Pamćenje ugodnih, neugodnih i besmislenih sadržaja u odnosu na emocije i emocionalnu klimu na času

Memorizing pleasant, unpleasant and meaningless contents in relation to the teaching process

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Резиме

Како ће ученици прихватити школско учење, да ли ће, колико и како памтити школске садржаје, у великој мери зависи од њих самих, али исто тако толико зависи од начина на који им је градио представљено и у каквој атмосфери. Овај рад истражује повезаност емоционалне киме на часу и памћења угодних, неугодних и бесмислених садржаја са емоцијама које се ученици испакују током наставе. Емоције у суштини представљају укрећварен нагон за делање, па тако свака емоција нагони наш ум и тело на одговарајућу реакцију. Кроз такве реакције уобличава се животно искуство и васпитање. Као што емоције својом снагом могу да угроzu mišljenje, претпостављамо и у овом раду испитујемо да ли могу да одређују памћење у односу на школско учење и

Summary

How pupils accept the school learning, and whether, how and to what extent they memorize school contents largely depends on them, but it also depends on the way school materials are presented to them and in what sort of atmosphere. This paper explores the connection between the emotional climate in the classroom and memorizing of pleasant, unpleasant and meaningless content with emotions expressed by pupils in the teaching process. Essentially, emotions represent the rooted urge to act; therefore, every emotion drives our mind and our body to an appropriate response. These reactions shape the life experience and upbringing. Since emotions can threaten thinking with their power, in this paper we assume and examine whether they can determine the memory in relation to school learning and emotional climate in the class-
**Introduction**

It was stated by Pestalozzi that the teaching process should represent the unity of head, heart and hand. The unity of head, heart and hand actually means the unity of words (thoughts), feelings and acts or, speaking in contemporary terms, the unity of the cognitive, affective and psychomotor (Bognar and Dubovički, 2011). The unity of thoughts, emotions and actions represents the multi-layered human being that equally involves the emotional, intellectual and spiritual being. In order for a child to express all its potential, it is necessary to achieve the unity of all these values through the teaching process. This is not exclusively about emotional qualities of the person, but also about archetypal powers which are at the core of every human development and which refer to the deepest human potential.

Even nowadays, in the early years of the 21st century “only such knowledge which by usual standards can be marked as rational has the highest scientific value. Intuition, emotions, the subconscious and learning from mistakes are all considered to be irrational” (Suzić, 1998, page 280). Lit-
(Czeč, 1998, str. 280). Since psychology literature generally acknowledges that emotions are an important aspect of communication, especially in teaching contexts, and that emotions can affect the psychological well-being of students, it is crucial to understand how emotions manifest themselves in the classroom. Carnegie-Mellon University in 2003 published the study titled "Characterizing Emotions in the Classroom." This study found that emotions are often experienced by students, especially during the learning process. Thus, the question of whether emotions are related to appropriate or inappropriate classroom behaviors is important for educators to consider.

This study highlights the importance of understanding emotions as they manifest within the classroom. It is suggested that educators should be aware of the emotions that students are experiencing, and that emotions can be a significant factor in the learning process. By understanding the emotions that students are experiencing, educators can help students manage their emotions and improve their ability to learn. This study is important because it provides insights into the relationship between emotions and learning, and it is a step towards improving the classroom environment.
of all thinking processes—perception, judgment, problem solving. Emotions affect the coding and invocation of information from memory, thus also affecting a huge range of mental processes (Haviland-Jones & Lewis, 2000). Exploring the connection between emotions and memory is important for many fields of psychology, pedagogy, school psychology, even for court proceedings and testimonies. Thus, such research is of huge significance for all these fields, but also for self-help for every person to better understand his/her own functioning.

Our research is founded on several levels. We investigate how pleasant and unpleasant contents affect school memory, whether the emotional climate and pupils’ emotions in the classroom influence the efficiency of memory, and whether there is a connection between these categories.

Memorizing pleasant, unpleasant and meaningless contents

Memory is a complex mental function which serves to register and retain all contents of our consciousness, what we perceive, feel or think, as memory images (engrams), after which these are willingly or unwillingly reproduced or brought back into consciousness. Memory is the total quantity of all experiences acquired by a person. It is associated with two important processes, learning and recollection. Learning is the storing and engramming of new experience, while recollection means bringing back the previously memorized experience into consciousness. Each sensation and sensory excitation is received
by our brain after several stages of processing (Suzić according to Rolls, 2001). Our experience determines whether our brain classifies information as pleasant or unpleasant. Such a process takes place as children learn school contents, which means that children perceive certain subjects as pleasant, and others as unpleasant. This depends on a series of factors, including the teacher (Suzić, 1995). As moods and emotions manifest themselves in behaviour, they also influence cognitive processes. The learning process or consolidation of new information into the memory happens as part of the learning strategy. The first psychological research of this subject used lists of words (Craik and Tulving, 1975) and found that words are memorized more easily if they are organized into pairs in relation to their meaning, than if pupils memorize words in relation to their phonetic features. Also, it was found that when the learning conditions are similar to those in which what is memorized should be reproduced, memory is better. This means that something that happened to the pupil during learning can help him remember something he knows at the moment of the examination, if a similarity occurs. This leads to the possibility that there is a connection between positive contents in a positive atmosphere, that is, the possibility of better memorizing of unpleasant contents in an unpleasant atmosphere. Memory is important for thinking, since it represents a record of information, while thoughts and emotions represent carriers of information. The research carried out by Blaney, Forgas and Rusting confirmed the hypothesis that mood affects the memorizing of contents which are in line with the
mood, which means that people who are in a positive mood memorize positive contents more easily, while those in a negative mood remember unpleasant contents more easily (Rusting, 1999). The research carried out by Isen and Nasby found a positive effect of positive moods on the memorizing of positive contents, but it did not find an effect of negative moods on the memorizing of negative contents (ibidem, 1999). Since there are discrepancies in the results of different studies dealing with the same or similar topic, through this research we have tried to establish whether pupils memorize pleasant or unpleasant contents more easily, whether they find it easier to memorize meaningless contents accompanying those pleasant and unpleasant ones, if there is a connection between the emotional climate and memory, and whether mood affects memory.

**Emotions and emotional climate in the teaching process**

Emotions are one of the key factors influencing the functioning of an individual and they take the main role in interpersonal life. Studies have shown that the expression of one’s own emotions is associated with improved physical and mental health, as it improves the immunological system and increases positive affect (Kalebić-Maglica, 2007). The author states that emotions can be weak or strong and depending on this they can cause tension of a lower or higher degree. Emotions represent an enormous energy potential which may become constructive or destructive. This is why emotions have to be managed,
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Zato emocijama važa upravljanje, jer mi se uvek nekako osjećamo i svaki trenutak našeg bitniješa obojen je nekom emocijom. Ove emocije daju unutrašnju utvrđenost u smislenost života. P. Ekman i sarađnici (2003) navede sedam primarnih emocija, čije se fazičalne ekspresije tumače na isti način svuda, a to su sreća, ljutnja, straha, tuha, iznenada, taženje i prezir. Ova lista osnovnih emocija napravljena je prema kriterijumu universalnost i prema značaju koji su te emocije imale u procesu evolucije. Dakle, emocije pripremaju telo za specifične odgovore u typičnim situacijama, koje su te emocije izazvale. Pri ljutnji krv nadire u periferne delove tela, čime se teto priprema za akciju i napad, rad srca i disanja su ubrzani, adrenalina se pojava i luci. U strahu krv teče kao velikim siletnim mišićima do nogu, čime se omogućava bekušto, a liče zbog tega besdi. Sreća i druga prijetnja osjeća dovođe do parasimpatičkog pobuđivanja, reakcije opuštanja, opuštenja stanka smernosti i zavukovla (P. Popović i Petrović 2006).

Kada pogenjemo emocije navedene u klasiifikaciji P. Ekmana, koje su samo delić svih emocija koje čovek postuje, lako je vidljivo da emocije obuhvataje sve sfere čovekovog života, da se čovek stvara fažu mnogih pojava u sebi i van sebe, da postuje izuzetne energetske sposobnosti. To ukazuje na moći energetski, misljenih i emocijskih uticaja na sredstven organizam. Pozitivne emocije povećavaju kognitivnu prisagodljivost. Kada smo dobro raspolaženi, potekoče nam se čine because we always have some sort of feelings and each moment of our existence is marked by an emotion. Emotions give human beings inner confidence in the meaningfulness of life. Paul Ekman and associates (2003) mention seven primary emotions, whose facial expressions are interpreted in the same way all over the world. These emotions are happiness, anger, fear, sadness, surprise, disgust and contempt. This list of basic emotions is derived in accordance with the criteria of universality and importance of these emotions in the process of evolution. Therefore, emotions prepare the body for specific responses in typical situations, caused by these emotions. In anger, the blood rushes to the peripheral body parts, which prepares the body for action and attack, heartbeat and breathing are accelerated, and the adrenaline level is increased. In fear, the blood flows to the large skeletal muscles to the legs, which allows for escape, making one pale in the face. Happiness and other pleasant feelings lead to parasympathetic arousal, relaxation, general calmness and satisfaction (Popović and Petrović, 2006).

If we look at the emotions from Paul Ekman's classification, which are only a small fraction of all emotions of man, it is clear that emotions cover all spheres of human life, that man creates many phenomena inside and outside of himself, and that man has extraordinary energy capacities. This indicates the power of energy, thought and emotional effects on one's own body. Positive emotions increase cognitive adaptability. When we are in a good mood, difficulties seem less serious and we are ready to take bigger risks, while ignoring previous difficulties in solving a
мањим и срећним смо преузети већи ризик и занемарити претходне тешкоће у решавању неког проблема. Често доживљавање позитивних емоција као што су срећа и радост повезано је са положењим позашаљем - друштвено, оптимизам, алtruizam, енергијаност и оријентацију. Негативно расположење и негативне емоције доводе до потпуно различитог размишљања у односу на позитивне. Људи подштег расположења су критичнији према другима, борбени су и склони расправљању. Њихов фокус је на негативним стварима које покушавају да исправе. Они су усмерени само на себе, више само своје потребе и испољавају се према другима. Људи позитивног расположења су велику душевну и мање склони свајима, креативнији су, толерантнији и конструктивнији.

Ако сав претходно изгледа сазнања пренесемо у ученичку и оно што ученици кроз емоције чак и физички доживљава за време наставе, постаје неизмерно важан на који начин се настава држи, како се наставник опходи према ученицима и која осећања ће покушацти да презенцира код својих ђаци, али и код самог себе, јер интеракција је неизбежна у свакој размене и свакој комуникацији. „Од наставника се данас очекује да схвати потребе, проблеме, интересовања и склонности ученика, да буде пријатељ детета и ученика, његов саветник, човек од поверења, те је неопходно развијање климе међусобног поверења и адекватних комуникација између наставника и ученика” (Ђорђевић и Ђорђевић, 1988). Ученицима је потребна топлина и пријатељски однос. Особине или својства наставника могу да имају позитиван и негативан утицај problem. Repeated experiences of positive emotions, such as happiness or joy, are associated with desirable behaviour - sociability, optimism, altruism, energy and originality. Negative mood and negative emotions lead to a completely different thinking in comparison with positive ones. People in a bad mood are harsher critics of other people, prone to fights and discussions. They are focused on negative things which they wish to resolve. They are focused on themselves; they only see their own needs, while they are distrustful of others. People in a positive mood are more generous and less prone to quarrels; they are more creative, more tolerant and constructive.

If we transfer all the previously presented knowledge into the classroom, together with everything a pupil experiences through emotions, even physically, during the teaching process, the way the teaching process is carried out becomes immensely important. It is also important how the teacher treats the pupils and what sort of feelings he/she tries to produce in his/her students and in himself/herself, since interaction is inevitable in any exchange and in any communication. "Nowadays, it is expected from a teacher to understand the needs, problems, interests and preferences of pupils, to be a friend of children and pupils, their advisor, a person of confidence, which is why it is necessary to develop a climate of mutual trust and proper communication between teacher and pupils" (Đorđević Đorđević, 1988). Pupils require warmth and friendly attitude. Characteristics and traits of the teacher may have a positive or negative influence on pupils. The situation at school, accompanied by
the overall emotional climate in it, creates strong emotions in pupils, and these emotions are experienced by pupils on the daily basis, constantly, 180 days in a school year. If only one teacher emits negative energy, sends negative impulses, causes fear or some other negative feeling, enough damage to young people is caused already, and this damage can manifest itself in various ways, both on the physical and on the psychological level. Emotions are evident in the teaching process in the form of emotional climate, which may be pleasant or unpleasant, and the teacher is the key factor that determines and creates this emotional climate in the classroom, that is, the factor that initiates or inhibits. The teacher, with his/her emotions and his/her own attitude towards the teaching process, also excites emotions in children. The favourable and driving climate and the establishment of positive social relationships in the classroom are closely linked. It is important to create appropriate climate in the class and to encourage the development of feelings of all actors in the teaching process, in order to achieve something positive. As our folk saying reads, you attract as you radiate. Therefore, teachers who radiate positive emotions certainly cause similar emotions and similar behaviour in pupils, while teachers’ negative behaviour tends to block pupils, causing similar negative feelings in pupils. These negative feelings will be returned to the teacher, as feedback. There are numerous emotions which occur in pupils in the teaching process and it is impossible to examine all of these in this paper. However, we will deal in more detail with those pupils’ emotions which are usually obvious; happiness (joy), satisfaction, sadness and fear.
Истраживање

Циљ овог истраживања је емпиријским путем утврдити каузалне везе у памћењу позитивних, негативних и бесмислених садржаја у односу на емоционалну климу и емоције ученика. У складу са циљем дефинисани су следећи задаци:
- Испитати упамћеност угодних, неугодних и бесмислених речи;
- Испитати памћење угодних и неугодних речи у односу на емоционалну климу на часу;
- Испитати памћење угодних и неугодних речи у односу на емоције ученика.

Хипотезе:
- Ученици боље памте угодне садржаје и бесмислени садржаје који се палице уз угодне;
- Ученици боље памте угодне садржаје уколико је позитивна емоционална клима на часу, а неугодне уколико је клима лоша;
- Ученици боље памте угодне речи уколико на часу преовладавају позитивне емоције и неугодне речи уколико преовладавају негативне емоције.

Сачињавање истраживања

Истраживање је проведено у једној основној и једној средњој школи. Снимано је шест наставних часова, по два у четвртом и осмом реду основне школе и два у другој години.

Research

The aim of this research is to empirically establish causal relations in the memorizing of positive, negative and meaningless contents in relation to the emotional climate and pupils’ emotions. In accordance with the aim, the following problems were defined:
- Examine the memorizing of pleasant, unpleasant and meaningless words;
- Examine the memorizing of pleasant and unpleasant words in relation to the emotional climate in the classroom;
- Examine the memorizing of pleasant and pleasant words in relation to emotions.

Hypotheses
- People memorize pleasant contents and meaningless contents accompanying pleasant ones more easily;
- Pupils memorize pleasant contents more easily if the emotional climate in the classroom is positive, while they memorize those unpleasant ones more easily if the climate is bad;
- Pupils memorize pleasant words more easily if positive emotions are dominant in the classroom, while they memorize those unpleasant ones more easily if negative emotions are dominant.

Research implementation method

The research was carried out in one primary school and in one secondary school. Six school classes were observed, two in the fourth and eighth grade of primary school, and two in the second grade of secondary...
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Measurement of the memorizing of words was performed at the beginning of the class and at its end. At the beginning of the class, memory items of pleasant contents and of meaningless contents accompanying pleasant ones were shown simultaneously on the video wall. The teacher read these items, and after 30 seconds the picture on the video wall was removed, while pupils had to complete the answer lists. The same procedure was carried out for negative contents. At the end of the class, pupils were given the lists all over again, in which they had to enter the memorized contents, which had been shown and read at the beginning of the class. Pupils had not been informed that the measurement of memorized words would be performed at the end of the class, which means that pupils did not attend the class with the intention to retain words in their memory. Entire research was carried out in January and February 2013.

Sample

The sample covered 143 respondents, of which 45 were pupils aged 14, 53 pupils were 10 years old, while 45 of them were 17. The entire sample was from the territory of the city of Niš.

Instruments

Three research instruments were used for this research: Efx (Suziċ, 1995), Thermometer of emotions (Suziċ, 2008) and PUNBS-test (memorizing pleasant, unpleasant and meaningless contents) which was produced for the needs of this research.
Efx is an instrument used to observe classes and it involves key elements of the class, such as: pupils' activity, teacher's activity, certain aspects of pupil motivation, emotional climate in the classroom, suitability of the teaching process to the cognitive style of pupils, and elements of didactic organisation of the class. This instrument involves presence at the class and its monitoring. The objectivity of observation is ensured through three Likert-type scales and one comparison scale (Suzić, 2003).

Thermometer of emotions is an instrument which, using the scale from 0 to 100, measures the intensity of an emotion in a certain moment. There are two positive and two negative emotions on the scale: happiness, satisfaction, sadness and fear. On the scale between 0 and 100, pupils check the intensity or degree of their emotions, at the beginning of the class, after 25 minutes, and after 45 minutes from the beginning of the class. This technique is called “punctuation of emotions” (Suzić, 2008).

PUNBC-test is an instrument constructed for the purpose of examining. Consists of four items, of which one is dedicated to memorizing pleasant words, the second to memorizing unpleasant words, the third to memorizing meaningless contents accompanying pleasant words, and the fourth item is dedicated to memorizing meaningless contents accompanying unpleasant words. Measurement of memorizing pleasant, unpleasant and meaningless contents was carried out at the beginning and at the end of the class.
Обрада података

Статистичка обрада података извршена је у пакету IBM SPSS Statistics 19.0, на нивоу изучувања аналисе коваријанса, ANCOVE или анализе коваријанса у мултиваријантном дизајну MANCOVE, при чему нас је занимала регресија, односно поновљено мерење ради фактора време и стандардне мултиваријанта регресије.

Метријске карактеристике инструмената израчунате су Cronbach-Alfa обрасцем. Арбитарна граница изнад које би се тест могао назвати поузданим је видност алфа Кронбаховог коефицијента $\alpha = 0.7$. Зависно од природе и намене скале, захтевају се различити нивои поузданости, али Нанмали (Nummali, 1978) препоручује да се не прихвати поузданост мања од 0.7. Израчунало смо да Cronbach-alpha тест за унутрашњу консистенцију инструмената $E_{idx}$ износи $\alpha = 0.88$. Код Термометра емоција Cronbach-alpha за унутрашњу консистенцију позитивних емоција $\alpha = 0.73$, а за негативне емоције $\alpha = 0.82$, а код инструмената ПУНБС вредност Cronbach-alpha за унутрашњу консистенцију намењених речи износи $\alpha = 0.77$. Овим смо потврдили поузданост свих инструмената.

Резултати истраживања

Прва хипотеза у овом истраживању гласила је да учионици боље памте угодне садржаје и бесчислене садржаје који се налазе уз угодне.

Processing of data

Statistical processing of the data was carried out using the package IBM SPSS Statistics 19.0, at the level of covariance analysis calculation, ANCOVA, or covariance analysis in a multi-variance design MANCOVA. We were interested in regression, that is, in repeated measurement, because of the factor of time and standard multiple regression.

Metric characteristics of the instruments were calculated using the Cronbach-Alfa pattern. Arbitrary threshold above which the test could be considered reliable is the value of alpha Cronbach coefficient $\alpha = 0.7$. Depending on the nature and purpose of the scale, different levels of reliability are required. However, Nummali (1978) suggests that any reliability below 0.70 should not be accepted. We calculated that the Cronbach-alpha test for internal consistency of the instrument $E_{idx}$ was $\alpha = 0.88$. For the Thermometer of emotions, Cronbach-alpha for internal consistency of positive emotions was $\alpha = 0.73$ and of negative emotions $\alpha = 0.82$. For the instrument PUNBS, the value of Cronbach-alpha for internal consistency of memorizing words was $\alpha = 0.77$. In this way, we confirmed the reliability of all these instruments.

Results

The first hypothesis of this research reads: pupils memorize pleasant contents and meaningless contents accompanying pleasant ones more easily.
Када говоримо о меморисању, по-знато је да човеков мозак памти угодне догађаје, а потиснује или заборавља догађаје који су произвели негативне емоције. Нас је занимало како овај механизам функционише у настави и да ли угодна клима у одељењу узрокује боље памћење угодних садржаја и обратно. Основно полазиште је утврдио да ли ученици боље памте угодне или неугодне садржаје. У овом истраживању нам је било важно да направимо два мерења упамћености садржаја — пре почетка часа и на крају часа. Прво мерење је ослобођено емоција које се јављају на часу и везано је сачувано за емоционалну објеност појмова које су ученици памтили, као и личну емоционалну објеност коју су ученици давали речима на основу сопственог искуства. У делу угодних речи које су ученици памтили налазиле су се речи: мајка, тврта, љубав, цвет, мир, а као неугодне днете су им речи: змија, ђубре, вакао, болест, смрад. Приликом сагледавања налаза морао имати у виду чињеницу да једна иста реч не мора служити за сваког ученика имати једнак емоционални садржај. Појмове угодне речи могу за неко дете имати негативни емоционални навој, па тако реч мајка, која по правилу треба да носи позитивну емоцију, можда донесе негативну емоцију детету кога је мајка напустила или му је мајка умрла. Стога је врло тежак задатак и велики изазов поуздано извршити анализу везану за памћење угоних и неугодних садржаја.

When we discuss memorizing, it is well known that our brain memorizes pleasant events, while it suppresses or forgets those events which produced negative emotions. We were interested in how this mechanism works in the classroom and whether pleasant climate in the classroom causes easier memorizing of pleasant contents, and vice versa. The starting point was to determine whether pupils memorize pleasant or unpleasant contents more easily. In this research, we thought it was important to perform two measurements of the memorizing of contents — before the beginning of the class and at the end of the class. The first measurement was not burdened with emotions which occur during the class, and it is associated only with the emotional colouring of the terms memorized by the pupils and the personal emotional colouring the pupils attributed to the words based on their own experiences. The part of pleasant words memorized by the pupils included the following words: mother, cake, love, flower, peace. Unpleasant words were snake, rubbish, hell, sickness, smell. When considering the findings, we have to bear in mind that one particular word does not necessarily have to have the same emotional content for all pupils. The mentioned pleasant words may have negative emotional intensity. Thus, the word mother, which generally carries positive emotions, may induce negative emotions in a child who was abandoned by the mother or whose mother had died. This is why the analysis referring to the memorizing of pleasant and unpleasant contents represents a difficult task and a great challenge.
Table 1

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>SD</th>
<th>t-test</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meaningful pleasant words (end of the class)</td>
<td>3.52</td>
<td>1.32</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meaningful unpleasant words (end of the class)</td>
<td>3.13</td>
<td>1.41</td>
<td>3.28**</td>
<td>.00</td>
</tr>
<tr>
<td>Meaningless with pleasant (beginning of the class)</td>
<td>2.80</td>
<td>1.21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meaningless with unpleasant (beginning of the class)</td>
<td>1.71</td>
<td>1.57</td>
<td>8.78**</td>
<td>.00</td>
</tr>
<tr>
<td>Meaningless with pleasant (end of the class)</td>
<td>1.69</td>
<td>1.21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meaningless with unpleasant (end of the class)</td>
<td>.44</td>
<td>.83</td>
<td>12.59**</td>
<td>.00</td>
</tr>
</tbody>
</table>

** p<0.01

Table 1 shows that, when it comes to the memorizing of meaningful pleasant and unpleasant words, statistically significant differences occur only in the second measurement, after the effects of experimental factors (emotional climate and pupils’ emotions). When it comes to the memorizing of meaningless contents, statistically significant differences occurred in both measurements (significant at the level .01), in favour of the memorizing of meaningless contents accompanying pleasant words. This finding concerning meaningless words may be interpreted by the fact that the pupils were provided with an opportunity to attribute a context or emotion to meaningless contents, as these were not explicitly given in the word. These were, in our case, only mildly suggested, by placing the content next to pleasant or un-
могућност да ученици сами дају позитиван, односно негативан стимуланс наведеним бисмисленом словами. „Корист од репрезентовања неурањних објеката који не зависе од асоцирања награде (за визуелне доживљаје то је инфеморна темпорална корта) је да они могу бити пројектовани на разлицине неурањне системе и тада испоручећи за више функција независно од мотивационог или емоционаленог стана“ (Rolls, 2000; шитирено код Сузића, 2004, стр. 43). Овим је потврђена наша хипотеза да се боље памте угодни садржаје као и бисмислене речи које се нане вез угодне. Друго мерење (на крају часа) нам је било важно за даљи ток истраживања јер оно собом носи емоционални садржај кроз емоције које су ученици имали током часа, па нас статистички значајни надаци добијени меревањем на крају часа директно упућују на испитивање повезаности памћења угодних и неугођних садржаја и емоционалне климе и памћења. Претходно добијени налази су нам директно указали на то да неки експериментални фактор има утицај на памћење, јер су се сви статистички значајни налази појавили у мерењу на крају часа. Из најразлога емоције повезане са памћењем.

Наша друга хипотеза гласила је да се боље памте угодни садржаји уколико су емоције ученика позитивне, односно неугођне речи, ако су емоције ученика негативне. Ако емоције утичу на кодирање и дозивање информације из памћења, тиме утичу на огроман дијапазон менталних процеса (Haviland-Jones & Lewis, 2000). У школским условима свакако постоје ситуације које су pleasant words. This created an opportunity for the pupils to give a positive or negative stimulus to the mentioned meaningless syllables. "The advantage of presenting neutral objects which do not depend on the association with reward (for visual experiences, inferior temporal cortex) is that these can be used in various neural systems, which means that they can be used for multiple functions, irrespective of motivational or emotional state" (Suzić according to Rolls, 2004). This confirms our hypothesis that pleasant contents and meaningless words accompanying them are memorized more easily. The second measurement (at the end of the class) was important for the further course of the research, because it carries the emotional contents through emotions experienced by the pupils during the class. Thus, the statistically significant data obtained through the measurement at the end of the class direct us towards the testing of the association between the memorization of pleasant and unpleasant contents and the emotional climate and memorizing. Previously obtained data directly suggest that certain experimental factor affects memorizing, since all the statistically significant findings occurred in the measurement at the end of the class. This is why we associated emotions with memorizing.

Our second hypothesis is that pleasant contents are memorized more easily if pupils' emotions are positive, while unpleasant words are memorized more easily if pupils' emotions are negative. If emotions affect the coding and invocation of information from memory, they also influence a huge range of mental processes (Haviland-Jones & Lewis, 2000). In school environment, there are certainly situations that are emotionally strong, but the question is whether
We may conclude that the feelings of happiness and satisfaction are the highest at the beginning of the class and that they decrease towards the end of the class (Table 2). This can be interpreted in two ways - pupils look forward to the class which began and they feel sorry that it is nearing its end, or pupils were happy at the beginning because of the class itself, but the class did not fulfill their expectations, failing to keep them happy until the end. The feelings of sadness and fear are the highest in the middle part of the class, and the lowest at the end. If we compare the flow of negative feelings (fear and sadness) during the class with that of positive feelings (happiness and satisfaction), it is...
тива осећања опада а негативна рас-
ла до средине часа, а како се час при-
ближава крају и негативна и позитивна
осећања су имала опадајући тренд. Ова
tенденција опадања и позитивних и не-
гативних осећања води ка осећању раз-
новредности што се показало као дош
стимулансе за когнитивни процес. Овај
показатељ је на ње упутио на позитив
тлање интеракције емоција ученика и
eфикасности часа, па смо применили
мультинваријантну анализу коваријансе
за више зависних јединставно повезаних
аритметичких средина.

Табела 3

**Емоције пошто часова и ефикасности часа – утицај времена (MANCOVA)**

Table 3

*Emotions during classes and efficiency of the class – influence of time (MANCOVA)*

<table>
<thead>
<tr>
<th>Variables</th>
<th>Test</th>
<th>Positive emotions</th>
<th></th>
<th></th>
<th>Negative emotions</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>F</td>
<td>P</td>
<td>F</td>
<td>P</td>
<td>F</td>
<td>P</td>
</tr>
<tr>
<td>Pillai's trace</td>
<td>1.29</td>
<td>.262</td>
<td>3.52</td>
<td>.002</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wilks' lambda</td>
<td>1.29</td>
<td>.261</td>
<td>3.54</td>
<td>.002</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hotelling's trace</td>
<td>1.29</td>
<td>.26</td>
<td>3.57</td>
<td>.002</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Roy's greatest root</td>
<td>2.37</td>
<td>.073</td>
<td>5.87</td>
<td>.001</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Легенда:** Варијабле: Тест, Позитивне емоције, Негативне емоције, Време Еф, Пилайова траса, Вилксова траса, Хотеллингова траса, Ройува највећи квадрат

**Информација:** Еф – ефикасност највећих физика

**Note:** Ef – efficiency of the class

Ефикасност часа узврштава пораст
позитивних емоција и пад негативних
емоција под утицајем времена. Показа-
ло се да се негативне емоције значајно
менају у вези са ефикасношћу часа по
свим критеријумима – Пилайевом кри-
tеријуму, Хотеллинговом критеријуму,
clear that positive feelings decrease, while
negative increase until the middle part of
the class, while both positive and negative
feelings decrease towards the end of the
class. Such decreasing trend of both posi-
tive and negative feelings leads towards
the feeling of indifference, which proved
to be a be a bad stimulus for the cognitive
process. The main indicators led us to examine
the interaction between pupils' emotions
and efficiency of the class, which is why we
applied the multi-variance covariance
analysis for several dependent and mutually
associated arithmetic means.

Efficiency of the class results in an in-
crease in positive emotions and a decrease
in negative emotions, under the influence
of time. It was found that negative emo-
tions significantly change, depending on
the class efficiency according to all crite-
ria – Pillai's criterion, Hotelling's criterion,
Wilks’ lambda, and Roy’s gsc-index (Table 3). All these criteria indicate significance at the level .002. Poorly efficient classes result in an increase in negative emotions of pupils, while classes that are very efficient result in an increase in positive emotions (Descriptive Statistics).

Further, we were interested in the interaction between pupils’ emotions and memorizing of words, which we calculated using the same approach (MANCOVA).

Tabella 4

Table 4

Influence of time on memorizing of words and emotions (MANCOVA)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Positive</th>
<th></th>
<th></th>
<th>Negative</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>satisfaction</td>
<td>Happiness</td>
<td>fear</td>
<td>endness</td>
<td>satisfaction</td>
</tr>
<tr>
<td>Time *positive meaningful (beginning of the class)</td>
<td>Roy’s greatest root</td>
<td>1.98</td>
<td>.101</td>
<td>1.71</td>
<td>.121</td>
</tr>
<tr>
<td>Time *negative meaningful (beginning of the class)</td>
<td>Roy’s greatest root</td>
<td>1.74</td>
<td>.150</td>
<td>1.83</td>
<td>.119</td>
</tr>
<tr>
<td>Time *meaningless with positive (end of the class)</td>
<td>Roy’s greatest root</td>
<td>1.12</td>
<td>.355</td>
<td>1.01</td>
<td>.412</td>
</tr>
<tr>
<td>Time *meaningless with negative (end of the class)</td>
<td>Roy’s greatest root</td>
<td>1.61</td>
<td>.174</td>
<td>2.44*</td>
<td>.050</td>
</tr>
</tbody>
</table>

Legend: Varijabla, Satisfakcija, Beznadzorna smes (sreda i traga), Vreme - pozitivne smes (sreda), Vreme - negativne smes (sreda), Vreme - beznadezna smes (sreda), Vreme - pozitivne smes (traga), Vreme - negativne smes (traga), Vreme - beznadezna smes (traga).

We found that pupils’ emotions affect memory. Thus, pupils who expressed positive feelings (happiness and satisfaction) memorized most pleasant words, while those whose emotions were dominantly negative (fear and sadness) memorized less pleasant words (Descriptive Statistics). The same trend continues when
it comes to the memorizing of unpleasant words, thus, pupils in a positive mood memorized more easily than those who expressed negative emotions during the class. When it comes to the memorizing of meaningless words (Table 4), we found that there was a statistically significant difference in the memorizing of meaningless words in both the first and the second measurement, and this was the case both for meaningless words accompanying pleasant words (significant at the level .00) and for meaningless words accompanying unpleasant words (significant at the level .007). All statistically significant data referred to negative emotions (fear and sadness). It must be noted here that the significances occurred in the second measurement, after the end of the class, and that negative emotions that arose during the class influenced the memorizing of words. This means that the factor of time had a significant effect in the interaction of emotions with meaningless contents. Measurement of the memorizing of meaningless contents at the end of the class showed that those pupils who checked negative emotions on the Thermometer of emotions found it more difficult to memorize meaningless contents, which is in line with the previous flow of the research, which showed that negative emotions cause poorer memorizing of words in general.

Our third hypothesis was that pupils memorize pleasant contents more easily if the emotional climate in the class is positive, while they memorize those unpleasant ones if the climate is bad. Emotional climate is the atmosphere created in the teaching process, in which participants of the teaching process feel comfortable or uncomfortable, which implies that the
emotional climate in the class itself can be comfortable or uncomfortable. Emotional climate in the class is established by pupils and teachers, which means that the educational process has an emotional character. However, emotional climate in the class is mostly created by the teacher’s behaviour. The teacher can make pupils happy, joyful, or even scared with his/her attitude towards them. We measured emotional climate in the class using the instrument EfX. The test of polarity of emotional climate in the class was monitored using the assessment scale in a bipolar continuum: casualness and relaxation versus strain and tension, emotional neutrality and coldness versus positive emotional involvement, authoritative and strict approach versus relaxed cooperation. We checked the memorizing of pleasant and unpleasant contents depending on the emotional climate in the class and the difference between two measurements (at the beginning and at the end of the class) using the covariance analysis (ANCOVA). The obtained results are shown in Table 4. In order to compare the values in more detail, we divided the emotional climate in the class into four categories: very low, low, good, and very good.
Table 5

Positive and negative words and emotional climate (ANCOVA)

<table>
<thead>
<tr>
<th>Emotional climate</th>
<th>M</th>
<th>SD</th>
<th>N</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Meaningful positive words</strong> (end of the class)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very low</td>
<td>3.04</td>
<td>1.58</td>
<td>23</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>3.70</td>
<td>1.19</td>
<td>43</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good</td>
<td>3.31</td>
<td>1.33</td>
<td>55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very good</td>
<td>4.18</td>
<td>0.96</td>
<td>22</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>3.52</td>
<td>1.32</td>
<td>143</td>
<td>3.78</td>
<td>.01**</td>
</tr>
<tr>
<td><strong>Meaningful negative words</strong> (end of the class)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very low</td>
<td>3.13</td>
<td>1.42</td>
<td>23</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>3.49</td>
<td>1.44</td>
<td>43</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good</td>
<td>2.53</td>
<td>1.30</td>
<td>55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very good</td>
<td>3.91</td>
<td>1.02</td>
<td>22</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>3.13</td>
<td>1.41</td>
<td>143</td>
<td>7.35</td>
<td>.009**</td>
</tr>
</tbody>
</table>

**Significant at the level .001

Legend: Emotional climate, Смысловые когнитивные речи (края класса), Emotional climate, аншлаг.

By means of Descriptive Statistics we found that in classes where there is a positive emotional involvement, relaxation and casuality the memorizing of contents was on the highest level, while it was the lowest in classes where the emotional climate was in favour of strain, tension and aloofness. Based on Table 4, we can conclude that the memorizing of pleasant and memorizing of unpleasant contents differ significantly (F = 3.78, significant at the level .01), or (F = 7.35, significant at the level .00), respectively. The emotional climate affected the memorizing of these contents. Thus, these contents were best remembered in those classes with the best emotional climate, while the memorizing was the poorest in those classes which had very low emotional climate. In a warm emotional climate, accompanied by casu-
The memory of pleasant, unpleasant, and... OUR SCHOOL 2013 Banja Luka

n. čirić: memorizing pleasant, unpleasant and... Our school in Banja Luka

climatic, the emotional climate of the classroom, and the memory of pleasant, unpleasant, and neutral words. The results showed that emotional memory was significantly affected by the emotional climate of the classroom. In conclusion, the memory of pleasant, unpleasant, and neutral words is affected by the emotional climate of the classroom. Additionally, the study found that emotional memory was significantly affected by the emotional climate of the classroom.

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Discussion

This paper was started in order to explore a few key elements of the teaching process and to understand the causal relations between these. We were interested to find out whether children memorized pleasant contents more easily than unpleasant ones, including also meaningless contents accompanying these. The second level of the research covered the association of the memorizing of these contents with the emotional climate in the classroom and emotions expressed by pupils during the class. These are still unexplored and open questions of the theory and practice in the field of pedagogy. In pedagogical research it is quite difficult to measure variables referring to the future, and these are still not properly defined in the pedagogical theory. This is especially true for those topics on which there is no complete agreement among pedagogues. However, this created an even bigger challenge for the author of this paper, as we believe that it is necessary to point out the importance of the problem covered by this research.

This research confirmed previous findings that pleasant contents are memorized more easily than unpleasant ones, but, in addition, we found it important to find out whether this fact changes if we associate the memorizing of pleasant and unpleasant words with the emotional climate in the classroom, with emotions expressed by pupils in the teaching process, with the efficiency of the class and with the direction of communication. In addition to pleasant and unpleasant contents which were mean-
The importance of emotional climate was confirmed in this research. Good emotional climate not only affects the improved memorizing of pleasant contents, but it also has a positive influence on memory in general, regardless of the contents being meaningful or not and pleasant or not. Another important fact we found is that the lack of emotions (indifference) has a negative influence on memory, which must be emphasized. It is very important to familiarize practitioners with this finding, because the lack of interest among pupils leads to indifference to the teaching process. Therefore, it is necessary to cause any kind of emotion in order to encourage pupils to learn and memorize. Certainly, it is advisable to induce positive emotions rather than negative ones. Pupils’ emotions affect memory, and the pupils who expressed positive emotions (happiness and satisfaction) memorized the most words, while those whose emotions were predominantly negative (fear and sadness) memorized less words. Therefore, emotions affect memory and we memorize things more easily with positive emotions, irrespective of the emotional colouring of the memorized contents.

We may conclude that the findings of our research imposed several pedagogical implications. We will single out just a few...
but it is evident that teaching should focus on positive emotions and attitudes. The teacher should be aware of the impact of their own emotions on the students. For this reason, it is important to create a positive learning environment and to present positive emotions to the students, as this will help them to remember the material better.

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