Chapter II

Review of Related Literature
CHAPTER – II

REVIEW OF RELATED LITERATURE

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CHAPTER – II

REVIEW OF RELATED LITERATURE

The term literature refers to the knowledge of a particular area of investigation of any discipline which includes theoretical, practical and its researcher studies. The Term ‘review’ means to organize the knowledge of the specific area of research to evolve on edifice of knowledge to show that his study would be an addition to this field. The task of review of literature is highly creative and tedious because researcher has to synthesize the available knowledge of the field in a unique way to provide the rationale for his study.

2.1. MEANING AND DEFINITION OF REVIEW OF RELATED LITERATURE

The term ‘review of literature’ has been defined in the following ways:-
According to Good, Barr and Scates “The competent physician must keep abreast of the latest discoveries in the field of medicine obviously the careful student of education, the research worker and investigator should become familiar with location and use of sources of educational information.

The literature in any field forms the foundation upon which all future work will be built. If we fail to build the foundation of knowledge provided by the review of literature our work is likely to be shallow and naïve and will often duplicate work that has already been done better by someone else” (W.R. Borg)

The keys to the vast storehouse of published literature may open doors to sources of significant problems and explanatory hypotheses and provide helpful orientation for definition of the problem, background for selection of procedure and comparative data for interpretation of results. In order to be creative and original, one must read extensively and critically as a stimulus to thinking” (Charter V. Good).
Review of Related Literature

"Practically all human knowledge can be found in books and libraries. Unlike other animals that must start a new with each generation, man builds upon the accumulated and recorded knowledge of the past. His constant adding to the vast store of knowledge makes possible progress in all areas of "human endeavor".

In survey and experimental research, the review of the literature serves a variety of background functions preparatory to the actual collection of data. In these research approaches the literature is reviewed to create the context from the past for the new study to be conducted with new subjects and newly gathered data. In the historical approach, we never ignore the past and in the sense review of the literature is the method of data collection if 'literature is used in the broadest possible sense. In this regard the sources used are the 'subjects' of the research and the material reviewed of the 'data'. Therefore, the primary function of the review of literature in the historical research is to provide the research data (John W. Best).

2.2. NEED OF REVIEW OF RELATED LITERATURE

The review of literature is essential due to the following reasons

1. One of the early steps in planning a research work is to review research done previously in the particular area of interest and relevant area quantitative analysis of this research usually gives the worker an indication of the direction.

2. It is very essential for every investigator to be up to date in his information about the literature, related to his own problem already done by others. It is considered the most important perquisite to actual planning and conducting the study.

3. It avoids the replication of the study of findings to take an advantage from similar or related literature as regards, to methodology, techniques of data collection, procedure adopted and conclusions drawn. He can justify his own endeavour in the field.
4. It provides us source of problem of study – an analogy may be drawn for identifying and selecting his own problem of research. The researcher for multiples his hypotheses on the basis of review of literature it also provides the rationale for the study. The results and findings of the study can also be discussed at length (Logesh Kumar Singh, 2007)

2.3. STUDIES CONDUCTED ON MEMORY

Studies Conducted on Memory and Attention

Author: Albanese, Marie-Claire (2007)  

Objectives:

1. To know unraveling the cerebral correlates of attention and spatial localization of innocuous. Vibrotactile stimuli applied to the right volarsurface of the forearm.
2. To investigate the short-term memory for sensory aspects (intensity and location) of cutaneous heat pain delivered to two areas (thenar and hypothenar eminences) of the palm of the right hand.

Findings:

1. Increased degrees of attention to the vibrotactile stimuli were associated with heightened levels of activation in several brain areas.
2. The presentation of painful stimuli evoked activation in different brain regions than those activated during the online maintenance of the intensity and spatial features of those stimuli.
3. The perception and short term memory of pain were processed by a comparable network of areas. The predictability of the memory and control trials may have contributed to these findings (DAI, 2007).
Author : Gregor, Joel A, PSY.D., (2007)

Topic : Analysis of different types of attentional interference compared to working memory.

Variables : Attention, Working memory.

Objective :

1. To compare color — word stroop task (CWS) and color — Block stroop — like Task (CBS) to test of working memory, specifically the Digits span Backward task (DB) and an operation span (OSPN) task.

Findings :

1. Experiment I shows no significant correlation was found between WM and CWS.
2. Experiment II shows no significant correlation between CWS and WM was found.
3. In adequate “attentional load” is believed to be the most probable cause for the lack of correlation. (previous studies have shown a relationship between working memory (WM) and the color — word stroop Task (CWS). newer stroop — like tasks such as the color — Block stroop — like task (CBS) have been shown to cause interference but the nature of the interference is unclear (DAI, 2007).

Author : Lozito, Jeffrey P.Ph.D., (2007)

Topic : Exploring the role of attention during implicit memory retrieval.

Objective :

To investigate the role of attention during implicit memory retrieval.

Tool :

Test – phase division of attention (Perceptual identification test, word — stem completion test, category exemplar production test, category verification Test)

Variables : Attention, implicit memory retrieval.
Methodology:

The present study used four implicit tests that can be classified according to each of these two dimensions. Experiment 1 used a perceptual identification test; Experiment 2 used a word-stem completion test; Experiment 3 used a category exemplar production test; and Experiment 4 used a category verification test.

Finding:

Implicit retrieval is automatic (across all experiments, none of the secondary tasks (attention) reduced level of priming for any of the implicit tests. Further, implicit retrieval had no detrimental effects on performance for any of the secondary tasks.) (DAI, 2007).

Author: Zerfas, Terri sue, Ph.D., (2007)

Topic: Theory of mind, attention, and executive function in first Grade girls.

Objective:

To explore the possible relationships among theory of mind, attention, and executive function in first – grade girls.

Methodology:

This study used to explore the possible relationship among Theory of mind, attention and executive function in first- grade girls

Tools:

1. A teacher rating scale (of behavior associated with the ability to establish, Sustain, and shift attention.)
2. Separate teacher rating scale (of behavior associated with the ability to self- regulated, for the purpose of problem-solving or goal- directed tasks)

Statistical Techniques:

Pearson Product moment correlation, multiple linear and stepwise regression analysis, a principle components factor analysis.
Review of Related Literature

Findings:

1. Identified significant co-efficient between the dependent variable, theory of mind and the predictor, variables for global executive function, meta cognition, attention and working memory.
2. The same independent variables predicted competency in theory of mind ability.
3. Chronological age was an additive factor in prediction.
4. These separate factors associated with the false belief questions that comprised the total theory of mind score. (DAI, 2007)

[Three results confirmed the role of attention and executive function in the development and manifestation of theory of mind competence in first grade girls]

Author: Ross Sheehy, Shannon., Ph.D., (2005)
Objective:
To investigate the relationship between visual attention and VSTM.
Methodology:
Participants were 5.5 and 1 months old infants.
Variables:
Attention and visual short-term memory
Findings:

1. 10- months- old infants are able to use attention to selectively encode items into VSTM.
2. This ability does not appear to be present in younger infants.
3. This ability does not appear to interact with the complexity of the test array.
4. Attentional facilitation requires a relatively salient cue. Infant VSTM representation can be mediated by visual attention and that this mediation relies on relatively well – developed visual attention mechanism. (DAI, 2005)
Review of Related Literature

Author: Eastwood, Adrienne, Eva, Ph.D., (2002)
Topic: Memory or attention? Understanding working memory in children.

Objectives:
1. To develop tests of working memory that has adequate psychometric properties
2. To ascertain whether working memory is distinct from short-term memory and
3. To investigate the relative contributions of processing speed (Ps) controlled attention (A), and short-term memory (STM) in according for individual differences in working memory capacity

Methodology:
Participants were 119 normally functioning children between the ages of nine and thirteen. Structural equation modeling techniques were used.

Tools:
California verbal learning test, Swanson cognitive processing test, woodcock- Johnson test of cognitive ability, Wechsler Intelligence scale for children.

Major variables:
Working memory, short-term memory, controlled attention and processing speed. Working memory & components of STM

Major findings:
1. Working memory is distinct from short term memory, through strongly correlated with short-term memory
2. Processing speed and controlled attention were very highly correlated.

Studies Conducted on Memory and Age
Author: Coats, Abby Heckman, Ph.D., (2007)
Topic: Age related effects of online emotion regulation strategies on mood and memory.
Review of Related Literature

Objective

To investigate the mood and memory related effects of these strategies in young and older adults.

Methodology:

Participants were young and older adults. Participants watched a sad film clip while being instructed to the specific emotion regulation strategic (i.e., avoiding negatitivity, focusing on positively, focusing on negativity or no instructions. Young adults who were instructed to avoid focusing on negativity showed better mood outcomes and more positive memory for the film compared to non-instructed young adults.

Variables:

Age -related effect, emotion regulation, strategies, mood and memory.

Findings:

Young adults who were instructed to avoid focusing on negatively showed better mood outcomes and more positive memory for the film compared to non-instructed young adults. Instructions to down-regulate emotions did not affect older possibly because they used such strategies spontaneously. (DAI, 2007)

Author : Shikhman, Marina, (2007)

Topic : Age, gender, general intelligence and educational level influences on working memory.

Objective :

The ambiguity in the definition of working memory function by employing a multi measure battery of tasks, assessing several components of working memory both across the verbal and visual – spatial domains.

Methodology:

Data were collected from normal adults (N = 403) age 18 to 55 who were tested at the Biophyschiatry department of New York State Psychiatric Institute.
Tools:

Test of visual spatial maintenance. (Spatial delayed response task), a test of continuous updating (N-Back test), a test of memory for temporal order (word serial position test) and a test of mental manipulations with in working memory (letter – Number sequencing), Vocabulary subtest of WAIS – III.

Variables:

Age, Gender, General intelligence, Education, and Working memory.

Findings:

Working memory declines linearly with age in normal adults between ages 18 and 55. Higher levels of estimated intelligence where predictive of better working memory performance and were also found to be a mediating factor for the effects of age on the performance of the measure of continuous updating (N –Back test) such that the age associated decrements were more pronounced in those with lower estimated level of intelligence. In individuals with high estimated intelligence, age was found not to be a significant predictor of performance.

After controlling for age, gender and general intelligence, education was a significant predictor of working memory performance on selected measures, including the verbal continuous updating task, how ever, education did not present as a mediating factor for the effect of age. Gender was found to be a significant predictor only on a test of visual spatial working memory, with males performing better than females. (DAI, 2007)

Author : Cappell, Katharine A, Ph.D., (2006)

Topic : The effect of age on the neurocognitive architecture of verbal and spatial working memory

Objective :

To study the effect of age and memory load on the neural substrates of verbal and spatial working memory
Methodology:

21 young adults and 23 seniors were scanned while performing verbal and spatial delayed response tasks in which memory load was manipulated. The event related design allowed for the separation of encoding maintenance and retrieval related neural activity.

Variables : Age and memory load, verbal and spatial working memory

Findings :

1. The neurocognitive architecture of working memory remains stable across life span

2. Verbal maintenance-related neural activity was largely left- lateralized in the two groups at the two lower memory loads, young adults also activated the right hemisphere extensively at the high memory load whereas senior did not neural correlates memory capacity declines in working memory capacity.

3. At low level of memory load, seniors can maintain performance in the face of age-related declines in the neural circuitry of working memory via the recruitment of DLPFC- mediated mechanism. At high levels of memory load, seniors have reached a capacity limitation at which DLPFC recruitment is not sufficient to maintain performance. (DAI, 2006)

Studies Conducted on Memory and Emotion

Author : Curtayne, Eileen.s., (2007)

Topic : Memory narrowing and thematic arousal. The effect of negative emotion on memory for event details.

Objective:

To investigate visually arousing stimulus, rather than negative arousal, is responsible for memory narrowing as well as their position that negative arousal benefits recall of both central and peripheral information.

Variables:

Memory narrowing thematic arousal, negative emotion memory.
Review of Related Literature

Findings:

The presence of visually salient and emotionally provoking detail produced an effect similar to the traditional memory narrowing pattern and exposure to all the detail categories. However, this latter effect was observed only for the female participants. (DAI, 2007)

Author: Knight Marisa, Ph.D., (2007)

Topic: Memory for neutral events that precede and follow the onset emotional arousal.

Objective:

1. To examine several critical issues pertaining to arousal-induced memory enhancement and impairment for events that occur close in time to the onset of emotional arousal.

2. Exp. 1-3: To examine the time course of arousal-induced retrograde enhancement and to determine whether the effect was specific to items that precede the onset of emotional arousal or whether memory enhancement would spill over to items.

3. Exp. 4-5: To examine the influence of emotional arousal on several aspects of episodic memory over time.

4. Exp. 4-5: To clarify the conditions under which both types of influence are likely to occur.

Variables: Neutral events, Emotional arousal.

Findings:

1. An extended time course is required for arousal-induced retrograde enhancement to be fully expressed.

2. Arousal-induced memory enhancement is specific to neutral stimuli that precede the onset of emotional arousal and does not spill over to stimuli that follow.

3. Arousal-induced memory impairment was specific to the recollective component of episodic memory and was attributable to the disruptive
Review of Related Literature

effect emotional arousal had on the encoding of items that preceded and followed.

By demonstrating arousal-induced enhancement and impairment simultaneously

4. Arousal-induced retrograde enhancement was observed only for items successfully retrieved on an immediate free recall test and only after a delay.

The result suggest that arousal-induced enhancement is jointly determined by

1. The Position of neutral items relative to emotionally arousing items.

2. The number of rehearsal items received at encoding. (DAI, 2007).

Author: Pierson, Eric E, Ph.D., (2007)

Topic: Mood and Memory; mapping the cognitive – emotive structure.

Objective:
To investigate the relationship between mood and memory.

Variable:
Mood and memory.

Findings:

1. Did not indicate a shift in mood as a result of participation in the experimental procedure

2. There were difference in the processing of threatening and non-threatening information between control participants and their high negative affect counter parts.

3. Individuals who experienced a negative mood induction procedure also processed threatening and non-threatening information differently than the control group.

4. Individuals who are either in a negative mood or experience a negative mood induction procedure generated non-threatening types of words to complete new word stems as opposed to the control group which generated threatening words. (DAI, 2007).
Author : Wae Chter, Randall L., (2007)

Topic : Emotional modulation of short-term memory positive and negative stimuli disassociates recall performance among high and low span individuals.

Objective:

1. To investigate the influence of emotional stimuli on the processing of separate non-emotional target information that follow the emotional stimuli after a brief delay.
2. To study the Confounding effect of novelty on the interaction between emotion and cognitive processing.
3. To investigate the influences of positive and negative emotional stimuli on stun processing in low versus high span individuals.

Variables:

Emotional modulation, recall performances positive and negative stimuli.

Findings:

Recall performance was different for high and low span individuals depending on the valence of the emotional stimuli. Recall of the consonants was enhanced for the low span individuals but did not change for the high span individuals when presented in conjunction with the positive happy faces. Recall of the consonants did not change for the low span individuals but was impaired for the high span individuals when presented in conjunction with the negative sad / mad faces. (DAI, 2007)

Studies Conducted on Memory Model

Author : Chamberland, Jessica, R., Ph.D., (2007)

Topic : The implicit memory models.

Objective:

1. To explore the difference in implicit and explicit processes by manipulating the level of encoding via a read-generate manipulation.
2. To study the high lights the interrelated nature of implicit and explicit memory.

3. To examine the effect of retention interval for these memory processes.

Variables:
- Implicit memory and explicit memory.

Findings:
1. Experiment 3 reveals that implicit and explicit memory increasing with more effortful encoding.

2. Experiment 4 reveals that decreases in explicit memory as lag increases interval and increases in implicit memory within this interval, suggesting the explicit and implicit memory are not separate system.

3. Taken together these studies suggesting that implicit storage may be differentiated from explicit and fractional storage. (DAI, 2007)


Topic: Mental models of texts.

Objective:
To examine the models were assessed before and after studying the text by testing the participant’s ability to produce diagram and concept maps, as well as answer knowledge and inference questions in the domain.

Methodology:
Participants were 144 students. They studied text on the heart and circulatory system under different conditions. In experiment 1, Students studied the text in one of three conditions. Participants studied the text alone, or they were promoted to answer adjunct inference questions, or they were promoted to monitor for new information while studying the text. Experiment 2 examined monitoring further by presenting the text and prompting for global monitoring, specific monitoring, or adjunct knowledge questions.

Findings:
Participants who were prompted for monitoring showed significant improvements in updating their mental models over participants in the other
Review of Related Literature

two conditions. Although providing adjunct questions was more effective than providing the text alone, adjunct questions were not as effective as monitoring in resulting in participant improvement of mental models. A significant advantage for monitoring, it was not clear whether this advantage was selective for some aspects of the mental model or for all aspects of the mental model.

Either for the monitoring conditions (Specific or global) led to significant improvement in aspects of the mental models and updating of central concepts. However, only participants in the global monitoring conditions showed a significant advantage over the other two conditions in answering knowledge and inference questions.

This indicated that prompting for global monitoring leads to more complete revising and updating of mental models than text only, adjunct inference questions, adjunct knowledge questions or specific monitoring (DAI, 2007).

Studies Conducted on Working Memory


Topic : Metacognition, proactive interference and working memory. Can people monitor for proactive interference at encoding and retrieval.

Objective:

To investigate whether subjects were sensitive to negative transfer and proactive interference (PI) at encoding and retrieval and whether sensitivity varied with working memory (WM) ability.

Methodology:

Monitoring at encoding was assessed by having subjects make judgment of learning or by controlling study time (E3) while learning word pairs.

Tools :

Dynamic prediction of knowledge (DPOK) judgments, judgment of learning.
Variables

Metacognition, proactive interference and working memory.

Findings:

Subjects are sensitive to negative transfer at the list level but not the item level. At retrieval, subjects were sensitive to PI at the list level and sometimes at the item level. Sensitivity to negative transfer did not vary with W.M, but sensitivity to PI did. (DAI, 2007)

Author : Samman, shatha N., Ph.D., (2004)
Topic : Multimodal computing: Maximizing working memory processing.

Objective:

Proposed an expansion of the current bimodal verbal, visual, spatial, kinesthetic, tactile, and tonal component systems.

Findings:

1. Multimodal WM capacity surpasses that of single modality capacity. Most notably, multimodal WM capacity averaged more than three times the magic number seven proposed by Miller's (1956) one-dimensional memory span.
2. Multimodal capacity nearly reached the summation of each single modality capacity.
3. Minimum interference between the subsystems interims of storage and rehearsal mechanisms. Which supports the proposed multimodal WM model. (DAI, 2004).

Studies Conducted on Recognition Memory

Author : Heather, Rae, Ph.D., (2007)
Topic : Pictorial encoding and testing impact recognition memory.

Objective:

To investigate whether studying pictures and narration versus narration show higher memory test score on pictorial test.
Sample:
Participants first studied information via pictures plus narration, pictures alone and narration alone. During this study, participants saw a power paint presentation containing 48 Photos, 48 narrated statements, or both concentrated man walking through a house and interacting with various household object. Second participants received conflicting information via pictures and narration, picture alone or narration alone.

Variable:
Pictorial encoding, narration, recognition

Findings:
The treatment of studying pictures and narration versus narration alone show greater than the treatment effect of studying pictures versus narration on a pictorial test. Additionally, studying pictures plus narration led to higher memory test scores than studying pictures alone on with written (d = 1.00) and pictorial test (d = 0.40) (DAI, 2007).

Author: Travers, stephanie victoria, Ph.D., (2004)

Topic: An examination of the effects of stroop encoding on perceptual implicit memory and recognition memory using masked repetition.

Objective:
1. To investigate whether encoding target items prior to performing a divided attention (i.e., Stroop) task prevented the detrimental effects of deselection on a perceptual implicit word stem completion task.
2. To know whether the pattern of significant, yet decreased, implicit memory for ignored items would generalize to the implicit perceptual identification task.
3. To examine the effects of deselection of encoding on components of recognition memory.

Tools:
Three key questions regarding the nature of deselection in memory.
Findings:

1. An immediate presentation of an item cannot prevent the subsequent detrimental effects of a requirement to ignore its second presentation. Although perceptual priming was preserved under conditions of ignoring, this form of memory was decreased relative to fully attending the information.

2. A pattern of fully preserved memory for items that were ignored once, yet decreased memory for items that were encoded and subsequently ignored.

3. Both components of recognition are affected by the requirement to actively ignore information.

These lines of investigation provide a comprehensive examination of deseletion processes that operate on long-term memory (DAI, 2004).

Studies Conducted on Autobiographical Memory

Author: Margiano, Suzanne Grace, Ph.D., (2007)
Topic: Examination of the effects of self-modeling on autobiographical memory.

Objective:
Systematically explore the relationship between autobiographical memory alteration and self-modeling efficiency.

Tool: Single-Subject research design

Methodology:
Participants were 3 fourth grade students using a single-subject research design.

Variables:
Self-modeling efficiency autobiographical memory.

Findings:
Autobiographical memory alteration in narrative recall recollective experience and self-concept reports following self-modeling intervention.
Review of Related Literature

(These findings support memory alteration as a mediating factor in eliciting behaviour change through self-modeling interventions). (DAI, 2007).

Study Conducted on Memory and Disease

Author : ML Aviliffe, Patrick, Ph.D., (2006)
Topic : Memory and executive functions in adolescents with lyme disease.

Objectives :
To examine relationship between the adolescents with lyme disease and adolescents without lyme disease matched on age, gender, IQ socioeconomic status and overall physical health to current cognitive performance.

Methodology:
Participants were 25 adolescents, aged 13-18 with lyme disease and 25 matched comparisons. Self assessment of cognitive difficulties, current grade point average and number of School days missed from September – December 31 of the current year were also collected.

Tools :
The wide range assessment of memory and learning second edition and the Delis Kaplan Executive Function system were administrated.

Variable :
Memory, Executive Functions, Lyme disease.

Findings :
The Lyme disease group reported significantly more cognitive difficulties than comparisons. Participants with Lyme disease scored significantly lower on measure of short term verbal and visual memory, working memory, long term recall of verbal information, as well as visual and verbal recognition memory. Lyme group’s performance on visual memory tasks which not only differed from matched controls but also fell more than one standard deviation below average than national norms. Tests of executive functioning results were more varied, with the two groups not differing on a verbal executive task, verbal fluency but differing significantly on a visually
based executive functioning tasks, spatial planting. Adolescents with lyme disease also had significantly lower grade point average and missed more days of school in the current school year. (DAL, 2006).

**Studies Conducted on Memory and Forgetting**

**Author**: Johnson, Lisa jeanne, Ph.D., (2004)

**Topic**: Examining the mechanism and influential extent of retrieval – induced forgetting.

**Objective**: To investigate three assumptions of the pattern suppression model of retrieval – induced forgetting were examined. These assumptions included.

i. That retrieval induced forgetting is retrieval specific

ii. That it results from retrieval competition and

iii. That access to affected items is inhibited at the level of the item representation.

**Methodology**: Out of 3 experiments, Experiment 1 examined the retrieval-specific nature of the effect. Experiment 2 and 3 examined the scope of retrieval completion.

**Variables**: Retrieval and forgetting process.

**Findings**:

1. The retrieval process is necessary to produce forgetting effect.

2. Retrieval – induced forgetting only for items that were members of the retrieval practiced category, suggesting that mere semantic relatedness is not sufficient to make an item a competitor.

3. No effect of retrieval practice was found either for reaction times or numbers of error. (DAI, 2004)

**Author**: Kelley, Matthew R., Ph.D (2002)

**Topic**: Remembering the forgotten; reminiscence hypermnesia, and memory for order.
Review of Related Literature

Objectives:
To investigate, whether repeated testing affects item and order retention differentially.

Methodology:
Three experiments established that repeated testing affects item and order retention differently.

Variable:
Reminiscence, hypermnesia, and memory

Findings:
Participants produced hypermnesia with repeated free recall tests, whereas participants net performance declined significantly across successive free reconstruction of order tests. Order performance declined over tests with a variety of encoding conditions (Pictures words, relational and item – specific processing) and retrieval conditions (intentional and incidental learning) When testing occurred immediately after presentation (DAI, 2002).

Study Conducted on Spatial Memory
Author: Yamamoto, Naohide, Ph.D., (2008)
Topic: Modality dependence and independence in human spatial memory.

Objective:
To investigate whether the pieces of spatial information acquired from different modalities merge into a single unified spatial representation or form multiple modality dependent spatial representation.

Variables:
Modality, spatial memory

Findings:
Judgment of relative direction generally showed that equivalent memory performance was yielded irrespective of learning modalities, suggesting that memory representation accessed during JRD’s was largely independent of any modality (DAI, 2008).
Study Conducted on Memory and Stress


Topic: The relationship between self-reported symptoms of trauma / chronic stress and discrete areas of memory and higher cognitive functions in children.

Objective:

To explore the relationship between self-reported symptoms of trauma / chronic stress and discrete areas of memory and higher cognitive functions in children.

Methodology:

Participants for this research were a convenience sample of 102 children, ages 6-12. Fifty-one participants reported experiencing elevated symptoms of Trauma / chronic stress (Trauma group) and 51 reported minimal or no symptoms of trauma / Chronic stress (No Trauma group)

Tools:

Angle /Andy cartoon Trauma scales, the california verbal learning test-children’s version the complex figure test and recognition test trails and a finger maze task.

Statistical Technique:

Multivariate analyses of variance. (MANOVAS)

Findings:

On the memory variables, ANOVAs revealed significant group differences in cumulative list learning, short delay free recall, and long delay free recall. Marginal group differences were detected for initial list learning and on the recognition trial. There were no significant group differences on measures of visual memory or tactuospatial memory. (DAI, 2004).

Study Conducted on Memory and Sleep

Author: Fenn, Kimberly Michelle, Ph.D., (2006)

Topic: Waking up to the impact of sleep: Consolidation of generalized skill learning and declarative memory formation.
Objective:
To know a role of sleep in the consolidation of generalized skills in perceptual learning of synthetic speech.

Variables:
Sleep, memory, sleep dependent memory consolidation, Generalized skill.

Findings:
1. Sleep plays a wide spread role in the consolidation of generalized skills, but the specific function of sleep may vary across tasks.
2. Sleep was found to stabilize performance, enhance performance above level achieved after training, and even change the representation of a skill.
3. Sleep was also found to recover memory that appeared to have been lost.
4. The role of sleep in declarative memory formation using a paradigm that elicits high rates of false memory.
5. Sleep improves memory by reducing false memory without sacrificing correct memory.
6. Our knowledge of sleep-dependent memory consolidation in three ways. It first extends the range of skills that display sleep related benefits to three separate generalized learning tasks. It also suggests two new manifestations of sleep-dependent memory consolidation: memory recovery and changed skill representation. Finally, it provides the first empirical evidence that sleep may function to prune out false memory. (DAI, 2006).

Study Conducted on Children’s Memory
Author : Cordon, Ingrid Marlene, Ph.D., (2004)
Topic : “Who spilled the jelly at camp Ingrid?” Influencing children’s memory through familiarity and stereotypes.
Review of Related Literature

Objectives:
To study how the acquisition of social information specifically knowledge about personal characteristics, influences young children’s ability to recall and report information. Two forms of knowledge were systematically examined, (i) Familiarity (ii) Stereo types.

Methodology:
Participants were one hundred and forty five children within each age group. Children were randomly assigned to one of four experimental conditions. Children assigned to the familiar condition interacted with a target research assistant over the course of six hours. Children assigned to the unfamiliar condition did not interact with the target research assistant. Additionally, children assigned to the stereotype condition were provided with a negative stereotype about the target research assistant, whereas children assigned to the control condition were not provided any stereotype information.

Statistical Technique: Analysis of covariance.

Findings:
1. An increase in children’s correct responses to open ended questions, but only for children in the unfamiliar condition. The effect of stereotype was not observed among children in the familiar condition, at least when open – ended questions were considered.
2. Moreover, knowledge structures developed through a process of familiarity generally increased children’s correct responses and reduced errors to a set of closed – ended questions. (DAI, 2004)

Study Conducted on Memory and Relaxation


Topic: Using relaxation to cue memory and improve law school administration test scores

Objectives:
To evaluate the success of induced mood congruence as a means for evoking context dependent memory (CDM) and improving performance on the law school administration test scores (L.S.A)
Methodology:

Sixty nine students from suburban- Newyork who attended a 9 week L.S.A.T preparatory class with the Princeton Review were selected. Teachers administered a relaxation technique to these students either (1) Prior to in class learning only. (2) Prior to both learning and testing or (3) during neither learning nor testing measures of change in anxiety were made and improvements in L.S.A.T scores by group were compared.

Hypothesis:

Test score improvement would be significantly higher for those participants in the relaxed mood- congruent condition than in the mood-incongruent condition, or in the neutral condition.

Variables:

Relaxation, Cue memory, Law school administration test, performance.

Findings:

The relaxation technique was shown to be an effective method for reducing anxiety, it did not evoke mood congruence and was not shown to correlate with improved test performance. Test irrelevant thinking was the type of test anxiety that most frequently demonstrated a negative impact on performance where as tension was once linked to improved scores. (DAI, 2006)

Study Conducted on Episodic and Semantic Memory

Author: Phatak, Vaishal.S, Ph.D., (2005)

Topic: Hippocampal and extra – hippocampal volume relationships to memory subsystems in temporal lobe epilepsy.

Objective:

To investigate the relationship between the hippocampal volume asymmetry and extra hippocampal volume asymmetry and performance on formal measures of episodic semantic memory.
Methodology:

A 2x2x2 design was used in this study segmentation of hippocampal and extra hippocampal volume asymmetry was conducted using AFN1.

Variables:

Hippocampal and extra – hippocampal volume, semantic memory and episodic memory

Findings:

Larger presurgical left extra – hippocampal volumes were correlated with greater post- surgical decline on BNT. There was no correlation between extra hippocampal volume asymmetry and post surgical change in vocabulary or information. The extra- hippocampal volume asymmetry was not correlated with post- surgical change on any of the episodic memory variables. The hippocampal volume asymmetry was not associated with post- surgical change in any of the semantic or episodic memory variables. There was no relationship between hippocampal volume asymmetry and pre-surgical episodic memory variables or semantic memory variables. There was also no relationship between extra- hippocampal volume asymmetry and pre-surgical semantic memory variables or pre-surgical episodic memory variables. (DAI, 2005).

Study Conducted on Memory and Neural Activity

Author: Guthormson, Amy, Ph.D., (2007)

Topic: The Cognitive neuroscience of memory errors.

Objective:

1. To Examine the neural activity associated with different types of memory errors.

2. To investigate the neural Origins of memory errors that occur when only the general, non specific features but not the specific details of an item are encoded.

3. To compare the neural activity correlates of two types of false recognition, related false recognition (i.e., claiming to remember something that is related to previously encountered item) and unrelated
false recognition (i.e., claiming to remember something that is unrelated to previously encountered items).

4. To explore the activity associated with two types of related false recognition, conceptual false recognition (i.e., false alarms resulting from semantic similarities between studied and tested item) and perceptual false recognition. (i.e., false alarms resulting from physical similarities between studied and tested items.

Variables
- Neural activity, memory errors.

Findings
- 1. Specific recognition (i.e., accurate memory for specific details was accompanied by encoding - related increases in right fusiform activity, whereas non-specific recognition (i.e., memory errors including false recognition and partial recognition) was associated with encoding related increases in left fusiform activity coupled with relatively little right fusiform activity.

- 2. Different types of false recognition can rely on distinct neural mechanisms.

- 3. Conceptual false recognition was particularly reliant on frontal cortex activity, which presumably reflected increased semantic processing during conceptual false recognition. Conceptual and perceptual false recognition rely on at least partially distinct neural substrates.

Finding
- In summary, this research examined the neural correlates of accurate and erroneous memory for different types of information specific Vs non-specific; related Vs unrelated; conceptual Vs perceptual) These studies provide valuable insight into the constructive nature of memory revealing the neural correlates of different types of memory error. (DAI, 2007).
Study Conducted on Memory and Competition

Author: Grant, Emily Skow, Ph.D., (2007)

Topic: A look at learning in repeated search: the role of memory and competition.

Variables:
Memory competition & repeated search efficiency.

Methodology:
Participants learn a great deal about repeated search displays including the location of a particular item (both identity and location), relative probability with which an item occurs in a location, and direction from the fixation point to the target.

Findings:
I argue that memory is established for this component and the reactivation of these memories by a repeated search display produces competition. This competitive target verification process takes time and can result in positive search slopes, which have been taken as evidence for memory-free-search - a flawed logical argument. (DAI, 2007)

Study Conducted on Memory and Neighbourhood interference effect

Author: Johnson, Rebecca Linn, Ph.D., (2007)

Topic: The quiet clam is quite calm: Foveal and parafoveal transposed-letter neighbourhood effects in reading.

Objectives:
1. To explore the nature of transposed-letter (TL) neighbourhood effects within the context of normal silent reading.
2. To address the processing of target words.
3. To manipulate the sentence context leading up to the target word to explore whether semantic constraints can attenuate neighbourhood interference effect.
4. To explore the parafoveal processing of transposed-letter neighbors by employing an eye-movement contingent boundary change paradigm.
Variables:

- Transposed-letter neighbourhood effects, silent reading.

Findings:

- The neighbourhood interference effects do occur in normal silent reading. (DAI, 2007)

**Study Conducted on Source Memory & Prospective Memory**

**Author**: Karanzoulis, Stella, Ph.D., (2006)

**Topic**: The relation of frontal lobe functions to source memory and prospective memory in amnestic mild cognitive impairment.

**Objectives**:

- To examine the relation of frontal lobe functioning to source and prospective memory.

**Methodology**:

- Participants were 28 healthy elderly individuals and 28 individuals with MCI (Mild Cognitive Impairment)

**Variables**:

- Source memory, prospective memory & mild cognitive impairment.

**Findings**:

- A difference only between the control participant and the below-average frontal group, those with average frontal abilities performed normally on the temporal order measure and differed only marginally from controls on prospective memory. Frontal lobe function did not affect spatial location source memory.

- Overall, these findings have important clinical applications as suggest that (individuals with MCI who have additional, albeit mild, Frontal lobe changes will be impaired in temporal order and prospective memory, whereas those with preserved frontal functions should show little impairment on both these types of memory tests. (DAI, 2006)

**Study Conducted on Memory and Imaginary Ability**
Review of Related Literature

**Author** : Chang, Sau Hov, Ph.d., (2007)

**Topic** : Individual differences in imagery ability false memories.

**Objectives** :
1. To examine the effects of imaging instructions and individual differences in visual imagery ability on false memories.
2. To know whether people who differ in the vividness of their visual mental images also differ in their susceptibility to false memories under standard study conditions.
3. To know whether people who differ in the vividness of their visual mental images differ in their susceptibility to false memories under condition in which they are instructed to form visual images.

**Methodology** :
96 Participants studied a series of concrete objects in pictures or red words and were then given a standard recognition memory test and two critical recollection tests.

**Tools** :
A series of concrete objects in pictures or red words and were then given a standard recognition memory test and two critical recollection tests.

**Findings**:
When participants were instructed to imagine a picture of an item when they saw the same item presented as a red word, and to visualize a red word of an item when they saw the same item presented as a picture, participants, regardless of imaginary ability, exhibited overall higher hit rates on all of the recognition tests than when they were not instructed to form visual images. (DAI, 2007)

**Study Conducted on Stereotype Inconsistent Memory**

**Author** : Stoever, Colby Justin (2007)

**Topic** : An exploration of the stereotype inconsistent memory advantage.

**Objective** :
Review of Related Literature

1. To examine memory for stereotype consistent and inconsistent information
2. To test the effect of manipulation strength on memory of trait words.
3. To test whether a 48 hour time delay between study and test phases would affect the memory of trait words.

Methodology:

Three experiments were conducted to further examine memory for stereotype consistent information. All participants across all experiments studied a list of trait words that were either stereotype consistent or inconsistent of gay men.

Tools:

A list of trait words

Findings:

1. The stereotype inconsistent memory advantage was due to an encoding or retrieval process.
2. There was no indication of a stereotype inconsistent memory advantage.
3. Interesting differences in total recall due to manipulation strength and a 48 hour retention interval were found. (DAI, 2007).

2.4. STUDIES CONDUCTED ON MNEMONIC STRATEGIES

Author: Hayes, Orla C. (2009)

Topic: The Use of Melodic and Rhythmic Mnemonics to Improve Memory and Recall in Elementary Students in the Content Areas

Methodology:

The purpose of this study is to examine the effects of musical and rhythmic mnemonics to facilitate the recall of academic content in the K-5 classroom. Experiments were conducted in three grade school classrooms. Children were taught songs with academic content in the curriculum areas that were current at that time. The students were interviewed and subsequently tested on the retention of subject matter and their experience. Findings
indicated that using rhythmic and musical mnemonics in any classroom provides an attractive and innovative alternative instructional and learning strategy.

**Author**: Brahler, C. Jayne; Walker, Diane (2008)

**Topic**: Learning Scientific and Medical Terminology with a Mnemonic Strategy Using an Illogical Association Technique

**Source**: Advances in physiology Education, v32 n3 p219-224 Sep 2008

**Methodology**:  
The Dean Vaughn Medical Terminology 350 Total Retention System, also known as Medical Terminology 350 (25), is a mnemonic instructional and learning strategy that combines mental imagery and keyword mnemonic elaboration processes to help students recall the scientific meaning of Greek and Latin word parts. High school students in Anatomy and Physiology classes at a career technology center were divided into experimental (Medical Terminology 350), control (rote memorization), or combination (Medical Terminology 350 and rote memorization) groups and completed pre- and posttests of standardized word recall tests. Students in the Dean Vaughn Medical Terminology 350 Total Retention System group achieved significantly greater pre- to posttest word recall improvement compared with students in both the rote memorization (P less than or equal to 0.0001) and combined rote memorization and Medical Terminology 350 (P less than or equal to 0.05) groups. There appeared to be a dose-dependent response as the pre- to posttest gain in word recall scores increased as exposure to the treatment increased.

**Author**: Eskritt, Michelle; McLeod, Kellie (2008)

**Topic**: Children's Note Taking as a Mnemonic Tool

**Source**: Journal of Experimental Child Psychology, v101 n1 p52-74 Sep 2008
Review of Related Literature

Methodology:

The current study examined the role that task constraints might play in the production of nonmnemonic notes. In Experiment 1, children played one easy and one difficult memory game twice, there was no significant difference in notation quality or memory performance between spontaneous and trained note takers, children's production of nonmnemonic notes may be due in part to a lack of knowledge regarding what task information is important to represent or how to represent it in their notes rather than to an inability to make functional notes in general.


Topic: Improving Students' Study Habits by Demonstrating the Mnemonic Benefits of Semantic Processing

Source: Teaching of Psychology, v35 n2 p96-98 Apr 2008

Methodology:

This article describes an in-class exercise that illustrates the advantage of semantic over nonsemantic study habits. The exercise includes a survey of students' current study strategies, followed by the presentation of an abbreviated version of Craik and Tulving's (1975) classic levels-of-processing experiment. Result indicate that significant benefits of semantic processing over non semantic processing.


Topic: Don't Forget Acronyms

Source: Teaching Pre K-8, v35 n8 p56 May 2005

Methodology:

The mnemonic device can be a terrific tool to help students memorize those things that are so easy to forget. A mnemonic device is a trick or strategy to help remember something. Adults use them every day. Frequently, they may use a rhyme to help them remember how many days are in each month and
they often use associations or alliterations to help them remember people's names.

Sometimes, an acronym is used as a mnemonic device. Younger students need to be directly taught the specific acronyms related to the topic being studied, and by middle school, students can begin to make up their own acronyms to help them study and memorize information.

**Author**: Goll, Paulette S. (2004)

**Topic**: Mnemonic Strategies: Creating Schemata for Learning Enhancement

**Source**: Education, v125 n2 p306 Win 2004

**Methodology**:

This article investigates the process of remembering and presents techniques to improve memory retention. Examples of association, clustering, imagery, location, mnemonic devices and visualization illustrate strategies that can be used to encode and recall information from the long-term memory. Several memory games offer the opportunity to test skills as strategies are explored.


**Topic**: Enhancing Student Learning and Social Behavior through Mnemonic Strategies.

**Source**: Teaching Exceptional Children, v36 n2 p30-35 Nov-Dec 2003

**Methodology**:

This article on using mnemonics with students having learning and behavior problems first offers a case study of a 7th grade student and then describes the letter strategy, the keyword mnemonic method, and the pegword method. Seven steps for implementing mnemonic strategies are offered. An inset reviews the research literature on using mnemonic strategies.
Review of Related Literature

Topic: Memory, Multiplication and Mnemonics: A Study into the Recall of Basic Multiplication Facts
Source: Online Submission
Methodology:

The purpose of this study is to examine what effects the mnemonic devices of pictures and stories have on the memorization and recall of multiplication facts. This study was conducted on a fourth grade classroom in which the students were divided into three groups. The first group was given standard flashcards, the second group was given a set of picture and story cards, and the third group was given both flashcards and picture/story cards. Students were initially assessed with a pre-test and subsequently given post-tests each Friday for five weeks. Results from the study suggest that students who received both the flashcards and the picture/story cards displayed the greatest success.

Author: Carney, Russell N.; Levin, Joel R. (2000)
Topic: Mnemonic Instruction, with a Focus on Transfer
Source: Journal of Educational Psychology, v92 n4 p783-90 Dec 2000
Methodology:

Examines mnemonic transfer in the form of knowledge generalization in the context of an artwork-learning task. Results reveal that mnemonic instruction produced memory benefits on a direct test, and that on a transfer task, mnemonic students who were directed to focus on the general style of the artist outperformed students who focused on details of the paintings.

2.5. STUDIES CONDUCTED ON USING EFFECTIVE STUDY HABITS

Author: Dolton, Peter; Marcenaro, Oscar D.; Navarro, Lucia (2003)
Topic: The Effective Use of Student Time: A Stochastic Frontier Production Function Case Study
Source: Economics of Education Review, v22 n6 p547-560 Dec 2003
Methodology:

The relationship between student study time allocation and examination performance is little understood. We model the allocation of student time into formal study (lectures and classes) and self study and its relationship to university examination scores using a stochastic frontier production function. This case study uses unique time budget data and detailed personal records from one university in Spain. The results suggest that, within the formal system of teaching in Spain, both formal study and self study are significant determinants of exam scores but that the former may be up to four times more important than the latter.

Author: Rybicki, Amanda (2002)
Topic: Developing Effective Study Skills While Studying a Foreign Language.

Methodology:

This research describes strategies used to improve student achievement in a foreign language class through the use of effective study skills. The targeted population included high school students in a first year foreign language class.

Analysis of probable cause data revealed that students were not successful in their classes due in large part to their lack of effective study skills. Over several months, students received instruction in the strategies. Results showed that students were able to use the language learning strategies to achieve higher success. Students reported feeling more comfortable with the various aspects of language learning when using these language learning strategies.

Author: Georgiady, Nicholas P.; Romano, Louis G. (1994)
Topic: Focus on Study Habits in School: A Guide for Teachers and Students To Increase Learning in the Middle School.
Methodology:

This booklet is designed to help middle school students and their teachers analyze in-school study habits, providing 12 specific suggestions to help students succeed academically. Students need to understand the importance of: (1) school attendance; (2) good health; (3) paying attention in class; (4) effective note-taking skills; (5) picking a good seat in the classroom; (6) having the right materials for their assignments; (7) using the proper study skills for large group, small group, and individual learning situations; (8) listening and taking notes in class; (9) passing tests; (10) effective test taking strategies; (11) asking for help when they need it; and (12) teacher-student conferences and dialogue.

Author: Oosterhuis-Geers, Joke (1993)
Topic: Procedure To Promote Effective and Efficient Study Skills (PROPES) with PA-Students.

Methodology:

Participants were Public administration (PA) students. The Procedure to Promote Effective and efficient Study skills (PROPES) was developed and implemented in 1991. Research results indicate that the PROPES group of 136 students improved their study pace and study effectiveness more than did the equivalent control group. PROPES students improved in experiencing less stress, using knowledge more often, receiving more signals about the learning process, and more often studying with friends.

Author: Mieux, Donna (1993)
Topic: Improving Academic Skills and Study Skills of Elementary School At-Risk Students by Peer and Cross-Age Tutoring.

Methodology:

A practicum aimed to increase academic competence in math and/or reading and to improve study skills of 27 at-risk students referred by their classroom teachers to the school resource specialist. A before-school peer and
cross-age tutoring program for at-risk students was developed. A supplementary cross-age and peer tutorial program is an effective strategy in addressing the varied needs of the at-risk student.

Source: Forum for Reading, v15 n2 p47-52 Spr-Sum 1984
Methodology:

A cyclical plan for studying that takes into account information processing strategies and their effective management by students consists of (1) specifying study purposes, (2) previewing the materials, (3) proceeding through the task incrementally, and (4) connecting the content to be learned to other knowledge about the material studied. The purpose of global review is to bring closure to the study of a text in a way that will render it memorable and useful for further study. The final consideration in the cyclical framework is preparing for a unit test, at which point students augment their notes with information gained from supplementary materials.

Author: Kahn, Norma B. (1979)
Methodology:

A revision of "Effective and Efficient Study," a guide to effective study for university students, is presented. Topics include: self-evaluation using a checklist of factors involved in college reading and study problems; self-evaluation regarding test anxiety; organizing work and budgeting time; remembering effectively; improving listening and note taking from listening; saving time in taking notes from reading by delayed note taking; reading rapidly for key ideas only; reading expository material for study purposes; mastering textbook material; reading fiction or poetry for full effect and meaning; speed reading; adapting to reading and note taking in an unfamiliar
genre or discipline; taking notes from textbooks or articles in the biological or physical sciences, history books or articles, material in folklore, psychology, and sociology, poetry in a first course in literature, and legal cases in a first course in law; questioning to encourage critical and creative reading of any expository (factual or theoretical) material; minding metaphors; preparing a research report; developing a habit of strengthening vocabulary; preparing for examinations; taking examinations; and improving concentration, motivation, and will power.

Author : Annis, Linda; Davis, J. Kent (1976)
Topic : The Effect of Study Techniques and Preferences on Later Recall.
Methodology :
College students were assigned to various study and review conditions in order to determine the effect of using a preferred or nonpreferred mode of study and of being familiar or unfamiliar with the assigned reading topic. Results of the posttest showed that reading only when one preferred this technique and was familiar with the topic produced the best examination scores. Reading only was least effective when one preferred to read only but was unfamiliar with the topic, while underlining and note taking were most effective in this situation.

2.6. STUDIES CONDUCTED ON NUTRITION

Studies Conducted on Iron
Author : Dorian Friedman (2006)
Topic : Iron Deficiency's Long-Term Effects: An Interview with Pediatrician Betsy Lozoff
Source : National Scientific Council on the Developing Child
Review of Related Literature

Methodology:

Betsy Lozoff is among the world's leading experts on iron deficiency and its effects on infant brain development and behavior. Iron deficiency is the most common single nutrient disorder in the world, affecting more than half of the world's infants and young children. Research by Lozoff and others has shown that there are long-lasting developmental disadvantages among children who experienced severe, chronic iron deficiency as infants--disadvantages that are not corrected by giving iron later. [The interviewer for this report was Dorian Friedman.]

Author: Kaplan, Bonnie J.; Crawford, Susan G.; Field, Catherine J.; Simpson, J. Steven A (2007)

Topic: Vitamins, Minerals, and Mood


Methodology:

In this article, the authors explore the breadth and depth of published research linking dietary vitamins and minerals (micronutrients) to mood. Since the 1920s, there have been many studies on individual vitamins (especially B vitamins and Vitamins C, D, and E), minerals (calcium, chromium, iron, magnesium, zinc, and selenium), and vitamin-like compounds (choline). Recent investigations with multi-ingredient formulas are especially promising. However, without a reasonable conceptual framework for understanding mechanisms by which micronutrients might influence mood, the published literature is too readily dismissed. Consequently, 4 explanatory models are presented, suggesting that mood symptoms may be expressions of inborn errors of metabolism, manifestations of deficient methylation reactions, alterations of gene expression by nutrient deficiency, and/or long-latency deficiency diseases. These models provide possible explanations for why micronutrient supplementation could ameliorate some mental symptoms.
Review of Related Literature

Author: Arij a, Victoria; Esparo, Griselda; Fernandez-Ballart, Joan; Murphy, Michelle M.; Biarnes, Elisabeth; Canals, Josefa (2006)

Topic: Nutritional Status and Performance in Test of Verbal and Non-Verbal Intelligence in 6-Year-Old Children

Source: Intelligence, v34 n2 p141-149 Mar-Apr 2006

Methodology:

The relationship between nutritional status and intellectual capacity in 6-year-old children was investigated in 83 subjects of medium-high socio-economic status, without any apparent risk of malnutrition and normal or high intellectual capacity. Nutritional status was evaluated by measuring food consumption, anthropometrical measurements and biochemical indicators (iron status, red cell folate and total plasma homocysteine concentration (tHcy)). IQ was evaluated using the WPPSI test. The relationship between nutritional status and IQ was investigated by multiple linear regression analysis adjusting for socio-demographic variables and sex. There was a significant and positive relationship between iron intake and both total and non-verbal IQ. This was also the case for folate intake and both total and verbal IQ. The fact that these observations were made in children from a developed country, in which their energy and education requirements are met, suggests that their cognitive development may benefit from specific preventive nutritional interventions with these nutrients.

Author: Bobonis, Gustavo J.; Miguel, Edward; Puri-Sharma, Charu (2006)

Topic: Anemia and School Participation

Source: Journal of Human Resources, v41 n4 p692-721 Fall 2006

Methodology:

Anemia is among the most widespread health problems for children in developing countries. This paper evaluates the impact of a randomized health intervention delivering iron supplementation and deworming drugs to Indian
preschool children. At baseline, 69 percent were anemic and 30 percent had intestinal worm infections. Weight increased among assisted children, and preschool-participation rates rose by 5.8 percentage points, reducing absenteeism by one-fifth. Gains were especially pronounced for those most likely to be anemic at baseline. Results contribute to a growing view that school-based health programs are an effective way of promoting school attendance in less developed countries.

**Author** : Lozoff, Betsy; And Others (1998)
**Topic** : Behavior of Infants with Iron-Deficiency Anemia
**Source** : Child Development, v69 n1 p24-36 Feb 1998
**Methodology** :
Compared behavior of 52 Costa Rican 12- to 23-month-olds with iron-deficiency anemia to that of 139 infants with better iron status. Found that iron-deficient infants maintained closer contact with caregivers; showed less pleasure and playfulness; were more wary, hesitant, and easily tired; made fewer attempts at test items; and attended less to instructions and demonstrations than comparison group infants.

**Author** : Schibeci, Renato (1997)
**Topic** : Can Iron Lift Your Learning Ability?
**Methodology** :
Presents samples of publicly available materials related to the role of iron in the diet. Summarizes what nutritionists feel about iron in the human diet and suggests some experiments related to iron for the classroom. (AIM)

**Author** : Loosli, Alvin R (1993)
**Topic** : Reversing Sports-Related Iron and Zinc Deficiencies.
**Source** : Physician and Sportsmedicine, v21 n6 p70-74,77-78 Jun 1993
Review of Related Literature

Methodology:

Many active athletes do not consume enough zinc or iron, which are important for oxygen activation, electron transport, and injury healing. Subclinical deficiencies may impair performance and impair healing times. People who exercise regularly need counseling about the importance of adequate dietary intake of iron and zinc.

Author: Crews, Cecilia N. (1989)


Methodology:

A kindergarten teacher reviews research findings on aspects of children's diet that may influence behavior and the ability to learn. Introductory discussion presents vignettes relating kindergarten children's behavioral responses to dietary intake. A brief background section offering dietary tips is followed by relatively extended discussions of caffeine, sugar, food additives, food allergies, and general nutrition. The section on caffeine emphasizes Baer's (1987) naturalistic study of the responses of individual children to caffeine. The study found only a few weak relationships between caffeine ingestion and outcome variables. The discussion of sugar's effects focuses on carbohydrate sensitivity and hyperactivity. The section on food additives focuses on Dr. Feingold's research, the effectiveness of the Kaiser-Permanente (K-P) Diet, as well as studies showing no consistent deterioration in children's behavior following dietary challenges with artificial food coloring. Discussion of food allergies takes into account the summation effect, exemplified by a child who has symptoms from eating chocolate only during ragweed season. Concluding remarks briefly consider problems related to inadequate nutrition, skipping breakfast, iron and protein deficiency, sugar excess, and chronic hunger. (RH)

Author: Driva, A.; And Others (1985)

Review of Related Literature

Source: Early Child Development and Care, v22 n1 p73-82 1985

Methodology:
Describes a pilot study, involving 48 institutionalized infants and toddlers, which aimed to treat iron deficiency anemia and to discover other factors contributing to the problem. Results indicate improvement in cognitive development after the administration of iron among three groups, while no significant differences were observed in psychomotor development. (DST)

Author: Pertz, Doris L.; Putnam, Lillian R. (1982)

Topic: What is the Relationship between Nutrition and Learning?

Methodology:
While teachers are well aware of the effect of nutrition on children's health, they are less aware of the relationship of diet to the learning process. An indirect relationship between nutrition and learning exists because food is required to supply energy for learning. Research has shown that a highly nutritional breakfast results in improved student attention in late morning task performance. Poor nutrition reduces the body's capacity to resist disease and infection, and iron-deficient blood is inefficient in transporting oxygen to the cells of the body and brain. A direct relationship between diet and learning has been shown by research indicating that protein-poor diets produce children who are less able to learn, have lower intelligence quotients, and poorer language development. The magnitude of the effects of nutritional deprivation appears to be positively correlated with its duration and severity and the developmental period during which it occurs. Reading teachers should become activists in the field of nutrition education. Among the points of a positive course of action for reading teachers are the following: (1) reading teachers and all educators should develop and enforce nutrition education programs; (2) teachers should stimulate children's awareness of an interest in good nutrition; (3) teachers should work with parents and school authorities to replace candy, sweets, and colas in vending machines with fruits, nuts, milk, and fruit juices; and (4)
Review of Related Literature

teachers should be alert to typical food allergy reactions, and bring them to parents' attention, encouraging consultation with their physicians.

Author : Munro, Nancy (1967)
Topic : The Relationship Between Hemoglobin Level and Intellectual Function.
Methodology :

In a study to learn whether or not poor nutrition, as indicated by low hemoglobin levels, affects intelligence and behavior, 113 Head Start children in Missoula, Montana took part. Group testing with the Lorge Thorndike Intelligence Test and individual testing with the Wechsler and Primary Scale of Intelligence or Wechsler Intelligence Scale for Children provided IQ information. An experimental group of the Head Start children was given iron tablets daily at school, and a control group was given placebos. Blood tests were taken at intervals in the school year, and teachers rated the behavior of all the children. Results of data analysis indicated that the iron pills did not significantly affect homeglobin levels. However, for those with low hemoglobin levels, increases in the levels were associated with increases in intelligence scores. "A Study of Food and Poverty" (PS 001 721), by the same author, is a longer report on the same subject.

Author : Charlton-Seifert Joan; (1979)
Topic : Sweet and Slow: The Relationship between Nutrition and Reading Disability.
Methodology :

Recent reports on the relationship between nutritional deficiencies and reading disabilities include the following findings: many children are undernourished but not underfed; undernutrition may decrease learning time, interfere with learning at critical periods of development, and lead to motivational and personality changes; inadequate diet causes reduced responsiveness and attentiveness, easy fatigue, and inability to sustain
prolonged effort; diet improvement results in better learning, fewer absences, and added social, physical, and educational benefits; and iron deficiency, found in 40% of the school age population, leads to poor attention span, apathy, listlessness, and poor scores on measures of intellectual growth. It has also been found that school lunch menus and vending machine foods may contribute to poor nutrition. Recommendations that are made for educators to remedy this situation include: integrate nutrition education into the reading curriculum; educate teachers, administrators, and parents in nutrition; give students input into cafeteria menu planning; and have the diet records of all students having chronic learning or behavioral problems professionally analyzed.

Studies Conducted on Iodine

Author : Taras, Howard (2005)
Topic : Nutrition and Student Performance at School
Source : Journal of School Health, v75 n6 p199 Aug 2005
Methodology :

This article reviews research from published studies on the association between nutrition among school-aged children and their performance in school and on tests of cognitive functioning. Articles are separated into 4 categories: food insufficiency, iron deficiency and supplementation, deficiency and supplementation of micronutrients, and the importance of breakfast. Research shows that children with iron deficiencies sufficient to cause anemia are at a disadvantage academically.

Studies Conducted on Zinc

Author : Yenigun, Ayse; Ozkinay, Ferda; Cogulu, Ozgur; Coker, Canan; Cetiner, Nurten; Ozden, Gonca; Aksu, Oguz; Ozkinay, Cihangir Year : 2004
Topic : Hair Zinc Level in Down Syndrome
Source : Down Syndrome Research and Practice, v9 n2 p53-57 2004
Methodology:

The hair zinc level of 19 children with Down syndrome was compared with the zinc level of 11 typically developing children. Hair zinc levels were found to be significantly lower (p less than 0.05) in those with Down syndrome (average 95.18 [plus or minus] 56.10 ppm) than in the typically developing children (average 208.88 [plus or minus] 152.37 ppm). Some of the problems experienced by children with Down syndrome may be due to these low zinc levels, but further research is required to confirm these results, and to establish any correlation with these problems.

2.7. STUDIES CONDUCTED ON RELAXATION TECHNIQUE

Author: Stueck, M.; Gloeckner, N. (2005)

Topic: Yoga for Children in the Mirror of the Science: Working Spectrum and Practice Fields of the Training of Relaxation with Elements of Yoga for Children

Source: Early Child Development and Care, v175 n4 p371-377 May 2005

Methodology:

The latest research work showed a clear increase in stress consequences for younger children related to experience, behaviour and health (among other things, fear to fail and psychosomatic disorders). In contrast, only a few stress-handling programmes are available specifically for children; a large part covers stress-handling training courses orientated to behaviour and cognition. The aim of the Training of Relaxation with Elements of Yoga for Children technique introduced and evaluated is the communication of self-control and Relaxation based on experience using breathing exercises, imagination journeys and specifically selected yoga techniques for children. This stress-handling programme has been investigated by means of a test/control/group design with 48 pupils of the fifth grade. During a pre/post comparison with three measuring times one could give proof that the training will increase emotional balance in the long term and reduce fears. Feelings of helplessness and aggression were
clearly reduced. Beyond this, the participants transferred the learned breathing
techniques and self-instructions to situations beyond school, in order to relax
after the lessons, to improve well-being and to control negative feelings. The
effects found out here indicate that yoga is suited for children as an
independent control method.

Author : Dacey, John S.; And Others (1997)
Topic : The Results of Teaching Middle School Students Two
Relaxation Techniques as Part of a Conflict Prevention Program.
Source : Research in Middle Level Education Quarterly, v20 n2 p91-102
Win 1997

Methodology :
Boston College Conflict Prevention Program techniques for relaxation
and self-control were taught to middle-school students in two Boston schools.
Preliminary results from teacher interviews revealed that students
spontaneously used these methods to calm their "fight-or-flight" reactions in
real conflicts. Results also indicated that females preferred the visualization
technique, while males preferred the breathing/muscle relaxation technique.

Author : Benson, Herbert; And Others (1994)
Topic : Increases in Positive Psychological Characteristics with a New
Relaxation-Response Curriculum in High School Students.
Source : Journal of Research and Development in Education, v27 n4
p226-31 Sum 1994

Methodology :
High school students' self-esteem and locus of control were evaluated
before, during, and after exposure to either a health curriculum based on
elicitation of the relaxation-response with follow-up or a control health
curriculum followed by the relaxation-response. The experimental group
significantly increased self-esteem and internal locus of control. (SM)
Author: Maycock, George (1988)

Topic: The Three-Fingers Technique: Does It Reduce Test Anxiety?

Methodology:

The utility of brief exposure to a mental focusing aid, the Three-Fingers Technique (TFT), in reducing test anxiety was studied for 15 college students. One week before their final examination, the students were given a 15-minute classroom introduction to the TFT, part of the Silva Mental Training Method (1983). After the introduction to this conditioned trigger that assists in improving mental focus and concentration, students participated in a 15-minute relaxation exercise and received instructions on using the method for studying and for taking tests. A Likert-type questionnaire was used to determine student attitudes about the Technique and its use. Almost all of the students (80%) felt that the relaxation exercise was helpful. All of the students reported that they felt anxiety on previous tests. Of the 13 students who used the technique, during the exam, 8 felt less anxiety than on previous tests, 3 maintained the same level of anxiety as on previous tests, and 2 felt more anxious than on previous tests. In an evaluation of aspects of the course, students ranked the relaxation exercise third in usefulness, after the course textbook and course lectures. One bar graph is included. (SLD)

Author: Matthews, Doris B. (1986)

Topic: A Comparison of Relaxation Strategies.

Methodology:

Some researchers argue that all relaxation techniques produce a single relaxation response while others support a specific-effects hypothesis which suggests that progressive relaxation affects the musculoskeletal system and that guided imagery affects cognitive changes. Autogenics is considered a technique which is both somatic and cognitive. This study was conducted to measure physiological and cognitive attributes of four techniques: progressive relaxation, autogenics, guided imagery, and a neutral stimulus. Physiological measures examined were frequency of brain waves, muscle tension, and
peripheral temperature which were measured during, and at the conclusion of, each relaxation exercise or neutral stimulus. Immediately following each technique, subjects answered questions measuring short-term memory. Four tests of recall used were auditory forward and auditory backward digit span, and recollection of lists of nonsense syllables and familiar nouns. Subjects were 40 students in grades six, seven, and eight. Even though subjects came to the observation session in a surprisingly relaxed state, relaxation exercises increased peripheral temperature; however, the other physiological measures and the four tests of recall did not respond to the relaxation exercises. The three types of treatment failed to produce difference levels of either physiological measures or test performance. Practice had some effects on subjects. Muscle tension and both auditory forward and backward digit span revealed an association with the order of observations. A 44-item reference list, two appendices and 29 tables are included.

Author : Matthews, Doris B.; Quinn, Jimmy L. (1987)
Topic : Relaxation Training: A Humanistic Technique to Increase Achievement.
Source : Journal of Humanistic Education and Development, v25 n3 p112-21 Mar 1987
Methodology :
Examined effect of program designed to teach self-regulation through relaxation training in 69 high school students. Relaxation training for 10 minutes was found to increase typing achievement of students significantly more than did traditional instruction without relaxation training. (Author/NB)

Author : Cullen, Audrey; And Others (1987)
Methodology :
A second language teaching technique using relaxation, imagination, and music to accelerate the learning process is imagination, and music to
accelerate the learning process is discussed. Part 1 describes the classroom setting and the stages and processes of the technique. Part 2 outlines the theory and sources of the method in the literature of learning theory and language teaching. The third part presents an evaluation of a project to train Louisiana language teachers in the method. The teacher training program consists of instruction in an unfamiliar language by means of the Accelerated Learning method, instruction in a more familiar language, and instruction in the use of the method itself. Evaluation is based on pre-to-posttest changes in trainee attitudes and language skills.

Author : Matthews, Doris B.; Justice, Christine (1983)
Methodology :

Research findings produce a positive argument for the inclusion of relaxation training in the school curriculum. Since today's children face a great deal of stress, they must learn coping techniques. Learning to relax at will is one method of learning to survive, because the relaxation response is incompatible with anxiety; the child learns to manage stress rather than to be managed by it. The school curriculum affords an important opportunity for the structured and organized learning of stress management. Such a program improves self-management skills and self-concept, strengthens the right hemispheric abilities of the brain and such faculties as creativity, and improves various abilities to attain achievement. The second section of this paper addresses five basic considerations in the introduction of a school relaxation program: (1) will implementation require additional personnel?; (2) how much inservice do teachers and other staff need?; (3) how much time in the instructional program does the technique require?; (4) what materials are appropriate for implementing the relaxation program?; and (5) what success can the student expect? A discussion, with specific suggestions for materials and procedures, based on two relaxation research studies, is provided for each
Review of Related Literature

of the five questions. A seven page reference list and a list of relaxation program materials with ordering information are appended.

Author : Bander, Ricki S.; And Others (1982)
Topic : A Comparison of Cue-Controlled Relaxation and Study Skills Counseling in the Treatment of Mathematics Anxiety
Source : Journal of Educational Psychology, v74 n1 p96-103 Feb 1982
Methodology :
This investigation assesses the relative efficacy of three intervention strategies for reducing mathematics anxiety and enhancing mathematics performance in college students. Findings suggest that the cue-controlled relaxation technique is a potentially viable intervention.

Author : Matthews, Doris B (1981)
Methodology :
Several counseling methods have attempted to help individuals change their behavior patterns. Techniques that teach control of the internal functions of the mind, body, and emotions are designed to allow the individual to reach his/her potential. Alpha training is one such method that is concerned with a brain wave pattern yielding an alert, non-focused but relaxed state. Because there appear to be differences between brain wave patterns of adults and children, counselors should be careful in their considerations of the client as a unique individual. Alpha training appears to be helpful as a stress management technique, but its relationship to achievement is inconclusive. In a recent study of alpha wave patterns, wrist temperature, and the use of autogenic relaxation training with middle school students no significant differences were found between experimental and control groups who were learning French. However there was a dramatic difference in retention: students who received relaxation training dropped out of the French class at a much lower rate. These findings
suggest that a major use for alpha training is in the area of psychological self-exploration.

Author : Throll, D. A (1981)
Topic : Transcendental Meditation and Progressive Relaxation: Their Psychological Effects.
Methodology :
Compared the effectiveness of Transcendental Meditation (TM) and Progressive Relaxation. At posttest the TM group displayed more significant results (decreases in neuroticism, and drug use). Both groups were less anxious. Explained the more pronounced results for meditators in terms of time spent on the technique plus differences between techniques.

Author : Frederick, A. B (1979)
Topic : Relaxation: Education's Fourth "R."
Methodology :
Strategies for coping with stress and tension that may be used by a teacher in a classroom setting are presented. The development of tension control as an area of study is traced, noting the role total relaxation plays in various religious and philosophical movements. Stages of teaching students how to relax through a technique known as progressive relaxation are described. A glossary of selected terms frequently used in tension control literature is included, and references for further reading are provided.

Author : Zuroff, David C.; Schwarz, J. Conrad (1978)
Topic : Effects of Transcendental Meditation and Muscle Relaxation on Trait Anxiety, Maladjustment, Locus of Control, and Drug Use.
Source : Journal of Consulting and Clinical Psychology, v46 n2 p264-71 Apr 1978
Methodology:

Undergraduates received training in transcendental mediations (TM), training in a muscle relaxation technique, or no treatment. Measures of trait anxiety, locus of control, maladjustment, and drug use were collected before and after the treatment period. There were no differences in maladjustment, locus of control, or drug use as functions of treatment.

Author: McGlynn, F. Dudley; And Others (1978)

Topic: Effects of Cue-Controlled Relaxation, a Placebo Treatment, and No Treatment on Changes in Self-Reported Test Anxiety Among College Students

Source: Journal of Clinical Psychology, 34, 3, 707-14, Jul 78

Methodology:

Describes an experiment in which a presumptively behavioral anxiety-management technique known as "cue-controlled relaxation" (Russell, Miller & June, 1975) was compared with a "deactivated" version of Borkovec's (1972) Avoidance Response Placebo treatment and with no intervention as means of reducing self-reported test anxiety among college students.

2.8. STUDIES CONDUCTED ON CHEMISTRY ACHIEVEMENT

Author: Uzuntiryaki, Esen; Aydin, Yesim Capa (2009)

Topic: Development and Validation of Chemistry Self-Efficacy Scale for College Students

Methodology:

This study described the process of developing and validating the College Chemistry Self-Efficacy Scale. In the first phase, data collected from 363 college students provided evidence for the validity and reliability of the new scale. Three dimensions emerged: self-efficacy for cognitive skills, self-efficacy for psychomotor skills, and self-efficacy for everyday applications. In the second phase, data collected from an independent sample of 353 college students confirmed the factorial structure of the 21-item CCSS. In addition,
each dimension of the CCSS had moderate and significant correlations with student chemistry achievement and differentiated between major and non-major students.

**Author**: Ozmen, Haluk; Demircioglu, Gokhan; Coll, Richard K. (2009)

**Topic**: A Comparative Study of the Effects of a Concept Mapping Enhanced Laboratory Experience on Turkish High School Students' Understanding of Acid-Base Chemistry

**Methodology**: The purpose of this intervention was to enhance student understanding of acid-base chemistry for tenth grade students' from two classes in a Turkish high school. Student understanding of acid-base chemistry was evaluated with a pretest/posttest research design using a purpose-designed instrument, the "Concept Achievement Test" (CAT) consisting of 25 items, 15 multiple choice and ten multiple choice with explanation. The analysis of the findings revealed statistically significant differences between the intervention and traditional groups with respect to conceptual understanding. Concept mapping in conjunction with laboratory activities is more enjoyable, helps student link concepts, and reduces their alternative conceptions.

**Author**: Atasoy, Basri; Akkus, Huseyin; Kadayifci, Hakki (2009)

**Topic**: The Effect of a Conceptual Change Approach on Understanding of Students' Chemical Equilibrium Concepts

**Methodology**: The purpose of this study was to compare the effects of a conceptual change approach over traditional instruction on tenth-grade students' conceptual achievement in understanding chemical equilibrium. The study was conducted in two classes of the same teacher with participation of a total of 44 tenth-grade students. In this study, a pre-test/post-test control group semi-experimental design pattern was used.

During teaching the topic of chemical equilibrium concepts in the chemistry curriculum, a conceptual change approach was applied in the
experimental group whereas traditional instruction was followed in the control group. Data were analysed with an independent samples t-test, and an analysis of covariance using the pre-test scores as the covariate. The results showed that the conceptual change approach was statistically more effective than traditional instruction in terms of students' conceptual understanding.

**Author**: Claesgens, Jennifer; Scalise, Kathleen; Wilson, Mark; Stacy, Angelica (2009)

**Topic**: Mapping Student Understanding in Chemistry: The Perspectives of Chemists

**Methodology**:

Preliminary pilot studies and a field study show how a generalizable conceptual framework calibrated with item response modeling can be used to describe the development of student conceptual understanding in chemistry. ChemQuery is an assessment system that uses a framework of the key ideas in the discipline, called the Perspectives of Chemists, and criterion-referenced analysis using item response models (item response theory (IRT)) to map student progress. It includes assessment questions, a scoring rubric, item exemplars, and a framework to describe the paths of student understanding that emerge. Integral to criterion-referenced measurement is a focus on what is being measured: the intention of the assessment, its purpose, and the context in which it is going to be used. The Perspectives framework allows us to begin to narrate the development of understanding that occurs as students "learn" over the course of instruction, helping to form a crosswalk among educational science standards and underscore the importance of scientific reasoning with domain knowledge. Here, we explain a framework we have investigated in chemistry and present evidence on measures of student understanding to describe the development of conceptual understanding at the high school and university levels.
Review of Related Literature

Author: Lewis, Scott E.; Lewis, Jennifer E. (2008)
Topic: Seeking Effectiveness and Equity in a Large College Chemistry Course: An HLM Investigation of Peer-Led Guided Inquiry
Methodology:

This study employed hierarchical linear models (HLM) to investigate Peer-Led Guided Inquiry (PLGI), a teaching practice combining cooperative learning and inquiry and tailored for a large class. For the study, two general HLM models suited to investigating reform were developed and utilized to examine the effectiveness and equity of PLGI as implemented in this setting. The models showed that the reform was associated with statistically significant improvement over traditional pedagogy in terms of academic performance on multiple measures.

Author: Tastan, Ozgecan; Yalcinkaya, Eylem; Boz, Yezdan (2008)
Topic: Effectiveness of Conceptual Change Text-Oriented Instruction on Students' Understanding of Energy in Chemical Reactions
Methodology:

The aim of this study is to compare the effectiveness of conceptual change text instruction (CCT) in the context of energy in chemical reactions. The subjects of the study were 60, 10th grade students at a high school. The data were obtained through the use of Energy Concept Test (ECT), the Attitude Scale towards Chemistry (ASC) and Science Process Skill Test (SPST). t-tests, ANCOVA (analysis of covariance) and ANOVA (analysis of variance) were used. Results revealed that there was a statistically significant mean difference between the experimental and control group in terms of students' ECT. there was no statistically significant difference between the experimental and control group in terms of students' attitude towards chemistry.
Review of Related Literature

Author: Roehrig, Gillian; Garrow, Shauna (2007)
Topic: The Impact of Teacher Classroom Practices on Student Achievement during the Implementation of a Reform-Based Chemistry Curriculum

Methodology:
This study aims to determine the relationship between inquiry teaching and student achievement. Two schools were involved in this study, with two high school chemistry teachers from each school. Each teacher participated in professional development and implemented this curriculum with sufficient training and guidance to develop reform methods. Student achievement was found to positively correlate with the use of inquiry teaching about the assessed concepts, regardless of teacher experience or school context.

Author: Kadioglu, Cansel; Uzuntiryaki, Esen (2008)
Topic: Motivational Factors Contributing to Turkish High School Students' Achievement in Gases and Chemical Reactions

Methodology:
This study aimed to investigate the contribution of motivational factors to 10th grade students' achievement in gases and chemical reactions in chemistry. Three hundred fifty nine 10th grade students participated in the study. The Gases and Chemical Reactions Achievement Test and the Motivated Strategies for Learning Questionnaire were administered to measure students' achievement level and motivational orientations, respectively. Multiple Regression Correlation analysis indicated that the constructs of intrinsic goal orientation, self-efficacy for learning and performance, and test anxiety each made a statistically significant contribution to the students' achievement.

Author: Frailich, Marcel; Kesner, Miri; Hofstein, Avi (2009)
Topic: Enhancing Students' Understanding of the Concept of "Chemical Bonding" by Using Activities Provided on an Interactive Website
Methodology:
This study investigated the effectiveness of a web-based learning environment in enhancing 10th grade high-school students' understanding of the concept of "chemical bonding". Two groups participated in this study. Computer-based visual models are utilized in all the activities in order to demonstrate bonding and the structure of matter, and are based on student-centered learning. The study incorporated both quantitative and qualitative research. The experimental group outperformed the comparison group significantly, in the achievement post-test, which examines students' understanding of the concept of "chemical bonding".

Author: Ozmen, Haluk; Demircioglu, Hulya; Demircioglu, Gokhan (2009)

Topic: The Effects of Conceptual Change Texts Accompanied with Animations on Overcoming 11th Grade Students' Alternative Conceptions of Chemical Bonding

Methodology:
This paper aims to determine the effect of conceptual change texts accompanied with computer animations on 11th grade students' understanding and alternative conceptions related to chemical bonding. The results of the study indicated that while there is no statistically significant difference between groups in pre-test, performance of EG students is greater than the CG ones in post-test and delayed test. And also, the EG students are better in remediating their alternative conceptions related to chemical bonding.

2.9. SYNTHESIS OF RESEARCH STUDY
Synthesis of the Studies on Memory and Chemistry Achievement

Uzuntiryaki, Esen; Aydin, Yesim Capa (2009), Ozmen, Haluk; Demircioglu, Gokhan; Coll, Richard K.(2009), Atasoy, Basri; Akkus, Huseyn; Kadayifci, Hakki(2009), Claesgens, Jennifer; Scalise,
Kathleen; Wilson, Mark; Stacy, Angelica (2009), Lewis, Scott E.; Lewis, Jennifer E.(2008), Tastan, Ozgecan; Yalcinkaya, Eylem; Boz, Yezdan(2008), Roehrig, Gillian; Garrow, Shauna(2007), Kadioglu, Cansel; Uzuntiryaki, Esen(2008), Frailich, Marcel; Kesner, Miri; Hofstein, Avi(2009) and Ozmen, Haluk; Demircioglu, Hulya; Demircioglu, Gokhan(2009) conducted a research on chemistry Achievement.
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Review of Related Literature


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