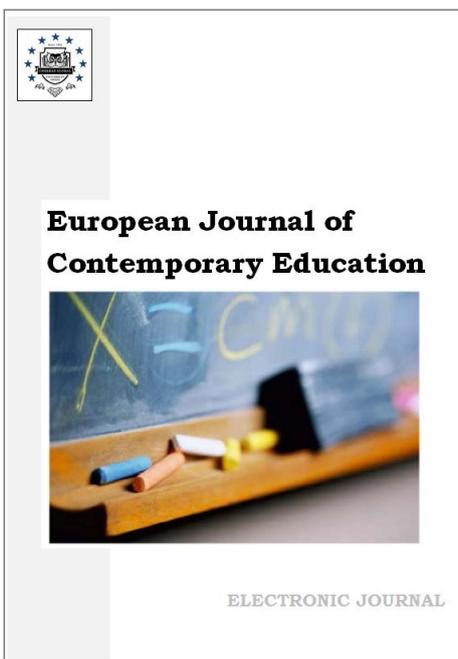




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## Student's Categorization Activities in the Educational Process of Second Foreign Language Reading Comprehension

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### Abstract

In the educational process of a foreign language study, the student learns about the culture of the language and processes its abstract structure. Reading comprehension in a foreign language is a tool for learning about this structure, and the student encounters many unknown and ambiguous stimuli during reading. In our research, we verify connections between reading comprehension in a second foreign language (French and German) and the student's categorization activities, which we specify in the variables of tolerance of ambiguity and personal need of the structure. The research was carried out with 277 students of secondary schools (grammar and vocational schools) in Slovakia using such research methods as Didactic test of reading comprehension for the German language, Didactic test of reading comprehension for the French language, Personal Need for Structure Questionnaire (PNS) and the Tolerance of Ambiguity Scale (TAS). It turns out that both the tolerance of ambiguity and the personal need for the structure are linked to performance in reading comprehension, but these connections manifest themselves in different ways depending on the different language variants.

**Keywords:** reading comprehension, second foreign language, foreign language education, personal need for structure, tolerance of ambiguity.

### 1. Introduction

Effective work with foreign language texts is an integral part of many professions; it is a condition for obtaining, processing and critical evaluation of information that comes to us from various sources from around the world (Gadušová et al., 2019). The research problem in current foreign language education is what aspects of reading comprehension to focus on in developing comprehension, what markers in different types of texts and their corresponding reading strategies to observe in the process

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of developing students' comprehension in order to prepare them for the needs of today's labor market, to get them acquainted with foreign language texts and, especially to enable their understanding (Gadušová et al., 2020a; Gadušová et al., 2020b; Gadušová et al., 2021). Current research (Benčíč, 2013; León, Escudero, 2017; Králik, Máhrik, 2019; Hockicková et al., 2020; Stranovská, Ficzer, 2020; Lalinská, 2020; Lalinská et al., 2020; Azizi et al., 2020; Pavlíková, 2021; Khonamri et al., 2020; Khonamri et al., 2021; Hudecová et al., 2021) focuses primarily on the cognitive and functional aspects of reading comprehension and reading competence. For this reason, little attention has been paid to the specific needs of text comprehension with an emphasis on cognitive, motivational and emotional processes such as the ability to receive, perceive experience, interpret and evaluate a literary text and to use the experience of understanding a literary text in communication. Compared to professional (exposition) texts, it is much more difficult to measure and validate the constructs of understanding literary texts. On the other hand, reading professional or factual texts, also called intensive reading, uses comprehension questions. We recommend that students work with academic texts at the level of intensive reading as well as with fictional texts at the level of extensive reading, so that students become familiar with several types of reading comprehension, practice various forms of working with texts and develop reading comprehension at several levels. Monitoring the reader, who chooses the type of reading when processing the text, plays an important role. According to Farris et al. (2004) understanding of the text lies in the fact that the individual is able to effectively approach the meanings of words and integrate them into the context of passages in the text. The ability to draw conclusions and thus combine information in the text is crucial for successful reading and comprehension. Individuals not only integrate information from a text, but also use their knowledge of the world to understand the text being read. The set of these processes represents the categorization activities of the student's cognition, i.e. cognitive structuring. According to McNamara et al. (2007) the categorization of different types of strategies in the reading comprehension process depends on the purpose and success of each strategy in different situations. This means that the reader must distinguish between different situational and contextual factors, organize information into categories, which happens in an ambiguous situation. We call this process categorization or cognitive structuring; taking into account the extent to which individuals need to categorize information and the extent to which they want it, reflecting the personal need for structure. The categorization activities of the student in the process of reading comprehension create a connection between language, thinking and reading comprehension strategies, i.e. the ability of the reader to make appropriate decisions between the context and the ability to decode, organize and categorize information. What strategy the reader chooses and whether he is able to choose the strategy and understand the text, the interaction of linguistic and cognitive-personality variables is necessary. The cognitive-personality variables are the cognitive structuring of knowledge as a personal need for structure and tolerance of ambiguity.

The personal need for structure is a cognitive requirement to classify information from the outer world, and it should be pointed out that this variable is little analyzed in the context of reading comprehension. The personal need for structure according to Bar-Tal (1994) is a desire for constant and clear knowledge, replacing an ambiguity sense, uncertainty and confusion, linked to simple information organization, relatively simple reasoning, thinking, decision making, less willingness to change attitudes and less complex memory structures.

The construct of the personal need for structure is made up of two sub-factors, such as the Desire for a simple structure (F1), the Response to its absence (F2), which can greatly affect the way people understand the outer world, experience and integrate with the world, for example, stereotypical behavior in uncertain situations.

Tolerance of ambiguity (TA) is related to an individual's response in situations that cannot be clearly understood and explained on the basis of available information. Frenkel-Brunswik (1948) characterizes it as a personality variable of a perceptual and emotional nature. Unknown situations cause excessive stress in people with low tolerance of ambiguity, so they may experience intense emotional reactions and avoid ambiguous stimuli. On the contrary, people with a high tolerance of ambiguity perceive similar situations as desirable and interesting (Furnham, Ribchester, 1995; Stranovská et al., 2019). TA as a personality variable affects several areas of an individual's functioning: perception, cognitive style of thinking, interpersonal relationships, and problem solving (Ehrman et al., 2003; Furnham, Marks, 2013). In the context of learning a foreign language, the student is regularly exposed to unknown meanings, so a certain degree of tolerance of ambiguous stimuli can be considered necessary for the success of the process of learning a foreign

language. A person with an optimal degree of tolerance of ambiguity perceives a foreign language in its complexity, one works with several possible interpretations of foreign language texts and flexibly chooses a suitable communication strategy. According to current research, students with medium or higher TA give better performance in understanding a foreign language text (Liu, 2015), experience more success and subjectively evaluate their performance in foreign language reading more positively (Erten, Topkaya, 2009).

Reading comprehension in a second foreign language is considered to be a particularly demanding and specific process, as it requires a higher cognitive load on the side of pupil, which is related to the recognition of language specifics of different foreign languages and the mother tongue. Today's society requires the student to perceive and understand several foreign languages, but the question arises as to what extent society supports the teaching of a second foreign language. One of the priorities of European language policy is to maintain linguistic diversity, cultural identity and, last but not least, to promote effective foreign language learning. European education policy takes into consideration also the impact of teacher quality on learner achievements and points on importance of creation of systems of quality assessment (Hašková et al., 2019; Hašková, Lukáčová, 2017). In line with the principles of plurilingualism, the creators of national education concepts have a vision that in the future most Europeans will be able to communicate in at least two foreign languages (Eurobarometer No. 386, 2012). The Slovak education system responded to this challenge in 2007 by adopting and approving the Concept of Teaching Foreign Languages in Primary and Secondary Schools, which became the starting document for the further direction of foreign language education in Slovakia. Part of the concept are specific proposals for the introduction of the first and second foreign language with regard to ensuring the continuity of language education in the transition from lower to higher education. In the past decade, however, there have been several erroneous decisions and interpretations that have significantly damaged a second foreign language education. In this context, it is possible to mention a reduced lesson allocation for a second foreign language (for example, in grammar schools three lessons are devoted to a second foreign language in the first and second year of its studies, in the following years the lesson allocation for a second foreign language is usually reduced to two lessons per week), the introduction of a second foreign language as an optional subject and the introduction of compulsory English as the first foreign language. Both German and French have a long tradition of teaching in our geographical area, whether in historical, cultural or economic contexts. In the educational context, however, over the last decade they both have become the second foreign language, which has begun to be reflected especially in the significantly declining number of students willing to study these languages. Quantitative indicators in statistical yearbooks show a sixty to seventy-five percent decrease in the number of students learning French at different levels of education. The lower lesson allocation, which is usually set for a second foreign language, in turn affects the quality of knowledge and language skills the student has to acquire in order to be able to communicate adequately and at the required level of proficiency in the given language.

The research goal is to find out the connections between personal-cognitive variables and the language variable Reading Comprehension, while distinguishing the category of a second foreign language.

We operationalize the personality-cognitive variables: Need for structure and Tolerance of ambiguity. Within the Need for structure, we verify and determine the factor of desire for cognitive structure and the factor of reaction to the lack of cognitive structure. Within the tolerance of ambiguity, we verify and determine the factors of novelty, complexity and insolubility. Within the language variable Reading Comprehension, we measure the performance in foreign language texts comprehension of intensive and extensive reading (detailed and global comprehension), taking into account the category of the second foreign language – German and French.

In our study, we set out the following hypotheses, which we verified by correlation analysis.

H1: There is a positive relationship between ambiguity tolerance and reading comprehension performance in German.

H2: There is a positive relationship between ambiguity tolerance and reading comprehension performance in French.

H3: There is a negative relationship between the personal need for structure and reading comprehension performance in German.

H4: There is a negative relationship between the personal need for structure and the reading comprehension performance in French.

## 2. Methodology

### Sample and Procedure

A total of 277 students from different regions of Slovakia took part in the research. The respondents were the third-year upper-secondary school students who were learning German or French as the second foreign language as part of their compulsory schooling (see [Table 1](#)).

**Table 1.** Characteristics of the research sample

Foreign language	Number of respondents	Average length of the language study (years)	Type of the upper-secondary school	
			Grammar	Vocational
German language (A2)	171	5.2	96	75
French language (A2)	106	4.6	86	20
Total	277	5.0	182	95

There were a total of 171 students in our sample who were learning German. The average length of their study of the German language was 5.2 years. 106 students of our sample were learning French. Their study of the French language lasted in average 4.6 years. We tested the level of students' text comprehension in both languages at A2 level language proficiency.

### Instruments

Research data were collected using questionnaire research methods. The test battery contained the following research methods: German Language Reading Comprehension Test, French Language Reading Comprehension Test, Personal Need for Structure (PNS) Questionnaire, and Tolerance of Ambiguity Scale (TAS).

The tests of the text comprehension in German and French were developed and validated by a team of experts within the project APVV-17-0071 "Support of literacy in the mother tongue and in the foreign language". The tests were written on the basis of valid documents of Slovak and European language policy.

The test of reading comprehension for the German language ([Hockicková et al., 2020](#)) tested the comprehension of German texts. It consists of five texts; two texts are focused on intensive and three texts on extensive reading with a total number of words up to 800. When choosing the texts, the authors relied on topics the students encountered in everyday life, in everyday communication at the level of different social strata (parent, teacher, classmate, sibling, and friend). The topics were as follows: interpersonal relationships (written communication of friends with a description of the way how to come see the friend), environment (how to protect the environment), and entertainment (entertainment magazine Bravo for young people), and leisure time of people of different ages and different areas of work, and board game description and instructions. The test contains a total of 20 items for all texts, three of which are open and the other closed. Respondents use the answer sheet to answer different types of tasks: dichotomous technique (correct-incorrect), simple selection, matching, substitution and ordering items. The reliability rate of the test reached the value of Cronbach's  $\alpha = 0.84$  ([Lalinská, 2020](#)).

To test reading comprehension in French the Test of Reading Comprehension for French at A2 level of language proficiency was used ([Lalinská et al., 2020](#)). The test contains 5 texts, each in the range of 100-250 words, including items per text. Selected text topics relate to situations the student encounters in everyday life (eating in the school canteen, orientation in the menu of restaurants and opening hours of restaurants, description of modern music-literary style slam, written correspondence related to booking a hotel, luggage storage when travelling to Paris). The test contains only multiple choice items with an answer choice from three options – one correct answer and two incorrect answers (distractors). The number of items for each text varies depending on the content of the text. The reliability rate of the test reached the value of Cronbach's  $\alpha = 0.83$  ([Lalinská, 2020](#)).

The Personal Need for Structure (PNS) questionnaire measured personal structure needs using a two-factor concept based on 12 items. The two subscales of the test are F1 – structure desire

and F2 – response to lack of structure. Respondents should indicate on the six-point Likert scale the extent to which they agree with the statements, such as whether he likes being spontaneous, whether he likes an orderly way of life or whether he does not like changing plans in the last minute. The respondent can achieve the total number of points from 12 to 72. A higher score in the questionnaire indicates a higher degree of personal need for the structure. People with a high degree of need for structure make more of their decisions using category-based judgments, as they are more motivated to find a structure in the given context.

The Tolerance of Ambiguity Scale (TAS) identifies the tolerance of ambiguity as the tendency of an individual to perceive ambiguity as desirable. The scale consists of 16 statements that relate to diverse life situations. Respondents express their opinion on them using a 5-point Likert scale. The respondent can achieve the total number of points from a minimum of 16 to a maximum of 112 points. The statements are divided into three subscales. The different subscales represent different sources of ambiguity according to Budner (1962): novelty of the stimulus, complexity and insolubility, i.e. situations that can be interpreted in several mutually incompatible ways. A higher score in the questionnaire indicates a higher level of intolerance to ambiguous situations.

### 3. Results

Descriptive statistics of students' performance in reading comprehension in German and French are shown in Table 2. The percentage of pupils' performance in reading comprehension in French was 72.45 % (average gross score 14.49 out of a maximum of 20 points). A group of students learning German performed slightly above the 50 % limit in the German reading comprehension test (51.04 %, average gross score 11.74 out of a maximum of 23 points). In relation to cognitive-personality variables, our sample was characterized by mean scores in the mid-range.

**Table 2.** Descriptive statistics of students' performance in the reading comprehension test in the second foreign language and cognitive-personality variables

	N	Mean	Mean%	Median	Min	Max	SD	Var
RCG	171	11.74	51.04	11	2	23	5.075	25.760
RCF	106	14.49	72.45	16	4	20	3.962	15.700
TA	277	59.40	45.21	60	33	80	7.784	60.598
Novelty	277	15.43	47.63	16	4	28	4.030	16.241
Complexity	277	31.22	41.15	31	14	45	5.190	26.932
Insolubility	277	12.76	54.22	13	4	21	2.748	7.552
PNS	277	44.26	53.77	45	17	67	8.940	79.925
F1	277	15.33	56.65	15	4	24	4.114	16.926
F2	277	26.49	55.69	27	7	42	5.743	32.979

Explanations: RCG – reading comprehension in German, RCF – reading comprehension in French, TA – total score of tolerance of ambiguity, PNS – total score of personal need for structure, F1 – desire for structure, F2 – response to lack of structure, SD – standard deviation, Var – variance.

Pearson's correlation was used to test the relationship between reading in a foreign language and the cognitive-personality variable ambiguity tolerance (Table 3). The connection between reading in a second foreign language and the tolerance of ambiguity was not confirmed, the relationship between reading in German, or French language and tolerance of ambiguity did not reach the level of statistical significance. We further tested the relationship between reading comprehension and individual sub-factors of ambiguity tolerance (Budner, 1962), i.e. novelty, complexity and insolubility. The relationship between reading in German and the ambiguity

tolerance sub-factors was not significant in our research. The first hypothesis was rejected. In the case of reading comprehension in French, the most important sub-factor proved to be the tolerance of complexity (negative relationship at the level of statistical significance  $p = .041$ ). The second research hypothesis was partially confirmed.

**Table 3.** Pearson correlation between reading comprehension in the second foreign language and tolerance of ambiguity

		TA	Novelty	Complexity	Insolubility
RCG	Pearson Correlation	-.061	-.013	-.162	.140
	Sig. (2-tailed)	.472	.880	.056	.101
RCF	Pearson Correlation	-.203	.023	-.242*	-.161
	Sig. (2-tailed)	.087	.848	.041	.177

Explanations: RCG – reading comprehension in German, RCF – reading comprehension in French, TA – total score of tolerance of ambiguity.

Statistical significance at the level  $p = .05$  (\*),  $p = .01$  (\*\*),  $p = .001$  (\*\*\*)

Pearson's correlation was used in our research to test the possible relationship between reading in a foreign language and the cognitive-personality variable personal need for structure (PNS) (Table 4). Correlation analysis confirmed a statistically significant negative relationship between PNS and reading comprehension in the case of French ( $p = .003$ ), which means that the higher the individual's personal need for structure, the lower is their performance in reading comprehension in French. In the case of the German language, the correlation between reading comprehension and PNS did not reach the level of statistical significance.

**Table 4.** Pearson's correlation between reading comprehension in the second foreign language and personal need for structure

		PNS	F1	F2
RCG	Pearson Correlation	-.122	-.085	-.144
	Sig. (2-tailed)	.148	.317	.088
RCF	Pearson Correlation	-.355**	-.358**	-.274*
	Sig. (2-tailed)	.003	.002	.022

Explanations: RCG – reading comprehension in German, RCF – reading comprehension in French, PNS – total score of personal need for structure, F1 – desire for structure, F2 – response to lack of structure.

Statistical significance at the level  $p = .05$  (\*),  $p = .01$  (\*\*),  $p = .001$  (\*\*\*)

The relationship between reading comprehension in German and PNS sub-factors was not significant in our research. The third research hypothesis was rejected. A significant negative relationship was confirmed between reading comprehension in French and both PNS sub-factors ( $p = .002$  for structure desire sub-factor and  $p = .022$  for response to structure lack sub-factor), the strength of correlation is more significant for structure desire. Thus, the stronger the desire for structure (or the more strongly expressed emotional response to the lack of structure), the lower the performance in reading comprehension in the French language. The fourth hypothesis of our research was confirmed.

#### **4. Discussion**

Student's categorization activities such as the need for structure and tolerance of ambiguity in the direction of complexity are shown in our research as predictors of reading comprehension in the French language. The lower the need for a structure is with students studying French, the higher their success in reading comprehension is and vice versa. This means that the less the students simplify the information read, or the less they experience the cognitive burden of organizing information from the read text, the more they notice semantic, pragmatic and non-textual indicators in the text (cultural specifics, secondary meanings, and others), they do not focus on the rules, word structures and sentence patterns at all costs. On the contrary, the more students simplify the information from the read text, or the more they feel the need for a clear structure, the lower their understanding of the foreign language text in French is. These results are in line with the previous researches (Sarmány-Schuller, 2014; Stranovská, Munková, 2014), which showed a negative relationship between the personal need for structure and verbal intelligence, or foreign language competence. At the same time, in the case of the French language, there was a slightly stronger relationship between the comprehension of texts and the sub-factor of the desire for structure than between the sub-factor of reaction to the lack of structure. In this regard, we support the claim of Steinmetz et al. (2011), who, based on their findings, argues that the desire for structure is more focused on the "need" for a structured, familiar one than the response to a lack of structure. Our results are consistent with the findings of Munková et al. (2014), where a negative connection between the desire for structure and reading comprehension in a foreign language was also demonstrated. We further agree with the research of Carrell (1983) and McNeil (2011), who found that the reader needs to have relevant general knowledge they can activate and can subsequently use the acquired knowledge, together with new information, accordingly.

The importance of the ambiguity tolerance sub-factors for reading comprehension in French was demonstrated by the performance in reading comprehension performance in the case of complexity tolerance (negative correlation with the TAS scale is due to higher values in the questionnaire indicating higher ambiguity intolerance). Tolerance in this context can be understood as a form of flexibility of thought that is relevant at different levels of reading comprehension processes. Cognitive flexibility allows the reader to work flexibly with the text and to choose the right reading strategies in accordance with the type of text being read and the objectives of the reading (Pressley, 2002; Pressley, Gaskins, 2006). In addition, reading in a foreign language places greater demands on the cognitive flexibility of the individual. The recognition of words and various grammatical rules in a foreign language is not fully automated, and therefore executive functions must divide conscious attention among several tasks just as in the case of the mother tongue. An individual with an optimal degree of tolerance of complexity is not limited to the use of already known elements of the language, because he is able to experiment with the foreign language and simultaneously process different layers of the foreign language (Stranovská, 2011; Stranovská, 2020). A positive response to the complexity of the text is also important in terms of processing information from the text: a complexity-tolerant student can flexibly manipulate more information to create the information core of the read text.

Significant correlations of reading comprehension in German with categorization activities (need for structure and tolerance of ambiguity) were not determined. There was a tendency relationship for reading comprehension in German and the sub-factor of the need for structure reaction to the lack of structure and sub-factor ambiguity tolerance for complexity.

The overall cognitive response of an individual to ambiguous stimuli does not appear to support a significant understanding of the German text. We propose to examine this area in another research sample. We relate our research results to the proficiency level in the given foreign language. We can assume that bottom-up reading processes at a lower language proficiency level require a higher cognitive load, as the reader must focus more on the correct decoding of grammatical and semantic structures in the text.

We perceive the differences in the context in the examined variables with respect to the category of French and German as remarkable. A possible explanation of the different results in German and French in relation to the ambiguity tolerance can be found in the different structure of the studied foreign languages. Our results confirm the theory of Colé et al. (2014), according to which not all languages are equally demanding in terms of flexible processing of different layers of the foreign language during reading. In languages where orthography and pronunciation are more complex, an

adequate response to ambiguous stimuli plays an important role. The written form of words is not clear enough, so the reader must look for other possible sources of understanding in order to process semantic and contextual information from the text. The relevance of the ambiguity tolerance is more modest in the case of languages where pronunciation and phonological rules are simpler, for example, in German. As far as French is concerned, mastering the phonological level of the language as well as its grammatical or spelling specifics is quite a challenge for Slovak students (Fanová, 2013).

The reason for the different relationship with cognitive-personality characteristics in different foreign languages in our research may also be the peculiarities of the reading comprehension test in French, or the characteristics of the research sample. Students learning French achieved a relatively high success rate in the test, which suggests that, on average, their command of the foreign language may have been slightly higher in this group than language proficiency level A2. Our findings in this regard point to the fact that cognitive-personality variables predict to a greater extent advanced foreign language learners who to some extent mastered the structure of the foreign language.

### **5. Conclusion**

Based on the research results, it seems that the importance of categorization activities of student cognition, i. e. cognitive-personality characteristics as tolerating ambiguous situations and uncertainties in the educational process of reading comprehension in the second foreign language is related to the level of foreign language proficiency. A teacher in a group of students with a lower language proficiency level should therefore establish the basis for later more intensive work with cognitive structuring and tolerance of ambiguity. At the beginner level, the teacher can also serve as a model in working with ambiguous and less structured stimuli and reduce the cognitive load to which students are undoubtedly exposed while reading the foreign language text. At higher levels of language proficiency, emphasis should be placed on gradual reducing the need for structure in pupils, on moving away from familiar (literal) interpretations of meaning, and on developing a creative, complex and multilevel perception of the foreign language text.

In the presented research, the focus was on correlations in general. The expansion of research with qualitative methods could provide a deeper insight into the nature of the identified links between reading in a foreign language and the cognitive-personality variables of secondary school students.

We consider the categorization activities of student cognition as an important set of factors that can cause different performance and effectiveness of learning for students who, however, study the foreign language under the same conditions. In addition, the tolerance of ambiguity and the personal need for structure belong to the relatively dynamic characteristics of the student, which can be optimized by the intentional action of the teacher to develop reading comprehension skills in the foreign language. We consider dealing with these characteristics to be effective, because by stimulating them we also support the cognitive processes of text comprehension. Many times, students are motivated to read, work with a variety of texts, but are unable to respond adequately to related questions. As a further direction of research, we see the development of targeted pedagogical intervention based on the identified context and its subsequent verification in practice, which serves for awareness and subsequent systematic, in-depth development of a narrower circle of cognitive, and metacognitive processes needed to understand the foreign language text.

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