflections and comparisons with theoretical assumptions and research findings are partly a concept for answering the questions posed in this analysis, as they provide a framework for understanding the structure of the self-regulatory construct. Thus, the question of the relationship between the observed variables, which are important for self-regulation or sufficient to formulate a model of self-regulation, did not provide sufficient indications that they could be considered reliable in assessing the effects for defining the construct of self-regulation. It also includes the analysis of the relationship between personality traits and motivation, with the intention of determining the extent to which personality traits have proven to be a good predictive factor for self-regulation of learning (success - average and in L2) of gifted and other students (Borenstein et al., 2009, Higgins et al., 2003). Related to the above is observing the issue of their mutual relationship and scope in terms of their predictive value for opportunities to encourage achievements of gifted and other students in learning LSP. It could be concluded, as previously stated in the presentation of findings, that dimensions of motivation generally achieve correlations of highest intensity with *Intellect* and *Agreeableness*, while correlations with other dimensions are somewhat weaker. This supports the conclusion that *Intellect* and *Agreeableness* are personality important traits for the construct of self-regulation, and support the aforementioned theoretical positions of Sternberg within the Theory of mental self-government, for which these findings are only the initial step and that it would be worth going in that direction.

The findings are also important for practitioners, as they show patterns and models among research results, sources of disagreement among these results, comparison of samples, comparison of outcome data, or analysis of sources of heterogeneity between the gifted and other students. Examining the sources of heterogeneity among studies, especially findings on negative relationships between dimensions of motivation and personality traits (*amotivation in relation to extraversion, Intellect, Agreeableness, and Conscientiousness; external motivation in relation to Intellect; negative correlation between motivation for stimulation and Emotional stability; external regulation*), indicates significant correlation only with the dimension of *Intellect*. For teaching LSP, it is important to have a closer knowledge of the mentioned types of motivation and their mutual relationship in order to find more reliable didactic strategies to encourage types of motivation that can lead to effects equal to internal motivation (Stanković & Blazič, 2015; Starc, 2010). Theoretical concepts suggest that it is possible to find mechanisms by which, based on the type of external motivation, leads to the effects caused by internal motivation can be reached, because identified motivation, which is very similar to it, achieves similar effects.

References

- Allport, G. (1961). *Pattern and Growth in Personality*. New York: Holt, Rinehart and Winston.
- Bandura, A. (1991). Self-regulation of motivation through anticipatory and self-reactive mechanisms. In R. A. Dienstbier (Ed.), *Nebraska Symposium on Motivation, 1990: Perspectives on motivation* (pp. 69–164). University of Nebraska Press.
- Benabou, R., & Tirole, J. (2002). Self-confidence and personal motivation. *The Quarterly Journal of Economics*, 117(3), 871–915.

- Borenstein, M., Hedges, L., Higgins, J.P.T., & Rothstein, H.R. (2009). *Introduction to Meta-Analysis*. John Wiley & Sons, Ltd.
- Colman, A.M. (2008). *A Dictionary of Psychology*, Oxford University Press. Published online: 2009, Current Online Version: 2014, DOI:10.1093/acref/9780199534067.001.0001
- Deci, E. L., & Ryan, R. M. (1985). *Intrinsic Motivation and Self-Determination in Human Behavior*. New York, NY: Plenum. <https://doi.org/10.1007/978-1-4899-2271-7>.
- Deci, E., & Ryan, R. (2000). The “what” and “why” of goal pursuit: Human needs and the self-determination of behavior. *Psychological Inquiry*, 11, 319–338.
- Egger, M., Davey Smith, G., Schneider, M., & Minder, C. (1997). Bias in meta-analysis detected by a simple, graphical test. *BMJ (Clinical Research Ed.)*, 315(7109), 629–634. <https://doi.org/10.1136/bmj.315.7109.629>
- Field, A. P., & Gillett, R. (2010). How to do a meta-analysis. *British Journal of Mathematical and Statistical Psychology*, 63(3), 665–694. <https://doi.org/10.1348/000711010X502733>
- Gojkov, G., & Stojanović, A. (2020). Personality traits as a factor in self-regulation of learning of academically gifted students, *Proceedings of the 5th International scientific conference: Talent education*, 14th October 2020, pp.14-27.
- Gojkov-Rajić, A. (2020). Factors of Anxiety Gifted in Foreign Language Learning, *Proceedings of the 2th International Scientific Conference Gifted and Talented Creators of the Progress St Kliment Ohridski University – Bitola Faculty of Education*. pp. 649-668.
- Gojkov Rajić, A., Šafranji, J., Gojkov, G. & Stojanović, A., (2020). Motivacione strategije kao faktor uspeha akademski darovitih studenata, *Zbornik radova 26. okruglog stola o darovitima: Lična i socijalna perspektiva*, 26. jun 2020. Vršac. pp.38-81.
- Gojkov-Rajić, A., Šafranji, J. & Gojkov, G. (2021a). Relationship between didactic instructions and meta-cognition in foreign language learning. In: Herzog, J. (Ed.) *Giftedness in a Variety of Educational Fields* (pp. 57-79). Verlag Dr. Kovač GmbH, Hamburg.
- Gojkov-Rajić, A., Stojanović, A., Šafranji, J. & Gojkov, G. (2021b). *Didaktički aspekti samoregulacije učenja darovitih*, monografija, Srpska akademija obrazovanja, Beograd, p.260.
- Gojkov-Rajić, A., Šafranji, J. & Prtljaga, J. (2021c). Self-regulation of gifted students in L2 learning: Predictive value of variables in the complexity of self-regulation construct, *Proceedings of the Sixth International Scientific Conference: Talent Education, 14-15th October, Ljubljana*. pp.31-50.
- Gojkov-Rajić, A., Šafranji, J. & Gak, A. (2022). Self-Confidence in Meta-Cognitive Processes in L2 Learning, *Društvena istraživanja* (in press).
- Goldberg, L. R. (2001). *International Personality Item Pool*. Retrieved from [http:// bit.ly/1 AfXuFc](http://bit.ly/1AfXuFc)
- Hartung, J., Knapp, G., & Sinha, B.K. (2008). *Statistical Meta-Analysis with Applications*. John Wiley & Sons, Ltd.
- Higgins, J.P.T., Thompson, S.G., Deeks, J.J., & Altman, D.G. (2003). Measuring inconsistency in meta-analyses. *British Medical Journal*, 327: 557–60. doi:10.1136/bmj.327.7414.557
- Ilić, I. (2009). Meta-analysis, *Acta Medica Medianae*, 4, 28-31.
- Jeffrey, C.W. (2007). Learner-centered teacher-student relationships are effective: A meta-analysis. *Review of Educational Research* 77(1), 113-143. <https://doi.org/10.3102/003465430298563>
- Kleitman, S. & Stankov, L. (2007). Self-confidence and meta-cognitive processes, *Learning and Individual Differences*, 17(2), 161-73 <https://doi.org/10.1016/j.lindif.2007.03.004>.
- Kulik, C. C., Kulik, J. A., & Bangert-Drowns, R. L. (1990). Effectiveness of mastery learning programs: A meta-analysis. *Review of Educational Research*, 60(2), 265–299. <https://doi.org/10.3102/00346543060002265>.
- Lenney, E. (1981). What's fine for the gander isn't always good for the goose: sex differences in self-confidence as a function of ability area and comparison with others. *Sex Roles*, 7, 905–923.

- Lenney, E., & Gold, J. (1983). Sex differences in self-confidence: the effects of task completion and of comparison to competent others. *Personality and Social Psychology Bulletin*, 8, 74–80.
- Lončarić, D., & Peklaj, C. (2008). Proactive and defensive self-regulation in learning, *Horizons of Psychology*, 17 (4), 73-88.
- Lončarić, D. (2014). *Motivacija i strategije samoregulacije učenja: teorija, mjerenje i primjena*, Učiteljski fakultet, Rijeka.
- Noels, K.A., Pelletier, L.G., Clément, R. and Vallerand, R.J. (2000). Why Are You Learning a Second Language? Motivational Orientations and Self-Determination Theory. *Language Learning*, 5, 57-85. <http://dx.doi.org/10.1111/0023-8333.00111>
- Noels, K. A. (2009). The internalization of language learning into the self and social identity. In Z. Dörnyei, & E. Ushioda (Eds.), *Motivation, language identity and the L2 self* (pp. 295–313). Bristol, England: Multilingual Matters. <https://doi.org/10.21832/9781847691293-016>.
- Oney, E., & Oksuzoglu-Guven, G. (2015). Confidence: A critical review of the literature and an alternative perspective for general and specific self-confidence. *Psychological Reports*, 116(1), 149–163. <https://doi.org/10.2466/07.PR0.116k14w0>
- Pušina, A. (2014). *Stil u psihologiji teorije i istraživanja*, Filozofski fakultet, Sarajevo.
- Radonjić, S. (1981). *Uvod u psihologiju*. Beograd: Zavod za udžbenike i nastavna sredstva.
- Radonjić, S. (1985). *Psihologija učenja*. Beograd: Zavod za udžbenike i nastavna sredstva.
- Radovanović, V.& Kvašček, R. (1976). Pojam, odredbe i vrste kognitivnog stila. *Pedagogija*, 2 - 3, 34-46. Beograd: Savremena administracija.
- Rončević, A., & Blažič, M. (2009). Multimedia in primary school. URN: NBN:SI:DOC-KXDUHYNX from <http://www.dlib.si>
- Rosenthal, R. (1979). The file drawer problem and tolerance for null results. *Psychological Bulletin*, 86, 638–641. <https://doi.org/10.1037/0033-2909.86.3.638>.
- Stanković, Z. & Blažič, M. (2015). Didactical model of instruction based on the application of educational software. *Didactica Slovenica*. 30 (1), 21-45.
- Starc, J. (2010). Notranje zagotavljanje kakovosti v visokošolskih institucijah, *Didactica Slovenica, Pedagoška obzorja*, 25, 76-87.
- Sternberg, R.J. (1997). The concept of intelligence and its role in lifelong learning and success. *American Psychologist*, 52(10), 1030–1037. <https://doi.org/10.1037/0003-066X.52.10.1030>.
- Sternberg, R. J. (2009). The theory of successful intelligence. In J. C. Kaufman, E. L. Grigorenko (Eds.) & R. J. Sternberg, *The essential Sternberg: Essays on intelligence, psychology, and education* (pp. 71–100). Springer Publishing Co.
- Sternberg, R. J. & Grigorenko, E. L. (1993). Thinking styles and the gifted. *Roeper Review*, 16(2), 122-130.
- Sternberg, R. J., Wagner, R. K., & Zhang, L. F. (2007). *Thinking styles inventory – Revised II*. Unpublished test, Tufts University.
- Sternberg, R.J. & Grigorenko E.L. (1995). Styles of thinking in the school. *European Journal for High Ability*, 6, 346-357.
- Sternberg, R.J. & Grigorenko, E.L. (1997). Are cognitive styles still in style? *American Psychologist*, 52(7), 700-712.
- Stojanović, A., Gojkov, G., (2021). Learning strategies and self-regulation of gifted students: didactic aspects, *Proceedings of the 6th. International Scientific Conference: Talent education*, 15.10.2021. Ljubljana; MIB Ltd., Ljubljana, Slovenija, pp.6-22.
- Šafranji, J. (2017). The Relationship Between English Language Learners' Self-Efficacy Profiles and Their Language Performance, *Godišnjak Srpske akademije obrazovanja*, 206-217. Srpska akademija obrazovanja, Beograd.
- Šafranji, J. (2018). Effects of Gender and Interaction of Gender and Personality Traits on Foreign Language Anxiety, *Journal Plus Education*, 20(2), 67-82.

- Šafranjan, J., Gojkov-Rajić, A., & Stojanović, A. (2018). Personality, Language Learning Motivation and Achievement, *Didactica Slovenica*, 33 (3-4), 107-123.
- Šafranjan, J. & Gojkov-Rajić, A. (2019). The Role of Personality Traits in the Choice and Use of Language Learning Strategies, *Društvena istraživanja*, 28 (4), 691-709.
- Šafranjan, J., Gojkov-Rajić, A. & Bulatović, V. (2021). Motivation for Foreign Language Communication, *Didactica Slovenica*, 36 (2), 49-63.
- Vallerand, R. J., & Reid, G. (1984). On the causal effects of perceived competence on intrinsic motivation: A test of cognitive evaluation theory. *Journal of Sport Psychology*, 6, 94-102.
- Viechtbauer, W. (2010). Conducting Meta-Analyses in R with the metafore Package. *Journal of Statistical Software*, 36, 1–48. <https://doi.org/10.18637/jss.v036.i03>
- Vinney, Cynthia. "Understanding the Triarchic Theory of Intelligence." ThoughtCo, Dec. 6, 2021, [thoughtco.com/triarchic-theory-of-intelligence-4172497](https://www.thoughtco.com/triarchic-theory-of-intelligence-4172497).
- White, J. C. (2007). Odnosi nastavnik - učenik usmereni na učenika su efikasni: Meta-analiza, *Pregled istraživanja u obrazovanju*, 77, 104-113 DOI: 10.3102/003465430298563
- Zimmerman, B. J. (2001). Theories of self-regulated learning and academic achievement: An overview and analysis. In B. J. Zimmerman & D. H. Schunk (Eds.), *Self-regulated learning and academic achievement: Theoretical perspectives* (pp.1–37). Lawrence Erlbaum Associates Publishers.
- Zimmerman, B.J. (2002). Becoming a Self-Regulated Learner: An Overview, *Theory into Practice* 41(2), 64-70. DOI: 10.1207/s15430421tip4102_2

Biographical notes:

Aleksandra Gojkov – Rajic was born in 1973 in Vrsac. She obtained her bachelor (1996), master (2001) and doctoral (2011) degree at the Department for German Language and Literature at the Philosophical Faculty in Novi Sad. She has worked at the Teacher Education Faculty in Belgrade and the Preschool Teacher Training College “Mihailo Palov” in Vrsac. She has published 6 books and around 20 professional papers from the field of German literature, cultural connections and foreign language teaching methodology, as well as a number of translations, among which the two books written by G. Grass should be emphasized.

Jelena Prtljaga is an associate professor at the Teacher Training Faculty in Belgrade and the Preschool Teacher Training College in Vrsac. She graduated from the University of Belgrade and received her PhD from the University of Novi Sad. She researches and publishes in the fields of English language teaching methodology and English linguistics (especially modality). She is a member of ESSE.

Jelisaveta Šafranjan graduated from the University of Belgrade with an MA in applied linguistics and a PhD in English language and linguistics. She teaches ESP at the Faculty of Technical Sciences, University of Novi Sad. Her main interests are ESP, applied linguistics, academic writing, psycholinguistics, computational linguistics, and discourse analysis.