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## **Cognitive Sciences and Technologies in Education**

**Kamal Kharrazi\***

Cognitive sciences and technologies as one of the components of convergent sciences and technologies (NBIC) is going to change the destiny of human being. Education is certainly and immediately one of those areas influenced by this interdisciplinary branch of sciences. This is specially true for teaching-learning processes, not only because of a better understanding of functions of mind and brain; emanating from findings of cognitive sciences, but also their pivotal role in using our brain more effectively. Today, innovation in and improvement of education is at high stick in developed countries. Based on the findings of cognitive sciences, education practitioners and scholars are trying to define new goals and objectives for education and to offer new strategies for its implementation. Information technology too, has rushed to the help of education and provided the teachers and educators with magnificent possibilities. Examination of these developments is promising and can make educational scholars and administrators familiar with an extensive array of new information. In my speech, I will try to touch upon fundamentals of cognitive approach to education from the perspectives of cognitive neuroscience, cognitive psychology, cognitive linguistics, philosophy of mind and artificial intelligence, and also to explain how cognitive sciences is able to make important transformations in education.

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## **A Study about the Relationship between Applying Cognitive Approach and Social Responsibility: An Iranian primary School Case Study**

**Yalda Delgoshaei\***

Since goals of curriculums are mainly to establish effective and efficient schools to foster self motivated, creative, independent, happy, educated and highly self confident human beings, many cognitive scientists believe that using cognitive approaches such as MI theory, will lead to educating responsible and sociable people. Therefore, the main concern of this research is to find out if there is any relationship between cognitive theories and becoming a socially responsible person. To achieve the mentioned aim, a pseudo-experiment was carried out on experimental and test groups using a pretest and a post test. In this experiment, the dependent variable was a plan written based on cognitive theories and the independent variable was the rate of social responsibility measured by Grasam test. Data were analyzed using data processing and descriptive and illative statistics, such as VillCockson. Cognitive approaches resulted in a 95% increase in children's social responsibility. Therefore, it is critical to give the schools advice to use cognitive approaches as guidelines for planning their curriculums.

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## **The Role of Motivational Beliefs as a Mediator in Children's Creativity Model**

**Mahbobe Alborzi\*, Bahram Jokar, Mohammad Khayer**

The aim of the present research is to study the role of motivational beliefs as a mediator in children's creativity model. Five hundred male and female elementary school students participated in the study. Students completed "Learning Climate Questionnaire", "Academic Self Regulation Questionnaire", and "A Consensual Assessment Technique for Creativity". The results revealed that perception of teacher was a predictor for motivational beliefs, separately and simultaneously. Autonomy regulation style and Control regulation style were predicted positively, by perception of teacher. Results also demonstrated that autonomy regulation style and control regulation style were significant positive and negative predictors of creativity respectively. These results were an evidence for confirming that any significant effects of antecedent variables on the creativity variable would occur through motivational beliefs.

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## **Structural Equations Model: Mediating Effects of Cognitive, Metacognitive, Affective and Behavioral Dimensions of Academic Engagement in Relation between Achievement Goals and Academic Achievement**

**Yasaman Abedini\*, Elahe Hejazi**

The purpose of this study was to present a causal model of relationship among achievement goals (mastery goals), Learning strategies (surface and deep processing), peers help seeking, task value, persistence on task and Academic achievement in high school female students. 260 female students from the high schools in Tehran were randomly selected using multi stage sampling. Two questionnaires were administered to the subjects: Mastery goals sub scale of achievement goals scale and motivational strategies for learning questionnaire. In the present study, the average of students' scores in five specific courses at the end of academic year was considered as the index of students' academic achievement. Data were analyzed through confirmatory and explanatory factor analysis, Cronbach's coefficient alpha and structural equations model. The results confirmed the mediating role of deep and surface learning strategies, task value and persistence on task and non mediating role of peer help seeking in relation between mastery goals and academic achievement.

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## **Semantic Processing of Tools and Animals in Persian: An ERP study**

**Ahmad R. Khatoonabadi\*, Sadra Sadeh, Reza Nilipour**

Questions about the organization of conceptual knowledge can be addressed by studying how different semantic domains are represented and processed in the human brain. In the present study, event-related potentials (ERPs) were recorded from 12 healthy right-handed male university students as they performed a semantic judgment task between 100 animal and tool words in Persian. The N400 component was computed by averaging between 300 to 600 ms to investigate dissociations between processing animal and tool words, as two categories of living and non-living items. Generally, the amplitude of N400 elicited for words related to animal category is larger than for tools. For tool words, posterior right, posterior left, central, anterior left and posterior regions formed a group of regions with most elicited negativity in comparison with other regions. In contrast, for animals, posterior left, posterior, and posterior right regions were the regions of interest with significant larger N400 negativity than others. Overall, moving from anterior regions to posterior ones increases N400 component negativity for both categories. Animals were more right-lateralized in the posterior regions while tools were more left-lateralized in the anterior regions. These results are in accordance with findings of some previous studies in this field, and can be explained on the basis of the feature-based account of semantic knowledge organization.

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## **Study of relations between morphological features of event related potentials and level of sustained attention**

**Farnaz Ghassemi\*, Mohammad Hasan Moradi, Mahdi Tehranidoust, Vahid Abootalebi, Anahita Khorrani, Amin Mohammadian**

Measurement of attention at its origin, i.e. brain, instead of conventional approaches which measure manifestations of attention, has gained special importance among researchers and several studies have been done in this regard. Measurement of attention directly from brain signals, is significant for eliminating excessive interfaces. This idea will generalize the application of this evaluation, leading to an increase in its validity. The aim of this study is to investigate the relations between morphological features of electroencephalogram signals and visual sustained attention level. This research aims to choose and carefully execute a proper protocol for investigating visual sustained attention. Continuous Performance Test, CPT, was used for defining the level of sustained attention. Signals were recorded via 32 channels Walter device which had been synchronized with the onset of stimuli in CPT and an electrode cap with 19 Ag/AgCl electrodes was used according to international 10-20 standard. For Event Related Potential (ERP) extraction, the average of each group of signal stimuli, which were time-locked to the onset of stimuli, was calculated. Thirty morphological features (including P300) were extracted from the signals recorded at Pz channel in 19 subjects. The subjects were divided into three groups according to their attention level. LDA<sup>1</sup> classifier was used for discrimination of classes (2 by 2). The accuracy of classifier was measured first by using only one feature which resulted in the determination of the best features. This procedure was then repeated for combining two and then three features. LOO<sup>2</sup> method was used for evaluating the accuracy of classifier. The P300 peak on target stimuli (X) was clearly observed for all subjects (irrespective of the correctness of answers). Calculated Correlations showed that there is a significant ( $p < 0.001$ ) relation between CPT results and some of these morphological features. Classification according to one feature yields in an accuracy of 75%. Combining the two features increases the accuracy to 91.7%. While for three features a 92.9% accuracy is achieved. However, it seems that the classifier is over-trained. Achieved results (obvious P300 on

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<sup>1</sup> Linear Discriminant Analysis

<sup>2</sup> Leave One Out

target stimuli) are in complete agreement with previous studies. This could be due to the characteristics of the task, complete perception of the task for subjects and/or the proper ratio of target stimuli to total stimuli (1 to 10). Calculated correlations confirm the significant relations between CPT results and some ERP features. The best classification results were obtained with a combination of two features (one amplitude and one delay), while increasing the number of features did not cause much improvement. Consequently, results represent a significant relation between CPT results and some parameters of brain signals which can be used in evaluating the level of attention.

## **Test Design, Data Collection and Multichannel Statistical Analysis of Event Related Brain Potentials for Layering Stable Visual Attention**

**Anahita Khorami\*, Seyed Ali Salehi, Mehdi Tehranidoost,  
Amin Mohammadian, Farnaz Ghasemi, Vahid Abutalebi**

The level of attention of humans has become a subject of interest in medical and engineering sciences in recent years due to various reasons. Since the level of attention becomes disordered in different illnesses, the evaluation of level of attention has gained importance in the diagnosis and follow-up of the aforementioned illnesses. In addition, researchers have been trying to design experiments which enable the early diagnosis of illnesses, including disorders of the frontal areas of the brain, which specifically affect stable and primary visual attention. Designing such experiments requires multidisciplinary approaches in order to provide valid signals to be used in engineering for various process studies and modeling; providing results worthy of use in medicine as well. These data are increasingly being collected worldwide and add to the efficiency of scientific studies. One of the objectives of this study is to design computer tasks to collect stable visual signals in order to quantify attention for future studies. In order to recruit subjects with a relatively equal intelligence level, Connor's self-rating questionnaire was used to select 18 to 40 year old individuals with symptoms of hyperactivity and attention deficit. Ishihara test was used to assess color blindness. Clinical interview and the assessment of handedness were also carried out. Also, some factors which could affect signals were evaluated. The collected data were assessed both statistically and with regard to the process of channels. Statistically, the only significant and strong correlation was present between the P300 and N200 components, especially in the X stimulus to which the subject should not have paid attention and had to ignore it ( $p < 0.05$  and  $r^2 = 0.9$ ). In the process of channels, regarding the importance of the Pz channel in collecting P300 and visual attention, all processes had taken place in this channel. The most important finding was an increase in P300 range in frontal, parietal and central areas of the right hemisphere in response to non-X stimulation. In this study, a significant increase in P300 range was evident in X and non-X stimuli in the right hemisphere of female subjects. However, in male subjects, non-X and X stimulation was mostly seen in left and right hemispheres respectively. The

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results of this study indicate that attention processes in the central nervous system is different in the two sexes. Also, regarding studies of event related potentials, the process of attention is more prominent in the right hemisphere. The latency correlation of these two components (P300 and N200) in Pz, indicates the significance of Connor's CPT in the evaluation of attention in addition to its clinical importance and its significance in behavioral assessment.

## **Could skewed frequencies be a design feature of language?**

**John Taylor\***

Things in a language occur with different frequencies. This is true of words, word classes, word groups, constructions, declensions, conjugations, inflected forms, phonemes, syllable types, etc. In fact, wherever we look in a language, we find skewed frequencies. There is also compelling evidence that speakers of a language 'know' (if only implicitly) these relative frequencies. In this talk, I argue that frequency distributions are more than just an incidental property of language as used; they are a design feature of language. A language without frequency effects would be (a) unusable (because it would lack redundancy), and (b) unlearnable. It is the latter topic that I mainly want to focus on.

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## **Ethnosyntax of Causative Constructions with ‘*dadān*’ and ‘*gozashtān*’ in Modern Persian: A Cognitive Approach**

**Keivan Zahedi\***

The present research aims to specify the ethnosyntactic features of the causative constructions with ‘*dadān*’ (give) and ‘*gozashtān*’ (let) in Modern Persian based on the Cognitive Grammar model. Ethnosyntax is a fairly recent development in linguistic inquiry which not only is compatible with cognitive universals, but also emphasizes the culturally-bound linguistic features. Analyzed data comprises of 2 categories: (1) corpus-based data including (a) 300 hours of recorded conversations in the form of a controlled interview between the researcher and 30 postgraduate students on 3 general topics, (B) 2000 sentences recorded from 2 TV dialogue-based programs and (2) a fifty-item questionnaire incorporating the intended constructions distributed amongst 300 subjects chosen on the basis of stratified random sampling. Therefore, the research method is both corpus-bound descriptive and of survey type. ‘*Gozashtān*’ construction shows a polarity between first person and non-first person constructions and a reverse of ground-figure distribution when compared with ‘*ejāze dadān*’ (allow). ‘*gozashtān*’ can also be categorized into (at least) 5 types, the common theme of which is ‘tolerance and interaction’. ‘*dadān*’ constructions in Modern Persian also incorporate the Iranian cultural feature of other-referencing rather than self-referencing. The findings indicate that the syntactic forms of ‘*dadān*’ and ‘*gozashtān*’ constructions are limited to and by universal cognitive constraints. Also, they incorporate the features of Iranian Persian-speaking culture. The non-referential ‘*pro*’ in ‘*dadān*’ constructions and the default subjunctive in both ‘*dadān*’ and ‘*gozashtān*’ constructs exhibit diagrammatic iconicity.

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## **A Cognitive Analysis of the Metaphorical Extension of Perception Verbs in Farsi**

**Azita Afrashi\* , Sara Madarshahian**

The present paper is an attempt to cognitively formulate the semantic radial networks of perception verbs in Farsi. Perception verbs are linguistic units which due to their direct and close relation to the physical, bodily experience of senses would best present the cognitive processes of concept formation. The radial networks of perception verbs are structured around the prototypical meanings. Non-prototypical meanings are structured through feature selection and metaphorical extension. Such an analysis is significant for three reasons: Formulating the polysemous radial paradigms of perception verbs is part of the cognitive semantic typology of languages. Perception verbs present the bodily basis of metaphorical extensions vividly. Such an analysis is not yet performed in Farsi. Accordingly, the s are introduced as follows: What are the paradigms for the metaphorical extension of perception verbs in Farsi? Are the explored paradigms in Farsi, in exact accordance with the previously introduced metaphorical paradigms by Lakoff & Johnson and Sweetser? How are the deviations from the pre-existing paradigms explained cognitively? How are the diversities among the radial networks of perception verbs in Farsi explained through a cultural –cognitive approach? In answering these questions, first the prototypical meaning of each perception verb is determined, and its related semantic features are assigned; then the non-prototypical meanings are contextually determined, and the changes in semantic features, leading to the metaphorical extension are marked. At this point the paradigms for the metaphorical extension of Farsi perception verbs are compared with the existing paradigms, and cognitive explanations are provided.

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## **An Examination of the Processing of Negative and Positive Polarity Items in Persian-Speaking Aphasic Patients**

**Shahla Raghibdoust\*, Maryan Kamal Khaledi**

The present research investigates the processing of negative and positive polarity items in Persian-speaking aphasic patients and normal individuals based on a sentence decision task. For this purpose, we used DMDX software to compare the subjects' level of capacity in terms of reaction time and accuracy. Polarity sensitive items include those items whose distribution and interpretation is sensitive to specific contextual factors. Negative polarity items like "hičkas" in Persian have been simply defined as occurring in negative sentences, whereas positive polarity items like "hesābi" behave in the opposite way, and are licensed in affirmative sentences. Although, there are different licensing contexts for polarity items, in this study we have restricted ourselves solely to constituent negation on the grammaticality/ungrammaticality of sentences involving polarity items. Our hypothesis was that processing of the polarity items can be challenging for Persian aphasics due to their syntactic, semantic and pragmatic features. For the purpose of this study, we tested two right-handed 46 and 53 year old Broca aphasic patients. In addition, twelve native speakers of Persian were also tested as the control group. Each subject read a total of 100 critical sentences (25 in each of the four critical conditions) and 50 distractor sentences on the computer screen in a randomized order. The subjects were instructed to judge sentence well-formedness by pressing "←" key for the sentences they thought to be false and pressing "→" key for the ones they considered to be correct. We used analytic and descriptive evaluations and appropriate statistical methods based on the subjects' processing time, accuracy of answers and number of errors. The results indicated that the level of performance of the aphasic patients was significantly different from that of the normal Persian-speakers, both in terms of reaction time and rate of accuracy. With respect to accuracy, the percentage of incorrect answers by aphasics was significantly more than the one by normal speakers. The percentage of correct answers to positive polarity items in aphasics was more (63 %) than the one to negative polarity items (47%). These percentages in normal speakers were 77.7 % and 73.5 %, respectively. Therefore, both groups reacted more accurately to the sentences involving positive polarity items than the ones involving negative polarity items. Concerning reaction time, the aphasics were significantly slower than normal subjects. They reacted

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to the sentences including negative polarity items in 6970 ms versus 1960 ms by normal individuals, and to the sentences involving positive polarity items in 7050 ms versus 1880 ms by normals. Thus, Normal subjects reacted to the sentences including positive polarity items quicker than the ones including negative polarity items, whereas the aphasics reacted somewhat slower to the sentences including positive polarity items than the ones involving negative polarity items. In general, the results drawn from this research suggest that there was a significant difference between the two groups regarding their accuracy and reaction time. In spite of their weak performance in this experiment, as well as their severe language production disorders, the aphasic subjects demonstrate considerable residue capabilities in analyzing syntactic and semantic features of linguistic structures including polarity sensitive items.

## **Neurocognitive Basis of Addiction Medicine; an Overview to Current Experiences and Future Horizons of Research Activities on Opiate Dependence in Iran**

**Hamed Ekhtiari\***

Neurocognitive and neuroimaging studies have generated a wealth of data demonstrating structural and functional brain changes, as well as cognitive deficits in drug addicted populations. Translating these findings to clinical implication through past decade of global experiences in approaching to addiction treatment as a brain disease indicate that 3 questions are now pivotal to continued practice-relevant progress: What are the main underlying neurocognitive pathologies that should be diagnosed, treated and followed up? How could we use these quantitative findings of neurocognitive assessments as a paraclinical data for clinical diagnosis, treatment selection and outcome follow up? How could we develop specific neurocognitive modulations for each specified clusters of patients' cognitive impairments? In this article we will try to address these questions based on current global and national experiences with more focus on Opiate dependence. We, in Neurocognitive Laboratory of Iranian National Center for Addiction Studies (INCAS), use Persian version of different neurocognitive and behavioral measures and tasks such as Iowa Gambling Task, Balloon Analogue Risk Task, Delayed Discounting Tasks, Time Perception Tasks, Different Inhibitory Control Paradigms, Different Cue Induced Craving Assessment Tasks, Attention Bias Paradigms, various Clinical Neuropsychological measures and self report Questionnaires for admitted opiates addicted patients in INCAS research clinics (more than 300 patients till now) and follow their cognitive changes after different treatment interventions to answer to upcoming questions. Functional MRI studies on Cue Induced Craving and Structural MRI studies for quantifying brain changes due to chronic opiate abuse are the other evaluation methods that are being used to address the questions. Different patterns of cognitive changes in different opioid types/ administration routes/ dosage and duration of abuse and dependence could be seen in primary data analysis of this two years longitudinal survey. Predictive values of different cognitive measures for different treatment variables such as drug dosage, retention rate, treatment course and outcome is another interesting finding. Effects of methadone maintenance treatment on brain activation pattern due to

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cue induced craving and decreased activities in self craving-perception areas such as anterior insula and increased activities in motor preparation areas such as premotor cortex and cerebellum could have promising implications for MMT adjuvant therapy with navigated repetitive transcranial magnetic stimulation. Cognitive changes during different addiction stages (Recreational Use, Abuse, Non Treatment Seeking, Treatment Seeking, Maintenance Retention, Abstinence and Relapse) and brain's circuit changes between novelty/leisure seeking, impulsive decisions, impaired motor control and compulsive behavior are and will be the main aim targets for translational research in addiction medicine. We consider the implications of our preliminary findings for diagnosis, treatment and prevention, suggesting that a comprehensive understanding of the nature and extent of these neurocognitive deficits should form a core part of the conceptualization and focus of effective treatment. Finally, we will propose that Iran, due to existing research-based and clinical infrastructures and excellent access to clinical population, could play a unique role in neurocognitive promotion in addiction medicine and discuss about future direction of this scientific movement.

## **The Role of School Interactions (Principals with Teachers and Teachers with Students), Motivational Beliefs and Self Regulated Learning Strategies, on Predicting Mathematics Performance and Attitude toward Schooling, in Elementary Schools**

**Fariba Khoshbakht\***

This study attempted to test a causal model for learning in elementary schools. In this model 1) interactions of principals with teachers, 2) interactions of teacher with students, 3) motivational beliefs, 4) self regulated learning strategies, and 5) mathematics performance and attitude toward schooling, were respectively introduced as exogenous, first, second and third mediators, and endogenous variables. The sample consisted of 1241 fifth grade elementary school students (521 girls and 720 boys) that were selected through randomized stratified sampling. The measuring instruments consisted of the Organizational Climate Description for Elementary School, Questionnaire on Teacher Interaction, Motivated Strategies for Learning Questionnaire, Mathematics Achievement Test, and Attitude toward Schooling Scale. The validity and reliability of all these instruments were confirmed. The model showed that teacher-student interactions, motivational beliefs, and self regulated learning strategies had mediator roles in the model. The interactions of teachers with students were predicted by interactions of principals with teachers. Also, there was a relationship between classroom interactions and motivational beliefs. Self regulated learning strategies were predicted by motivational beliefs. Finally, mathematics performance had a significant relationship with Self regulated learning strategies. Also, attitude toward schooling was predicted by Self regulated learning strategies. Findings were interpreted in the light of characteristics of classroom's and school's interactions, motivational beliefs and self regulated learning strategies of students, and academic outcomes.

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## **The Effects of Conflicting Schemas on Recall**

**Tolios Athanasios\***

This experiment hypothesizes that: a) the conflict of schemas would be greater (i.e. recall would decrease) as the participant activates together (through reading and listening) word lists from two different schemas, than when he/she activates word lists from one schema, and b) participants would show a greater reconstruction phenomenon in the recall face when activated together (through reading and listening) with word lists from two different schemas, than when activated with word lists from one schema. 36 undergraduate students from the American College of Greece were randomly selected and voluntarily took part in the study. One third (n=12) read and listened to school schemas, one third (n=12) read and listened to supermarket schemas and one third (n=12) read school schemas and listened to supermarket schemas simultaneously. Results showed that conflict of schemas increases as participants activate word lists from two different schemas together. In addition, in contrast to the second part of the original hypothesis, participants would not show a greater reconstruction phenomenon in face recall when they activated word lists from two different schemas together.

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## **The Study of Effectiveness of Thought Skill Training through Trix Thinking on Increasing Creativity in Elementary School Students**

**Fatemeh Bahrami\*, Omid Isanezhad**

The study aims at determining the effectiveness of thought skill training by trix thinking methods. The method of research was semi experimental (Pre test, Post test with control groups). The statistic population consisted of elementary school students. The sample included 225 students who were randomly selected and divided into two experimental (1 female and 1 male) groups and two control groups (1 female and 1 male). Thought training was administered for 6 Months. The instrument was Torance creativity test (form A, B) and data were analyzed by ANCOVA. The findings showed significant differences between control and experimental groups in post test creativity ( $P < 0.001$ ). The findings showed that the trix thinking method has an effect on increasing students' creativity.

<b>P</b>	<b>F</b>	<b>Mean of Squares</b>	<b>df</b>	<b>Sum of Squares</b>	<b>Variable source</b>
0.00	26.68	1310.61	2	2621.23	Corrected Model
0.09	2.71	106.07	1	2659.71	Control
0.001	69.06	2659.71	1	1059.04	Pretest
0.000	13.82	1059.04	1		Groups

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## **Effect of Brain-Based Learning Instruction on Comprehension and Speed of Learning in Grade Three Primary Schoolchildren**

**Somayeh Saifi\*, Soghra Ebrahimigavam, Norali Farokhi**

The aim of the study was to assess the effects of brain – based learning instruction on comprehension and speed of learning in grade three primary schoolchildren. The study was semi-experimental, and the plan in non–equivalent control group design was used. The subjects were 40 primary grade three male students who were selected by the researcher, and were allocated to one experimental and one control groups. Brain-based learning was instructed to the teacher and the parents of the experimental group in five and one sessions respectively. The learning environment was changed based on effective components on the brain (light, nourishment, oxygen, color, music, and water). Thereafter, the teacher of the experimental group continued teaching based on the principles of brain-based learning for three months. Pre and post-test of comprehension and speed of learning was carried out in both groups. Brain-based learning instruction led to an increase in comprehension rate and speed of learning of the students. Teaching brain – based learning to students has a significant effect on increasing comprehension, speed and quality of learning in students.

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## **A Causal Model of Students' Gender, and Parents', Teachers' and Students' Beliefs about Children's Mathematical Ability in Elementary Schools**

**Morteza Latifian\*, Fariba KHoshbakht**

Recently in Iran, the interest for choosing math courses has increased among girls compared to boys. Therefore, it is important to investigate the factors that may have influenced girls' math interest. The purpose of this study is to apply the Tiedmann's model of mathematical ability perception in an Iranian sample. In this model gender, previous grades in mathematics, teachers' perception abilities, parents' perception abilities, children's competence beliefs in mathematics, and current math grades are included. The participants were 306 schoolchildren from 12 elementary schools from Shiraz, Iran. Cluster sampling method was used for sampling. Subjects consisted of 55 boys and 32 girls from the third grade, 61 boys and 62 girls from the fourth grade, and 36 boys and 60 girls from the fifth grade. (third, fourth and fifth grades are the three final grades of elementary school in Iran). Parents and teachers of each student participated in the study. The final sample consisted of 306 students, 305 mothers, 299 fathers and 12 teachers from elementary schools. The scales made by Tiedmann (2000) were used in the present study. The scales included Student questionnaire, Parent questionnaire and Teacher questionnaire. A path analytic model was used to test the model. The results showed that:

- 1) Gender and previous math grade had a direct effect path on teachers' ability.
- 2) Teachers' abilities had a direct effect path on current math grade.
- 3) Fathers' and mothers' beliefs about their children's abilities had a direct effect path on students' self- competence in mathematics.

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## **Metalinguistic Awareness of Young Children: Evidence from Persian Young Children**

**Maryam Danaye Tousi\***

Poem production is a common form of language play in young children, and provides interesting information about their meta-linguistic abilities. A task involving poem production was given to 140 Persian girls and boys, between the ages of 4 and 6 years. The basic task involved the successive presentation of three pictures. After each picture was presented, the child was asked to produce a story about the picture. The poem related to the picture (a rhyming poem, an alliterative poem and a simile poem, each related to just one picture) was then presented as a stimulus, and the child was asked to produce something similar to what she/he had heard. During this task, each child would hear one rhyming poem, one alliterative poem and one simile poem. In total, two thirds of children produced poems. Poem production increased with a rise in age in boys; however, this was not the case for girls. There was a striking difference between children on the use of phonological devices (rhyme and alliteration) and semantic devices (simile). While both girls and boys used a significant number of phonological devices in their poems, almost no semantic devices were used. Regarding the use of phonological devices, girls had a better performance than boys and used more rhyme and alliteration in their poems. The implications of these findings are discussed.

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## **Study of the Determining Factors in Distinguishing between Landmark and Trajector and Different Kinds of Landmark**

**Arsalan Golfam<sup>\*</sup>, Sepide Abdolkarimi**

Understanding situational relationship between things and their location in the outer world is a primitive and at the same time basic cognitive achievement of mankind, which is acquired from early childhood. Also, prepositions are linguistic devices used for the linguistic codification of the situational relationship between things and their spatial situation in the outer world. This paper is an attempt to introduce the concept of Landmark and Trajector. Considering the concept of Perspective within the cognitive framework, different kinds of relationship between Landmark and Trajector and the important point that these relations can be used in abstract cases. In the latter case we face the expression Imagery Schema. Authors have used their intuitions in considering the degree of naturalness of linguistic structures and have found out that factors like the size of objects, movement or stillness and fore grounding and back grounding are determining factors in considering a linguistic element as the Landmark or Trajector in linguistic structures. These factors are those used by children in early stages of cognitive processing which have a close relationship with visual perception.

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## **Face Classification by Non-face Neurons**

**Hossein Esteky\***

Our mental representation of object categories is organized making our categorization ability rapid and seemingly effortless. Previous reports indicate that about 20% of neurons in monkey inferior temporal (IT) cortex specifically respond to faces. Do cells with selective response to faces carry larger amount of face classification information in their responses compared with cells with no category selectivity? To address this question we examined responses of IT cells of two macaque monkeys with a large number of natural face and non-face images. During the recordings, the monkeys performed a passive fixation task. We found that the categorical structure of faces and objects is represented by the pattern of activity distributed over the cell population. Different face categories created distinguishable clusters in the population code. The largest dissimilarity with non-face object images was found for human face stimuli indicated by larger negative correlation coefficients. This neural representation of dissimilarity with non-face objects formed a shape space that roughly matched the intuitive face classification scheme making three prominent groups of categories: primates, non-primate mammals and birds/reptiles. These results suggest the existence of a face similarity map in the correlated activity of IT cell population capable of discriminating different face classes. To examine whether face selective cells carry larger amount of face classification information than cells with no category selectivity we selected cells with significantly higher responses to human faces compared to objects with  $d'$  values more than one ( $n=52$ ) and cells with no category selectivity ( $n=66$ ). We then measured the amount of response correlation among cells in these two groups. Cells selective for human faces as well as those with no category selectivity conveyed the population code for face classification. These results suggest that cells with no face or object category selectivity contribute to the population code for face classification.

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## **Neuroesthetics**

**Semir Zeki\***

All visual art - whether in conception, in execution, or in appreciation - must obey the laws of the visual brain. Consequently, a great deal can be learned about the organization of the visual brain by undertaking a serious, neurobiological, study of visual art. In this lecture, I will describe some of the laws of the visual brain that neurophysiological and neuroanatomical studies have demonstrated and relate these findings to discoveries in visual art. I will concentrate in particular on the functional specialization of the visual brain and the characteristics of the specialized visual areas and will relate these to artistic explorations of motion in kinetic art (Marcel Duchamp, Alexander Calder, Jean Tinguely), of colour in Fauvist art (Henri Matisse, André Derain, Maurice de Vlaminck and others) and to the quest for form in art (Picasso, Braque, Cézanne, and Mondrian). I will describe how the perception of beauty in works of art correlates with activity in the reward centres of the brain, and how this activity is quantitatively related to the declared subjective intensity of the experience of beauty. I will next consider art in relation to one of the primordial functions of the visual brain, namely the acquisition of knowledge about the world, and relate this to concept formation and to abstraction, discussing in particular the difficulties of externalizing brain concepts, exemplified in the works of artists such as Michelangelo and Cézanne, and described by literary figures such as Honoré de Balzac and Émile Zola.

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## **Body Language, Emotion and Raw Consciousness**

**Beatrice de Gelder\***

Bodies provide eloquent emotional signals, and it is part of our normal social competence to adapt spontaneously and effortlessly to the continuous cues they provide. The popular literature provides many examples of efficient body language that are often taken from social interaction but also in clinical settings and business transactions. Many of these examples illustrate the broad consensus that the body language of people around us influences us automatically and within milliseconds, just as much or more than their facial expressions do. We either feel welcomed by somebody's body language or our suspicion is aroused and fear is triggered. In the past body language has already been systematically studied by social psychologists in humans and animals ethologists. Yet there is as yet little neuroscientific research on how emotional body expressions are recognized. In this talk we build a bridge between the more familiar research findings about recognition of facial expression and what is currently known about the neurofunctional basis of perceiving emotional body language expressing fear. We will review what movement and action contribute to recognition of emotional intentions, to what extent attention to body language and awareness are needed and how investigations of emotional body language from clinical populations including early visual deficits contribute to a novel understanding affective consciousness.

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## **Primitive Associative Processes Contribute to Cognitions and Choice Behavior**

**Bruce Overmier\***

The paper will discuss discovery of new roles for basic associations in choice behavior. Study of the functions of associations with reinforcers suggests that having different reinforcers for different choices changes the learning and memory dynamic in choice tasks. Also discussed will be how these discoveries give new insight into the psychobiology of memories. Finally, I will discuss how all this taken together can be used to aid learning in children, learning disabled individuals, and patients with selected dementias.

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## **A Neuro-computational Model of Positive and Negative Congruency Effects in Masked Priming: Implications for Cognitive Control and Consciousness**

**Ahmad Sohrabi\*, Robert L. West**

Positive priming effects have been found to be present with a short interval between the prime and the target, while negative priming effects (i.e., a congruent prime causes longer RTs) have been found with a long interval between the prime and the target. This study aimed to reveal other factors that influence priming effects and simulate human data with a neurocomputational model. This study includes a behavioral experiment and a neuro-computational model of masked priming. Participants consisted of ten healthy, right-handed students (4 females and 6 males, aged 22-43) with normal or corrected-to-normal vision. Each participant gave informed consent. The experiment was approved by the Carleton University Ethics Committee for Psychological Research. The model was a multi-layer dynamic neural model that consisted of different computational components. The experimental results showed positive and negative priming effects using stimuli with strong and weak representations, respectively, without changing the interval between the presentations of prime and target. A model was developed that fits our results. The model also fits a wide range of previous results in this area. In contrast to other approaches, our model depends on attentional neuro-modulation and not motor self-inhibition. The model uses neuromodulation and dynamic computation instead of simple neural nets employed previously. Implications for cognitive control and a need for a working memory component will also be discussed.

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## **Overfitting in Autistic Patients**

**Fatemeh Bakouie\*, Sareh Zenderouh, Mansour Vafadoust,  
Shahryar Gharibzadeh**

Autism is a biological disorder with an onset in the first years of life that persists throughout life. It is characterized by abnormality in reciprocal social interactions, communication, and language development as well as by repetitive and stereotyped behavior. These are caused by defects in multiple areas of the brain. Although intense effort has been invested to discover a physical cause for the etiology of autism, as yet none of the efforts have been successful. We are still a long way from determining the cause of the disease. Reduced generalization has been noted in autism for many decades. This key feature of people with autism can also be viewed from the perspective of artificial neural networks (ANNs). ANNs have been around since the seminal papers of McCulloch and Pitts and Rosenblatt. Many neural network models have been proposed since then. ANNs are built by using simple models of biological neurons. The pattern of connections between neural units is most often established via learning rules and gives the network its ability to compute complex functions and to develop emergent behaviors. One of the problems that occur during neural network training is over-fitting, i.e. the error on the training set is driven to a very small value, but when new data is presented to the network, the error is large. In other words, the network has memorized the training examples, but it has not learned to generalize and find the answer in new situations. What happens in the biological neural networks of the brain in people with autism is to some extent similar to overfitting in ANNs. In other words, the interest that autistic persons show toward lawful and highly predictable systems produces a situation that is analogous to overfitting. When overfitting happens in ANNs, the network learns precisely the relationship between inputs and outputs in the training set, but it doesn't have the ability to adapt to novel circumstances. Consequently the generalization ability of the net is poor. A memorizing procedure rather than learning happens in the brain of autistic patients. Therefore, such patients are not capable of incorporating prior knowledge in the learning process. This is in accordance with change resistance, need for sameness, and low generalization features of autistic persons. It seems that taking this similarity between ANN and autism into consideration may lead to introducing novel learning procedures for these patients. For example, increasing the training set (i.e. increasing the different situations to which the patient is exposed) and/or early stopping (i.e. reducing the intense concentration on few trained experiences) might be considered as proper strategies in managing autistic patients.

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## **Computational Modeling of Cocaine Addiction using Reinforcement Learning Framework**

**Amir Dezfouli\*, Payam Piray, Mohammad Mahdi Keramati, Hamed Ekhtiari, Caro Lucas, Azarakhsh Mokri**

Under two assumptions, first, phasic activity of dopaminergic neurons in ventral tegmental area (VTA) qualitatively corresponds to error signal employed in value learning process and second, drug consumption leads to increase of dopamine in VTA, we propose a neurocomputational model for drug addiction. Temporal difference reinforcement learning (TDRL) framework was used. Drug induced changes were modeled by adding an uncompensatable parameter to the error signal term in TDRL. Also, the level against which rewards are compared was introduced into TDRL using an additional term. Simulations show that the behavior of the model is satisfactorily compatible with the animal models of drug self-administration, especially compulsive drug seeking. Some other aspects of addiction such as down-regulation of reward system are also addressed by the model. Many decision-making deficits of drug addiction can be explained based on the two mentioned assumptions using computational modeling approach. Also, the model presents explicit behavioral predictions which can be tested both on humans and animals.

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## **The Effect of the Task Variable on Meta-Memory Judgments and Memory Behavior of Children**

**Leila Sadat Rohani\*, Delavar, Yousefi Luyeh**

Since meta-knowledge is one of the important parts of intelligence and knowledge as well as a major factor in learning and educational improvement; and meta-memory is one of the elements of meta-knowledge, studying the Categories of children's meta-memory is worthy of consideration (Stenberg 1985). The purpose of the present research is to study the effect of the task variable on three types of meta-memorial judgments (learning judgment, confidence judgment and feeling of knowing judgment) and the memory behavior (recall) in normal students of second grade guidance school. In this study, 80 second grade guidance school students were selected at random in several stages to participate in the research and were divided into four groups, with 20 students (10 males and 10 females) in each group, matched by intelligence age. Based on the type of concept (emotional, concrete, abstract, or dynamic), four sub-tests were developed and each subtest was executed on 20 (10 females and 10 males) students in order to neutralize the effect of experience in the test. Each subtest was carried out in four stages: the first stage, to evaluate learning judgment; the second stage, to evaluate memory behavior; the third stage for evaluating assurance of judgment; and the fourth stage to evaluate the judgment on the sense of knowledge. To analyze data, MONOVA with repeated measurement was used. The confidence judgment, the feeling of knowing judgment and the memory behavior are affected by the sex variable. Thus the average of the real memory behavior and error of confidence judgment of female learners is remarkably higher than that of the males; and the average of error of feeling of knowing judgment of male learners is remarkably higher than that of the female learners. The behavior of real memory is also affected by the task variable. Thus, the average of score of real memory behavior in the 3 groups with the type of emotional, dynamic and abstract concepts is remarkably superior to the sample subgroup whose type of concepts are concrete. Ultimately, the type of concept and its interaction with gender has no effects in the three sub-meta-memorial judgments. The effect of task variable on the meta-memorial judgments and memory behavior, is not a sustained effect considering gender and its interaction with the type of concepts. These results are in line with the findings of some researches regarding the role of task variable in memory behavior (for example Yousefi Louyeh 1382 (2003)) and the role of gender differences (for example San 2002 and Landberg and colleagues 2002) in meta-memory and memory behavior.

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## **Performance of a Schizophrenic Patient Group with Negative and Positive Symptoms on Bender-Gestalt and Wisconsin Card Sorting Tests and Correlation of the Groups Performance on These Two Tests**

**GH. H. Javanmard\*, MM Alilo, P Ahmadi, J Babapour, J Mamagani**

Schizophrenia and other serious mental illnesses (SMI) are increasingly being recognized as neurocognitive disorders (Rempfer and et al., 2006); and deficits in neurocognitive function are a core feature of schizophrenia (Keefe and et al., 2006). There is increasing evidence of structural and functional brain impairments in schizophrenia (Andreasen and et al., 1990). Although these impairments are controversial, several neurological structures are at the heart of a certain consensus (Heinrichs et al., 1993). One popular hypothesis postulates a dysfunction of the dorsolateral prefrontal cortex. Structural and functional neuroimaging studies have implicated the prefrontal cortex (PFC) as a site of functional and structural alteration in schizophrenia (Vostrikov and et al., 2007). The prefrontal cortex plays an important role in the processing and integration of internal and external information, in abstraction and problem solving and in the planning, execution and evaluation of behavior (Ewerett and et al., 2001). Stuss and Knight (2002) and Mesulam (2000) believe that prefrontal cortex functions can be conceptualized as attempts to constrain or transcend the influence of default mode and its stimulus bound style of responding to the environment. Examples of these functions could be arbitrary changes in thinking, the suppression of perseveration, the arbitrary and revisable linkage of emotional valence to secondary reinforcers, the ability to inhibit proponent tendencies and the parallel processing of multiple variables. Several studies show that patients with schizophrenia perform poorly in the WCST categories and commit more errors on the Bender-Gestalt test than normal subjects (Ewerett and et al., 2001, and Marli, 1982). Thus these tests are sensitive to prefrontal functions. This research was performed with the aim of assessing a schizophrenic patient group with negative and positive symptoms on the Bender-Gestalt and Wisconsin card sorting Test (WCST) and determining the correlation of scores of these two test scales. For this purpose, 32 schizophrenic patients that were hospitalized with a diagnosis of schizophrenia by hospital psychiatrists and psychologists based on DSM-VI-TR criteria were selected. The Scale for Assessment of Negative Symptoms (SANS) and Scale for Assessment of Positive Symptoms (SAPS) were carried out. 14 patients demonstrated negative and 18 patients demonstrated positive symptoms. Bender and WCST were administrated to the samples. Bender was scored based on Hain's 15 criteria and WCST was scored based on five scales.

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The means of each criterion of Bender and WCST for two groups were obtained. Results indicated perseveration, distortion, rotation and overlapping for schizophrenic patients with negative symptoms; and perseveration, rotation, distortion and splitting for schizophrenic patients with positive symptoms as the first four errors. T-test results indicated that between the two groups, the criteria of rotation ( $p < 0.005$ ) and shorting ( $p < 0.05$ ) have a significant difference. In other words, the schizophrenic patient group with negative symptoms demonstrated more errors in these two criteria. Five scoring criteria for WCST consisted of: numbers of categories, numbers of trials for success on the first category, the time necessary for succeeding in the first category, total trials related to attention shift and numbers of perseverative errors. Results indicate that differences between functions on WCST scales for the two groups were not significant. Also, results of significant correlation testing indicated that there were significant correlations between the perseveration in Bender and perseveration in WCST ( $r = 0.006$ ) and between concretization in Bender and the time necessary for succeeding in the first category in WCST ( $r = 0.008$ ). The findings of this study were consistent with dysfunction of frontal lobe hypothesis and indicate that schizophrenic patients act weaker in hypothesis testing, current behavior inhibition and speed data processing. This indicates that the default mode model of Stuss and Night (2002) and Mesulam (2000), which was presented about the impairments of frontal lobes, can be used to account for schizophrenia.

## **The Role of Right Hemisphere in Empathy Processing in Respect to Lateralization**

**GholamReza Chalabianloo\*, MirTaghi Garooci**

Empathy is one of the most important elements of an individual's social relationships. Empathy is mostly a psychological construct, however, it has been suggested that a number of brain regions are involved in empathy. Empathy is identification with or vicarious experiencing of feelings or thoughts of another person (Reuckert & Naybar, 2008). Because of the importance of empathy especially in professional relations such as psychotherapy, it has been suggested that deficits in empathy are related to structural or functional abnormalities of the brain. However, in recent years study of the neuropsychological basis of empathy has become a major research topic. In order to study lateralization and right- left handedness effects on empathy processing, 50 right handed (25 females and 25 males) and 28 left handed (20 females and 8 males) subjects were selected from Arsanjan Azad University by random sampling and completed the empathy questionnaire (Mehrabian & Epstein, 1972). The subjects then participated in a computerized task consisted of viewing pairs of chimeric faces, which were formed by combining two pictures of the same person together. The first picture was taken with the person smiling, while the second picture was taken from the same person with a neutral expression. A left side smiling face was paired with a right side neutral face and vice versa. This task is a new revised version of Levy Chimeric Faces Task. Data indicated that there are significant differences between sex groups in general empathy scores. Results revealed that right hand participants evaluated left chimeric pictures happier. There was a significant correlation between empathy scores and the rate of left side smiling pictures. There was no significant difference between sex groups. In the left handed participants there was no significant difference in evaluating chimeric pictures. Our results indicated that in right handed participants, the right hemisphere has a main role in empathy processing, but this function is not localized to one hemisphere. More results are discussed in details in full text.

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## **Children's Ideas about the Natural Phenomena of the Moon Within Pakistani Cultural Context**

**Masoud Nadim\*, Muhammad Pervez, Su Zhaoxia**

To explore how children understand develop ideas about the natural phenomena of the moon. To investigate the role of a specific culture in the development of individual cognitive development. To analyze the contents of the interview protocol. To obtain a better understanding of various sources of children's conceptions of and phenomena. The sample of this study consisted of 10 children, studying in the first, third, and five grades, in different schools in Islamabad. To address the research questions, four related investigations were completed. A qualitative investigation was carried out to find out the answers. Findings show that children have misconceptions of the natural phenomena of the moon on the whole, which was most particular among the girls. This trend increases gradually as children enter higher grades. This in turn, shows that the educational system as a whole is not contributing effectively in the understanding of science concepts. The results also show that culture and cultural artifacts do not play a significant role in the development of science concepts. It can be concluded that not only education processes, but other elements of the culture and society are not playing their respective roles in the understanding of the concepts in general, and science concepts in particular. Therefore, there is a dire need to look into this issue more deeply to get in-depth insight into the whole process of learning from cognitive, cultural, social, and psychological perspectives.

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## **Time-order Effects and Modality Dominance in Cross-modal Comparisons**

**Caroline Cederström\*, Åke Hellström**

In this experiment two perceptual errors are investigated in order to map the cognitive mechanisms at work during a comparison task. Firstly the time order effect (TOE), which refers to an overestimation of one stimulus in relation to another due to its temporal position; research has generally found that as the inter stimulus interval (ISI) increases in a stimulus pair the TOE becomes more negative (pause function). Secondly, modality bias refers to an overestimation of one stimulus in relation to another due to its modality. Our hypothesis is that the cognitive mechanisms in the comparison process are independent of the sense modalities of the stimuli being compared. The sensation-weighting model is able to tease apart attention due to modality from attention due to temporal position. By comparing sensation-weight distributions we are able to draw conclusions about perceptual mechanisms in the comparison process in different modal combinations. Intra-modal (tone-tone and line-line) stimulus pairs and cross-modal (tone-line and line-tone) stimulus pairs with two levels of inter stimulus intervals are presented. Subjects are to indicate that which of the two stimuli they experienced as stronger, that is to say, louder for tone-strength and longer for line-length. The results found that TOEs are present in cross-modal comparisons. The pause function was not found in the tone-line combination. An interaction effect was found in the cross-modal combination between temporal position and modality whereby the visual stimulus and second temporal position had a higher weight. The perceptual errors that occur are dependent upon the modality of the stimulus and there is evidence of a visual dominance.

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## **Comparing Episodic Memory in Schizophrenic Patients, their Biological Relatives and Normal Individuals**

**Gholamali Nikpour\*, Alireza Homayouni**

In order to have better understanding of schizophrenia, the present study examined memory impairments, which are one of the most important problems in this disorder. Episodic memory was evaluated and compared in schizophrenic patients, their biological relatives and normal individuals. The method used in this research is causative – comparative. 20 schizophrenic patients, 20 of their biological relatives and 20 normal individuals were randomly selected and the William's individual episodic memory test (WIEMT) was administered to them. The participants were presented with 15 target words (5 pleasant, 5 unpleasant, and 5 neutral). The participants were then asked to recall a past memory associated with target words. Data were analyzed using ANOVA. Results showed significant differences among groups. The majority of patients with schizophrenia as well as their relatives tended to choose neutral stimuli (words). However, the majority of normal individuals chose pleasant words with good and pleasant effects in their past memory. Our results reveal that deficits in episodic memory perception can be regarded as one of the most prominent cognitive deficits in schizophrenia and should thus be taken seriously in both the diagnosis and treatment of this disorder. The importance of assessing memory function impairments in clinical settings is also emphasized.

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## **The Comparison of Brain/ Behavioral Systems' Activity and Dimensions of Perfectionism in CHD and Normal Subjects**

**Somayeh Moazen\***

The relationship between specific personality characteristics and psychosomatic disorders is one of the major research topics in health psychology. The present research compares two personality characteristics (BAS/ BIS activity and perfectionism) in CHD and normal male subjects. 50 married males (mean age 53) with a diagnosis of CHD from Modares hospital were compared with 50 healthy males (with the same inclusion criteria) according to the Carver and White's BIS/BAS and multidimensional perfectionism scales. The results showed that in men with CHD the activity of BAS was higher than healthy men. Also, in subjects with CHD, self-oriented perfectionism and other-oriented perfectionism were higher than healthy men. There were significant differences between correlations of BAS's subscales and dimensions of perfectionism in CHD and healthy subjects. BAS and dimensions of perfectionism are suitable components for the psychological analysis of CHD.

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## **Social Processes of Cognitive Products**

**Francesca Ruscito\*, Warren Thorngate**

The purpose of this study is to examine the social consequences of individual cognitive processes. When people observe the opinions or behaviors of others in their social networks, there is an increased likelihood that they adopt or mimic what they observe (Burt, 1980; Carley, 1991). If others can in turn, observe people's new opinions and behaviors, then one of two outcomes may occur. First, people may mimic what they observe and create a chain of positive feedback that encourages the behavior to continue. Alternatively, people may mimic the behavior, but fail to obtain sufficient positive feedback to warrant continuing. The focus of this study is recycling efforts in neighborhood community networks. We varied the cognitive assumptions of how social influence is stimulated and maintained, and studied how different assumptions may lead to different social outcomes. A computer simulation was created using the program NetLogo. A neighborhood of hypothetical residents displaying various recycling behaviors was generated, and several cognitive assumptions about the residents were varied, for example, their chances of mimesis, learning rate, forgetting rate, and sociability. The results point to the stability of outcomes across different cognitive assumptions, and point to the interplay of individual cognition, sociability and social structure in changing community behaviors. They also suggest that simulation may be a good methodology for improving the functioning of networks of people. Simulations also allow for an observation of those cognitive processes which affect networks the most when varied.

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## **Content Rearrangement in OCRITS, the Intelligent Tutoring System**

**Marzieh Shariati\*, Mehrnoush ShamsFard**

In the early 70's, Intelligent Tutoring Systems (ITSs) appeared to simulate human instructor behavior, using AI techniques. Although a human instructor can promote efficiency of the learning environment, an increase in the number of learners will negatively affect this efficiency. Therefore, there is a need for a system to personalize learning processes by interacting with students, with a thorough knowledge of their needs and background knowledge, choosing and presenting learning contents according to one's needs and characteristics. Such a system can extremely cut down education costs in a society. ITSs have two essential learning models: Pedagogical Models and Content Models which respectively determine "How" and "Which" contents to be delivered. In addition, web-based education is achieving one of the most important branches of education technologies. Classroom independence of web-based education, authoring tools for developing coursewares, cheap and efficient storage and distribution of course materials, hyperlinks to suggested readings, digital libraries, etc. are some advantages of this kind of education. In this paper we introduce OCRITS, an Ontology-based Content Rearrangement Intelligent Tutoring System. OCRITS is developed to present a framework for the semi-automatic selection, presentation and rearrangement of learning contents. It selects contents regarding the existing concepts and relations in the domain of the course and the user's characteristics. To do this, OCRITS uses an ontology of courseware including a multi-layered knowledge base graph of courseware, subjects, concepts and knowledge elements. Knowledge element is the smallest deliverable semantic unit of OCRITS which has a category (definition, example, exercise, property, application, etc.) and a type (text, picture, voice, film, etc.). OCRITS helps students to learn better by offering the best set of knowledge elements regarding their categories, types, relations and the students' needs and preferences. Besides, OCRITS enables the author of the knowledge base (a teacher for example) to set priorities and determine minimum number of delivered sub-contents of a concept. In OCRITS's knowledge base graph, each node represents a content unit (e.g. the concept of "input device" in "Computer Basics" courseware) and each edge shows a relation between two contents (e.g. inclusion relation between "input device"

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and “key board” in the above mentioned courseware). The proposed graph traversing algorithm is a customized DFS algorithm which has taken pedagogical strategies, learners’ preferences and students’ training history into consideration. OCRITS stores a number of feedbacks such as the elapsed time, evaluation information, last training session, etc. for each delivered content in the student training history, to perform multi-stage evaluation, check pass status of a prerequisite content, report student learning status, and to avoid duplicating the delivery of content. For the evaluation process, every question has a weighted relation with its corresponding concepts. The weights show the importance (value) of the received response in calculating the evaluation score of the parent concept. The automatic extraction of contents from web resources and improving knowledge base editor to ease authoring and editing contents are some future goals of this tutor.

## **A Model for Intelligent Detection of Learners' Emotional States in E-learning**

**Mohammad Esmaeel Jafari\***

The role of emotion in learning is well-known. However, only little effort has been carried out to detect learners' emotional states in order to personalize e-learning. This paper presents a probabilistic model aiming to implement the process of affective diagnosis in an educational environment. The model establishes the affective state based on the well-known cognitive theory of emotions (the OCC theory), represented as a Dynamic Bayesian Network. The model predicts a student's emotional state by assessing the student's emotional reaction during interaction with an Intelligent Tutoring System (ITS), in light of the student's goals and personality. Dynamic Bayesian Network is suitable for modeling emotional states, since emotions have a dynamic nature. Also, Dynamic Bayesian Network is appropriate for dealing with the high level of uncertainty involved in recognizing a variety of users' emotions. Within this model, learner models in Intelligent Tutoring Systems can be extended to embrace an emotional module, and pedagogical strategies can be selected so that tutor actions influence the learners' emotional state with the aim of improving the quality of the learning process. An important factor in refining the student model is users' direct interaction with the student model. In a flexible architecture, students and teachers can create their own views by choosing nodes from a Bayesian student model. Students and teachers create, share and discuss interesting representations of learning processes. Thus, an intelligent tutoring system has to offer special interfaces for changing prior and conditional probabilities. This creative view is also used for inferring students' scientific encouragement. In general, the conclusion that arises from this work has to do with guidance in Intelligent Tutoring Systems. Accurate student models, and thus accurate assessments, seem to be possible using Intelligent Tutoring Systems, provided that guided interaction with the models is appropriately achieved. Exploratory studies point to this as an important hypothesis that merits further validation.

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## **Learning Extrastriate Neuronal Selectivity with Redundancy Reduction**

**Mohsen Malmir\*, Saeed Shiry Ghidary**

Statistical approaches to studying the properties of neurons in sensory systems ascribe the selectivity of neurons in visual and auditory cortices to regularities of signals in natural environment. “Efficient coding” hypothesis is an outstanding theory that explains the work of sensory systems in discarding unnecessary data and supplying higher order brain areas with the most informative features in sensory input. Based on this hypothesis, several models have been developed that simulate different properties of neurons in the primary visual cortex. For example, sparse coding and ICA models developed neurons that were similar to V1 neurons in selectivity for orientation and spatial frequency. This was done by removing redundancies between responses of neighboring neurons. However, these models are confined to functional properties of neurons in V1 and cannot be extended to model the selectivity of neurons in extrastriate visual areas like V2. In this paper, we propose a neural network based on local redundancy reduction, in order to model the feature selectivity in V2. The main idea is to use redundancy reduction in different spatial extents of different model layers. We show that with inhibitory signals from surround in the first layer of the model, redundancies in responses of neurons in local neighborhoods are eliminated. A two layer neural network is implemented with local inhibitory connections. Weights of these connections are learned from a set of natural images to reduce redundancies in input image. The response of each neuron in this model is rectified and then divided to a weighted sum of responses of its neighboring neurons. Neurons in visual area V2 are selective to visual features of intermediate complexities like angles and junctions. We examined the selectivity of neurons developed in the model with a set of stimuli composed of gratings and contour segments. These stimuli were used previously to probe the selectivity of neurons in visual area V2. We show that neurons in the proposed model can simulate the properties of V2 neurons revealed in electrophysiological experiments.

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## **Artificial emotions indecision making: Midbrain on a Chip**

**Caro Lucas\***

Decision making with bounded rationality has in recent years become a focus of increased attention. Satisficing has been appreciated as biologically and cognitively plausible way of overcoming complexities and uncertainties. In addition, the less model driven action selection is, the more robust it becomes with respect to possible mismatches between reality and its cognitive representation. Far from being irrational cues often hindering decision makers from logical selection of actions, emotions have in recent years increasingly been celebrated as useful faculties leading to better and more robust inferences in real world circumstances. Artificially intelligent systems, therefore, ought to capture the emotional aspect of decision making no less than the fully rational cognitive aspects that has dominated all engineering and computational efforts in the past. BELBIC is a computational model of the midbrain, where emotional processing is taking place, used in feedback control and decision making applications. Emotional assessments are fed, in addition to the sensory inputs, back to BELBIC so as to select satisficing actions even when the environment or the plant is unknown. Computer simulations and experimental implementations in numerous application domains have shown BELBIC's excellent performance, great adaptability, and rapid learning capability. Cognitive processes like attention and habituation, where emotions play great regulatory role in human action selection, has been a focus of our research efforts. The success of industrial applications of BELBIC has led us to carry out research in model driven and pattern oriented design for BELBIC and development of automatic or semi automatic tools for co-design, co-simulation, co-deployment and co-testing of its mixed real and virtual implementations.

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## **Cognition: The Interaction of Brain, Body (Morphology, Materials), and Environment**

**Rolf Pfeifer\***

Traditionally, in robotics, artificial intelligence, and neuroscience, there has been a focus on the study of the control or the neural system itself. Recently there has been an increasing interest into the notion of embodiment in all disciplines dealing with intelligent behavior, including psychology, philosophy, and linguistics. In this talk, I explore the far-reaching and often surprising implications of this concept. While embodiment has often been used in its trivial meaning, i.e. "intelligence requires a body", there are deeper and more important consequences, i.e. cognition as emergent from the interaction of brain, body, and environment, or more generally from the relation between physical and information (neural, control) processes. It can be shown that through the embodied interaction with the environment, in particular through sensory-motor coordination, information structure is induced in the sensory data, thus facilitating categorization, perception and learning. I conclude with some speculations about potential lessons for robotics and cognitive science.

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## **Control of Attention to Mental States and Multiple Critics**

**Arash Arami\*, Caro Lucas, Majid Nili-Ahmadabadi**

Attentional modulation is needed when a decision maker is faced with too much information to process. In this paper we discuss the use of attention in control applications where usually higher order system dynamics are involved as typical benchmarks considered in cognitive experiments. Previous works have implemented various forms of attention and active perception for selecting the necessary data, reducing the dimensionality of the input space, tuning the sensors, etc. However, decision making can depend not only on objective sensory data, but also upon mental states or subjective inputs. Specifically, we examine attention for the evaluation of selected action by various critics, as well as sensory inputs. The complexity of each situation and consequent variety of evaluation indices or local goals, which could be compatible or contrary to each other, can confuse the agent. Therefore, the agent needs to attend to the dependable critics which can be altered regarding the state. The attention to different critics or goals can be established by forming different architecture in the agent's mind, which can assess the domination of a critic or an aggregation of them. Also, the ascendancy of critics can be judged by the rate of failure. In other words, the agent who feels unsatisfied while being unsuccessful to satisfy the particular goal, attends to that goal. In cases where there are no adequate knowledge about the ascendancy of different critics, and only the desired behavior is known, the attention can be learned by feedbacks of a super critic which evaluates the agent's behavior. For instance, in real world applications human experts can play the role of super critic.

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## **Computer Simulation of Mental Spaces: A Network-Based Approach**

**Ramin Golshaiee\***

Meaning representation is a thriving subject in various scientific fields including linguistics, psychology, philosophy, and artificial intelligence. In recent years with the revolution brought about by cognitive semantics in the study of meaning, finding suitable methods for representing and formalizing the accomplishments of this revolutionary approach to meaning has been deeply felt. One of the topics treated in cognitive semantics is the theory of Mental Spaces proposed by Gilles Fauconnier. In his opinion, mental spaces are partial structures which are built in a real-time manner during speaking and thinking for local understanding and action. According to this view, semantic interpretation is nothing but a dynamic process of conceptualization. The primary objective of this study is to provide a framework for computer simulation of mental spaces based on semantic networks. The model used as the basis of representation is the extended version of conventional semantic networks, namely Multi-layered Extended Semantic Networks (MultiNet). The data used in this study have been collected selectively from Persian sentences and have been represented in MWR, MultiNet's meaning representation software. Results obtained from analysis of represented data and their comparison to principles of mental spaces theory shows that MultiNet paradigm is capable of being used as a formal tool for simulating mental spaces and dynamic process of conceptualization. Furthermore, this paradigm can play an invaluable role in teaching and formalizing principles of cognitive semantics, especially the theory of mental spaces, in a tangible way.

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## Semi-Productive Constructions: The Case of Verb Islands in Persian

Neiloufar Family\*

Persian has a deceptively small repertoire of about 160 simple verbs which belies an intricate system of light verb constructions (LVC), similar to the English *take a walk* or *give a speech*. Most verbal notions expressed in other languages by simple verbs are expressed through these constructions (e.g. *to learn* is ‘memory GET’). LVCs in Persian range from the transparent (*moʃt zædæn* ‘punch HIT’ to punch), to the idiomatic or lexical (*xoʃk zædæn* ‘dry HIT’ to be shocked). Most constructions occur between these two extremes. These multiword constructions are decomposable into multiple simplex words but are semantically and pragmatically idiosyncratic. A special kind of semi-productive idiom, often with unpredictable semantics, is at the foundation of the verbal system. Certain characteristics of the system have been described and analyzed in linguistic studies, but no study thus far has incorporated cognitive evidence for the patterns observed. Lack of substantial empirical data make theoretical studies difficult to support. The aims of our project include investigating mechanisms involved in verbal productivity through studying the acquisition of the verbal system in Persian. We offer new data gathered on a weekly basis from four Persian-speaking children between the ages of 1;11 and 5;0. The only way to express a novel verbal notion in Persian is to combine a pertinent preverbal element with one of the LVs of the language (*imeil zædæn* ‘to email’, *vaks xordæn* ‘to be waxed’). The synthesis of these new forms is based on the semantics of the preverb and the notion expressed. Verbal constructions are only partially specified in the lexicon, allowing for a type of semi-productivity. The analysis of overgeneralization errors produced by the subject children indicates that they fine-tune their knowledge of the semantic and pragmatic restrictions on lexical items used in these constructions. There must be a semi-productive process that kids need to develop in order to understand and produce novel verbs in Persian. While overgeneralization errors normally occur at the level of morphology in English speaking children (e.g. past tense marker), in Persian, overgeneralizations are semantically based, at the level of these semiproductive light verb constructions. For example, while playing with her mother, Minu (4;7,21) utters the following sentence: ‘*maman, injat hæm \*qelqelæk migire?*’ *mom, here-2S also tickle prog-get&pres-3S?*

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‘mom, does it tickle you here too?’ The LVC qelqelæk gereftæn ‘tickle get’ does not exist in Persian. The correct form would be qelqelæk amædæn ‘tickle come.’ We claim that she is using her knowledge of a semantic island in the space of the verb gereftæn, used to express having an uncontrollable urge to release an internal pressure, to express the notion she wishes to express. Here, the child shows that she hasn’t fine-tuned the restrictions on the lexemes allowed in this construction. This research highlights some aspects of how children acquire semi-productive constructions. These types of constructions are particularly interesting because they occur between the grammar and the lexicon. These constructions, often claimed to occur at the fringes of language, are readily available in a language like Persian.

## **Questionnaires and Cognitive Corpus Analysis in a Study of Emotion Concepts**

**Barbara Lewandowska-Tomaszczyk\***

The objective of the paper is to compare results obtained from answers to a questionnaire on emotion words developed by the GRID research consortium<sup>1</sup> (cf. Fontaine et al 2007) with the results of a cognitive-corpus analysis of the same emotions obtained by Dziwirek and Lewandowska-Tomaszczyk (in press). Fontaine et al. propose to look at emotions in terms of a four-dimensional scale based on the dimensions identified in terms of over one hundred features and represented as a number of components of emotions, such as appraisals of events, psycho-physiological changes, subjective experiences, etc. The approach is basically componential and the dimensions are used to compare and contrast emotional experience across different cultures in the GRID project in the form of a questionnaire administered to 100 subjects and additionally, to 20 subjects for six words expressing emotions specific to a language and culture. The questions refer not only to the individuals' interpretation of the situation involving an emotional experience, the accompanying bodily symptoms and behavior, but also the way they express the emotional experience. In the present study the questionnaire and the scales were administered to 120 Polish subjects and the results are being currently calculated and will be subsequently analyzed. Dziwirek and Lewandowska-Tomaszczyk studied sentences including emotion expressions in 100-million English and Polish corpora by means of a cognitive grammar apparatus and looked at the basic, prototypical senses of emotions as well as their extended senses, taking classes of subordinate constructions as their objects. The results of the present analysis show behavioural, mental and emotional profiles of emotions on the one hand, and conceptualizations of emotions and polysemies and radial categories (cf. Lewandowska-Tomaszczyk 2007) in the semantics of emotion words on the other. The analysis and its results are likely to provide an answer to the question, first of all, as to what extent the parameters describing emotions proposed in the questionnaire cover the shades of meanings of emotion words analyzed in terms of a cognitive linguistic approach and the quantitative data calculated from authentic language data and, secondly, where do the two methodologies diverge in their outcomes and/or complement each other.

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<sup>1</sup> The GRID project is coordinated by The Geneva Emotion Research Group at the University of Geneva, The Swiss Centre for Affective Sciences, The Geneva Emotion Research Group, the HUMAINE Association and Ghent University

## **Fostering Foreign Language Development – Exploring Cognitive Premises**

**Michał B. Paradowski\***

Learning invariably proceeds by relating new facts to the already familiar (which is why we typically learn in terms of prototypes). In the context of foreign language learning the familiar is the student's mother tongue (L<sub>1</sub>). Drawing on this (or the learner's other mastered language) and showing comparisons and contrasts between this and the target languages mirrors, facilitates, and accelerates the processes which occur independently in the learner's mind. The role of pedagogic intervention is unquestionable, as transfer of operations from L<sub>1</sub> to FL usually requires additional correction and clarification. This is not, however, the end of the story. The basic reason why we look for familiar orientation points and similarities when in new circumstances is our natural need for safety. This is also why the target language should literally be taught in the framework of the learner's L<sub>1</sub> – as in the Language Interface Model (LIM; Gozdawa-Gołębiowski, 2003). This proceeds from an explication of how grammar rules operate in the learners' L<sub>1</sub>, through an explanation of relevant L<sub>2</sub> rules and subsequent modification of the L<sub>1</sub> rule to accommodate L<sub>2</sub> data, with practice first expecting the learner to apply the FL rules to L<sub>1</sub> examples, to finally end with competence expansion, thus leading to multicompetence and allowing for the obliteration of the rules from the learner's conscious mind. The research project measured the impact of language-interface grammar training on improvements in the linguistic proficiency of FL learners of English vis-à-vis results obtained from control groups instructed in the same language areas, but via the employment of other methods and approaches. Of primary importance was an examination of the role of L<sub>1</sub> awareness and interfacial training in developing enduring results. This was a semi-naturalistic and comparative method study with a single blind research design and quasi-experimental paradigm (convenience sampling; n=284). Controlled longitudinal classroom experiment with continuous collection of data over the period of one school year across a representative range of grammar areas, preceded by a pilot study, and followed by a structured debriefing stage. The findings reveal appreciably enhanced performance and retention in the experimental group taught via the Language Interface Model over control groups not only in a follow-up test, but also in a

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deferred post-test. The deductive, process approach does not merely lead to the acquisition of structure and lexis, but to the development of meaning, to the formation of generalizations that stand behind a word, and consequently, to the raising of FL consciousness. The findings corroborate the importance of explicit learning, attention, and L<sub>1</sub> awareness in interlanguage development.

## **Validity Evaluation of Estimating Missed or Scratched Questions in Computer-Based Implementation of Conner's Attention Questionnaire**

**Farnaz Ghasemi\***

Conners Adult ADHD<sup>1</sup> Rating Scale (CAARS) is one of the reliable questionnaires in evaluating ADHD in adults. However, the probability of missing the questions by patients suffering from this disorder is high and can disturb the evaluation of the questionnaire. In this case, to evaluate the questionnaire, the operator should complete the missed answers. Therefore he/she calculates the estimation of missed answers by averaging the answer of other questions in that subscale and inserting the result for the missed answer. The goal of this study is to extract principal components of the questionnaire and evaluate the validity of estimating missed or scratched answers in the screening version of this questionnaire. The software version of the questionnaire was prepared and used. This study is performed on 380 subjects with an average age of  $24.3 \pm 5.9$  years (200 females). Principal components are determined by means of PCA<sup>2</sup>. Kruskal-Wallis test (a non-parametric version of ANOVA) is used for investigating the veracity of this approach. The questionnaire has four subscales, "Inattentiveness", "Hyperactivity", "ADHD" and "ADHD Index". For each question, the average of the answers to other questions in that particular subscale is calculated (as the estimate of the missed answer). Then a test is performed to evaluate the difference between the original answer and its estimation (30 tests). In the next step, regarding the fact that there is a possibility for each of the questions to be missed, the signification of the difference should be evaluated in the whole group; therefore, the Multiple Comparison Procedure is used for investigating the significance of the differences between original and estimated answers in each of the groups. Eight Principal components were found. The results of Kruskal-Wallis tests indicate that for some particular questions there is a significant difference ( $P\text{-value} < 0.001$ ) between the original and estimated answers and this substitution is not reliable for them. Four of these questions are in "Inattentiveness" subscale, three in "Hyperactivity", eight in "ADHD" and nine in "ADHD Index". The result of Multiple Comparison Procedure shows

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<sup>1</sup> Attention Deficit Hyperactivity Disorder

<sup>2</sup> Principal Component Analysis

that this estimation when evaluated in the whole group, does not have any significant difference ( $\alpha=0.001$ ) with the original value in any of four subscales. Although the difference between original and estimated values is significant for some particular questions individually, the groups evaluating the estimation did not show any significant differences in general. Notwithstanding this fact, if the missed question is a critical one, more considerations shall be paid.

## **An Affinity between Chomsky – Fodor's Cognitive Linguistics and Wittgenstein's Philosophy of Language**

**Mitra Jebreili\***

This is a Contrastive – analytical study, and an attempt to sort out an affinity between two competing approaches or theories concerning the nature of word and sentence meaning and referring, namely Wittgenstein's Philosophy of Language and Chomsky – Fodor's Cognitive Linguistics. In this paper, the philosophical ideas of the most influential philosopher of language in the 20<sup>th</sup> century, Ludwig Wittgenstein in his early work, "Tractatus" as well as his later work "Philosophical Investigations" are discussed and challenged. Linguistics has undoubtedly had an influence on the Philosophy of Language in the past forty years. The Chomsky-Fodor approach is the cornerstone for the interdisciplinary subject known as Cognitive Science. The Chomsky-Fodor approach holds that traditional philosophical puzzles concerning Word – Meaning can be solved by scientific means. The basic assumption of the Chomsky-Fodor approach to Cognitive Linguistics known as Computationalism is based on Mentalese, whose main components are clarified in this paper. To sum up, although the cognitive critical assessment of Wittgenstein's philosophy is extensive and ubiquitous, an appropriate conclusion as Convergent Compromise may be drawn between Cognitive Science and the Philosophy of Wittgenstein, on the basis of a Dichotomy of Causal Meaning [Causal Mechanisms of Human Cognition] and Conventional Meaning [rooted in Traditional Philosophy].

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## **A Representational Account of Ineffability of Consciousness**

**Yasser Pouresmail\***

There is an intuition to the effect that phenomenal or qualitative consciousness (hereafter ‘phenomenality’) -which is the subject of the Hard Problem- is ineffable. However, a representational account of consciousness implies that phenomenality is effable, because representationally conceived, phenomenality is identical to representum (what represents, in contrast with representans –the things represented- which I believe the rival higher-order views identify phenomenality with), and representum is effable. How can this be compatible with our intuition? In this paper, I shall be discussing this dilemma. Primarily, the apparent incompatibility between our ineffability intuitions and the representational approach can be solved in different ways (notice that the assumption is that we adhere to representationism): We can provide a reinterpretation of the ineffability intuition in order to make it compatible with representationism. We can provide a reinterpretation of representations that can be viewed as ineffable. Here, I shall take the first approach and try to provide a revision of our ineffability intuitions. I do not subscribe to the latter, because a representational theorist, whether a first-order or a higher-order one, identifies phenomenality with representans or representum respectively, and neither of these can be thought of as intrinsic properties, as I shall describe later; therefore, there is no chance of conceiving representations as ineffable. However, one way to provide ineffable representations is to seek a subjective component or aspect in representing (or being represented), and then, develop the idea that subjectivity is what gives rise to ineffability. This will result in a particular version of representationism which preserves the qualitative aspects of phenomenality in representations, to which phenomenality is reduced. (Apparently Chalmers 2004 adheres to such a version of representationism.). In order to refute this possibility, I will discuss the relation between intrinsic/extrinsicity and ineffability/effability to show that representing cannot be ineffable as an extrinsic property. Needless to say that adopting the first approach is tantamount to acknowledging that phenomenality, understood in terms of representations, is effable. Phenomenality of a mental state, S, is indeed its representing something, C, and since there is nothing ineffable about representing, there would be nothing ineffable about phenomenality itself. What should we do with ineffability intuitions then? My claim is that all phenomenal states have the same

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intersubjective notion and their intersubjective notion is only demonstratively, though not descriptively, effable, and that is because of their simplicity as I will delineate. I shall then, argue that demonstrative effability is a feature of many fundamental concepts, of which more complex ones are made and it is by no means restricted to the case of the phenomenal. And I will finally show how representationism gives an account of the phenomenal as fundamental concepts which are the building-blocks of other more complex ones.

## **The Conservation Law of Information and its Cognitive Consequences**

**Maysam Tehrani\***

Studying the mind and intelligence requires dealing with the entry of information. By the dawn of the new millennium, physics achieved results which indicate that information seems to play a unique role in constructing the universe. The newfangled life of this ex-abstract content of information betokens a very revolutionary future. Actually, by thinking of information not as merely a physical entity but the very cornerstone of the universe, the consequences would be noteworthy. The matter of the Conservation Law of Information is the most significant player in this scenario. Existence of such a law and the notion which holds that the universe probably has an information infrastructure being much more fundamental than any current wave model deserves a considerable amount of attention. For cognitive science, as a science dealing with information, considering the nature of information helps to get better understanding about the essence and the interaction between cognitive elements. More specifically, the conservation law of information eventuates in corollary that all which is knowable is conserved, already existed and just detectable, not being able to create. Thus, the role of our brains and minds in interacting with the surroundings changes fundamentally; so does our understanding of them. The article has introduced a novel theoretical approach known as the Quantum Theory of Cognition; a hypothesis based on the quantum nature of mental events which holds that according the Conservation Law of Information, cognition might have quantum like characteristics also.

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## **Psychological Clarification of Pictorial Relation and Media Technology in Education**

**Hassan Sharafi\***

High level educational behavior of teachers and students for perceiving educational concepts and accurately recognizing the quality of teaching-learning can be observed both in reality and virtually. Visual presentation (presentation of reality) is a connective and information strategy of teaching that could cause attaining information, making knowledge, developing new thought and turning learning to performance. Increasing parents and teachers information, possibility of using space intelligence and expanding education approaches and learning opportunities and etc are the expected conclusions. Expected conclusion in this respect is as follows:

1. Increasing awareness of parents, teachers and students about ways of learning how to learn, especially those who enjoy from more spatial intelligence.
2. Making volume of complex connections in exploring and production of curriculum concepts for curriculum planners and developers.
3. Developing educational methods and learning opportunities for improving international studies findings (TIMSS, PIRLS) and so on.

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## **Science education appropriate to multimedia learning**

**Hassan Sharafi\***

Environments in elementary science curricula it has been attempted to encourage students to think like scientists to discover the best solution of the problem by themselves and make concepts both mentally and objectively. In the process of these two construction, we may take advantage from media technology the instrumental and behaviorist point of view (Variable: ICT) and effort-based view (Variable: curriculum development). Students make conceptions by doing projects and using computer learning environments such as educational CDs, word processor for writing reports, E-mail, feedback process, educational games, making website, conceptual map, graphic softwares, electronic listening and speaking and so on (behavioral view) and develop them (effort-based view).

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## **Improving Intermediate EFL Learners' Reading Comprehension and Cognitive Strategy Use: The Effect of Concept Mapping Instruction**

**Shole Amiri\*, Yaser Khajavi**

This study sought to examine whether the teaching of concept mapping learning strategy as a cognitive tool could contribute to the achievement in reading comprehension and cognitive strategy use among Iranian intermediate EFL learners. To fulfill the aims of the study, 60 individuals (21 males, 39 females) were selected through simple random sampling from BA students of TEFL at Islamic Azad University, Izeh branch. The age of the participants ranged from 19 to 23 years. They were randomly assigned to a concept mapping (N=30) and a control group (N=30) in a pretest posttest control group design. MSLQ and reading achievement tests were used to assess students' cognitive strategy use and reading comprehension. Also Raven's Advanced Progressive Matrices (APM) was used for measuring students' IQ. After controlling for the effects of IQ and pre-test scores of the students, ANCOVA revealed that concept mapping strategy significantly influenced students' reading achievement ( $F=31.22, p<0.05$ ) and cognitive strategy use ( $F=88.51, p<0.05$ ). It can be concluded that concept mapping instruction contributes to students' achievement in reading and enhances their cognitive strategy use. These findings have implications for language teachers and EFL learners.

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## **The Role of Parieto-frontal Network in Intelligence Functions with Regard to Cognitive Training**

**Bitá Bemani Yazdí\*, Jafar Hasani, Hasan Ashayeri**

Consideration of the role of different brain regions in intelligence is one of the essential issues in cognitive neuroscience. Research documents indicate that some of the brain lobes such as the frontal and parietal lobes play a more important role in these functions. In recent decades, it has been assumed that the neural networks related to these lobes are predictor factors of individual differences in intelligence and reasoning. According to parieto-frontal network perspective of intelligence, the dorsolateral prefrontal cortex, the inferior and superior parietal lobule, the anterior cingulate, regions within the temporal and occipital lobes and the white matter related to these regions interfere in cognitive processing chain. Considering the various functions of these regions, one might conclude that the brain operates as a network; and moreover, cognitive processes such as reasoning, abstraction, symbolism, etc., utilize auditory and visual means (usually in combination) for early sensory processing. In the other words, according to this model, intelligence includes cognitive, instrumental and mechanical dimensions. For this reason, with regard to parieto–frontal network perspective in training intelligence based processes, using combined cognitive-instrumental methods based on asymmetrical brain activity and neuroscience explorations are more useful than other methods. In the current study, while assessing the parieto-frontal model of intelligence processes, its application and implications in education were reviewed, with and emphasize on cognitive training.

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## **A Cognitive/ Metacognitive Model for Analyzing Processes Underlying Mathematical Problem Solving**

**Azimeh Sadat Khakbaz\***

The processes underlying mathematical problem solving had intrigued mathematics educators until Polya's four stages in mathematical problem solving was introduced in 1957. Polya's stages not only accounted for the above mentioned problem, but also set a plan for further discovery through math problem solving. Schoenfeld was one of the researchers who developed a framework to describe mathematical problem solving upon Polya's stages. Investigating Polya's stages and Schoenfeld's framework resulted in a model for analyzing mathematical problem solving which is described in this paper. According to this model, cognitive and meta-cognitive strategies merge to help teachers distinguish problematic processes which impair students' mathematical problem solving, and help them to improve it. The article will also present a case study in elementary mathematics where this model is used to analyze mathematical problem solving. In the presented case study the student gains knowledge and skills based on the mentioned method, and controls knowledge and skills to get engaged in mathematical problem solving with a positive attitude against the mathematical environment, problems, and abilities for problem solving. The teacher reinforces control ability and positive attitude by using cognitive and meta-cognitive strategies for building a fertilized teaching-working environment.

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## **The Role of Social Support, Academic Stress and Academic Self-Efficacy on Mental and Physical Health**

**Khadije Fouladvand\*, Vali Allah Farzad, Mehrnaz ShahrAry**

This study is aimed at analyzing the direct and indirect effect of social support on mental and physical health, which was analyzed according to a structural equation modeling method in a propositional model. The target populations of this research were undergraduate students of Tarbiat Moallem University. The sampling method used in this study was multi-stage. The research sample included 320 students (188 female, 132 male). Data was collected using the College Academic Self-efficacy Scale by Owen (1988), Social Support Inventory by Sameti, Shokrkon & Najarian (1376), Students Stressors Questionnaire by Poladi Reyshahri (1374) and Mental and Physical Health Questionnaire (SF-36 Version 2) by Ware (1996). The results of this research indicated that a higher level of mental and physical health is accompanied by both a higher level of social support and academic self-efficacy, and a low level of academic stress. Also, the relationship between social support and mental and physical health is mediated by academic self-efficacy and academic stress. The relationship between academic self-efficacy and mental and physical health is mediated by academic stress. All of the relations between the variables are statistically significant. Social support, academic self-efficacy and academic stress accounted for 0.194 of the mental and physical health variance.

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## **The Comparison of “Attachment Styles” between Girls with High and Low IQ Scores at the Level of Guidance School**

**Narges Razeghi\*, Golbandi Haqiqat Amir-Mazaheri Mohamad Ali**

The developmental health of a person in each period of lifetime depends on several factors. One of the most important factors during the critical period of life is the security of attachment. Based on previous researches it has been shown that attachment influences appearance of normal social development, cognitive development and the development of normal personality in children (Mikulincer, 1998; Kerns and et al, 2000; Peterson and et al, 2002; Stone Wolfson, 2002; Clarke - Stewart, 2002; Broberg and et al., 2002; Erel and et al, 2002; Moss and et al, 2005; Shpancer, 2006). In the process of development, the changes and development of different aspects occur parallel to each other, and emotional developments occur spontaneously along with the cognitive development of the child. Because of the fact that intellectually disabled children show considerable delay in all stages of their development, and in contrast, bright children pass most stages of their development earlier and faster, it could be assumed that each of these groups have particular developmental and attachment needs, which should not be ignored by children specialists. Therefore, this research aims to determine whether there are any differences between the attachment styles of bright and intellectually disabled children. In this causal – comparative research, students were selected via simple random sampling. 30 female students from “exceptional talents” guidance school and 30 female students from “intellectually disabled” guidance school were recruited (In both groups 10 students were selected per each educational level of guidance school). The study of attachment styles was done using IPPA (Inventory of parent and peer attachment). The reliability and validity of this method has been confirmed in several recent researches (Armsdon and et al, 1987; Nosrati, 2004). Finally; independent T-test was used for data analysis. It can be concluded that there is significant difference ( $P < 0.01$ ) between the attachment styles of bright and intellectually disabled female students. Also, mother alienation in bright girls seems to be significantly higher in comparison to intellectually disabled girls. The findings of this research matches other researches that have been carried out so far (Kogan, 1998; Peterson and Moran, 1995). It has been shown that attachment results from a relationship built between two people, and the particular characteristics of each child influences the possibility of building relationship and attachment styles. The importance of attachment in the process of development should be emphasized, and further research has to be carried out on its effectiveness and the essential factors involved.

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## **Effectiveness of Self-monitoring Training on Reduction of Off-Task Behaviors of Students with Attention Deficit Hyperactivity Disorder (ADHD)**

**Mirmahmoud Mirnasab\***

The present study examines the effectiveness of self-monitoring training on reduction of off- task behaviors of students with attention deficit hyperactivity disorder (ADHD) in special education settings. Four students who were attending schools for students with special needs were randomly selected and studied by using a multiple-baseline single subject experimental design. After observing off-task behaviors during baseline phase sessions (8 sessions), self monitoring training was utilized for four students in the intervention phase (12 sessions). The package was the Lloyd self monitoring package that has been prepared in Virginia University. Variations of off- task behaviors were exactly observed and recorded through the follow-up sessions (10 sessions). Visual analysis of data points by analysis of level and trend (using White's Split middle technique) indicates that off-task behaviors in classroom settings were reduced for the four students in the intervention phase. But maintenance of effects was not shown during the follow-up phase. The findings of this study have implications for studying long-term effectiveness and the generalization of effects to home and clinics. In addition, the findings have implications to study effectiveness of self monitoring training on reduction of off-task behaviors by using large-scale group designs.

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## **Effect of Self-regulation Strategies Training on Math Achievement, Motivational Beliefs and Cognitive Engagement in Female students**

**Akram Malekzadeh\***

The mathematic course and the factors affecting students' achievement in it have been a pivotal issue in the education system, where frequent researches have been conducted and great budget has been spent. However, many students fail in math courses. Studies have indicated that 92.6 percent of the students that are not interested in math and have a negative view of it, have failed successively in the course. Regarding these consequences and subsequent to a great amount of studies, cognitive psychologists have come to the conclusion that in order to solve this problem, new approaches in cognitive topics must be applied. One of the most important cognitive topics is the self-regulating approach, which has a positive effect on students' achievement in mathematics course, and can also reinforce the effective factors of academic achievement. One of the most important effective factors is cognitive engagement and motivation beliefs. The purpose of this determining of the effects of self-regulation strategies on mathematical achievement, motivation beliefs and cognitive engagement was conducted in two distinct studies. 40 failed second grade female students from a guidance school in Shiraz were recruited for the first study. The subjects were randomly divided into two groups: 20 students in the experimental and 20 students in the control group. Pretest consisted of a questionnaire including subscales such as: achievement goals, self-efficacy and learning strategies. The schedule of self-regulation strategies training was offered to the experimental group. In the second study two groups of first grade high school female students were recruited. The experimental group received self-regulation strategies training. Results of analysis of variance with repeated measures showed that self-regulation strategies training increases cognitive engagement and mastery of goals and reduces avoidance-approach orientation. There is no significant positive relation between self-regulation strategies training and mathematical achievement among failed female students. The results of the second study showed that among high school students self-regulation strategies training culminate in mathematical achievement.

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## **Effects of Perceptual Learning Styles on TEFL Listening Comprehension**

**Marjan Mehrpour\***

This study was performed to investigate the effects of perceptual learning style on EFL learners' listening comprehension ability. For this aim, 105 female EFL learners enrolled at level 5 of the ILI, Shiraz branch participated in the study. The subjects took part in a listening comprehension task and completed a learning style questionnaire. The score in different measures were analyzed using t-test, ANOVA and Pearson correlation. Statistical analysis showed that:

- 1) Contrary to expectation, there was no relationship between listening comprehension ability and auditory learning style.
- 2) No significant differences were observed between students with different major learning styles and their listening comprehension scores.
- 3) There were no significant differences between visual, auditory, kinesthetic and tactile styles in students with high listening comprehension scores and low listening comprehension scores.

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## **The Efficacy of “Multi- Sensory” And “Test- Study- Test” Cognitive Educational Approaches on Decreasing Dysgraphia in Ahwaz Elementary Second and Third Grade Male and Female Students**

**Dr Farah Naderi\*, Sheida Daei,**

The purpose of this study was to examine the effect of using “multi-sensory” and “test- study- test” approaches to improve orthography impairment of elementary second and third grade male and female students in the city of Ahwaz. The sample consisted of 60 male and female second and third grade elementary school students who were selected randomly via simple sampling procedure. The subjects were allocated to two experimental and one control groups (20 students each) by random; with an equal chance for each student to be in any of the three groups. The research design was experimental. Pre test and post test with experimental and a control group was carried out. Three data sources were used to determine the effect of using “multi-sensory” and “test study test” techniques: Raven Progressive Matrices Test, Spelling Test and students’ school achievement records. The research began by identifying the students whose incorrect answers in a spelling test was 25%. Factorial Analysis of Variances indicated that both interventions, namely the “Multi-sensory” and “Test- Study- Test” approaches improved the impairment in spelling and decreased students’ dysgraphia. Findings supported the implementation of “multi-sensory” and “test- study- test” as an intervention for decreasing dysgraphia. “Multi-sensory” approach by comprehensive reinforcement of the senses, “test- study- test” approach by repeating the acquired materials, substitution of the concepts in visual and/or auditory memory and intensification of similarities and difference distinction, helps students to overcome their educational difficulties.

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## **A Study of Social Information Processing in Mild Intellectually Handicapped Students**

**Khatoon Pourmaveddat\*, Laya Bashash**

The present study investigates the development of Social Information Processing (SIP) in mild intellectually handicapped students with regard to the social information processing model presented by Crick and Dodge (1994). Dodge and colleagues (Crick & Dodge, 1994; Dodge, 1986) proposed a comprehensive SIP model to conceptualize the cognitive processes underlying social interactions in children. This model consists of the following six steps: (1) encoding social cues (2) mental representation and interpretation of cues (3) clarification of goals (4) search for possible social responses (5) making a response decision after evaluating the consequences of the various responses and estimating the probability of favorable outcomes and (6) acting out the selected response while monitoring its effects on the environment and regulating behavior accordingly. The sample consisted of 120 elementary school and high school students. The subjects were selected from the exceptional schools of Shiraz and were interviewed individually using Turkaspa and Bryan (1994) social stories. The results indicated that with the increase in school grades, students demonstrated more skills in areas of representing, interpreting social cues, clarifying positive goals and the whole clarifying goals, evaluation of positive goals, and selecting solutions. Also, they showed improvement in the linking between goals and selected solution. These findings support the positive effect of education on skill formation in SIP and social compatibility. However, no significant difference was observed between mean scores of boys and girls in SIP. Finally, suggestions are presented regarding the role of education in SIP and social adjustment for the purpose of preparing training, clinical and intervention programs for these students.

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## **The Relationship of Cognitive Style and Learning Strategies with Academic Achievement**

**Mohammad Azad Abdollahpour\*, Parvin Kadivar,  
Mohammad Hossain Abdollahi**

The aim of this research was to examine the relationship between cognitive styles (field dependent and field independent), cognitive and metacognitive strategies and academic achievement. A sample of 180 male high school freshmen attending district 6 public high school during the 2002-2003 school year, were randomly selected using stratified random sampling. In the next step, cognitive styles tests (Group Embedded Figure Test) and the inventory of learning strategies were administered and data were collected. The scores of social studies and math in the first semester were selected as indicators of academic achievement. These two courses are distinguished in terms of necessary processing and learning strategies. Results showed a significant difference between field dependent and field independent groups in math achievement, with the independent group fairing better in math. However, there was no significant difference in social studies course. Another finding showed that in employing cognitive and metacognitive strategies between the two groups of cognitive styles, the significant difference was more frequent among field independent students. These findings revealed that using cognitive and metacognitive strategies were positively correlated with math achievement but had no relation with achievement in social studies course.

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## **The Effect of Cognitive and Metacognitive and Method of Teaching in Mathematics**

**Azim Heydari\*, Ghazban Abdolhoseini**

This research has been carried out to study the effects of cognitive and metacognitive methods of teaching, on an improvement in learning and educational progress in mathematics subjects. The method used in this research was quasi-test with pre- test, post-test scheme. The tool of research was a 14-item questionnaire about mathematics subjects. Reliability of the tool was measured by retesting with coefficient-coincidence of 80%; and the validity of the questionnaire was proved by experienced teachers. The statistical population of the research included all grade-one male and female high school students in the city of Ilam in School Year 2006-2007 (1385-1386). The statistical sample was 200 grade-one-students who were selected based on multistage random sampling method. This sample group was divided into two groups: the test group (100 students), and the control group (100 students). The test group underwent 12 sessions of cognitive and metacognitive methods of teaching and was counseled by researchers; however, the control group was taught by typical and common methods of teaching mathematics in schools. Then the results were statistically analyzed using descriptive and inferential analysis (dependent & independent T-test) by SPSS software. The results showed: cognitive and metacognitive methods of teaching had positive effects on educational progress of students' mathematics and that they are effective methods for teaching mathematics to high school students. There was no positive correlation between the average grades of boys and that of the girls. Also, the results showed that there is a positive relation between average grades of girls in the control group and test group, and also between the average grades of boys in the control group and test group.

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## **Development of a Cognitive Based E-Content Model of Theoretical Courses of MA Program in Education Courses**

**Amin Mousavi\*, Kamal Kharrazi**

Nowadays Information and Communication Technology is an inseparable part of human's life. Learning is a field which assigns a major proportion of this technology to itself; in a way that using ICT in this field has led to the emergence of a new area called "E-Learning". According to the conducted researches, one of the potential reasons for the failure of "E-Learning", is the inappropriate way of designing and developing e-courses which have remained in this form for years. The results of the previous studies on learning Medias indicate that lack of attention to individual differences and the learners' different needs has no effect on learning improvement, and digital media especially the internet, are not exceptions. Consequently, attempts have been made in the present study to present/introduce a model for developing e-content based on the requirements and emphases of cognitive learning theories. The aim of the study was to meet the cognitive needs of MA students in education course in their theoretical courses. For this purpose, in addition to reviewing and investigating the existing resources in the area of educational content designing from the view point of learning theories especially cognitive approach, the effects of cognitive factors of the content on learning, investigating suitable educational parts in cognitive approach, and characteristics of theoretical courses in humanities, eight specialists were interviewed in the present study using qualitative research method in the area of electronic content development. These specialists were chosen using purposeful sampling in order to find the best data for developing the model. Finally, after investigating the resources and obtaining data from interview, a model consisting of five phases of analysis, designing, producing, tentative implementation and revision was designed which can be utilized for electronic content design in the humanities courses, while considering the requirements and emphases of cognitive theories.

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## **Studying the Relationship between Kolb's Learning Styles and Witkin's Cognitive Styles (Field Dependence and Field Independence) and their Role in Choosing Academic Courses in High School**

**Alireza Homaiony\*, Hassan Thaghipour**

The aim of this research was to study the relationship between Kolb's learning styles (Converger, diverger, assimilator, and accommodator) and Witkin's cognitive styles (field dependence and field independence) and their role in Student's choices of academic courses in grade II high school. Kolb's learning styles inventory, LSI, and Witkin's Group Embedded Figures Test, GEFT, were used in this study for gathering information. Chi square and ANOVA were used for data analysis. The results showed that field independent individuals mostly prefer mathematical or empirical courses and field dependent individuals prefer human sciences. Also, convergers and assimilators prefer mathematical or empirical sciences, and divergers and accommodators mostly prefer human sciences.

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## **The Relationship of Cognitive Styles and Locus of Control, with Students' Academic Achievement in University of Isfahan**

**Mehdi Esfahani\*, Amir Keshavarz, Karim Asgari**

Cognitive styles are those relatively consistent ways by which individuals can receive, organize and process information. In fact these styles have been told to be potential abilities which are different among individuals, and learning and performance might be influenced by them. Also it is important to know that failure and success might be attributed to internal and external factors, and therefore, learning and academic performance can be influenced by these factors. 150 students in the University of Isfahan were randomly selected, and assessed by Kolb questionnaire (comprising four subscales: Convergent, Divergent, Assimilator and Accommodator) and Rutter's inventory of locus of control. The students' academic mean score was used to assess their academic achievement. The data was analyzed using SPSS-15. There was a significant and positive relationship between internal locus of control, and convergent, assimilator and accommodator subscales with academic achievement. Also, there was a significant and negative relationship between external locus of control and academic achievement ( $p < 0.05$ ). Analysis of regression also showed that internal locus of control, divergent style, assimilator style, accommodator style, and external locus of control predict 26.1, 15.2, 12.3, 8.5, and 0.4 percent of academic achievement scores, respectively ( $p < 0.01$ ). According to the results, it seems that any intervention or improvement program for academic achievement in university students is better to be organized with respect to the role of cognitive styles and locus of control.

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## **Studying the Role of Mental Spaces Theory in Eliminating Semantic Anomaly and Referential Ambiguities**

**Arsalan Golfam<sup>\*</sup>, Sepide Abdolkarimi**

The cognitive approach is a relatively newly born and semantic-based approach which can justify the acceptability or unacceptability of linguistic structures, using theories which the generative semantics lacks. The theory of mental spaces is a theory introduced in cognitive linguistics, which if not taken into account, will probably lead to difficulties in eliminating semantic anomaly from sentences which are semantically anomalous and referential ambiguities from ambiguous noun phrases. This paper is an attempt to explain the concept of mental space and the relationship between mental spaces and metonymy and also the role of the above-mentioned theory in eliminating semantic anomaly and referential ambiguities. The authors, as native speakers of Persian who have a good command of English and German and are familiar with French have used their intuitions in gathering data. They have checked the correctness of German and French data by consulting with other speakers of German and French. The findings of this survey showed that different modes of the verb, changing predicates and deixis are examples of linguistic elements which serve as space makers whose existence in languages is the representation of mental spaces and this representation is also the reflection of the same mental mechanism in human beings in linguistic codification and a proof for cognitive universals.

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## **Effectiveness of Cognitive Strategies on Improvement and Correction of Written Expression Problems in Fourth Grade Elementary School Students with Learning Disability**

**Alireza Farahani\*, Mir Ghasem Hoseini, Omid Isanejad**

The purpose of present study was to determine the effectiveness of cognitive strategies on the correction expression problems in fourth grade elementary school students with Learning disability. The method of this project was semi-empirical. 57 fourth grade elementary school students with learning disability were randomly selected and assigned to two experimental and control groups with 29 students in the experimental group and 28 students in the control group. For the diagnosis of written expression disorder teachers' opinions and students scores in composition as well as Anglert Questionnaire (1997) with five micro processes of planning, organizing, writing, editing and correcting were used. The experimental group received 35 sessions of cognitive strategies education in 5 stages, with one cognitive strategy at each session. The control group did not receive any education. Post test was conducted for both groups. Prescriptive statistics and t- student test was used for data analysis. The analysis of data showed that mean scores of five sub scales in the experimental group in post test was significantly higher than pre-test scores ( $P < 0.05$ ). Also, there were significant differences in the scores of cognitive strategies of 5 sub scales between the experimental and control groups ( $P > 0.05$ ). The findings of this research show that the method of cognitive strategies based on education, planning, organizing writing and correction is effective for improvement of written expression problems in students.

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## **Phonological and Orthographic Processing Skills in Children Learning to Read/Spell Persian and English Concurrently**

**Mohammad Ahmad Panah\***

The concurrent development of reading and spelling in Persian and English were examined in a sample of Iranian students. The s were to investigate: (a) whether phonological and orthographic skills in one's first language (Persian) are interrelated to parallel skill development in reading and spelling in a completely different language(English), and (b) To assess children's reliance on phonological and orthographic skills while reading and spelling two very different orthographies. Vowelized Persian is characterized as shallow orthography, which has very regular grapheme to phoneme correspondence rules, whereas English is characterized by complex and inconsistent correspondence between phonemes and their graphemic representations. Ninety Iranian students in grades 2, 3 and 4 who had attended both Persian and English classes, were tested for word reading and spelling in Persian and English. Our results revealed that phonological and orthographic skills in Persian were high and positively interrelated to the parallel skills in English. The predictors of reading and spelling performance were different across languages: phonological and orthographic processing skills, each predicted unique variance in word reading and spelling in English; but in Persian. Only phonological skills predicted unique variance of word reading and spelling.

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## **The Role of Phonological and Syntactic Awareness in Models of Reading**

**Shima Nabifar\***

The aim of this article is to discuss the models of reading with regard to the role of phonological and syntactic awareness in the cognitive process of reading. In this article phonological and syntactic components of language are considered as two essential and fundamental factors in the cognitive process of reading. These two also explain many problems of reading. Of course, it is also necessary to indicate that other components of language play important roles in the processing of language in reading. However, researches indicate that syntactic and especially phonological awareness are basic for the explanation of many reading problems such as dyslexia. The question is which one is the determinant factor for the explanation of reading problems and how is the role of these two components shown in the models of reading. There are 3 hypotheses about the role of phonological and syntactic awareness in the explanation of reading problems. First we are going to review these three hypotheses; we will discuss the models of reading with regard to the hypotheses thereafter.

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## **Conceptual Metaphors behind English Idioms: Reframing Students in FL Translation Class**

**Ahlam Mohammad Al-Khattabi\***

Foreign language translation class is one of the classes that should be invested in teaching not only how to translate from the native language to the second language but also in the opposite direction. It should be invested in teaching pragmatic competence (social language) to enhance the students' ability to understand the culture of the second language and appreciate it. Such an understanding will result in a good translation (non-literal translation). Idiomatic expressions are one of the aspects to achieve pragmatic competence because they are cultural-oriented and need different methods of translation. This study suggests a cognitive method in FL translation class. By explaining the conceptual metaphors behind such idiomatic expressions, the students could be reframed to understand such expressions and translate them in their native language correctly.

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## **Metaphorical Conceptualization of the ‘War on Terror’: A Cognitive Approach**

**Ahlam Mohammad Al-Khattabi\***

In this contribution to the growing literature on conceptual metaphor, this paper analyses and explores the use, the effect, and the role of conceptual metaphors as being one of the powerful persuasion tools in English political discourses during the war on terror. The discourse on the war on terror is “a panorama of metaphor” to use Lakoff’s phrase (1991). As an interpretive tool, conceptual metaphors link metaphors to larger patterns of meaning, including ideological frameworks. Accordingly, this study is devoted to the analysis of the ideologies produced by such metaphors as a tool of framing the war and people’s minds. The corpus contains six press conferences, selected randomly, by English speaking politicians. They cover the September 11<sup>th</sup> attacks on the WTC and the wars initiated by the slogan “War on Terror”. The conferences cover a three-year period, from 2001 until 2004. This period is chosen because it abounds in political changes and events. Moreover, it has witnessed two wars: Afghanistan and Iraq, which were issued by the slogan “War on Terror”. The selected conferences discuss three main topics: the terrorist attacks of September 11<sup>th</sup> 2001, the war on terror, and the military interventions in Afghanistan and Iraq. The research derives thirteen conceptual metaphors, three of them identified by Lakoff (1991) during the First Gulf War, that in turn form patterns or constellations of meanings in the framing of the war on terror. The current study analyzes the salient examples of concepts framed by metaphors by politicians in order not only to persuade people of their belief, decisions, and viewpoints but also to legitimize the ‘self’ and delegitimize the ‘other’; thus, such use of figurative language reveals their ideological motivations. The creation of images of the ‘self’ and the ‘other’, initiated by the use of metaphor, is a fundamental mechanism in political discourse during the war on terror. Political discourse has become more self-oriented and a mere representation of the ‘self’ and the ‘other’ after 9/11; it has become a battlefield in its own.

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## History of Bilingualism and Language Knowledge in Stuttered and Normal Kurdish-Farsi Bilingual Students

Hiva Mohamadi\*, Reza Nilipour, Fariba Yadegari

The major objectives of this research were to study the contributing factors of bilingualism, as they relate to the development of stuttering. The contributing factors were linguistic knowledge in L1 and L2 of the stutterers and their normal peers as well as the manner and age of learning L2 in both groups. The subjects in this case-control study were 31 Kurdish-Farsi bilingual stutterers (mean age 10.9) and 31 normal peers (mean age 10.8) from among 4 and 5 graders in Javanrood primary schools. The stutterers in each class were initially introduced through their teachers. They were interviewed and their demographic history as well as the manner and age of L2 learning and their feelings about L2 linguistic knowledge were collected. The quality of the linguistic knowledge of the subjects and the control group in L1 and L2 were evaluated and compared by analyzing a sample of their spontaneous speech and their grades in Reading, Dictation and Composition in Farsi. The quality of their spontaneous speech samples were evaluated by measuring the linguistic indices: speech fluency index, speech complexity index, type-token ratio and MLU. The severity of each subject's stuttering in both Farsi and Kurdish was also measured based on spontaneous speech samples by using the Ambrose and Yairi's formula  $[(pw+ss).ru]+(2.dp)$  as a measure to diagnose normal nonfluency from stuttering. The results indicated that the stuttering students scored significantly lower than the normal group in speech fluency index, speech complexity index, lexical type-token ratio index and their grades in Reading, Dictation and Composition in Farsi. The manner and age of L2 learning between the two groups were not significant. The control group had better feelings than the stuttering group towards their language abilities. The speech complexity index of Farsi was higher than Kurdish in both groups. The difference in type-token ratio index in L1 and L2 in both groups was not significant. The severity of stuttering in the stuttering group in Farsi was significantly higher than Kurdish. The linguistic knowledge of the stuttering group was lower than the normal group in L1 and L2. This finding confirms that linguistic knowledge of the stuttering group was lower than their normal peers. Based on the measured indices Farsi was the dominant language of both stuttering and normal groups due to formal education in Farsi. In contrast to some previous reports, our results indicated that the severity of stuttering in the dominant language (Farsi) was higher than the nondominant language (Kurdish). This may be due to emotional and attitudinal factors.

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## **Linking Elements in German Compounds: Evidence from Students of German as a Second Language (Non-native Speakers and Bilinguals)**

**Maja Andel\*, Ivana Lucica**

German is known for its large number of compound words, as well as for the possibility for building ad-hoc compounds. When combining two words an infix should be used, but its choice is not obvious in terms of phonology, morphology or semantics. Based on a previous article by Dressler et al., where the choice of a particular infix by native speakers of German was studied, we presented a group of bilingual speakers of Croatian and German and a group of non-native speakers (students of German language), with the same task, in order to compare their choices. The method used in the study was the same as in the inspiring article – a questionnaire consisting of 30 items – an existing word and a nonword (both nouns) to be combined in a compound. As expected, the choice of infixes by non-native speakers differed from the results of native speakers. Similar results in two groups existed only if the native speakers group was unanimous in choosing one of the infixes. Otherwise the non-native group was more likely to choose dispersed answers or to recur to the null-morpheme solution. The bilingual group's answers were expectedly similar to those of native speakers. The difference in results suggests a different morphophonological categorisation of nouns in native and non-native speakers of German, which is most likely linked to poorer knowledge of lemmas (indirect, and not necessarily conscious information on non-visible morphological features of a word, such as its genitive form or etymology) in non-native sp.

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## **Memory, Narratology and the Problem of Authenticity: A Story of Pain**

**Andrea Lesic-Thomas\***

As both memory and narratives provide focus on some of the major trends in social sciences and humanities, the question of how literary scholarship can draw from this new research to illuminate its own problems is now quite pressing. The paper will explore the problem of authenticity in literary 'memory texts' in the context of new thinking on memory and trauma in the cognitive sciences. After a brief survey of relevant research on narratives and trauma, the paper will analyze several literary texts that handle the same topic. What transpires are possible bridges between the disciplines, as well as points of illumination on stories, memory and trauma which can arguably only come from literary texts' unique capacity for world-processing. Narrative constructions of memory show that we are storytelling apes who often prefer the satisfaction of a well crafted narrative to the mere truth, and that unity and coherence that narrative logic brings to autobiographical remembering are the main mechanisms for overcoming the unintelligibility of trauma. In addition, culturally sanctioned scripts for life stories could be blamed for the frequent failure of our life stories to overcome trauma effectively; when the cognitive drive for narrative coherence meets the seductiveness of cultural stereotype and narrative cliché, autobiographical narratives can become harmful. Arguably, literature and art are almost uniquely capable of liberating our thoughts from the shackles of stereotype and cliché, and providing us with models of signiferous practices which can constructively process traumatic memories and integrate them in a larger, complexly meaningful, and healing narrative.

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## **Notes on the Phonological Features of Persian Speaking Parkinsonian Patients**

**Arezoo Adibeik\*, Behrooz Mahmoodi Bakhtiari**

Idiopathic Parkinson is an age-related, common progressive neurodegenerative disease whose cause is yet unknown (Evans, 2003). Also, it is not yet clear whether specific language disturbances form part of Parkinson's disease (PD) cognitive profile (Katsarou et al., 2003). This disease leaves several impacts on the speech of its patients, many of which have not undergone a serious study in different languages. The ultimate goal of this article is provision of the prosodic features of Persian – speaking Parkinsonian patients, using four major tasks to evaluate their production and perception impairments. The tasks include "spontaneous speech", "fluency task (DDK)", "production and perception of emotional prosody", "production of high-low vs. low-high vowels". In doing this research, the above-mentioned tasks were administered to 5 non-demented patients with idiopathic Parkinson and 5 healthy controls and the results were analyzed. Notably, the patients appeared to have difficulties in producing emotional prosody as well as the production of low-high vowels. Our findings were inconsonant with the previous studies (Breitenstein et al. 2001; Davis Garret et al., 2002; Harel et al., 2004) which indicated that these patients show greater deficiencies in production, including disturbances of respiration, phonation and articulation. However, we found out that these patients did not have much difficulty in the perception of emotional prosody which is in contrast with the above-mentioned studies. Finally, we noted that speech defects are common in moderate and advanced PD. Notably, vocal tremor was identified on narrow band spectrogram for these patients.

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## The Rivalry of Phonological and Semantic Computation in Syntactic Theory

Tommi Leung\*

We argue that the observation of binocular rivalry in visual perception is instantiated in the mental computation of syntactic derivation of human language. In human language, one inquiry is to model the displacement property, e.g. raising [1] and wh-questions [2]. Generative grammars typically relate the ‘interpreted’ with the ‘pronounced’ position by means of movement [3]. Proposals are suggested to why language allows [1, 2] but not [4]. One assumption is that movement establishes a movement chain between the interpreted and the pronounced position. A chain is constrained by the Principle of Unambiguous Chains (PUC) which states that it contains one strong occurrence. An occurrence of the moved item is defined by sisterhood in syntactic structure, whereas a strong occurrence (notated by \*) determines where the moved item is pronounced. The chain formed by [1-2a] represented in [5] is grammatical since one of the two occurrences is strong. Alternatively examples in [6] are ungrammatical since the chain contains two strong occurrences ruled out by PUC. Regardless of the number of occurrences, only one of them can be strong, and only one instance of the wh-word is pronounced. Other combinations are ungrammatical [7]. Therefore all occurrences express **one** particular type of interpretation. In the chain  $\{*x, y\}$ , x determines the phonological interpretation of the moved item, whereas y determines its semantic interpretation. The computational system works in a way so that it generates the phonological and semantic interpretation of lexical items one at a time (depending on the identity of occurrence). They cannot be computed simultaneously. This sheds light on the famous observation of binocular rivalry in visual perception in which the human mind can perceive two equally valid interpretations of an ambiguous figure [8-9], yet it does not perceive them simultaneously. Instead the mind only flips back and forth so that one interpretation is salient whereas another instantaneously invisible. The mind is constrained to perceive one thing at a time. If the theory of visual perception is also the theory of mental computation, the symmetry between syntactic computation and binocular rivalry hinges on the general architecture of the language faculty. The Minimalist Program of syntax suggests that during syntactic derivation, there is a point Spell-Out that splits out two linguistic interfaces, PF (phonetic form) and LF (logical form) [10]. PF and LF are independent of each other and involve distinctive algorithms. As a result, a single syntactic representation is informative of its phonological and semantic interpretation, whereas the computation chooses one particular dimension of interpretation (PF or LF) at one time depending on the stage.

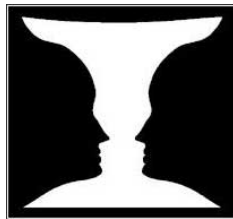
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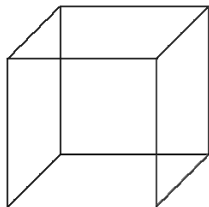
For the language faculty it is impossible to compute both phonological and semantic interpretation simultaneously.

- [1] a. John seems to thrive.                      b. John seems to be likely to thrive.  
 [2] a. Who did John see?                      b. Who do you think that John saw yesterday?  
 [3] a. seems John to thrive → movement of 'John' → John<sub>i</sub> seems t<sub>i</sub> to thrive  
      b. did John see who → movement of 'who' → Who<sub>i</sub> did John see t<sub>i</sub>?  
 [4] a. \*John seems John to thrive.                      b. \*Who did John see who?  
 [5] a. Chain of 'John' = {\*seems, to} (\* = strong occurrence)  
      b. Chain of 'who' = {\*C, see} (C = complementizer)  
 [6] a. \*John seems thrives. / \*John seems John thrives. (Chain of 'John' = {\*seems, \*thrive})  
      b. \*Who did John see who? (Chain of 'who' = {\*C, \*see})  
 [7] a. Who<sub>i</sub> C<sub>1</sub> do you think t<sub>i</sub> C<sub>2</sub> Mary said t<sub>i</sub> C<sub>3</sub> John liked t<sub>i</sub>? {\*C<sub>1</sub>, C<sub>2</sub>, C<sub>3</sub>, liked}  
      b. \*Who do you think who Mary said John liked? {\*C<sub>1</sub>, \*C<sub>2</sub>, C<sub>3</sub>, liked}  
      c. \*Who do you think Mary said who John liked? {\*C<sub>1</sub>, C<sub>2</sub>, \*C<sub>3</sub>, liked}  
      d. \*Who do you think Mary said John liked who? {\*C<sub>1</sub>, C<sub>2</sub>, C<sub>3</sub>, \*liked}  
      e. \*Who do you think who Mary said who John liked who? {\*C<sub>1</sub>, \*C<sub>2</sub>, \*C<sub>3</sub>, \*liked}\

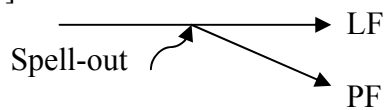
[8]



[9]



[10] numeration



## **An Investigation on the Domain of Phonological Processing in Persian Production System**

**Bahareh Hormozi\*, Mahmoud Bijankhan**

In this article we were to define the scope of phonological analysis in the language system. Three picture-word naming tests in three different formats were designed. 30 native speakers of Persian took part in these tests. The results show that, contrary to earlier published results which claim that phonological analysis scope accepts at the most two phonological words, the language phonological analyzer, while analyzing an utterance, chooses a bigger language unit to analyze phonologically. Besides picture-word naming tests, 53 exchanges and substitution speech errors, appropriate for giving a clear cut investigation of phonological analysis scope, were chosen from a list of 1064 speech errors (Asadi Motlagh, 2002). By reviewing these errors, we found out that almost all speech errors occur in a syntactic unit. These syntactic units do not have the same labels in all cases. Finally, using existing research results in phonology-syntax interface, the results of the above mentioned tests, and also speech errors analysis, we concluded that although the data entering phonological analyzer is a unit where syntactic bounds exist between its parts, it is a phonological entity. This unit is a phonological group.

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## Conceptual Metaphor as Revealed by Reduplication in the Languages of Iran

Dariush Borbor\*

The aim of this paper is to demonstrate the comparative workings of conceptual metaphor as revealed in the reduplications of current languages in Iran and to present an overall typology. We are not aware of any previous study on the subject. The study is based on a hitherto unpublished and nearly completed study of reduplication of current languages in Iran<sup>1</sup> which presents all types of reduplication in the languages and the dialects of Iran with a detailed typology. The results demonstrate how a particular group of reduplicates which are available in various related or non-related languages possess various non-metaphoric meanings in themselves, but result in metaphoric meanings when reduplicated. A few examples among others include:

*Āb-~taš* > *~b-u-~taš*: “met. [highly] hazardous, risky, unsuitable [action/venture/situation]”.

*Āb-t~b* > *~b-u-t~b*: “met. alluding to [plenty] of joy, success; pomp, splendour”.

*}b-‘alaf* > *āb-u-‘alaf*: “met. agricultural products/ possessions”.

*}b-nān* > *āb-u-nān*: “met. edibles; resources, sustenance”.

*}b-gil* > *āb-u-gil*: “met. [much/ lot of] wealth, riches, belongings, possessions, properties; attainments; affluent, well-off”.

*}star-u-rūyi*: “met. said of [very] close friendships/ opinions”.

*}ft~bi-lagan*: “met. [plenty of / excessive] fuss, blandishment; much ado about nothing”.

*}ft~b-maht~b*: “met. [very] chaste, moral, righteous; naive”.

The paper will present an overview of conceptual metaphor in reduplication which verifies more clearly the cognitive aspect of perception in a number of related or unrelated languages for the first time.

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<sup>1</sup> Borbor, Dariush, Comparative Etymological Dictionary of Reduplication in the Languages and Dialects of Iran (Arabic, Armenian, Balochi, Brahui, Kurdish, Mandaic, Persian, Syriac, Turkish)

## **A Statistical Modeling Approach for Child Syntax Acquisition**

**Fatemeh Torabi Asr\*, Zohreh Azimifar, Afsaneh Fazly**

How a human perceives the world and acts upon it has often been a source of inspiration for technology as well as science and humanities. Particularly, researchers in many branches of Artificial Intelligence (AI) have aimed at building computational systems that mimic human behavior in their actions. Child language acquisition as an interesting phenomenon has attracted a wide range of studies from various viewpoints and to some extent even from controversial opinions during recent years. Infants are sensitive to what they hear from the very early days of life. They learn words and the associated meaning step by step, even in the absence of special attention of their parents. It has been observed in some practical studies that children can learn many aspects of grammar in their first language (e.g. semantic relationships and even some parts of syntax) long before attending school. The main theme of this work is to review recently proposed statistical models for learning syntax. A novel approach based on Bayesian framework is also presented to model child syntax acquisition by taking into account the mother--child ordinary conversations. Bayesian modeling has recently gained much attention in many fields of AI such as Natural Language Processing, for its different statistical principles from those offered by traditional methods.

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## **A Comparative Study of WordNets: A Proposal for Persian Lexical Network Structure**

**Somayeh Bagherbeigi\*, Mehrnoush Shamsfard**

WordNet is a general name for calling different lexical networks of languages all around the world. Generally, these networks serve as lexical ontologies or computational semantic lexicons in intelligent knowledge based systems. Princeton WordNet (PWN) was the first WordNet, developed by George Miller and his colleagues (1986) in Princeton University based on the mental lexicon in the scope of psycholinguistic research activities. PWN is a set of over 100,000 concepts interconnected by semantic relations to form a semantic network. A concept denotes an abstract set of members, grouped based on their common properties. In recent years various WordNets have been designed for many languages and mapped into English WordNet. Among the others, one can mention EuroWordNet, Balkanet, ArabicWordnet and other networks for Indian, Swedish, Danish and African languages. Each of these new networks has been developed considering the structure and features of their own language. In this paper we have done a comparative review on Princeton WordNet, EuroWordNet and BalkaNet. In this review we study and compare their aims, methodologies and structure design. Then, we will propose a framework for developing Persian WordNet according to the studied properties and Persian language features.

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## **A Study of Persian Proverbs Based on Image Schemas in Cognitive Semantics Theory**

**Simin Aryanfar\*, Arsalan Golfam, Shahin Nematzadeh**

The purpose of this study is to analyze a number of Persian proverbs in order to show the function of image schemas in relation to the human body. Cognitive linguistics attempts to describe and account for language systematicity, and its structure and functions. This article attempts to study the mechanisms of human understanding of some of his/her body organs as objective phenomena and discovering how these embodied experiences give rise to concepts in the abstract domain. A number of metaphoric Persian proverbs, which consist of some body organs such as hand, head, etc., are studied based on cognitive semantic theory and image schemas proposed by Evans & Green (2005) as well as others. 308 image schemas are derived and the results are studied by inductive reasoning and demonstrated in tables, pictures and diagrams. This article reviews the literature on cognitive semantics, image schemas and proverbs. It introduces the principles proposed by Evans & Green, Lakoff, Johnson, Gibbs, and others. Conclusions and findings are as follows: 1. The proverbs are used and comprehended on the basis of bodily and concrete experiences. 2. Physical experiences in source domain, build the grounds for understanding abstract and metaphorical expressions such as proverbs in target domain. 3. There is a direct relationship between frequency of image schemas and the use of body organs in daily activities. 4. We cannot draw distinct boundaries between schemas. 5. Image schemas are inherently meaningful. 6. Image schemas have a significant role in the economic function of mind (the principle of minimal effort) and creating projected mental patterns. 7. Image schemas need to be studied in basic and general categories. Therefore, some new general image schemas are introduced by researchers as: object and non- object schemas, animate and non-animate schemas, opposition schemas, etc. In general, it could be claimed that we comprehend the metaphoric Persian proverbs on the basis of image schemas and by conceptual projection that allows us to understand abstract concepts in terms of concrete experiences.

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## **The Interaction of Cognitive Nonlinguistic Abilities and Syntactic Understanding in Aphasic Patient**

**Hayat Ameri\* , Arsalan Golfam**

One of the most important issues discussed in Neurolinguistics is the modularity of language. Is there any language-specific faculty in the brain which is responsible only for language processing, as it is claimed by the Generative linguist Chomsky? Chomsky believes that cognitive structures are systems of rules and representations that can be considered as mental organs serving as devices for different capabilities (Chomsky, 1980). Chomsky argues that the human mind has modular structure, with different structures for different cognitive capabilities. According to him, each structure has its own functions, characteristics and principles. On the other hand, is it possible to consider parts of the brain as processors of both linguistic and some cognitive non-linguistic abilities? In the latter case some general capabilities and a number of common neural processes should be present in the brain to account for these capabilities. We can predict that learning may be transferred between non-linguistic and linguistic domains via this common neural basis. To test this hypothesis and to compare these two viewpoints about modularity, we studied the effects of non-linguistic cognitive sequencing training on the syntactic comprehension of 10 agrammatic Broca aphasic Persian- speaking patients. Syntactic comprehension was assessed using Caplan et al's Test for syntactic comprehension in aphasia (1985). Syntactic comprehension was quantified before and after 10 sessions of training on a non-linguistic cognitive sequencing task. This task was based on a transformational rule, corresponding to the transformation required for understanding some kinds of syntactic structures in Persian language that have a non-canonical word order. After the training period we observed a significant improvement in the patients' comprehension of these non-canonical sentences, but not for the canonical sentences which hold the default word order of Persian language and were included in the syntactic assessment test. We also observed a significant improvement in the cognitive sequencing processing of the subjects. These results strongly suggest that there are some common neural bases in the brain for processing linguistic abilities and some non-linguistic cognitive skills, and that training can be transferred from non-linguistic domains to linguistic ones. Therefore, the modularity of language is questioned according to this research.

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## **Animal Metaphors in Cognitive Linguistics**

**Mehri Rouhi\***

The phenomenon of animal metaphor can be discussed based on the class-inclusion model in cognitive linguistics. In this article we try to prove that this kind of metaphor accords more with the mentioned model than with the correspondence model of Lakoff. This does not mean that the correspondence model is not valid in this regard. However, we argue that depending on the nature of this kind of metaphor, class-inclusion model can explain some of its characteristics better than the other model. The correspondence model assumes that metaphors are essentially analogical in character. Also, it suggests that mappings are one to one and structurally consistent. The invariance principle of this model states that metaphorical mappings preserve the cognitive topology (i.e. the image schema structure) of the source domain, in a way consistent with the inherent structure of the target domain. However, the class-inclusion model does not treat metaphors as analogies; rather the source is treated as a prototypical instantiation of a larger, newly-created super ordinate category, which is then seen as encompassing both source and target domains. This newly-created category uses a prototypical member as an exemplar. We try to compare these two models in explaining animal metaphors in Persian.

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## **Word Disambiguation, Letter Grouping Based Approach**

**Nastaran Dadashi\*, Abdolhosein Abbassian**

Semitic languages such as Farsi, Hebrew and Arabic force special challenges for developing effective natural language processing applications. This paper investigates letter grouping approach for morphological and phonological disambiguation in Farsi. A model suggested in this paper investigated the effect of letter ordering on predicting the correct vowel state. A lexicon of 858 words containing an ambiguous Farsi (CVC) syllable was trained and tested through an Artificial Neural Network. Support Vector Machine was applied as an alternative method for training the data set. The results suggest that the letter grouping can effectively increase the accuracy of word disambiguation system which leads to better linguistic information retrieval. Furthermore, support vector machine gave better results in a longer processing time.

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## **Impact of Writing Error Correction Strategies on Writing Improvement of Iranian L2 Learners of English**

**Mitra Mesgar\***

One of the determining factors in the area of teaching writing is error correction strategies. The purpose of this study is to evaluate existing error correction strategies and introduce the most suitable ones regarding students' needs. Learners received basic instruction on English grammar and writing skills. These learners were classified into two groups, each consisted of 17 subjects. Writing composition task was used to measure learners' writing levels and the qualities of participants writing skills. The subjects attended writing classes, once a week, for fifteen weeks. They wrote one paragraph every week. In the next session, they handed in their papers for correction. The instructor used two techniques for error correction. The control group was following the approach of red-penciling of each single item and the teacher looked for grammar errors. For the experimental group, the teacher gave priority to fluency. Students express themselves without restricting forms of English. Minor errors that did not negatively affect comprehension were not corrected. The final writing test was conducted after treatment fulfillment. Subjects were provided with topics to write about. Each paper was scored two times by two different scorers. The control group showed a lack of knowledge in certain areas of language use. They did not use structures which might send them toward the application of erroneous forms. But the experimental group used various types of structures without being threatened by the correction strategies. Therefore, error correction strategies can function as a teaching device that plays a fundamental role in language teaching and learning. Red-penciling for global errors strategy has positive effects on the improvement of writing in learners.

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## **A Discourse Analysis Study of Persian-Speaking Alzheimer's Patients**

**Arghavan Golbaz\***

This paper examines the performance of Persian-speaking Alzheimer's patients, using five major tasks to evaluate the impairments of local and global coherence as well as cohesive ties in their discourse. The assessment was made based on five major tasks: spontaneous speech, two tasks of picture description and two tasks of story retelling. Fifteen subjects participated in the research: five Alzheimer's patients in the middle stage of disease and ten normal individuals as the control group. The two groups were matched according to the criteria of education, language and age. The results indicated that the performance of patients, as compared to that of the control group, was disturbed in all five tasks. The patients showed severe deficits in producing local coherence and global coherence and in utilizing cohesive ties. However, they appeared to be more deficient in global coherence than in the other two aspects, namely, local coherence and cohesive ties; and used only very simple and repetitive forms of cohesive ties. The comparison of the patients' performance across the production and comprehension tasks also revealed that their performance was most impaired on story retelling tasks, which could be attributed to their memory disruptions. Thus, consonant with the findings of the previous research, the results of this study confirmed that Alzheimer's patients experience considerable difficulties in processing language at the discourse level.

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## **Early Diagnosis Gerstmann's Syndrome**

**Nima Narimanzadeh\***

To present a case report of a 6.5-year-old preschooler child with no history of acquired neurological disorders or Mental Retardation. The subject exhibited the tetrad signs of Developmental Gerstmann's Syndrome (DGS) including: Finger agnosia, Right/left disorientation, Dyscalcula and Dysgraphia, which occurred along with some other subtle neurologic signs such as motor incoordination, clumsiness, etc. This study was carried out with the aim of emphasizing the importance of early identification of this neurodevelopmental disorder through conducting detailed assessment of preschooler children, specially those who are at risk for Learning Disabilities (LD). The child was initially admitted at the speech pathology clinic with the complaint of a mild articulation disorder. In the first session, all main features of DGS were observed. All 4 cardinal skills expected to be disordered in DGS were thoroughly assessed with the means of neuropsychological tests. Likewise, diverse aspects of cognition, behavior and language were evaluated. The results showed a selective and severe presence of the 4 signs of DGS. These disabilities were associated with a pronounced Constructional Apraxia and a marked Visual-Spatial Deficit as well as a significant Dressing Apraxia. EEG revealed subtle dysfunction of both right and left parietal lobes. However, language was found to be normal both receptively and expressively, with the exception of few partial difficulties. The results indicate that the diagnosis of DGS can be an early indication of learning disorders in children before entering school. Considering the cognitive disabilities and their key role in mastering skills and future educational success, and regarding the fact that most of these children cannot overcome their problems on their own, the importance of early prognosis and intervention is evident.

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## **The Study of Production of Simple and Compound Nouns in Persian Aphasic Patients**

**Mousa Ghonchepour\*, Shahla Raghibdoust**

This case study investigates and describes some morphological disorders of Persian aphasic patients in the production of simple and compound nouns to add to the richness of findings about the three sides of the brain, language and mind triangle. The production of simple and compound nouns is studied through neuropsychological methods in two Broca and one Transcortical motor aphasic patients via confrontation naming and repetition tasks. The analysis of subjects' linguistic data indicates that the aphasic patients made fewer errors in producing simple nouns as compared to compound ones. The subjects also gave poorer performance on confrontation naming than on repetition task. The evidence showed that in repetition, the brain-damaged subjects usually processed compound nouns based on the decomposition route; while in naming, the processing of these elements took place according to both the holistic and decomposition strategies. Although the aphasic patients were not able to properly retrieve the phonological form of simple and compound nouns in production and repetition tasks, they retained the grammatical knowledge and their morphological structure. This important evidence confirmed the dissociation and modularity of different aspects (phonology, morphology, syntax and semantics) of linguistic competence.

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## **Formal Schema in Persian Short Stories**

**Abdolvahed Zarifi\***

From the discourse point of view, different types of texts are linguistically distinguished by the formal schema in which information components are organized. Formal schema is the higher order structure containing knowledge of rhetorical structures including knowledge of general properties of text types and differences in genre (Carrel and Eisterhold, 1988). It is frequently maintained that rhetorical organizations are culture specific. Different models of story schema, along with some investigations on how these models work, have been sketched out by Rumelhart(1975),Thorndyke(1977), Mandler & Johnson(1977), Mandler(1978),Glen (1978) and Hatch(1992). It is interesting to point out that inadequate data were used in the development of these models. Unfortunately, no such studies have been carried out on the schematic structure of Persian short stories. Ten Persian short stories were randomly selected from among the published works of famous Iranian short story writers. The stories were then analyzed in terms of the short story model of formal schema proposed by Hatch (1992). Findings revealed that Persian short stories enjoy some elements not anticipated by Hatch.

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## **A Survey of the Lexical Access in Persian Mental Lexicon**

**Arezoo Najafian\*, Mostafa Asi**

This paper investigated the lexical access of Persian derived words for answering to the following questions: What is the basic unit upon which the Persian mental lexicon is organized? Is it morpheme or word? What is the role of frequency of words on accessing them? Two masked priming tasks were carried out (using DMDX software) on 122(62males and 60 females) Farsi monolingual Tarbiat Modares University students. In these two tasks (lexical access of prefixed and suffixed words) we investigated a given target in 4 conditions: with a morphological (بيمناک- بيم), semantic (ترس- بيم), and orthographic related prime (بیمار- بيم) and with an unrelated prime as control condition (شخم- بيم). The frequency of all of prime-target pairs in the 2 experiments were divided to 4 levels: low, medium, high and very high. Data analysis did not show any significant differences between reaction time and error rate in the 4 conditions of the 2 experiments. There was a significant difference between frequency of targets and reaction time and error rate ( $F_1=3.497$ ,  $F_2=6.695$ ,  $p<0.05$ ). However, there was no significant relationship between frequency of prime and the 2 variables. According to the results, we can say that processing of Persian derived words is word-based, that is, the Persian complex (derived) words are retrieved as simple words and there is no decomposition. The frequency of the target is a very effective factor in lexical access.

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## **Influence of Intracerebral administration of Muscarinic Agents in Dorsal Hippocampus (CA1) on Cannabinoid State-dependent Memory in the Step-down Passive Avoidance Test**

**Morteza Piri\*, Mohammad Nasehi, Mohammad Reza Zarrindast**

In the present study, effects of muscarinic agents on WIN55, 212-2 induced state-dependent memory of passive avoidance task were examined in mice. One-trial step-down paradigm was used for the assessment of memory retention in adult male NMRI mice. Post-training intra-CA1 administration of cannabinoid receptor agonist, WIN55, 212-2 (0.5 and 1  $\mu\text{g}/\text{mouse}$ ) and CB1 receptor antagonist, AM251 (50  $\text{ng}/\text{mouse}$ ) decreased memory retrieval. The memory impairment by WIN55, 212-2 (1  $\mu\text{g}/\text{mouse}$ ) was completely reversed by pre-test administration of the same dose of the drug (1  $\mu\text{g}/\text{mouse}$ , intra-CA1), suggesting WIN55, 212-2 state-dependent memory. Administration of scopolamine (1 and 4  $\mu\text{g}/\text{mouse}$ ) but not physostigmine (0.25, 1, and 4  $\mu\text{g}/\text{mouse}$ ) intra-CA1, 5 min before test by itself decreased the memory retrieval. On the other hand, in the animals in which retrieval was impaired due to WIN55, 212-2 (1  $\mu\text{g}/\text{mouse}$ ) post-training administration, pre-test administration of physostigmine (1 and 4  $\mu\text{g}/\text{mouse}$ ) and scopolamine (4  $\mu\text{g}/\text{mouse}$ ) intra-CA1 24 hr after training restored memory retrieval. Furthermore, animals under the influence of post-training administration of WIN55, 212-2 (1  $\mu\text{g}/\text{mouse}$ ), pre-test co-administration of non-effective doses of WIN55, 212-2 (0.25  $\mu\text{g}/\text{mouse}$ ) and scopolamine (0.25 and 1  $\mu\text{g}/\text{mouse}$ ), increased the restoration of memory by the WIN55, 212-2. These findings may implicate the involvement of muscarinic receptors in state-dependent memory induced by intra-CA1 administration of the WIN55, 212-2.

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## **Effects of Cannabinoidergic Drugs of the Dorsal Hippocampus in Nicotine Sensitized Rats on Memory Formation**

**Morteza Piri\*, Mohammad Reza Zarrindast, Shahrbanoo Oryan,  
Mousa Sahebgharani**

In the present study, the effect of intra-dorsal hippocampal (intra-CA1) injection of cannabinoid receptor agents on memory formation was investigated in 5-day nicotine-treated rats. Passive avoidance task of memory was used to examine the retrieval of memory formation 24 h after training. Subcutaneous (S.C.) nicotine was injected daily for five days, followed by 10 nicotine-free days before training. Post-training intra-CA1 administration of cannabinoid receptor agonist, WIN55, 212-2 (0.25, 0.5  $\mu$ g/rat) and CB1 receptor antagonist, AM251 (25, 50 ng/rat, intra-CA1) decreased memory retrieval. Administration of AM251 (25, 50, and 100 ng/rat, intra-CA1), 2 min before injection of the effective dose of WIN55, 212-2 (0.25  $\mu$ g/rat) could not alter the response induced by WIN55, 212-2. Repeated administration of different doses of nicotine (0.2, 0.4, and 0.5 mg/kg) for 5-days had no effect on memory retrieval. However, repeated administration of different doses of nicotine (0.2, 0.4 and 0.5 mg/kg) for 5-days reversed amnesia induced by WIN55, 212-2 or AM251. The results suggest that WIN55, 212-2 and AM251 have influence on memory formation, and subchronic nicotine pre-treatment may restore memory through a possible cholinergic receptor sensitization.

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## **Effect of Cannabinoidergic Drugs in the Dorsal Hippocampus of Physostigmine Sensitized Rats on Memory Formation**

**Morteza Piri\*, Mohammad Reza Zarrindast, Shahrbanoo Oryan,  
Mousa Sahebgharani**

Cognitive sciences and technologies as one of the components of convergent sciences and technologies (NBIC) is going to change the destiny of human being. Education is certainly and immediately one of those areas influenced by this interdisciplinary branch of sciences. This is specially true for teaching-learning processes, not only because of a better understanding of functions of mind and brain; emanating from findings of cognitive sciences, but also their pivotal role in using our brain more effectively. Today, innovation in and improvement of education is at high stick in developed countries. Based on the findings of cognitive sciences, education practitioners and scholars are trying to define new goals and objectives for education and to offer new strategies for its implementation. Information technology too, has rushed to the help of education and provided the teachers and educators with magnificent possibilities. Examination of these developments is promising and can make educational scholars and administrators familiar with an extensive array of new information. In my speech, I will try to touch upon fundamentals of cognitive approach to education from the perspectives of cognitive neuroscience, cognitive psychology, cognitive linguistics, philosophy of mind and artificial intelligence, and also to explain how cognitive sciences is able to make important transformations in education.

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**The effects of intra-dorsal hippocampus (intra-CA1) injection of cannabinoid receptor agents on memory formation have been investigated in 3-days apomorphine-treated rats**

**Mohammad Nasehi \***

In the present study, the effects of intra-dorsal hippocampus (intra-CA1) injection of cannabinoid receptor agents on memory formation have been investigated in 3-day apomorphine-treated rats. Passive avoidance task of memory was used to examine retrieval of memory formation 24 h after training. Apomorphine was injected subcutaneously (S.C.), once daily for 3-days followed by 5 apomorphine-free days before training. Post-training intra-CA1 infusions of the non selective CB1-CB2 receptor agonist, WIN55, 212-2 (0.1, 0.25, and 0.5  $\mu\text{g}/\text{rat}$ ), shortened the step-through latency, suggesting impaired memory formation in a dose-dependent manner, whereas post-training intra-CA1 micro-injections of the selective CB1 receptor antagonist, AM251 (25, 50, and 100  $\text{ng}/\text{rat}$ ) did not affect memory formation. Intra-CA1 infusions of AM251 and WIN55, 212-2, two minutes apart, did not modify the WIN55, 212-2-induced reduction of step-through latency. However, the deleterious effect of WIN55, 212-2 (0.25  $\mu\text{g}/\text{rat}$ ) was completely abolished in rats previously given apomorphine (0.5 and 1  $\text{mg}/\text{kg}/\text{day}$ , S.C.) for 3 days. This reversal of WIN55, 212-2-induced amnesic-like effect, was counteracted by the dopamine D2 receptor antagonist, sulpiride (0.25, 0.5, and 1  $\text{mg}/\text{kg}/\text{day}\times 3\text{-days}$ , S.C.), administered 30 min before each injection of apomorphine (0.5  $\text{mg}/\text{kg}/\text{day}\times 3\text{-days}$ , S.C.). The D1 receptor antagonist, SCH 23390 (0.01, 0.02, 0.07 and 0.1  $\text{mg}/\text{kg}/\text{day}\times 3\text{-days}$ , S.C.), was ineffective in this respect. The results suggest that subchronic apomorphine treatment may induce dopamine D2 receptor sensitization, which in turn reverses amnesia induced by WIN55, 212-2.

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## **A New Cognitive and Neurological Approach to Reconcile the Paradox between Neuropsychological and Previous Neuroimaging Data in Analyzing Aphasia and Amusia**

**Houshang Besati\***

One of the issues discussed in cognitive theories is the extent of the automatic operation of the language faculty and its independence from other cognitive processes. Many neuroscience researchers maintain that our linguistic operations are connected to other cognitive processes within the brain. In line with their claim, there are some substantial neuroimaging data which suggest an overlap in the processing of some aspects of language and music, whereas this is in sharp contrast with the viewpoint taken by neuropsychologists who claim there are two different processing domains for language and music. The present article aims at investigating the dependence or independence in the processing, representation, and presence of any neural relation between aspects of music and language, particularly syntax. For this reason, through posing relative questions and providing systematic answers, I will not only highlight the paradox emerged from previous analyses, but also, relying on new neuroimaging data and cognitive theories, suggest a particular converging point in language and music processing and the way they are neurologically related. I have further demonstrated, assuming a conceptual difference between syntactic processing and representation, that the syntax of language and music share common sets of processes, although they do not overlap on their representational level. I conclude that there are some particular neural connectional networks within the cortices of language and music, and that at least some language and music processing operations are located in cortical areas different from those specialized for syntactic representation.

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## **The Preliminary Study of Long-lasting Effects of Transcranial Magnetic Stimulation with High Frequency (20HZ) in Medication-resistant Major Depression: A Follow-up Study**

**Sanaz Khomami\*, Reza Rostami, Reza Kazemi**

Repetitive transcranial magnetic stimulation (rTMS) is a novel, safe and non invasive therapeutic tool for neuropsychiatric disorders such as depression. Studies have found an antidepressant effect when high frequency stimulation is applied over left dorsolateral prefrontal cortex (DLPFC). But the information to determine long-term outcomes of treatment is not yet sufficient. Thus, the aim of this study was to investigate the long term effects of 1 month high frequency rTMS on the left frontal cortex at 1.5 month follow-up. Fifteen medication-resistant patients with major depression were treated with daily sessions of rTMS(20Hz,90% MT) over the left dorsolateral prefrontal cortex. Each patient underwent two appraisals with Hamilton Rating Scale for depression in the second and first weeks before rTMS treatment, and two appraisals 1 and 1.5 month after rTMS treatment. After the second week of treatment, compared to baseline, the percentage of improvement was (<39% HDRS) reduction and in the end of treatment the improvement was (<69.7% HDRS) reduction. Although there was a reduction in improvement, the antidepressants' effect (53.2% HDRS), HF-rTMS (20 Hz) lasted about 45 days after treatment. In sum, the left prefrontal HF-rTMS was effectively associated with antidepressant treatment and these effects lasted about 45 days. Nevertheless, more controlled studies will be necessary to specify the long lasting effects of rTMS.

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## **Evaluation of the Sesame Oil Effects in Avoidance Memory of Young Diabetic Rats**

**Shabnam Hassanizadeh\*, Seyed Reza Fatemi Tabatabaei,  
Ahmad Ali Moazedi, Ahmad Ali Papahn**

This study was performed to evaluate the effects of diabetes on passive avoidance memory and comparison of the effects of sesame oil on passive avoidance memory of normal and diabetic rats. 60 one-month male rats were divided to non-diabetic and diabetic groups. Diabetes was induced by two IP injections of streptozotocin with one week interval. One week later, each group was divided randomly to three subgroups: control, 4 weeks (4W) and 6 weeks (6W). 10% sesame oil was added to the diet of the 6W subgroup for 6 weeks. Two weeks later, the same diet was administered to the 4W subgroup and was continued for 4 weeks. The diet of the control group was not supplemented with any sesame oil. Finally, all the groups were tested by step down. In non-diabetic subgroups, consumption of sesame oil for 6 weeks increased short-term memory (10 min after training) ( $P < 0.05$ ), whereas in diabetic subgroups, 4 and 6 weeks sesame oil consumption increased long-term memory (72h after training). Sesame oil increases avoidance memory in young male rats but its effects on short and long term memory is different in non-diabetic and diabetic rats.

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## **Early Visual Processing Deficit in Children with ADHD: An Event-Related Potential Study**

**Mohammad Ali Nazari\*, Patrick Berquin, Pascal Missonnier, Ardalan Aarabi, Damien Debatisse, Alain De Broca, Fabrice Wallois**

Recent studies described several changes of late frontal event-related potential (ERPs) components related to voluntary attention during the Go/No-go paradigm in children with attention-deficit/hyperactivity disorder (ADHD). We aimed to determine whether the EEG parameters of encoding visual incoming information are also modulated by attentional childhood disorders. Early posterior visual component, the P1, was investigated during performance of an equiprobable Go/No-go task in a cued continuous performance test (CPT-AX) paradigm. High resolution EEG (64 electrodes) data were recorded from 15 children meeting DSM-IV criteria for ADHD, as well as 15 age-matched children in the control group during CPT-AX task. The P1 component was measured with Go and No-go stimuli in this task. ANOVA was used to compare ERP amplitudes and latencies between groups and conditions. At the behavioral level, low Go correct response and high omission error were observed in children with ADHD. These children displayed lower P1-No-go amplitude and delayed P1 latency compared to healthy controls. In addition, the P1 latency was delayed for No-go compared to Go condition. Results suggest an early deficit in visual sensory integration within the occipital cortex in ADHD children. In the visual modality, these children might have difficulty in the earliest stages of information processing notably in inhibition.

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## **Investigation of the Effects of Persian Classical Music Forms on Brain waves by QEEG**

**Farzaneh Pouladi\*, Reza Rostami, Masood Nosratadadi**

Considering the ability of music to induce an emotional response and its significant role in therapeutic fields, this study aims to report the neurological effects of different forms of Persian classical music on brain waves. The statistical population of this study was 22-30 year old masters students at Tehran University. Fifteen subjects were assigned and selected voluntarily after the primary assessment of their general health. The independent variable of the present study consisted of the four forms of classical music: "Pishdaramad", "Chaharmezrab", "Reng" and "Avaz"<sup>1</sup>. The dependent variable was brain waves. Different forms of classical music, lead to different intensities of asymmetric activation between the two hemispheres. The intensity of activation was significantly greater in the right hemisphere where the subjects were presented with Avaz and Pishdaramad. On the other hand, greater left hemisphere activation was found when the subjects were presented with Reng and Chaharmezrab. Also, alpha brain wave (8-12 HZ) was less activated in the occipital lobe when Reng and Chaharmezrab were presented. The results of this study show that when a change is imposed on the rhythm and tempo, a change in the brain wave activity may result. Also, different combinations of the rhythm and the tempo can induce specific emotions of happiness and sadness. The representations of these emotions could be viewed in the brain hemispheres; for example since "Avaz" has no weight and is a free rhythm; it activates the left hemisphere which is related to negative emotions. On the other hand, since "Reng" has an upbeat rhythm, it activates the right hemisphere which is related to positive emotions. The results of the present study could be applicable in the treatment of psychological disorders.

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<sup>1</sup> Since there were no translations for the aforesaid terms, they had been transliterated into English.

## **Assessment of Aqueous Extract of Cichorium Intybus on Anxiety in Mice**

**Abbas Ali Taherian\* , Abbas Ali Vafaei, Ali Rashidy-pour ,  
Saeed Rashidan**

Anxiety is one of the most common psychotic disorders. Medications used for the treatment of this disorder have shown many side effects. Therefore, it is necessary to search for new drugs with fewer side effects. Cichorium Intybus (CI) is a medicinal plant that has many beneficial effects including some anti anxiety effects. The possible effects of hydro-alcoholic extract of CI on anxiety reaction in mice were investigated in this study. In this experimental study, 60 male albino mice (25-30 g) were used. The animals were first randomly divided into five groups. The treatment groups received different doses of CI extract (250, 500, and 1000 mg/kg, ip), the control group received vehicle of CI extract and the sham group received only an injection. Following CI extract injection (25 min) animals were put inside the black wall box for 5 minutes for increasing motion activity. Then, animals were transferred to the plus maze for evaluation of anxiety reaction, including the number of entrances and time spent in the open arm. These factors were monitored and recorded for 5 minutes. Our findings indicated that the extract of CI (250 and 500 mg/kg) significantly reduced anxiety reaction in treated mice and they spent more time than the control groups in the open arm ( $P < 0.01$ ). But the dose of 1000 mg/kg of CI did not have significant effects. The above findings showed that CI extracts can have modulatory effects on anxiety reaction in mice.

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## **Examination the Role of NMDA Receptors and Calcium Channels in Glucocorticoid-induced Enhancement of Memory Consolidation in Mice**

**Maryam Abotalebi\* , Ali Rashidy-Pour, Abbas Ali Vafaei**

Many lines of evidence indicate that glucocorticoids enhance memory consolidation; however, the underlying mechanisms are not clear. The aim of this study was to determine the role of NMDA receptors and Calcium channels in glucocorticoid-induced enhancement of memory consolidation in mice. Experiments were performed on 140 male albino mice (about 30 g). The animals were trained in an inhibitory avoidance task (0.5 mA shock for 3 seconds). In Experiment 1, dose - response effects of corticosterone were determined. Immediately after training, the animals received different doses of corticosterone (0.3, 1, or 3 mg/kg). Testing after 48h revealed that corticosterone at the dose of 0.3 mg/kg, significantly improved memory consolidation. In Experiments 2 and 3, effects of corticosterone were examined in the presence or absence of verapamil, a calcium channel blocker (2.5, 5, or 20 mg/kg), or MK-801, an antagonist of NMDA receptor (0.1 mg/kg). Results indicated that both drugs blocked corticosterone-induced enhancement of memory consolidation. The above findings show that memory enhancing effects of corticosterone, at least in part, are mediated via calcium channels and NMDA receptors.

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## **Thalamic Deep Brain Stimulation (DBS): It's Effect on Cognition, Language and Ear Advantage**

**Zahra Sadat Ghoreishi\*, Reza Nilipour, Sohrab Shahzadi**

Thalamic Deep Brain Stimulation (DBS) is reported as a successful treatment procedure in Parkinson's patients with motor symptoms resistant to medication. Despite evidence of cortico-subcortico-cortical circuit involvement in motor control, the role of this neural circuitry on cognitive functions is still controversial. This paper investigates the effect of thalamus-DBS on mental status, language processing and ear advantage in patients with Parkinson's disease. In this project as a case series research, we measured mental status, language performance and ear advantage in six Parkinson's patients who had underwent implantation of deep brain stimulating electrode in ventrointermediate thalamic nucleus. The data were collected in two "on" (electrode stimulation of the thalamus) and "off" (no stimulation) positions, with at least 40 days time interval in between. The patients were assessed using MMSE, Dichotic listening task, verbal fluency and grammar comprehension. The findings of this research suggest an improvement of Right Ear Advantage (REA), grammar comprehension and a decline in verbal fluency in "on" position versus "off" position, in both groups. The MMSE scores were at normal levels in both positions. The results indicate that thalamic DBS, improved auditory comprehension (because of increase in REA & grammar comprehension). However, a decrease in verbal fluency was observed. The results confirmed contemporary theories of thalamic participation on language processing. The results of MMSE showed the cognitive safety of DBS operation.

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## **A Survey on Memory Function Decline after Using Ecstasy**

**Batoul Akhavirad\***

Neuroanatomy studies the relations between neural systems in relation to behaviors such as thought, emotion, and memory. For example, it indicates a close relationship between several brain structures of limbic system and memory, feelings and behavioral motivations. Therefore, behavior is shaped through the chemical changes of neural systems that are the results of external and internal chemical stimulants. Stimulant drugs cause chemical changes in the brain; and psychoactive drugs are chemical compounds that interrupt cognitive, emotional and motor processes. Ecstasy is a psychoactive drug which was first produced as a drug used for weight control in cases of obesity. However, its detrimental effects on the nervous system was later revealed, and is currently considered to be an addictive drug, due to the fact that it brings about chemical dependency, substance abuse, and physiological dependency. Recently, the prevalence of the abuse of this drug has risen in Iran, and therefore a need for conducting research in this area seems necessary. This survey was carried out on a sample of 100 students. The students were chosen from 3<sup>rd</sup> grade of high schools from 20 educational districts in Tehran. The students' educational achievement reports were examined before and after the drug use. The results indicate that the subjects who had used the drug suffered from some problems in learning. They had problems in learning and remembering the learned materials in class. They demonstrated a decline in short-term memory, inhibition in serotonin reuptake, and a reduction of dopamine.

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## **Evaluation of the Role of Glucocorticoid Receptors on Spatial Memory Reconsolidation in Rats**

**Abas Ali Vafaei\*, Saeed Nikzad, Ali Rashidy-Pour**

Previous studies indicated that glucocorticoid receptors have modulatory effects on memory processes. The aim of this study was to determine the effect of Corticosterone as a glucocorticoid on re-consolidation memory in a water maze (WM). 60 young rats (250-300 g) were trained in a WM task with six trials per day for six consecutive days. Retention and retrieval of the spatial training was assessed 48 hours after the last training session with a 60-s probe trial. Corticosterone (0.5, 1, and 3 mg/kg) was injected immediately subsequent to retention testing. Evaluation of memory reconsolidation was done by two criteria including the percentage of time that the animal spent in target zone and the latency time that the animal spent for finding the platform for the first time. Also, these criteria were evaluated 24 hours, 72 hours, and 1 week subsequent to the retention test to determine the amount of reconsolidation of spatial memory. The results indicated that Corticosterone significantly impairs the re-consolidation of memory in a dose dependent manner ( $P < 0.01$ ). These findings provide evidence for the view that glucocorticoid receptors have an important role in the reconsolidation of long term spatial memory.

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## **Evaluating the Role of the Cholinergic System in Glucocorticoid-Induced Enhancement of Memory Consolidation in Mice**

**Abas Ali Vafaei\*, Somayeh Amiri, Ali Rashidy-Pour, Abas Ali Taherian**

Many evidences indicate that glucocorticoids enhance memory consolidation; however, the underlying mechanisms are not clear. The aim of this study was to determine the role of the cholinergic system in glucocorticoid-induced enhancement of memory consolidation in mice. Experiments were performed on 100 male albino mice (mean weight 30 grams). The animals were trained in an inhibitory avoidance task (0.5 mA shock for 3 seconds). In Experiment 1, effects of Corticosterone were determined. Immediately after training, the animals received Corticosterone (0.3 mg/kg as best doses). A test performed 48h later, revealed that Corticosterone had significantly improved memory consolidation. In Experiments 2 and 3, the effects of Corticosterone were examined in the presence of Atropine (as an antagonist of muscarinic cholinergic receptors in doses of 0.5 and 2 mg/kg) or Mecamylamin (as an antagonist of nicotinic receptors in doses of 0.5 and 2 mg/kg). Results indicated that Atropine, but not Mecamylamin blocked Corticosterone-induced enhancement of memory consolidation. The findings above indicate that memory enhancing effects of Corticosterone, at least in part; are mediated via Acetylcholine muscarinic receptors of the cholinergic system.

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## **Learner Style Modeling Implemented in an Intelligent Tutoring System using Item-Response theory**

**Mohammad Tahmasebi\*, Shahnaz Sehati, Mahboobeh Mirjalili**

Computer Aided Instruction systems present course wares to a learner without considering his or her characteristic, interests, preferences and previous background of the domain knowledge, but regarding to a main theory in pedagogical science that states different learners have different learning styles, intelligent tutoring systems support individualized teaching by interactively adapting their behavior to the needs of the user and building representation of the student's current understanding. In this paper a computer based intelligent tutoring system is presented. A prototype of system is implemented that models learner style based on Myers-Briggs and Felder-Silverman theories and Bayesian Network as a formal framework of uncertainty. The system can help the user navigate through subjects and recommended learning goals.

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## **The Creativity Engine**

**Shahriar Pourazin\***

Creativity is one of the powers of human beings that remains intriguing. As “vision” and a few other sub-topics of early ages of AI, it might be considered to be part of the formulated and engineered fields of “no-longer-AI.” This paper is an effort to sketch the very fundamental requirements of a system which can act creative. The idea emerges out of the impression that those with a good ability to keep facts in mind have less creative behavior. Those who forget things more should somehow re-create the lost methods, procedures and facts through their creativity. This paper by no means tries to prove the above mentioned statement. Rather, it emphasizes on representing a similar system which has the ability to replace its methods, procedures and facts. People place a forgotten piece of knowledge back into the memory. The system presented here has the ability to keep the alternatives for a knowledge element. It should select a preferred element by a meta-level process. Also, although the model seems too simple to be creative in the first glance, it can simulate forgetting and creatively remembering. The examples in the paper show that importing some pieces of knowledge from the outside world may lead the system toward new creative achievements. The paradigm seems important not because it treats creativity as a unique magical macro operation, but because it shows creativity as a floating operation made up of micro replacements of alternatives for knowledge elements. This might be one of the multiple ways to automate creativity.

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## **On Feasibility of Common Language Development Among Intelligent Agents Using Evolvable Hardware Simulation with Inspiration from Origin of Language**

**Yasser Baleghi Damavandi\*, Karim Mohammadi**

Recently, using cognitive science has turned out to be a considerable solution for designing hardware systems. In this research the origin of emergence of self organized communication in hardware systems is simulated and analyzed with the inspiration of their natural correspondents; i.e. the origin of language among human beings. Many researchers believe that the origin of language is a consequence of the simultaneous evolution of anatomic vocal tracts and brain complexity, in which the last step in Homo Sapiens took place as a result of a mutation to increase brain complexity. Considering the above mentioned statement, it can be asked whether it is possible to have such a communication in human made agents. If the answer is yes, then what are the requirements of that communication? Undoubtedly the word communication here refers to an emergent self organized entity like the human language, not a predefined protocol that is now vastly available among many manmade hardware devices. Inspiring from cognitive science implies that for this communication, agents should be able to produce correct physical signals and be intelligent enough (at least artificially). In the performed simulations based on the above theories, 2 evolvable hardware agents successfully established a communication to co-evolve an adder. In a more complex situation, these agents were able to encode and decode images for transferring and retrieval applications. The success in this experiment can indicate the advantage of applying cognitive science in new engineering designs.

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## **An artificial Neural Network Model of Mapping from Grid Cells to Place Cells**

**Sareh Saeidi\***

Grid cells in the dorsocaudal region of medial entorhinal cortex, introduced by Hafting et al. in 2005, show a special activity pattern. These cells increase firing frequency at multiple regions in the environment, arranged in regular triangular grids. The firing pattern of each grid cell is characterized by three parameters: spacing (the distance between vertices of the grid), orientation (tilt to an external reference axis), and spatial phase (offset relative to a reference point). Some neurons in the hippocampus of rats have been found to have spatially localized activity. These "place cells" fire whenever the rat is within a certain location in the environment, called place field. These cells are thought to be the basis of memory for places. "Grid cells" in the medial entorhinal cortex which are one synapse upstream from the place cells, are known to be the principal cortical inputs to place cells of the hippocampus. In this paper, an artificial neural network model is proposed, which allows for the single confined place fields of hippocampal pyramidal cells to be emerged from activity of grid cells. Place fields could be formed considering a modest number (25) of grid cells with diverse orientation and spacing, which is consistent with physiological experiments. Results show that this model might be a good candidate for modeling such a complex mapping.

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## **Intelligence Air Defense using Autonomous Computing in Multi Agent System Environment**

**Touraj Bani Rostam\*, Mehdi Naghyan Fesharaki**

In this paper, we design an Intelligent Air Defense System using Autonomous Computing and heterogeneous agents. The proposal inspires of human body function and consists of three groups of agent and several interfaces to enable elements to interact. The system recognizes self elements from non-self ones considering function of leukocytes and partitions them to two different workspaces, self and non-self. To achieve this objective, cooperative systems and interacting among elements are utilized by the proposed algorithm in every autonomous element. Functions of all elements, autonomous managers and interactions between autonomous elements and cooperative managers are performed inspiring of function of the body organs and using the proposed patterns in Autonomous Computing and Elementary Loop Function (ELF) parameters. The whole system behavior would be considered intelligent due to using cognitive processes like perceiving world, analyzing status, current model, desired model and behavior generation.

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## **A Model of Human Decision Making Using Reinforcement Learning Theory**

**Rezvan Kianifar\*, Farzad Towhidkhah**

Decision making is an optimization process in which the decision maker should maximize desired outcomes. Humans engage in reinforcement learning process to adjust representations of competing decision options. The most important aspects of human decision making process are motivation, learning, prediction and adaptability. The majority of research in this area has focused on motivational components of decision making, while relatively little attention has been paid to the role of higher cognitive faculties, specially prediction and adaptation in decision-making behavior. In light of the above, we have proposed a model for human decision making by concentrating on the role of frontal brain regions including dorso-lateral prefrontal cortex, orbito-frontal cortex, and anterior cingulate cortex, which are responsible for prediction, action value estimation and adaptive action selection in a reward-based behavior. We have considered a reinforcement learning framework to represent the relations between these brain areas. This model can represent the four mentioned characteristics of decisions. The mentioned model has been implemented in a maze task to find the optimal path between two states. Simulation results reveal that considering prediction and adaptive action selection mechanisms, optimal path can be found in few trials while avoiding constraints considering a complete model.

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## **Characterizing the Brain Cognitive System as an Adaptive Complex System**

**Maryam Esmaeili\***

A relatively recent area of scientific inquiry is the exploration of the dynamics of complex systems. A defining characteristic of complex systems is their tendency to self-organize globally as a result of many local interactions. In other words, organization occurs without any central organizing structure or entity. Such self-organization has been observed in systems at scales from neurons to ecosystems. Neurocognitive networks are composed of neuronal populations that operate and interact according to dynamic principles. The prevalence of bidirectional connectivity between network populations suggests that a basic mechanism subserving neurocognitive network function is reentry at the level of cortical areas, whereby populations distributed throughout the cerebral cortex cooperatively process information using recurrent transmissions. The activity in a population is governed by the dynamics of its internal interactions and by the time-varying inputs that it receives from multiple other populations with which it is interconnected. Neurocognitive networks are composed of neuronal populations that operate and interact according to dynamic principles. In this paper we try to model the behavior of the cognitive system of brain as an adaptive complex system. We also analyze the functionality of cortex by the interaction between neurocognitive networks as active agents. The aim of this paper is characterizing the cortex of brain as an adaptive complex system.

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## **Do Human Beings use Gestalts when Predicting Obstacle Movements?**

**Bahareh Taghizadeh\*, Farzad Tohidkhalah,  
Mohammad Ali Ahmadi Pajouh, Mehdi Borjkhani**

While interacting with the environment, visual perception is a basis for human decision making. Owing to their incredible visual systems, human beings are able to detect obstacle displacements and predict their movement. Among different theories proposed for human perception, Gestalt Theory is one of the most powerful and most accepted ones. According to this theory, perception relies on combining local beliefs from low level primitives. The authors have designed a number of empirical experiments and asked subjects to predict oscillatory movements. Results brought out evidence implicating that the perception of movement may be based on a mechanism that relies on the Gestalt Theory viewpoint and its extension to temporal Gestalts. According to the evidence, prediction of object movement may rely on a behavioral model. A model is proposed to predict the movement of an obstacle with oscillatory motion from the new viewpoint introduced in the article.

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## **Determining Main Components of Cognitive Agents using Cognitive Theories and Architectures**

**Kamal Mirzaie\*, Mahdi Naghian Fesharaki**

Today, we have complex problems and systems which should be analyzed and designed by using different approaches. One of these new approaches is to take advantage of cognitive models and architectures which could overcome the complexity of these problems. In this paper, we will first review and explain cognitive theories such as Society of mind, Unified theory of cognition and Anderson theory. Then, the SOAR and ACT-R architectures will be discussed and explained. The SOAR is Newell's candidate for a Unified Theory of Cognition. It is a rule-based system that operates in a cyclic manner, with a production cycle and a decision cycle. It operates as follows: First, all productions that match the contents of declarative memory fire. A production that fires may alter the state of declarative memory and cause other productions to fire. This continues until no more productions fire. At this point, a decision cycle begins in which a single action from several possible actions is selected. The selection is based on stored action preferences. Thus, for each decision cycle there may be many production cycles. The ACT-R cognitive architecture is another approach to creating a unified theory of cognition. It focuses on the modular decomposition of cognition and offers a theory of how these modules are integrated to produce coherent cognition. The architecture comprises five specialized modules, each devoted to processing a different kind of information. Also, important components in cognitive architecture such as knowledge representation and decision making are illustrated. For knowledge representation, we will explain methods such as semantic net, Object Attribute Value triple, frame and OAR. The decision making models have been used in the multi-resolution reasoning structure. This means that we have simple decision making models such as OODA for reactive behavior, and complex decision making models such as CECA for deliberative behavior. We conclude with a summary of the main components and key architectural features that cognitive agents capable of developing mental capabilities should exhibit.

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## **Knowledge Stem Cells**

**Mehrnoush Shamsfard\***

In recent years there have been increasing efforts to create huge knowledge bases and real world knowledge based applications. Building and exploiting ontologies, large knowledge bases of concepts and relations, enables reusability and interoperability among machines. Creating, using, sharing and mapping ontologies are some major efforts to exploit human knowledge in intelligent systems. Construction of ontologies is a time and cost consuming process and suffers from knowledge acquisition bottleneck. Meanwhile, moving toward automatic ontology learning (OL) is a solution. Many OL systems use existing general ontologies to create new domain specific ones. They still carry the bottleneck of creating the general ontology with themselves. To get around this problem, in this paper I propose the concept of Knowledge Stem cells (KSC). These cells are essential knowledge elements, which a learning system should have to acquire knowledge automatically. KSCs are the foundation of learning flexible, dynamic ontologies from scratch, something similar to learning kernels that babies are born with. They contain the essential meta-knowledge for acquiring new knowledge and adding, moving, deleting and updating ontology elements (ontels). Finding the knowledge stem cells -just like the stem cells in biology- can help to create learning systems which can learn what they need from their environment upon a small kernel. It reduces the costs, increases the flexibility and eliminates the errors and bias from the human developer. In this paper after describing the concept of knowledge stem cells and their features, we will discuss their application in a case study.

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## **Learning Methods Used by AIS-based Spam Detectors**

**Sharareh Jahanshah\***

This article aims to introduce the latest methods for preventing the spread of spams. Also, the most effective methods in hand are offered to be utilized in identifying a spam. To distinguish a spam, many methods have been implemented for a long time, namely Neural Network, Genetic Algorithm, examining personal information of the user, and Trust Rank. However, one of the latest methods of distinguishing a spam is Artificial Immune System (AIS). In this method, which simulates the compatible immune system of human body and uses Self and Non-self concepts, the entire received messages are first examined, and then classified into two groups of self and non-self messages, with non-selves including spams. This is done on the basis of existing Gene Libraries and lymphocytes, as well as by taking advantage of Heuristic Libraries. In order to optimize this method and produce functional lymphocytes, methods such as Word Root Extraction Algorithm or Baye's Score can be adopted as well. Optimizing AIS method is possible through examining the production of lymphocytes and their antibodies, and by taking note of their related algorithms, learning and forgetting ability of lymphocytes, Random Combination Algorithm, weighing lymphocytes, and culling of antibodies. Similar to the biological immune system that has developed four defensive layers against pathogens, AIS utilizes a bulk of methods as well. In fact, AIS interacts with other layers to improve security condition, e.g. some systems use a blacklist, which is an underlying layer of AIS. AIS can be improved by expanding the idea of examining the genetic mutation of lymphocytes, and by utilizing compatible gene libraries and weighing gene libraries, as well as processing the images. In the present article, the available methods and their flaws have been reviewed, and a method based on processing the images is introduced to enable users overcome the possible shortcomings. Finally, it is worth mentioning that artificial immune system can be viewed as a two-level classifier; a fast and flexible method with a high security level in classifying emails (or messages in general). This is due to the fact that the method is based on comparing emails with the existing lymphocytes library, while applying instant changes in such libraries is possible. Nowadays, this method is known as the core of many anti-spam tools.

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## **Global versus Local Perspective on Schizophrenia**

**Sareh Zenderouh\*, Fatemeh Bakouie, Mansour Vafadoust,  
Shahryar Gharibzadeh**

Schizophrenia is a progressive disorder with multiple biochemical abnormalities. There are multiple susceptibility genes which act in conjunction with environmental factors. Candidate genes could influence neurodevelopment and neurotransmission. New findings show that epigenetic factors play a major role in the disease. Schizophrenia is a dynamical disease, i.e. important aspects of schizophrenia can be understood by the theory of nonlinear dynamical systems. Chaotic dynamical systems are characterized by lawful but delicate sensitivity to initial conditions. Small differences in the input can result in a different sequence of outputs. We believe that genes act as initial conditions, and environmental factors are the control parameters of the chaotic human brain system, which can force the system into specific states, e.g. schizophrenia. Since in chaotic systems, control parameters can direct the system to specific states, environmental factors play a key role in aggravation or decline of schizophrenia. This is in accordance with reports which show high relapse rate of schizophrenia in families with high emotional expressions. Based on our hypothesis, schizophrenia could be considered as a chaotic model and the global features of the disease could be extracted instead of local features. It is not a necessity to include the effects of each part of the brain circuits, and to correct any change in the amount of neurotransmitters; instead it is better to recognize the interaction of environmental factors with it. Modeling the behavior of schizophrenia patients by chaos theory may be a good beginning to control the disease.

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## **The Relationship between Behavioral Inhibition/ Activation Systems with Implicit and Explicit Memory Bias in Depressed Individuals**

**Reza Abdollahi Majareshin\***

The aim of the present research is to examine the relationship between behavioral inhibition/ activation systems and implicit memory bias in depressed people based on the Transfer Appropriate Processing (TAP) framework. For this purpose, 60 participants (30 outpatient depressed participants for the experimental group and 30 non-depressed participants for the control group) were selected as research sample based on psychiatry interviews in accordance with DSM-IV criteria and Composite International Diagnostic Interview (CIDI). In order to examine behavioral inhibition / activation systems BIS/ BA scale was used (Carver and White, 1994). For examining implicit memory bias, word dot counting task (perceptual encoding), generation task (conceptual encoding) and lexical decision task at two levels of conceptual and perceptual processing were used. For examining explicit memory bias, free recall task was used. Participants completed the tasks individually. The results showed that depressed participants in comparison with non-depressed participants show more implicit and explicit memory bias toward negative words at the level of conceptual processing. Participants with high scores in behavioral inhibition system in comparison with participants with high score in behavioral activation system show more implicit and explicit memory bias toward negative words at the conceptual processing level. Participants with high scores in behavioral activation system in comparison with participants with high scores in behavioral inhibition system show more implicit and explicit memory bias toward positive words at the level of conceptual level. Furthermore, these analyses showed that at the level of perceptual processing of depressed participants, participants with high scores in behavioral activation system and participants with high score in behavioral inhibition system in implicit memory showed no bias toward exciting words. At the level of perceptual processing at explicit memory, depressed participants in comparison with non-depressed participants in the control group had a better remembrance toward negative words. In addition,

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non-depressed participants in the control group had a better remembrance toward neutral words, but in participants with high scores in behavioral activation system and in participants with high scores in behavioral inhibition system no bias was observed. These findings showed that employing Mood-Congruency hypothesis, Trait-Congruency hypothesis and the transfer appropriate processing (TAP) altogether in implicit memory bias of depressed participants would lead to a better understanding of implicit memory in depressed people.

## **Designing and Constructing Tasks and Software for Perceptual and Conceptual Implicit Memory Bias Based on Transfer Appropriate Processing (TAP) Framework**

**Reza Abdollahi Majareshin\***

The aim of the present research was designing and constructing the tasks for studying perceptual and conceptual implicit memory bias based on Transfer Appropriate Processing (TAP) framework. First, the valence of the word stimuli (191 words) were selected for inclusion in the positive and negative word sets if they met designated criteria for ratings on dimensions of emotionality and imaginability. Then ratings for emotionality and imaginability were obtained by 125 psychology students based on a 7-point Likert scale. This research designed the tasks for using in two experiments. Experiment 1 was designed for measuring perceptual implicit memory and experiment 2 was designed for measuring conceptual implicit memory. In experiment 1, for measuring implicit memory, word dot counting task (perceptual encoding) and lexical decision task (perceptual retrieval) were used. In experiment 2, for measuring implicit memory, generation task (conceptual encoding) and lexical decision task (for conceptual retrieval) were used. The results showed that the words were significantly different considering positive and negative valence. There were no significant differences in imagery for stimuli in the positive and negative sets. It was also essential that the stimulus sets designated for use in the primed and unprimed word conditions be matched on emotionality and imaginability dimensions. Accordingly, independent samples t-tests computed on the primed and unprimed data sets for the positive and negative word sets indicated that there were no significant differences on any word dimension in these conditions. Finally, 112 words (28 positive words, 28 negative words, and 56 neutral words) were selected. Also, 4 tasks were constructed that consisted of word dot counting task, generation task and two lexical decision tasks. In sum, the results of this study showed that designed tasks are usable for implicit memory bias based on Transfer Appropriate processing (TAP).

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## **The Effect of Cognitive-Behavioral Training on Test Anxiety, Study Habit and Motivation Achievement in Female High School Students**

**Sahar Safarzadeh\*, M. Shahandeh**

The goal of the present research was to investigate the effect of cognitive-behavioral training on test anxiety, study habit and motivation achievement in female high school students who were supported by Imam Khomeini Committee in Ahwaz. The sample included 180 high school students, who were randomly chosen from among all those who were qualified. The subjects were assigned to "experimental" and "control" groups through simple randomization. Cognitive-behavioral training was applied to the experimental group (90 subjects), while the control group (90 subjects) were not subjected to such training. Three instruments were used: test anxiety inventory (TAI), study habits (PSSHI) and Hermen's motivation achievement which was used as pre-test and post-test. Data were analyzed using one-way variance analysis "ANOVA". Cognitive-behavioral training caused a decrease in test anxiety and an improvement in study habits as well as an increase in motivation achievement levels.

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## **The Influence of Children's Self-report Trait Anxiety and Holistic Face Processing on Attentional Bias to Emotional Faces**

**Hassan Shafiee\*, Mohammad Ali Goodarzi, Mohammad Reza Taghavi**

Consistent with cognitive models of anxiety, adults and children with clinical anxiety or high levels of trait anxiety selectively attend to threatening stimuli. This study investigated the influence of the levels of children's self-report trait anxiety and holistic face processing on attentional bias to threatening (angry faces) and non-threatening (happy and neutral faces) stimuli and the combination of these faces. Participants were divided into two groups (low and high trait anxiety) based on their scores on the trait version of the STAIC and the results of a semi-structured interview. 30 high- and 30 low anxiety children (10-12 years of age) completed the pictorial version of modified dot-probe task. Data were analyzed by a repeated measures design procedure. This study demonstrated that high trait anxious children show attentional bias toward angry faces (vigilance). In contrast, low trait anxious children show attentional bias away from angry faces (avoidance). These effects were only observed in normal emotional faces and were not observed in the combined emotional faces. The results support previous work highlighting a specific link between anxiety and attention to threat in childhood and suggest that face processing is a holistic process.

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## **The Comparison of Cognitive Deficiencies of Automatic and Analytic Systems**

**Foroogh Bakhtiari\*, Hamhid Reza Oreyzi**

Dual-process theories of cognition introduce two kinds of cognition that have different functions. The first system which is called automatic system is automatic and related to ground, while the second system is controlled. The processes in the second system need more effectiveness and awareness. Instrumental and implicated learning processes, as well as well-learned associations, and the regulation of behavior by emotions, are related to the first system; while the process of cognitive and executive abilities, and open thinking are related to the second system. Based on this framework, two large groups of cognitive deficiencies are posed. The aim of this research is: 1-The comparison of the cognitive deficiencies in males and females, 2- The Investigation of dual-process theories' validity. Method: In this research, 700 students participated (345male, 355female). The first system of cognitive deficiencies (the lack of emotional information, which is needed for decision making in real life) is measured by Alexitimia scale (Bagby & Parker, 1994). The second system of cognitive deficiencies, which happen when the automatic processes of the first system are not adequate and the analytic processes of the second system are not activated, are measured by Crawford's Discriminative Attention Processes Questionnaire (1993), Eysenck's Impulsivity Scale(1985), and Kohn's Reactive Scale (1985). For investigating dual-process theories' validity, exploratory and confirmatory factors analysis is used. Also, reliability and validity of instruments, and normality in sample is investigated. Results: Exploratory factors analysis of data revealed two factors. Model fitness and statistics GFI, CFI, and RMSEA revealed the validity of two factors model. The comparison of males and females showed high scores in the first system for females, and high scores in the second system for males. Conclusion: Regarding the validity of dual-process theories of cognition, these theories can be used for the investigation of both cognition and its deficiency.

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## **Examination of the Effect of Storytelling on Attribution Styles of Primary School Students**

**Zahra Nikmanesh\*, Yahya Kazemi**

This study was conducted to examine the effect of storytelling on attribution styles in primary school students, based on Seligman theory of Learnt Helplessness. The sample consisted of 32 fourth and fifth grade elementary school students in Zahedan, Iran. The subjects were selected from among the volunteers participated in the story telling workshop of Kanoon. The participants were divided into two groups with regard to their pretest scores. The groups were then assigned to a control and an experimental group randomly. The experimental treatment was conducted only on the experimental group during 10 sessions. Data were analyzed using ANCOVA and t-test. There was significant difference between the control and experimental group. The results revealed that in the experimental group, the storytelling workshop had changed pessimistic attribution styles to optimistic ones.

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## **The Study of Word Stem Completion Test Validity in Assessment of Implicit Memory**

**Sajjad Basharpour\*, Hossein Ghamari Givi**

The present study was carried out to investigate the validity of word stem completion test (Jacoby, Toth & Yonelinas, 1993) in the measurement of implicit memory. The statistical sample of this research comprised of Mohaghegh Ardabili University personnel. One hundred individuals were selected randomly from the aforementioned personnel, and were asked to complete demographical parameters list, word completion test (Jacoby, Toth and Yohelinas, 1993) and Stroop test (Stroop, 1935). Data were analyzed using Pearson's correlation coefficient test. The results of this research indicated that there is no significant correlation between implicit memory score in stem completion test and cards 1 and 3 of the Stroop test; even though they are both used for the measurement of implicit memory. Therefore, it can be concluded that stem completion test is not a valid test for the assessment of implicit memory. Because it ignores the essential elements involved in memory, such as speed of information processing and psycho- motor performance.

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## **The Effect of Cognitive Styles on Pre-University Student Performance in Language Tests**

**Azita Khazai\*, Mohamad Reza Pahlavannejad**

This study investigated the effect of reflectivity/ impulsivity of cognitive styles on the performance of students in language tests. 200 pre-university students participated in this study. First, the teachers stated the students' cognitive styles. Thereafter, two types of tests (multiple-choice and open ended) were given. The scores were analyzed statistically. The current study revealed that the cognitive style significantly contributed to the pre-university students' performance on these two language tests.

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## **The Influence of Metaphorical Tasks on Explicit Memory Bias in Depression**

**Sousan Alizadeh Fard\*, Hassan Ahadi, Hossein Eskandari,  
Hassan Ashayeri**

The difference between the effect of metaphoric and non metaphoric objects on explicit memory bias in individuals with depression is the main purpose of this study. Cognitive psychopathological approaches focus on information processing to explain how emotional disorders, such as depression, occur and develop. Memory bias as one of the processes is important in the researches studying the relationship between mood and memory. Results of these researches have shown that the quality of tasks and level of cognitive processing affect recall and retrieval in memory test results. In the present study, metaphorical tasks were applied in memory tests as cognitive tasks that need high level of cognitive processing. Two groups (depressed and normal) were selected (n=30) by using Beck Depression Inventory and General Health Questionnaire. The subjects' memories were evaluated using free recall test and recall with cue test for metaphoric and non metaphoric sentences. Findings showed that subjects in the depressed group remember more negative sentences in comparison with the normal group. Also, more metaphoric sentences were remembered to a higher degree in comparison with non metaphoric sentences in both groups. These results confirmed that metaphors, due to their higher level of cognitive processing, are more effective in developing mood congruent cognitive bias.

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## **The Effects of Music and Silence Combination on Semantic Memory**

**Mohsen Doustkam\*, Sepideh Pour Heidari**

In this study the effects of the combination of music and silence are evaluated on semantic memory. First, forty five subjects chosen from among masters students of Shahid Beheshti University in Tehran, Iran individually listened to ten Spanish Words (as a foreign language) along with their Persian meanings. The subjects consisted of the following three groups: M) the group presented with words in the background of music, S) the group presented with words in the background of silence, and MSM) the group presented with words in the spaces of silence between two pieces of music. This research showed that in line with the proposed hypothesis, the Persian meaning of the words represented in the background of silence between two pieces of music was recalled more efficiently. Also, the retrieval of information that is presented along with music is more efficient than the retrieval of information presented without a music background.

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## **The Effect of Stress on Visual Selective and Focused Attention**

**Amir Mohammad Shahsavarani\*, Seyed Kazem Rasolzade Tabatabaei,  
Abbasali Allahyari, Hasan Ashayeri, Kolsum Sattari**

The goal of this research was investigating the effect of stress on both visual selective attention and visual focused attention. 40 subjects were chosen by random multi-stage sampling method and with respect to control variables and were then placed randomly in two groups with equal numbers of subjects: the experimental and control groups. The cognitive stressor task was first administered to the experimental group and their selective and focused visual attention was assessed thereafter. The selective and focused visual attention of the control group was also assessed. However, the cognitive stressor task was not administered to these subjects. The dependent variables were errors in counting and errors in classification. All subjects filled out written subscription. The results showed that the subjects in the experimental group score higher in both counting and classification errors significantly ( $p < 0.0001$ ). These results have inconsistencies in some points with other research results. The inconsistencies in results are probably due to considerations of neuropsychological control variables and different populations of research. The research results reveal that stress has a negative effect on selective and focused visual attention.

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## **The Process of Autobiographic Memory Checking in Depressed Patients With and Without Suicidal Ideation**

**Reza Kazemi\*, Sonia Didehroshani**

The aim of this study is to determine the process of autobiographical memory in depressed patients with suicidal ideation and depressed patients without suicidal ideation. Subjects were selected from inpatients and outpatients of Ardabil Isar hospital and psychiatric clinic, who were diagnosed with major depressive disorder based on diagnostic criteria of DSM-IV through a clinical interview by a psychiatrist. A scale for suicidal ideation was used to divide the depressed patients into two groups: the group with suicide ideation (n=20) and the group without suicide ideation (n=20). The subjects were matched by age, sex and education. Also, Beck depression inventory (BDI), Beck hopelessness test and AMT from autobiographical memory were administered to both groups. The results showed that patients with suicide ideation respond slower to welcome cue words and respond faster to unwelcome cue words. Also, in reaction to unwelcome cue words, patients with suicide ideation were more specific than patients without suicide ideation in retrieval from autobiographical memory.

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## **Study of the Effect of Cognitive Exhaustion and Working Memory on Cognitive Problem Solving in Female and Male College Students**

**Saeed Toulabi\*, Omid Shokri, Mohammad Taghi Farahani,  
Hasan Asadzdeh, Alireza Moradi**

An experiment was designed and administered to study the effect of working memory and cognitive exhaustion on cognitive problem solving performance. First, 80 male and female students whose scores on the working memory test was one standard deviation above and below the mean were selected based on an information processing index and randomly assigned into 8 groups each including 10 participants. The experiment consisted of cognitive exhaustion and problem-solving tasks for the experimental group and a problem-solving task for the control group. We also included the effect of gender in this investigation. Finally, having compared the experimental and control group through an independent t-test, we analyzed the data through a three- way ANOVA test. The results showed that in the problem-solving situation had better performance of male student vs. female student. The results also showed a significant effect of group variable (control and experiment group) and working memory variable (above and below) on performance problem-solving. But, the interaction between variables was insignificant.

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## **The Impact of Written Emotional Expression on Depressive Symptoms and Working Memory Capacity in Students with High Depressive Symptoms**

**Valiollah Ramezani\***

The main aim of this study was to investigate the effect of written emotional disclosure on depression and working memory capacity in the students with high depressive symptoms. Using screening sampling method 33 students (4 male and 29 female) in Tarbiat Moallem University were selected and categorized randomly into two experimental and control groups. The instruments were Beck Depression Inventory (BDI) (Beck, 1961), clinical interview and Working Memory Index (WMI) (Wechsler, 1997). This is an empirical study with functional goals. MANOVA was used for analyzing the data. The results indicated that: written emotional expression reduces the depressive symptoms and increases working memory capacity. In spite of short term negative consequences, emotional disclosure had long term positive consequences. Overall, written emotional expression could be considered as a simple, effective and low cost strategy for coping with stressful life events.

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**Analyzing the Relationship between Cognitive/ Metacognitive Strategies and Intelligence in Urban and Rural Students of Third Level of Guidance School and High School in Ivanegharb, Iran**

**Koorosh Parviz\***

This research studies the relationship between cognitive/ metacognitive strategies and intelligence in learners. Previous researches (e.g., Parviz, 2008) have demonstrated a difference between urban and rural students related to learning strategies in lower levels of education, but not in higher levels. The study aims to figure out the factors responsible for the mentioned difference, and to determine whether one of the factors in intelligence. The sample was selected in Ivanegharb, Iran. The participants were divided into 4 groups: 1- rural guidance school students, 2- urban guidance school student, 3- rural high school students and 4- urban high school student. Each group comprised 75 individuals. One way ANOVA showed that urban guidance school students scored higher than rural students with respect to intelligence, however, no difference in intelligence was found among high school students. In addition, Pearson correlation test showed a positive significant relationship in metacognitive strategies and intelligence among guidance school students. Also, in this educational level, a positive significant relationship was found for cognitive strategies and intelligence only in rural, but not in urban students. No significant results were found for high school students. It can be concluded that the above mentioned differences and their relationship is related to the variability of intelligence in different urban and rural students in different levels of education.

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## **Investigation the Effect of Teaching Metacognitive Strategies on Working Memory**

**Abutaleb Seadatee\***

In order to investigate the effect of teaching metacognitive strategies on working memory in female and male college students, an experiment was designed and performed. Method: First, the information processing inventory was administered as a pretest, and the scores of the subjects were calculated. Subjects belonging to the 25 percent upper distribution were considered as those with high working memory and those belonging to the 25 percent of lower distribution were selected as the ones with low working memory. The subjects were then randomly assigned to eight groups (four experimental and four control groups). Subjects with high working memory were assigned to 4 experimental groups and subjects with low working memory were assigned to the 4 control groups (each group consisted of 30 subjects, with a total of 240 subjects). In the next step, metacognitive strategies were taught to experimental groups while the control groups received no treatment. Finally, the information processing inventory was administered again as a posttest to all groups. Data were analyzed through multivariate analysis. There was no meaningful difference between the mean scores of male and female students in information processing inventory. Also, there was no meaningful difference in the mean scores of male and female students of the control groups in information processing inventory. However, there were meaningful differences in the mean score between male and female students of the experimental and control groups in information processing inventory. In other words, the mean scores of the experimental group with high working memory were higher than that of the experimental group with low working memory. Also, the mean scores of the experimental groups with high working memory were higher than the control groups. The mean scores of groups with high working memory were higher than the groups with low working memory in the information processing inventory. The followup test which was administered 2 months after posttest, confirmed the data.

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## **Memory Functions Impairment in Epilepsy and Attention Deficit Hyperactivity Disorder: a Case-Control Study**

**Zahra Ramezankhani\*, Afsaneh Zarghi, Ali Ramezankhani, Mehdi Moazzezi, Seyed Abolghasem Mehrinejad**

The purpose of this study was to examine memory functioning in a well-characterized group of children with epilepsy and attention-deficit/hyperactivity disorder (ADHD). The study group included 150 Iranian children (75 boys, 75 girls) aged between 10-12 years. 50 subjects were diagnosed with only epilepsy, 50 subjects were diagnosed with ADHD and 50 subjects were normal. These groups were matched according to intelligence, sex and age. Best estimate DSM-IV diagnoses were assigned on the basis of structured interviews and clinical ratings. The children's memory functioning was evaluated with WISC- MEMORY-TEST, which is a form that includes criteria for general knowledge, personal knowledge, mind control, logical memory, progressive and regressive number repeating, visual memory, acquiring associations and direction alignment. The Benton Visual Test was also carried out. Data were analyzed using unidirectional variance of analysis and Tukey test. The children with epilepsy and ADHD were more impaired than normal subjects and had additional difficulties in social functioning, school problems, and self-reported depression. Calculation of distribution indices (average, variance, criteria deviation) and plotting were employed for description of the research data. Memory function performance in the normal children was better than that of the epileptic or ADHD subjects ( $P < 0.05$ ). There were no significant differences between the epileptic and ADHD subjects in terms of memory performance ( $p > 0.05$ ). Children with epilepsy or ADHD are impaired in multiple domains of memory functioning. Essential constrictions and recommendations are presented.

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## **Effects of Multiple Recall Attempts on Learning and Exam Performance**

**Farideh Kheyri\***

Examining the effects of repeated recall and testing on learning and exam performance among university undergraduates. Sixty undergraduates at a university in Iran were instructed to learn four novel comprehension passages in ten 30-minute sessions held in ten days. In Session 1, half of the participants were required to study the material package and then return it to the experimenter. In the next nine sessions the subjects were scheduled to come to the lab, receive a package, study the designated material in the package and then return the package. Another half studied the material in Session 1 and were then required to take one test on the passages in the next nine sessions. They came to the lab each day and took a test on the material. The results showed that participants taking multiple tests during the treatment phase had a higher level of learning and received higher scores on the passages than those who only studied the material. Based on the present findings, it can be concluded that memory processes such as repeated attempts to recall information from long term memory lead to higher levels of learning. This effect has a wide-range application in education. Specifically, the educational programs could be designed in a way to consider a pivotal role for multiple testings across all learning tasks.

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## **Fathers and Emotional Intelligence of Children**

**Mojgan Mirza<sup>\*</sup>, Abdulla Rohani, Mansor Mariani, Redzuan Ma'rof**

Emotional intelligence can be considered as one of the necessary skills children need in order to advance in social life. It is also an important element for improving pro-social behavior and self management skills in children. Evidenced by recent studies, fathers' involvements with their children significantly influences the children's cognitive, emotional and behavioral development. In spite of this, many fathers are uncertain and confused about their responsibilities and also the privileges associated with this link. The emotional intelligence development is a relatively new Early Childhood Development concept with little empirical research reported in the literature especially for children within immigrant communities. The objective of the present research is to examine if, there could be a relationship between EQi (Emotional Quotient Inventory) of fathers and EQi of their children. The population of interest for this study included Iranian Primary schoolchildren and their fathers who are living in Malaysia (age 8 to 11, n=107). Data collection was carried out in 2007 using EQi Youth Version and EQi Adult Version of Bar On model instruments. (1997-2000). This research was designed to be a correlation-based study. Comparison between correlation coefficient of Pearson product moment between EQi of fathers and those of their children in different gender and age groups indicated a significant Moderate-High correlation ranked between  $r=0.57^{**}$  and  $0.87^{**}$  with positive nature. In addition, the results indicated that EQi of fathers have a more close relation with EQi of boys compared to girls. Consequently, results of this research confirm that Fathers play a significant and crucial role in the development of EQ-i and social skills of their children.

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## **Comparison of memory monitoring of students with learning disorders and normal students**

**Marzieh Amohammad Shirazi\***

The aim of this research was to compare the memory monitoring (judgment of learning) of students with learning disorder (Reading and reading/writing) with normal students. 30 LD students (15 students with reading disorder and 15 students with reading/writing disorder) and 30 normal third and fourth grade primary schoolchildren participated in this study. A list of 20 words selected from the books of literature in the third and the fourth grades of primary school was used. There was no significant difference between memory monitoring (judgment of learning) of LD students and normal students. Also, there was no significant difference between the time of the memory monitoring of the two groups, as well as between the mean error scores of memory monitoring in the third and fourth grade primary schoolchildren.

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## **Construction and Validation of Pictorial Dot Probe Task using Faces as Stimuli**

**Ali Khatibi\*, Mohsen Deghani, Hamidreza Pouretamad**

Application of psychophysical tasks in evaluation of selective attention at secondary mental performance among patients and normal subjects is a widely accepted technique, especially in the field of neuropsychology. Dot-probe task is one of the measures for selective attention used both in depression and anxiety disorders. This task originally used words, which have limitations as stimuli, due to linguistic and cultural restrains. The current study was carried out to develop a modified version of this task, replacing words with emotional faces and examining the validity and reliability of the task. A sample of 40 adult healthy subjects was examined. Acquired data revealed the validity of pictorial stimuli and also reliability of subjects' answers to pictorial stimuli. In addition, selective attention scores were not found to be correlated with the educational level and subjects' gender, which indicates the independency of the evaluation task of selective attention from demographic characteristics. It can be concluded that the designed task is valid enough for initiating cross-cultural studies and could be considered for this type of research.

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## **Correlation between Responsibility, Metacognitive Beliefs and Obsessive-compulsive Symptoms**

**Samaneh Nateghian\*, Samad Shirinzadeh Dastgiri**

Cognitive models of Obsessive–Compulsive disorder (OCD) have emphasized inflated responsibility (Salkovskis, 1985) and metacognitive beliefs (Wells, 1997), as factors contributing to the disorder. This study examined the correlation of responsibility and metacognitive beliefs with obsessive-compulsive symptoms. Fortyfour patients with obsessive-compulsive disorder (OCD) took part in this study. In order to measure metacognitive beliefs, responsibility beliefs and obsessive-compulsive disorder symptoms, the Metacognition Questionnaire-30 (MCQ-30), Responsibility Attitudes Scale (RAS) and Padua Questionnaire (PSWQ) were used. Results indicated that responsibility and metacognitions were positively correlated with obsessive-compulsive symptoms. However, when metacognitions were controlled, responsibility was not associated with obsessive-compulsive symptoms, but the relationship between metacognitive beliefs and obsessive-compulsive symptoms was significant when responsibility was controlled. These results offer additional support for Wells' meta-cognitive theory of OCD.

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## **The effect of trait anxiety on tasks of working memory**

**Fereshte Cheraghi\***

This study investigated the effect of trait anxiety on tasks tapping the phonological and visuo-spatial components of working memory (WM). The experiment in this study was designed to test Eysenck and Calvo's Processing Efficiency Theory (PET) which suggests that the phonological and executive components of WM may be important in understanding the relationship between performance and anxiety. A sample of first year college students (n=160) completed the trait measure of the Spielberger State-Trait Anxiety Inventory. After administering the inventory, 24 subjects belonging to the 25 percent of upper distribution and 24 subjects from the 25 percent of lower distributions were selected. Both groups were exposed to self-threat instruction and based on tasks presentation (visual-verbal/ verbal-visual) were randomly assigned to four groups. They performed two WM tasks. Measurement of accurate responses was taken as an indicator of performance outcome or effectiveness. The time taken to complete tasks and a subjective rating of mental effort were taken as measurements of processing efficiency. Data were analyzed using two ways ANOVA. Analyses explored the effect of trait anxiety on time, mental effort, and accurate responses in the verbal task, and the effect of anxiety on time in the visual task. There was only a significant interaction effect of trait anxiety and task presentation manner on time in the visual task. The results suggested that anxiety reduced performance and processing efficiency in the verbal task rather than the visual task. Processing efficiency was lower when the high anxiety group performed the visual task as the second task.

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## **Prediction of Need for Cognition Based on Five Factor Model of Personality in Shiraz University Students**

**Farideh Hosseini\*, Morteza Latifian**

The present study explored the role of Big Five Factor model of personality in prediction of need for cognition. Recently, psychology theorists have made efforts to identify new personality traits that are most closely associated with thinking, information processing, problem solving, and knowledge. The need for cognition is a construct that is the result of this scientific effort. In addition, alongside the emerging consensus of the five factor model of personality, there has been increasing interest among researchers in studying the dispositional source of motivation. Based on the above, this study has examined the role of five factor model of personality to predict the need for cognition. The sample included 191 female and male students at Shiraz University, to whom the big five personality factor questionnaire and need for cognition questionnaire were administered. The collected data were analyzed using simultaneous multiple regression analysis. Results showed that the five factor model of personality has a significant relationship with need for cognition and that openness to experience can predict the need for cognition. Multiple regression analysis indicated that openness to experience can predict the need for cognition.

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## **How to Solve the Riddle of Sick Building Syndrome: A Literature Review**

**Anna Lindqvist\***

Sick Building Syndrome (SBS) is a widely spread phenomenon where building occupants show specific physical symptoms without any known causes. Different explanations have been suggested. This literature review analyzes the most prominent of those explanations, with focus on psychological aspects. This theoretical analysis of former research, maps out and considers different explanations of SBS. The symptoms of SBS are constituted by different types of sensory irritation; however, research has not yet been able to define its origins. One of the most developed approaches is the theory of psychogenic illness, explaining SBS as “masshysteria”. However; this approach does not succeed in solving the SBS riddle. This theory is discussed and empirical evidence of why SBS is not a mass psychogenic illness is presented (e.g. that the symptom pattern of SBS is not typical for mass psychogenic illness). Thereafter, the psychophysical approach is suggested instead. This approach has traditionally paid attention to cognitive perception of indoor air concerning sensory irritation and acceptability, and suggests that SBS is caused by substances in buildings. Research has not found the origin of SBS inasmuch as it has failed to identify the substances that cause SBS. This does not mean such substances do not exist. Being able to find the cause of SBS implies first and foremost that the research has the correct object of study. It is suggested that a psychophysical alignment may conduce to solving the problem.

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## **The Effect of Music Instruction on the Cognitive Abilities of Preschool Children**

**Hilda Mirbaha\*, Hosein Kavi, Mehrangiz Pournaseh**

Music instruction is known to enhance spatio-temporal abilities in children. The aim of this study was to determine the effects of short-term music instruction on general reasoning abilities and its four main components in preschool children. Thirty students of music classes at the age of 5 to 6 years and starting a music course were assigned to the experimental group. Another thirty kindergarten children with no music instruction were enrolled as the control group. Both groups were matched for mothers' education, economic level of the family, age and gender. The experimental group participated in a 12-week, vocal and instrumental music curriculum. The cognitive test used in this study was Tehran-Stanford-Binnet Intelligence Scale used as pre- and post-test for each sample. Statistical analysis showed significant gains for participants receiving music instruction in general reasoning ability. Moreover, they scored significantly higher than the "no music" group on the verbal reasoning and short-term memory subtests. The numerical and visual/ abstract reasoning abilities did not differ for the two groups at the end of the course. This study indicates that music instruction is useful for enhancing some aspects of cognitive abilities e.g., general reasoning, verbal reasoning and short-term memory in preschool children.

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## **Comparison of Stroop Interference between Patients with Multiple Sclerosis and Normal Participants**

**Soghra Sahragard\*, Soghra Rostami, GholamReza Chalabianloo**

Multiple Sclerosis is one of the most prevalent and progressive neurological diseases and the consideration of its psychological and neuropsychological consequences is necessary at present. It has been revealed that neuropsychological impairments are frequent consequences of MS. Researches have introduced patients with different attentional problems, such as problems with sustained and selective attention (Arnet et al, 1999; Plohmann et al, 1998; Beaty et al, 1995; Krupp et al, 1994). Vitkovitvh et al (2002) indicated that patients with MS have problems in Stroop interference task. In order to compare patients with MS and normal subjects, 39 patients with MS and 39 normal participants were selected by random sampling procedure and were given computerized Stroop task. Data were analyzed by ANOVAs with repeated measures with a 2\*2\*3 design. At the first stage of the task, each color word (e.g. "blue") was presented in black on white background. In the second stage, each word was presented with the same color it indicated. In the third stage or the negative priming stage, each word was presented in the color of what its following word was to indicate; for example, the word "blue" was presented in red – whenever it would be followed by the word "red". Results indicate that there are significant differences with regard to groups and sex, in error responses during Stroop task ( $F= 8.06, p<0.01$ ). Post hoc analysis revealed that men with MS made more errors in the interference phase of the task. Also, results showed that there are significant differences between groups and sex, in reaction times ( $F= 14.28, p<0.01$ ). Post hoc analysis indicated that men with MS had a longer reaction time in the interference phase of the task. Our results were in line with studies that indicate patients with MS have problems in their attentional functions. These impairments are related to deficits of inhibitory systems such as frontal lobe dysfunctions. Results are discussed in more detail in the full text.

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## **Study of the Effect of Word's Color in Short Term Memory**

**Fariba Zahedi\***

In light of the importance of learning and necessity of improvement in education systems in all levels, the study of effects of stimuli like color, context, background and other components, in increasing or decreasing the performance of memory, especially in textbooks, is essential. The goal of this study is to investigate memory performance in situations where words are presented in different colors. The statistical population consisted of students of faculty of psychology and education in Tehran University. 56 subjects including females and males were selected randomly. Two lists of words were prepared, each containing 15 words. In the first list the words were presented in colored fonts (red, green, blue) and in the second they were presented in black. The experiment was carried out in a controlled condition at the laboratory of psychology in the faculty of psychology. The list of words was presented by a tachyscope, which was equipped with electronic chronometer for 6 groups. Slides were automatically timed for 1 second each. Then the subjects were asked to write down what they remembered from the words immediately (retrieval test). The answers were scored for number of correct answers in order. The mean variety of the groups was studied according to the data and statistical analysis, and the variance was normalized by co-variance analysis. Although the variety of mean values of groups in the colorful list was higher than the black list, the effects of color, sex and interaction of these two, were not significant.

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**Cognitive Assessment System (CAS) Test the Tool for  
Assessment of Cognitive Subfunctions in Children and  
Adolescents Introduction of a Primary Study with Persian  
Translated Copy**

**Atefe Fathi\*, Hosein Rezabakhsh**

Recently, efforts have been made in applied psychology to provide tests that follow from current Psychological knowledge (Kaufman & Kaufman, 1983, 1993; Woodcock & Johnson, 1989). These Tests are based on cognitive, neuropsychological, and factorial views of intelligence studied by Contemporary Psychologists and have therefore been described as “non-traditional” (Naglieri, 1996a) because of the intent to link theory and practice. The Cognitive Assessment System (CAS) is among these non-traditional approaches to intelligence because it is based on recent findings about Intelligence as a group of cognitive processes. The CAS was developed to integrate theoretical and applied areas of psychological knowledge using a theory of cognitive processing and tests designed to measure those processes. More specifically, the CAS was developed to evaluate Planning, Attention, Simultaneous and Successive (PASS) cognitive processes of individuals between the ages of 5 and 17 years. This research was designed to study the cognitive functions in normal children in Iran with CAS (Cognitive Assessment System). The sample included 30 primary schoolchildren (8girls – 11boys) of two of the educational regions of Tehran (9 and 12). Two inventories for assessment were used: 1- Raven test for assessment of IQ: Advanced Matrices of Raven, colored sample for 5-9 year old children (Karami, A. Assessment of Child’s intelligence, 1383. pp; 25- 27). 2- CAS (Cognitive Assessment System) for assessment of cognitive functions. The results of data analysis showed that there are no significant differences between girls and boys in CAS. In addition, the results indicated a positive and high correlation between age and IQ with cognitive functions in CAS. We also found that in comparison with American norms, 73.34% of subjects were in the low average row, and 26.66% were in the below average row, while there were no subjects in the average, high average, superior and very superior rows. The CAS test is a well-known material for the study of cognitive function in

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children and adolescents. Introduction of the Persian version of this test is a valuable opportunity for avoiding inefficient material such as the Raven test, which in comparison with CAS, assess limited cognitive domains. One of the main features of CAS, is the separation of cognitive functions. In this study, we found that subjects have poor action in PASS theory; therefore, those hypotheses and approaches that are related to action of subjects were analyzed.

## **Comparison of Short Term Memory Efficiency (Visual and Auditory) in the Circadian Rhythms of Eight to Ten Year Old Students (Chronopsychology)**

**Mahnaz Esteki\*, Shahin Oliyaiizand**

This study compared student's short term memory (visual and auditory) in the circadian rhythm at different hours of a day. An ex post facto research was designed, and 104 subjects (52 girls, 52boys) from morning and afternoon schools (areas7 and 8) were selected using cluster random sampling. Members of both sexes were divided into 4 groups (13student in each group) and were tested at different hours of a day(8:00, 11:00, 14:00, 16:00). The data was analyzed using F and t-Test. The findings indicated a significant difference in short term memory efficiency between the two sexes. Boys had a higher performance than girls in visual STM efficiency. Girls had higher performance at 16:00, and boys had higher performance at 8:00 and 11:00. Biological rhythms are very important in distribution and planning of mental activity.

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## **Psychometric Properties of Melbourne Decision Making Style Questionnaire**

**Mohammad Bagher Kajbaf\*, Zohreh Ranjbar Kohan,  
Marzieh Sadat Sajjadinejad**

The aim of this research was to evaluate the psychometric properties of Melbourne Decision Making Style Questionnaire. 232 undergraduate students of Isfahan University in the educational year 2007-2008 were selected through cluster random sampling and then responded to Melbourne Decision Making Style Questionnaire as well as Problem Solving Style Inventory. The validity coefficient of the questionnaire was calculated by construct validity and congruent validity. In construct validity, correlations between two subscales (decision self-esteem and vigilance, hypervigilance, buck passing and procrastination) was calculated. These correlation coefficients were 0.59, -0.50, -0.50, -0.47, respectively. Also, in congruent validity, correlations between productive problem solving style and decision self-esteem and vigilance were 0.51 and 0.53, respectively. In addition, the correlations between hypervigilance, buck passing and procrastination were -0.38, -0.43 and -0.38, respectively. Furthermore, the correlations between nonproductive problem solving styles and decision self-esteem and vigilance were -0.48 and -0.22. Also, the correlations between nonproductive problem solving styles and hypervigilance, procrastination and buck passing were 0.61, 0.42 and 0.44 respectively. The reliability coefficients of the questionnaires were calculated by test-retest and Cronbach's alpha coefficient. Test-retest coefficient for decision self-esteem, vigilance, hypervigilance, buck passing and procrastination were 0.41, 0.73, 0.64, 0.68, 0.68 and 0.69 respectively. Cronbach's alpha coefficient for decision self-esteem, vigilance, hypervigilance, buck passing and procrastination were 0.50, 0.77, 0.74, 0.74, 0.73 and 0.74 respectively. In general, the findings of this research confirm appropriate validity and reliability of the Persian version of Melbourne Decision Making Style Questionnaire and show that this instrument can be applied in clinical and research situations.

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## **Comparison of Executive Functions in Children with Cerebral Palsy (Spastic Diplegia) and Normal Children**

**Mojtaba Soltanloo\*, Gholamreza Olyayi, Mehdi Tehranidoost, Mehdi Abdolvahab, Hosein Bagheri, Soghra Fagihzadeh**

Cognitive sciences and technologies as one of the components of convergent sciences and technologies (NBIC) is going to change the destiny of human being. Education is certainly and immediately one of those areas influenced by this interdisciplinary branch of sciences. This is specially true for teaching-learning processes, not only because of a better understanding of functions of mind and brain; emanating from findings of cognitive sciences, but also their pivotal role in using our brain more effectively. Today, innovation in and improvement of education is at high stick in developed countries. Based on the findings of cognitive sciences, education practitioners and scholars are trying to define new goals and objectives for education and to offer new strategies for its implementation. Information technology too, has rushed to the help of education and provided the teachers and educators with magnificent possibilities. Examination of these developments is promising and can make educational scholars and administrators familiar with an extensive array of new information. In my speech, I will try to touch upon fundamentals of cognitive approach to education from the perspectives of cognitive neuroscience, cognitive psychology, cognitive linguistics, philosophy of mind and artificial intelligence, and also to explain how cognitive sciences is able to make important transformations in education.

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## **Cognition about Cognition: a Study of the Effectiveness of Metacognitive Therapy and Change in Obsessive-compulsive Disorder Symptoms**

**Rahim Yousefi\*, Masood Ghorbanalipour**

According to recent theories, metacognition is a central factor in the development and maintenance of psychological disorders (Wells, 2007; Fisher & Wells, 2005; Wells, 2000; Wells & Matthews 1994). A main point in this perspective is that in psychological disorders beliefs are formed from metacognitive components that guide thought and coping styles. Metacognitive beliefs about the threatening meaning and significance of intrusions are fundamental to the development and maintenance of obsessive-compulsive disorder (OCD) in the metacognitive model. The aim of the present study was to examine the effectiveness of metacognitive therapy in obsessive-compulsive disorder. For this purpose 26 patients with obsessive-compulsive complaints were interviewed using SCID and were assessed by MCQ and SCL-90 scales in pretest and posttest. The subjects were then placed under metacognitive therapy program in 8 sessions according to Wells model. At the end of the therapy program all patients were assessed again by MCQ and SCL-90. Analysis of data showed significant differences between pretest and posttest scores both in MCQ ( $P < 0.001$ ) and SCL-90 ( $P < 0.01$ ). In addition, patients with obsessive-compulsive disorder showed better and adaptive metacognitive beliefs and decreased obsessive-compulsive symptoms after metacognitive therapy. This finding suggests that reductions in metacognitive beliefs about intrusions can result in a decrease in anxiety and compulsion. Metacognitive therapy has been developing as an innovative method of cognitive behavioral therapy in the recent two decades.

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## **Self-Regulation and Cognitive Failures**

**Bahram Jowkar\*, Azimeh Salimi**

Over the past 20 years, a substantial amount of research has been conducted on cognitive failures. Cognitive failures are everyday lapses in attention, memory, and perception. This study investigated the relationships between self-regulation and cognitive failures. Participants consisted of 261 students from the University of Shiraz (196 females and 65 males). The subjects completed Cognitive Failures Questionnaire (CFQ, Broadbent, Cooper, FitzGerald, & Parkes, 1982), and Motivated Strategies for Learning (MSLQ, Pintrich, & DeGroot, 1990). To examine the reliability of measures, Cronbach's alpha coefficient and factor analysis were used to determine the reliability and validity of the measures respectively. The results of multiple regression showed that self-regulation strategies and motivational beliefs were negative predictors of cognitive failures and test anxiety was a positive predictor of cognitive failures. The results showed that cognitive failures are determined partly by cognitive and metacognitive strategies.

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## **Attentional Bias to Tobacco Related Stimuli in Smokers and Abstinent Individuals**

**Mahdieh Rahmanian\*, Marzieh Aminian**

According to recent theories, attentional bias to drug related stimuli plays an important role in the initiation of substance use and its relapse. The goal of this study was to assess the attentional bias to tobacco-related stimuli in smoker, abstinent and normal individuals. A sample of 180 individuals (60 subjects in each group) aged 18 to 55, and matched by age and education, was assessed by Dot Probe Task. The results indicated that, smokers, compared to abstinent and normal individuals, had shorter reaction times to tobacco related words presented at 500 milliseconds, which is an evidence of attentional bias. However, there was no significant difference between the groups in reaction time to word stimuli presented at 20 milliseconds, which is an evidence of no pre-attentional bias. The findings of the present study provide evidence of attentional bias for tobacco related cues in smoker individuals.

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## **Goal-directed Imitation in Four and Five-Year-Old Children**

**Pardis Fallahzadeh\*, Utku Kaya, Annette Hohenberger**

Imitation is a fundamental way to acquire knowledge in human development. In their Theory of Goal-Directed Imitation (GOADI), Wohlschläger et al. (2003) divide the representation of observed movements into hierarchically organized aspects. The highest aspect is usually the goal of the imitation. Its activation triggers its corresponding motor program automatically (according to the ideomotor principle). In a face-to-face imitation task, young children usually mirror observed movements, that is, they copy the goal of the body movement in terms of perceptual mirror symmetry rather than map them conceptually onto their own body. In our experiment, we vary the perspective of the child onto the experimenter systematically (0°, 90°, 180°) in two tasks, a hand-to-ear and a cup-grasping task. Children are supposed to imitate the movements of the experimenter. Tasks are conducted on 4, 5 and 6-year old Turkish preschoolers (15 female, 18 male) under three conditions. Imitation schemes varied according to age and perspective. Overall, older children's imitation of movements was better than those of the younger ones. In older children, the applied imitation scheme was mapping rather than mirroring. In the 180° and 90° conditions, the mirroring scheme was predominant, but in 0°, mapping was predominant. GOADI was confirmed; however, it was qualified by the child's perspective on the experimenter. Imitation develops from perceptually-based to more conceptually-based schemes.

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## **Creativity and A, B Behavioral Patterns in Students**

**Narges Alirezaie\***

The current study has been carried out to examine the relationship between Creativity and A, B behavioral patterns in a group of students. The sample consisted of 243 individuals (136 females, mean age (17.74±0.94) and 107 males, mean age (17.66±1.56) which were screened based on Morgan's table. Abedi Creativity Questionnaire (1372) and Bortner's A, B personality Types (1969) inventory were used for evaluating creativity and behavioral patterns. Data were analyzed using  $\chi^2$  and independent t-test. There was a significant difference between types A and B creative students, with type B students being more important than type A students ( $\chi^2=11.388>$ ,  $\chi^2=9.48$ ) ( $p<0.05$ ). Also, the mean of creativity total scores as well as fluency, elaboration, originality and flexibility subscales were compared between males and females using independent T-test. Results demonstrated higher significant scores for females only in total score ( $p<0.01$ ) and originality subscale ( $p<0.05$ ). In situations like university entrance exams, where students should struggle hard to be accepted in universities, A type behavior is unconsciously strengthened. They learn to act more and more rapidly with a "time urgency" quality, whereas Type B individuals are calmer and more relaxed. It seems that type A students are accepted in higher numbers to universities in comparison to type B students, and creative students are accepted less than others.

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## **Analyzing the Relationship between Cognitive/ Metacognitive Strategies and Personal Characteristics in Payame Noor University Students**

**Koorosh Parviz\***

Previous research (Wingman et al, 1997; Parviz, 2008) has showed a positive correlation between learning strategies and cognitive dimensions of personality such as intelligence. The aim of this study was to examine a possible positive correlation between the emotion dimension of personality and learning strategies. The participants consisted of 140 Payame Noor University students. For assessing of personal characteristics the sixteen-factor personality questionnaire of Cattell and for assessing learning strategies learning strategies and study questionnaire of Karami are used. One way ANOVA test show that between cognitive and metacognitive strategies people that in factors of I, G and M are lower than 4, normal (5&6) and higher than 7 to 10 there is significance difference. The mean of this statement is that normal people in emotions use more metacognitive strategies than them that are insensitive and realist. And normal people in temperament use more cognitive and metacognitive than they that are irresponsible and unmoral. Also the functionalist people use more cognitive strategies than fantasy people. The main result that can be inferred from this research is practical and logic people use more than others from learning strategies.

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## **Phenomenology of Cognition**

**Reza Balaghat\***

The phenomenological study device is the Greek catchword: we must deliver the phenomena. The phenomenon is the thing that shows itself and in this showing shows the thing that cannot be shown unless it remains covered under its appearance. The focus this descriptive – analytic study, is Husserl’s approach to phenomenology. The questions addressed by this study are the following re: 1- Can we pose phenomenology as a method? 2- If yes, what is its structure? And 3- How we can survey the cognizant with this method? To respond to these questions, the study goes through the following steps: 1- definition and evaluation of needed resources, 2- Collection of the factual and detailed data about the research subject from those resources, 3- Survey and evaluation of the collected data, 4- Data classification, and 5- adjusting and analyzing the data and providing an exhaustive report from the outcomes. The importance of this study is building a bridge between philosophy and the cognition. The outcomes of the research show that we can pose phenomenology as a method. Phenomenology as a method is structured based on Husserl’s approach and contains 3 stages: reduction, delivery and empathy. In reduction, we move from nominee to phenomenon. In reduction we do not judge whether or not what is open to humans is fact; what is important is face value, and this does not mean that we do not believe the nominee. Thereafter, we return to the essence of the cognizant and shape its form and sense. On this basis we can reach the empathy of subject of cognition. Therefore, we can survey the cognition subject with this method that passes from the reduction delivery and empathy stages.

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## **Is The Reconciliation of Realism and Interpretationism of Intentionality Tenable?**

**Housam Hashim\***

The purpose of my dissertation is to give an accurate understanding of the view that we normally have of ourselves as agents that are subject to an array of states that are meaningful such as beliefs, desires, fears and choices. Most theorists within the philosophy of mind and cognitive sciences hold that the ascription of such propositional attitudes is a form of theoretical explanation with beliefs, desires and the rest its theoretical postulates. Theorists on the subject of the nature of attribution of belief are usually divided into two camps. These camps are usually taken to be mutually exclusive. The realist towards the attribution of belief holds that the subject of whether a person has a particular belief or not is a matter of fact. Here a belief is seen as a property of that person. The interpretationist towards the subject of the nature of the attribution of belief on the other hand argues that whether a person has a particular belief or not is a matter of interpretation. The question that I address in this thesis is whether there is a third option. That is, is the reconciliation of realism and interpretationism in belief attribution tenable? I am skeptical that this is possible. I argue that if this reconciliation is not tenable then in order to avoid the elimination of what I think is a correct understanding of ourselves we should interpret the subject of belief in terms of usefulness and utility in the prediction and explanation of our behaviour. I argue, therefore that the descriptions of intentional psychology are practically.

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## **The Economy of Attention and the Marketplace of Ideas**

**Warren Thorngate\***

Attention is the stuff we "pay" to convert ideas into messages and messages into ideas -- to produce and consume information. Communication technologies from language to the Internet have allowed information to accumulate at an accelerated pace, but the amount of attention available to process this information has not increased and never will. The result: As information accumulates, we attend to a diminishing proportion of it. How do we choose what to attend to and what to ignore? What are the consequences of our choices? My presentation will examine how three criteria: truth, importance and interest, govern the evolution of communication and the marketplace of ideas. I will then speculate about the educational implications

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## **Advance Magnetic Resonance Imaging in Cognitive Neuroscience**

**Mojtaba Zarei\***

MRI technology has progressed rapidly within the last 20 years. We are now able to visual structure and function of the brain in a way that was difficult to imaginable 30 years ago. Functional MRI uses regional signal changes that is associated with neural activation. Structural imaging has reached a resolution of 100 micron close to what can be seen histologically. Diffusion tensor imaging provides organization of white matter tracts by delineating direction of water diffusion. MR spectroscopy provides information about biochemical composition of brain tissue. These advancement have impacted our understanding of cognitive functions greatly. I will explain these techniques and provide examples of how they have been used to understand cognitive function."

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