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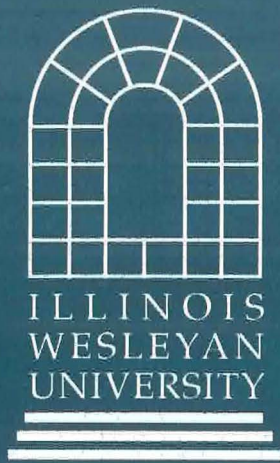
Complete 1992 Program

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IWU Student Research Conference Program

Third Annual ILLINOIS WESLEYAN STUDENT RESEARCH CONFERENCE

APRIL 25, 1992

SCHEDULE OF ACTIVITIES

10:30 A.M. - 12:00 P.M. ORAL PRESENTATIONS

1:00 P.M. - 3:00 P.M. POSTER SESSION AND RECEPTION

3:05 P.M. - 4:30 P.M. ORAL PRESENTATIONS

4:35 P.M. PRESENTATION OF CERTIFICATES
BY PRESIDENT MINOR MYERS, JR.

The Organizing Committee would like to thank:

Minor Myers, jr, President, IWU
Ellen Hurwitz, Provost and Dean of the Faculty
Lisa Brown, Associate Professor of Computer Science
Louis Verner, Associate Professor of Biology
Ann Taulbee, Associate Professor of Art
Benjamin Rhodes, Director of Development
Dawn Wright
Student Senate
Sara Kaufman

Members of the Organizing Committee

Teddy Amoloza, Assistant Professor of Sociology
Wayne Dornan, Assistant Professor of Psychology
Gail Lima, Assistant Professor of Biology
Wendy Wolbach, Assistant Professor of Chemistry

STUDENT PARTICIPANTS

Chris Barrett	Barbie Bentley
Diane Bootz	Bjorn Borup
Jill Brown	Kim Brucker
Bill Burton	Laura Campbell
Andy Carr	Christine Chaille
Jie Chen	Elizabeth Crail
Kevin Crawford	Paul Davies
Brian Driscoll	Jorie Duttlinger
Susan Eyer	Colin Fitzgerald
Karen George	Niki M. Handlin
James Heise	Angela J. Hill
Kari Hurd	Stephanie Jeter
Jane Johnson	George Kamboureglou
Ann Kramer	Sandra Lyn
Jane Martin	Derek Marusarz
Clay McCormack	Cynthia Miller
Micheal Monfils	Jonathan Moore
Susan Monger	Meghan Murphy
Lori Ann Musser	Leanne Nieukirk
Amy K. Rajala	Tammy Ross
Lauri Shields	Thomas M. Smith
Andrea Stenger	Monica Stevens
William M. Struthers	Susan Tamblyn
Kari Vanderzyl	Krista Vink
Brenda Weil	Tom Welge
Brian Werner	Todd West
Pamela Wiegartz	Dawn Wright
Nicole Zook	

STUDENT ABSTRACTS

* Indicates Faculty Supervisor

THE EFFECTS OF BILATERAL INJECTIONS OF NEUROKININ K INTO THE DORSAL MIDBRAIN CENTRAL GRAY ON FEMALE RAT SEXUAL BEHAVIOR: A PILOT STUDY

Christopher Barrett, Department of Psychology, IWU, Dr. Wayne Dornan*

The dorsal midbrain central gray (dMCG) an area within the central nervous system, has been implicated in the neural control of sexual receptivity (lordosis behavior) in steroid-primed ovariectomized female rats. Bilateral lesions of the dMCG disrupt lordosis, while electrical stimulation facilitate the display of lordosis behavior in steroid-primed ovariectomized female rats. Additionally, bilateral injections of the neurokinin substance P (sP), into the dMCG have been reported to facilitate lordosis behavior when compared to injections of saline (controls). Recently, accumulating evidence suggests that neurokinin K (NKK), another product of the sP gene, regulates the expression of male rat copulatory behavior. Bilateral injections of NKK into the preoptic area of male rats has been reported to have an inhibitory effect on the expression of male rat sexual behavior. Therefore, this pilot study assessed what effects NKK will have upon female rat sexual behavior. NKK or saline was injected bilaterally into the dMCG of steroid primed ovariectomized female rats, and the effects of these injections on sexually receptivity was assessed.

MMPI PROFILES FOR ADULTS WITH LEARNING DISABILITIES

Barbara L. Bentley, Dept. of Psychology, IWU, Dr. Robert Lusk*

Adults with learning disabilities have been relatively neglected in research as compared to children with learning disabilities. This study compared the MMPI scores of forty-three adults with learning disabilities, eighty-one adults with other psychological problems, and the normative populations' standard scores on the MMPI. It was predicted that overall psychopathology as measured by the MMPI would be greater among those in the learning disabled group as compared to the normative group. Also, three specific clinical scales were hypothesized to show elevations in the group of learning disabled adults as compared to the MMPI normative group. These scales included the Depression Scale(Scale 2), the Psychopathic Deviate Scale(Scale 4), and the Social Introversion Scale(Scale 0). To evaluate differences in total pathology, the sum of the T-scores on the clinical scales of the MMPI was obtained (excluding Masculinity/Femininity, Scale 5) and then a T-test was performed comparing the learning disabled adults with the normative group. For the specific scales of the MMPI (Depression, Psychopathic Deviate, and Social Introversion), T-tests were also performed comparing the T-scores for each scale between the learning disabled group and the MMPI normative sample. The T-tests revealed significant differences for Scale 2, Scale 4 , and Total Score at the $p < .005$ level and at the $p < .01$ level for Scale 0.

GRAVITATIONAL FIELD INSIDE THE EARTH: WHAT YOU WOULD WEIGH IN A MINE SHAFT

Diane Bootz, George Kambouroglou, and Kevin Sonntag
Department of Physics, IWU, Narendra Jaggi*

Many undergraduate physics textbooks show that the gravitational field (g) DECREASES linearly as one moves from the surface to the center of the spherical earth. Experiments, however, have demonstrated that there is an initial INCREASE in g as one moves down in a mine shaft. A model of the earth was constructed to understand this discrepancy. The model consists of concentric spherical shells of different densities. The gravitational field is determined as a function of the radius. Instead of decreasing monotonically as the uniform density model predicts, the multiple shell model predicts that g first increases to a maximum beneath the surface before linearly decreasing. This result is in pleasant agreement with the experimental data.

ANOMALOUS DISPERSION:
THE SPECTRUM IS NOT NECESSARILY R•O•Y•G•B•I•V

Diane L. Bootz and George Kambouroglou
Department of Physics, IWU, Raymond G. Wilson*

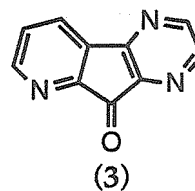
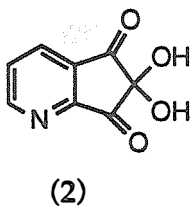
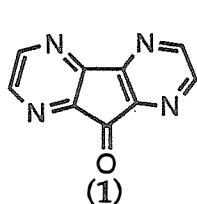
This study is an attempt to develop "an innovative approach to anomalous dispersion." Typical dispersion measurements taken in a student optical physics laboratory utilize materials which *display* only "normal" dispersion, a normal spectrum; the material does not absorb in the visible region of the optical spectrum.

This approach allows us to measure dispersion in the visible, *through an absorption region*. From this data we will extract the real part of the refractive index as a function of the wavelength, $n_r(\lambda)$. This method utilizes flat plates of dispersive materials rather than prisms. Anomalous dispersion in the visible is a demonstration of the spectral colors being "out of order."

SYNTHESIS OF NEW REAGENTS FOR THE DETECTION OF AMINO ACIDS AND FINGERPRINTS

Björn Borup and Forrest J. Frank*, Illinois Wesleyan University
P.O.Box 2900, Bloomington, IL 61701

DFO (1,8-Diazafluoren-9-one) is a new reagent for the detection of latent fingerprints. It reacts with amino acids present in fingerprints to give a fluorescent product, and is an improvement over ninhydrin which has been used in forensic laboratories for years. The object of this work was to synthesize new analogs of ninhydrin and DFO. The preparation of 9H-cyclopenta[b]pyrazine-9-one (**1**) did not succeed. The compound 9H-cyclopenta[1,2-b]pyrazine[3,4-b]pyridine-9-one (**3**) an analog of DFO is being synthesized via cyclopenta[b]pyridine-5,6,7-trione (**2**) an analog of ninhydrin.



COMBINED EFFECTS OF TEMPERATURE AND SALINITY ON THE ZEBRA MUSSEL, DREISSENA POLYMORPHA

Jill Brown, Dept. of Biology, IWU, Dr. Gail Lima*

In 1986 the European mussel, Dreissena polymorpha, was introduced into the Great Lakes by a ship from overseas. Since its discovery in 1988, the zebra mussel has received much attention because of its economic ramifications to waterfront industries. The mussels attach themselves to almost any hard surface, including water intake pipes which may reduce the intake of water from the freshwater rivers and lakes. Removal of the mussels is costly and the pipes often become clogged again. This study examines factors that may be lethal to the mussels.

My research examined the influence of temperature and salinity on survival of adult zebra mussels, which are thought to be closely related to marine mussels. It has been suggested that zebra mussels may have a higher tolerance to salinity which has been attributed to their possible relationship to marine species. In addition, I compared lengths and heights of shells to dry tissue weights of the animals. This can be used as a method for determining growth. The combined effects of temperature and salinity on adult mussels were determined by exposing mussels at 11 and 22 C° to one of three salinities (0, 5, or 15 ‰). Adult mussels were collected from Sterling State Park MI and transported to the laboratory where they were maintained for a week until acclimated. Twenty animals were chosen at random for each of the six test groups and subsequently weighed. The mussels were then measured and placed at the appropriate temperature. The salinity was gradually increased over the first two weeks by adding Instant Ocean to freshwater collected from Lake Evergreen. The mussels were monitored daily for four weeks. Dead mussels were removed from the test dishes and weighed. The mussels were then dried for two days and weighed again to determine the dry tissue weights. The relationship of dry tissue weights to shell lengths and shell heights was then determined. The results will be presented at the Conference.

PERCEPTION OF RELIGIOUS EXPERIENCE BY ADULT AMERICANS

Kim Brucker, Depts. of Psychology/Sociology and Anthropology
IWU Teodora Amoloza*

The effects of age, education, and family background on perception of one's relationship with God are examined using 1989 General Social Survey data. Younger respondents and older respondents are very likely to report having had a powerful religious experience, but the middle-aged ones are not. The older people feel closest to God. Results also show that among females, the more educated ones are less likely to have had a powerful religious experience. In addition, females who had at least one parent die before age 16 are more likely to feel extremely close to God than those females whose parents had divorced or separated. The findings show that there are very significant differences among age groups and some differences between genders when observing people's perception of their relationship with God. These should be taken into account by anyone working in the religious field or any other area that deals closely with people and their attitudes and beliefs.

DELAY REDUCTION: HOW DELAY TO REINFORCEMENT AFFECTS CHOICE

William Burton, Dept. of Psychology., IWU, Dr. James Dougan*

The factors that cause an organism to choose one alternative over another have been an area of extensive research. Choice behavior has been studied on concurrent variable interval schedules. These studies led to the formation of the matching and momentary maximizing hypotheses. These models are limited because they can only account for choices between two simultaneously available alternatives. There are many facets to choice behavior that these hypotheses do not account for. The purpose of the present experiment is to determine how temporal distance to reinforcement affects choice behavior. The delay reduction hypothesis (Fantino & Abarca, 1985) has been proposed to explain choice behavior in a wide variety of situations. According to the delay reduction hypothesis, choice is determined by the length of time until reinforcement. The alternative with the shortest delay until reinforcement is chosen. The present experiment attempts to show the strength of the delay reduction hypothesis. During training rats were exposed to a schedule of reinforcement on which a sequence of lights predicted the relative temporal distance to food. During the experimental phase, rats responded on one bar for delayed food and were given the option to change to another bar which signals more immediate food. Change to the bar that signals immediate reinforcement supports the delay reduction hypothesis.

INCENTIVE AND BEHAVIORAL CONTRASTS: A COMPARATIVE ANALYSIS

Laura Campbell, Dept. of Psychology, IWU, James Dougan*

This study has been designed to reconcile two divergent literatures: Crespi's 1942 study on incentive contrast and G.S. Reynolds' 1961 study on behavioral contrast. These two phenomena seem to be related, but have never been explicitly reconciled. The hypothesis is that it should be possible to simultaneously obtain both results if viewed from the correct perspectives.

A pilot study was done using a small sample of rats on a radial arm maze. Each rat was initially trained to run to the end of each arm for a reinforcement of 16 pellets. The number of pellets was then decreased to 4 in half of the arms. Results supported the hypothesis that the rats would run faster in the unshifted arms (behavioral contrast), and slower in the shifted arms (incentive contrast).

The current study has been designed to further investigate the relationship between incentive and behavioral contrasts using an operant box with variable interval schedules. Using colored lights as discriminative stimuli, the rats initially pressed a bar for food on two alternating reinforcement schedules where both components were the same, as were both halves of the radial arm maze. Then, in the second phase, one component was reduced so that the rat would receive less food for pressing the bar, similar to the decrease in half of the arms of the radial arm maze. Results are predicted to support those previously obtained. That is, the rats will press the bar more in the unshifted component (behavioral contrast), and less in the shifted component (incentive contrast).

ANALYSIS OF CARBON ACROSS THE CENOMANIAN-TURONIAN BOUNDARY

Andrew J. Carr and Wendy S. Wolbach*
Dept of Chemistry, Illinois Wesleyan University

Soot from wildfires has been discovered in sedimentary rocks at the 66 Ma-old Cretaceous-Tertiary (K-T) boundary, a time of mass extinctions which included those of the dinosaurs. This extinction was presumably caused by the impact of a giant meteorite. The question at hand is whether other extinctions have been caused by meteorite impacts as well. Discovery of impact-related evidence at a smaller extinction event that occurred during the Cenomanian-Turonian boundary (C-T) 92 Ma ago, where plankton were the chief casualty, could lend support to the impact theory. Analysis of sedimentary rocks spanning this extinction horizon for possible changes in abundance, morphology, and isotopic composition of reduced organic and inorganic carbon (soot) may yield such information. In the absence of soot, the isotopic study of the organic carbon could yield important clues regarding changes in the environment at that time.

Currently two sample sites are being analyzed for reduced carbon content: Red Wash, New Mexico and Chipsa Summit, Texas. Both sample sites are from the Western Interior Basin. During the time of the extinctions 92 million years ago, the basin was an inland sea. The preliminary data suggests a decrease in the amount of reduced carbon at both sample sites. This would indicate that the extinction that took place was not rapid. Lower amounts of reduced carbon are generally more characteristic of extinctions caused by changes in climate conditions, compared with those caused by meteorite impacts. Climate changes would allow microorganisms time to digest (oxidize) the plankton before sedimentation could occur, thus reducing the amount of reduced carbon preserved in the rock.

TEACHERS' TRAINING, KNOWLEDGE AND ATTITUDES TOWARD MAINSTREAMING BEHAVIORALLY DISORDERED STUDENTS IN REGULAR CLASSROOMS

Christine Chaille, Education Department, IWU, Dianne Mancus*

Public Law 94-142 requires that special education students be placed in "the least restrictive school environment" possible and that teachers who work with special needs students in regular classrooms receive training and help from special educators. Lefrancois (1988) maintained that although *mainstreaming* is mandated by law it is still highly controversial. According to Vandivier & Vandivier (1981), teachers have reservations about including children with "particular types" of disabilities in regular classes, and Mooney & Algozzine (1978) reported that teachers consider "socially defiant" behaviors to be more disturbing than those associated with learning disabilities.

This study was designed to determine the relationship between experienced classroom teachers' willingness to accept behaviorally disordered (BD) students in regular classrooms and their knowledge of effective and ineffective intervention strategies for mainstreaming them. Twenty experienced, regular classroom teachers from three central Illinois elementary schools volunteered to complete a survey. Knowledge scores were determined by assessing respondents' ability to accurately identify effective and ineffective strategies as described by Duquette & O'Reilly (1988), Fagen & Hill (1977), Knoff (1985), Long, Morse & Newman (1976), and Wells (1983). Training in special education and experience with BD students were also assessed.

The hypothesis that teachers' willingness to mainstream would correlate positively with knowledge of effective intervention strategies was not statistically supported ($Chi\text{-}Square = 3.838, df = 2, p < .146$). However, of the 8 teachers willing to mainstream, 6 had high knowledge scores. Other findings included: 1) the more behaviorally disordered students teachers had taught in the past 5 years, the more willing they were to mainstream ($Chi\text{-}Square = 13.4, df = 6, p < .05$); 2) of the 5 teachers who had mainstreamed 11 or more BD students in the past 5 years, 4 had high knowledge scores; 3) teachers were not accurate when assessing their own knowledge level; 4) nearly half (9 out of 20) of the teachers had no courses or in-service training which addressed the needs of BD students; and 5) only 3 out of 20 teachers in the study, 15%, were knowledgeable, willing to mainstream BD students if given a choice, and, in fact, had mainstreamed 11 or more BD students in the past 5 years.

This pilot study leads to the following concern: Will school districts be forced to group and segregate the increasing numbers of BD students because regular classroom teachers are not prepared to work effectively with them?

APPLICATION OF WAVELET TRANSFORM ON SIGNAL ANALYSIS

Jie Chen, Dept of Mathematics., IWU, Tian-xiao He^{*}, Melvyn W. Jeter^{*}

Like the Fourier Transform, Wavelet Transform decomposes signals into simple units and the original signals can be reconstructed from them. Fourier Transform decomposes signals into sine and cosine functions of different frequencies, while Wavelet Transform decomposes signals into wavelets.

Since Fourier Transform is a global integration transform and there is no time factor in it, it cannot analyze nonstationary signals whose statistical properties change with time. In order to analyze nonstationary signals, we need decompose signals into units which are localized in both time and frequency domain. Basic theory of Fourier Transform tells us that there is trade-off between time and frequency compactness. This problem is solved by decomposing the signal several times at different levels. This is the essence of multiresolution analysis method developed by Stephane G. Mallat. Mallat summarized some fundamental theorems of multiresolution analysis, which state the existence of scaling functions and wavelets, and proposed a procedure to decompose and reconstruct signals when given a certain wavelet. Ingrid Daubechies at Bell Laboratories found out how to construct a suitable wavelet. A team in Texas A & M university indicated that a special wavelet constructed by B-spline function had certain properties that are useful in signal analysis.

According to the results of the above sources, we have the mathematical formulas and a procedure for signal analysis using a second-order B-wavelet.

I write a program package in Mathematica to implement the decomposition and reconstruction algorithms. I use the program facilities in Mathematica and apply the object-oriented programming concept so that the package can be used just as a build-in package. The programs are developed by first running on-line commands step by step to make sure they are correct. Then these commands are collected in a package. Finally the package is put in the right place of the directory and an appropriate path name is assigned to Mathematica so that it can find it automatically. Several pictures of scaling functions and wavelets are plotted using Mathematica. Some artificial signals are experimented. Future work will be the analysis of some real signals and find a better way to deal with boundary points.

^{*} This research is supported by a Grant-In -Aid of Research by Sigma Xi, The Scientific Research Society.

AN ANALYSIS OF THE CELTIC AND SLAVIC ELEMENTS IN THE GERMAN LANGUAGE

Elizabeth Crail, Dept. of Foreign Lang., IWU, Julie Prandi*

This analysis concerns the linguistic history of the German language and concentrates on the specific influence exerted on it by the Celtic and Slavic tongues with which it came in contact. The sources are a number of general studies on German linguistic history, some of which are specifically oriented toward the Slavic elements. Due to the different periods in which the various sources were written, the determination of the actual word sources vary, sometimes considerably. For this reason it was necessary to compare the relative merits of the arguments for or against any particular source before personally determining its validity. This was made possible by general linguistic studies throughout the semester which afforded the necessary knowledge to make such decisions.

Since the Celtic language was the earliest for which there is any proof that it exerted influence on the German language, such comparisons are very important not only for understanding some of the earliest word origins, but also for facts about the unwritten history of the early Germanic tribes. For instance, the German word "Reich", meaning kingdom or empire is considered to have been borrowed from the Celts primarily on account of the vowel. While the word "Reich" is related to the Latin "rex", it must have come from the Celtic "rig", also related to "rex", because of the "ei" sound in the modern form of the word. The knowledge that words of this nature were borrowed from the Celts suggests that the Celtic culture was more advanced in many ways than the original Germanic tribes which wandered into the area.

The Slavic loan words found in German are much less prevalent and very random in area of influence, because most of the contact was after the Germans were the more advanced culture, and therefore most of the borrowing was German words into the Slavic tongues rather than the other way around. The different Germanic languages and dialects have been differently influenced by other languages depending on which part of Germany they originated in. The Celtic influence is much stronger in the southwest of Germany, whereas the Slavic influence is stronger in the southeast German-speaking areas, particularly in Vienna.

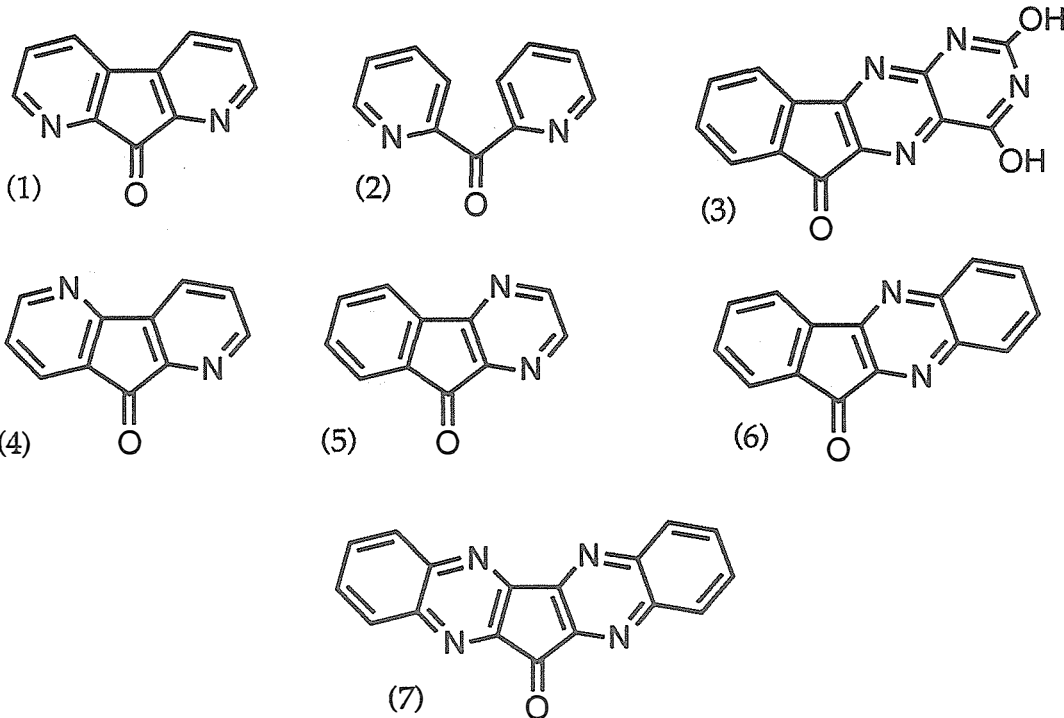
The study of such linguistic influences makes not only for a better understanding of the language itself, but also of the history of the people and thus their relationships with the peoples who influenced them and their language.

AMINO ACID DETECTION USING 1,8-DIAZAFLUOREN-9-ONE AND ANALOGS

Kevin D. Crawford and Forrest J. Frank*

Department of Chemistry
Illinois Wesleyan University
Bloomington, IL 61702

The newest reagent for the detection of the amino acids present in latent fingerprints is 1,8-diazafluoren-9-one (1). However, the fluorescence observed with this compound is sometimes obscured by the fluorescence of certain papers. Thus, several analogs have been synthesized by other researchers (2-7) in an attempt to find a better reagent. This research investigates the UV-visible and fluorescence properties of the reaction products of these compounds with amino acids both in solution and on paper.



FACTORS INFLUENCING EMPLOYMENT IN THE U.S. AUTO INDUSTRY

Paul S. Davies, Dept. of Economics, IWU, Michael Seeborg*

The purpose of this study is to explain the changes in employment levels in the U.S. automobile industry over the past 30 years. While employment levels were generally increasing from 1960 through 1977 (although experiencing cyclical ups and downs), employment levels have been trending downward over the past 12 years. Specifically, changes in employment levels are hypothesized to have been caused by changes in four areas: 1) international competition (primarily from Japanese auto producers), 2) union (UAW) power, 3) labor-saving and productivity-enhancing technology, and 4) outsourcing arrangements of the Big Three American automobile manufacturers. Theoretically, changes in these areas are shown to effect employment of auto workers by shifting and/or changing the slope of the demand curve for auto workers. Marshall's Laws of Derived Demand for Labor are used in making this demand-side analysis. Empirically, data from the motor vehicles and equipment industry (SIC 371) and OLS regression analysis are used to test the four hypotheses of declining employment in the automobile industry. The results suggest that increasing international competition does indeed negatively effect employment in the U.S. auto industry, while the UAW may not be as powerful in influencing employment levels was originally expected.

THE CURRENT STATE OF THE SUPREME COURT APPOINTMENT PROCESS:
BUSINESS AS USUAL

Brian S. Driscoll, Dept. of Political Science, IWU, John Wenum*

The recent spectacles of the confirmation hearings of Judges Robert H. Bork and Clarence Thomas have given the Supreme Court appointment process a sense of corruption, and a call for reform. Allegations levelled against the President and the Senate accuse them of "playing politics": not selecting the best judges on merit, but relying instead on political factors to make their choices. The truth is, however, that the Supreme Court appointment process has always been political. It was designed to be political by the Framers of the Constitution, and there is ample precedent for the insertion of politics into today's appointments. The process, however, has evolved into something more complex for the President and the Senate since the inception of the Constitution, and both institution's roles have changed. In today's process there are several factors that influence confirmation of Supreme Court Justices, namely timing, ideology, and presidential management. All of these factors come together in the Thomas nomination, to form a case study. Analysis will show that despite the recent public outcry, the confirmation process is business as usual, both in terms of politics and in terms of recent history.

CROSS-MOTIVATIONAL CHOICE: A TEST OF TWO THEORIES

J. Duttlinger, Psychology Department, IWU, Dr. James Dougan*

Choice, the simple allocation of responses amongst alternatives, has been extensively studied in the past. Most often, choice has been studied on concurrent variable interval schedules. A variety of quantitative models, including matching, behavioral economics, and momentary maximizing, have had varying degrees of success in accounting for choice behavior. The present study examined predictions of two more recent theories, behavior systems and delay reduction. Rats were deprived of both food and water, and were exposed to a "cross-motivational" choice in which one alternative produced food, the other water. Periodically, the animal was given the opportunity to immediately obtain water. According to the delay reduction theory, the rat should choose the more immediate reinforcer, even if this involves changing its initial choice. According to the behavior systems theory, the rat will be "locked in" to a particular choice alternative once the initial choice is made.

A RE-SURVEY OF MACROLICHENS IN THE LAND BETWEEN THE LAKES NATIONAL RECREATIONAL AREA

Susan Eyer, Biology Department, IWU, Jonathan Dey*

In 1990 various macrolichen species of the Land Between the Lakes National Recreational Area (LBLNRA), located between and including parts of Tennessee and Kentucky, were collected by J.P. Dey of Illinois Wesleyan University. His tentative identification of some specimens revealed several species not noted in a previous study by H.C. Phillips of Austin Peay State University in 1970. While this by itself warrants revision of the previous list, recent taxonomical changes have taken place in lichen studies which also affect the identification of several of Phillips' specimens. A revision of this list could be used as a tool for updating the biological inventory of the LBLNRA, as a guide for managing this inventory, as a base survey for future pollution monitoring studies, and as an updated source for revising the North American ranges populated by these lichens.

Currently I am examining Dey's LBLNRA lichen survey, and have already discovered 13 lichen species not noted by Phillips. This raises the known lichen flora to 95 species, up from Phillips' previous tally of 82 species. The preliminary identification of lichens involves examination of vegetative and reproductive morphological characteristics, with wet mount thallus sections being examined for anatomical characters as is necessary. Additionally, the chemical composition of the specimens are roughly categorized by means of chemical spot testing upon the cortex and medulla of the thallus. Also, further chemical testing will be made of some specimens by means of thin-layer chromatographic tests. My examination of the specimens on hand continues, and Dey and I plan to visit the Austin Peay State University herbarium to borrow Phillips' specimens for reexamination. We also plan to conduct further field work in the LBLNRA, with completion of the collecting and identification process by September 1992. Finally, we plan to compose a paper by May 1993 for publication.

OPTIONS PRICING: IS THE MINORITY OUTPRICING THE MAJORITY?

Colin Fitzgerald, Dept. of Economics, IWU, Robert Leekley*

Options are among the most flexible financial instruments. They can serve many functions; profit enhancement, risk management, arbitrage and hedging are but a few. For this reason, options have become an invaluable component of many financial portfolios. Since April of 1973, when a uniform options market was established, the options market has grown more rapidly than any other financial market.

The value of an option depends on several factors. The strike price of the option and the price of the underlying instrument are the most important. Others include the time to expiry, the volatility of the underlying instrument, the risk free interest rate, and cash flows from the instrument. The exact magnitude of the effect that some of these factors have on the value of an option is still unsettled. However traders need some model, to guide them in deciding whether an option is properly valued. Many traders use some version of the Black-Scholes model. A few use more complicated models, such as the model developed by Cox, Ross and Rubinstein. Are these more complex models actually better? This study attempts to find out.

Whatever models traders use, their purpose is to estimate the (unknown) intrinsic value of an option. If this value is greater than the (known) current market price, they would want to buy; if it is less than the current market price, they would want to sell. Thus a good model is one that gives profitable buy and sell signals. This study compares buying and selling according to the signals generated by both the Black-Scholes and the Cox-Ross-Rubinstein models. The profits generated by each model are then compared. If the Cox-Ross-Rubinstein model is actually better, it should generate greater profits.

THE EFFECTS OF A "DANGEROUS" STIMULI ON THE OPTIMAL FORAGING THEORY

Karen George, Dept. of Psychology, IWU, James Dougan*

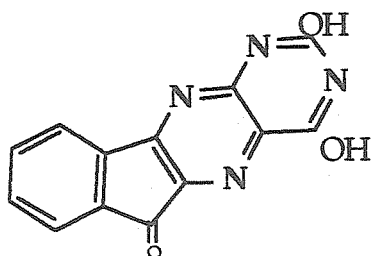
According to the optimal foraging theory, an organism will choose the most efficient method for gathering food while expending the least amount of energy. However, it seems logical that an organism would opt for a less efficient method of gathering food in order to avoid a "dangerous" or frightening stimulus. The present experiment examines if the presentation of a "dangerous" or frightening stimulus will result in the subject choosing a less efficient method of food gathering in order to avoid the "dangerous" stimuli.

Four Long Evans rats were conditioned to bar press on two bars within a Skinner box. A concurrent fixed ratio, fixed ratio schedule was introduced on the two bars. One bar yielded a reinforcement after fifteen bar presses and the other yielded a reinforcement after thirty bar presses. The optimal foraging theory would correctly predict that the lower ratio bar would eventually be chosen exclusively as a method of gathering food. Next, a "dangerous" or frightening stimulus is introduced on the lower ratio bar. The "dangerous" stimulus consists of a loud beeping tone with three colored, flashing lights over the lower ratio bar when the lower ratio bar is pressed. A single bar press to the higher ratio bar extinguishes the "dangerous" stimulus.

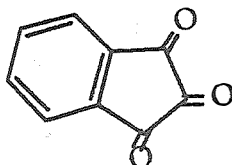
It is hypothesized that the subjects will chose the higher ratio bar in order to avoid the "dangerous" or frightening stimulus even though it is the less efficient method of gathering food.

**A POSSIBLE NEW AMINO ACID DETECTION AGENT:
6H-2,4-DIHYDROXYINDENO[2,1-g]PTERIDIN-6-ONE**
Niki M. Handlin & Forrest J. Frank*, Illinois Wesleyan University
P.O. Box 2900, Bloomington, Illinois 61702

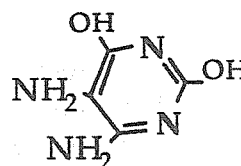
Ninhydrin (1,2,3-triketohydrindene hydrate) (2) is the most commonly used amino acid detection agent. When ninhydrin reacts with amino acids it results in a purple coloration, but no fluorescence. The focus of this study is to synthesize a pteridine analog of ninhydrin which reacts with amino acids to form fluorescent products. The compound 6H-2,4-Dihydroxyindeno[2,1-g]pteridin-6-one (1) an analog of ninhydrin (2) is being synthesized via the reaction between ninhydrin and 2,4-dihydroxy-5,6-diaminopyrimidine sulfate (3). The Timmis synthesis between 1,3-indandione and 6-amino-2,4-dihydroxy-5-nitrosopyrimidine results in the same compound (1).



(1)



(2)



(3)

CHEMICAL DEMONSTRATIONS: WOOLING STUDENTS INTO CHEMISTRY

James Heise, Dept. of Chemistry, IWU, Dr. Forrest Frank*

It is no hidden secret that the U.S. will desperately require increasing numbers of chemists and other chemically knowledgeable personnel with which to continue scientific research in chemistry and chemically related fields including medicine and microbiology. Such research will provide the necessary information with which to feed the growing high technology sector of our economy and help improve the quality of life around the globe.

Geared toward the ends of attracting more young high school aged students into chemistry and chemistry related fields, this educationally focused work is based on studies delving into the crucially important question: Why do students like or dislike chemistry? Using this question and prior research on this topic gathered from sources including The Journal of Chemical Education, The Journal of Research in High School Science and Mathematics, The Science Teacher, and many others as a guideline, ideas were generated on how to introduce students to the seemingly magical world of chemistry and to make the subject itself more interesting, palatable, and hands-on through the use of chemical demonstrations that target students' senses by using light, color and sound to produce sensory stimulating effects.

Demonstrations that are chemically relevant to high school chemistry classes have been put together so as to be easily observed, discussed, and enjoyed for the complete benefit of the student and at low cost to any high school science department. Work completed includes demonstrations dealing with acid-base chemistry, gas laws, and the physical and chemical properties of hydrogen and carbon dioxide, as well as specific chemical concepts such as density.

THE TEACHER IN TRANSITION: LEARNING TO LET THE CHILD LEAD

Angela Hill, Dept. of Education, IWU, Dianne Mancus*

Whole language is an interdisciplinary method of teaching which is becoming a political movement in the schools. It empowers both student and teacher, allowing the student to become self-directed and freeing the teacher from a primarily authoritarian role. Literacy activity in the whole language classroom resembles reading and writing in the real world, so that school work is seen as purposeful by students. Ideally, students plan and work cooperatively in cross-grade groupings.

In this ethnographic study of two first grade classrooms, a participant-observer identified those factors which support and hinder a teacher's transition from the traditional model of teaching to whole language orientation. Data was collected through one week of full day participation in a whole language college laboratory classroom in Georgia, and a semester-long internship with a public school teacher in Illinois who is moving from traditional commercially-driven teaching to whole language child-centered instruction. Theoretical and empirical literature, classroom observations, and teacher interviews were analyzed.

Factors identified as assisting the transition from basal to whole language instruction were: 1) a support network of administration, teachers, and parents to share information and encourage risk-taking; 2) less restriction on how time is spent throughout the day, since subjects are not drastically separated; 3) teacher's skill and experience with positive classroom management; 4) the creation of new definitions for teacher and student success, i.e., less performance-oriented, in terms of standardized measures of achievement, and more mastery-oriented, in terms of improvement, individual goal-setting, and self-examination for improvement; 5) teacher's realization that the child's writing is the best text for beginning reading instruction.

Factors found to limit the transition to whole language included: 1) the allocation of funds for workbooks and skill sheets rather than for the purchase of *real* books and quality literature; 2) school-district assessment documents geared toward the evaluation of isolated skills with standardized quantitative scores; 3) reluctance to change teaching style, take pedagogical risks, and deviate from principles taught in teacher education classes; 4) absence of unified commitment to whole language instruction among teachers, administrators, and parents; 5) failure to comprehend the political nature of whole language philosophy, e.g., giving up basal readers but not the teacher-centered classroom; 6) fear of sharing authority and responsibility, losing control of students, and changing the nature of the student-teacher relationship.

COMPARISON OF THE REACTIVITY OF HYDROXYL RADICALS PRODUCED FROM H_2O_2 AND HONO

Kürstan L. Hurd and Dr. Tim Rettich*, Illinois Wesleyan University
Department of Chemistry

The reactivity of hydroxyl radicals formed thermally and photochemically under varying conditions was studied. Hydroxyl radicals produced by thermal and photochemical reactions of aqueous H_2O_2 were compared with $\cdot\text{OH}$ photochemically produced from HONO. In these systems, the aqueous reaction solutions were saturated with benzene which is a known scavenger for $\cdot\text{OH}$.

(1) A significant effect of pH on the $\cdot\text{OH}$ production was observed during photolysis of H_2O_2 . The concentration of reaction products were doubled when solution pH varied from 13 to 2.

(2) Additionally, the role of dissolved gases was found to be important. An oxygen purged solution of H_2O_2 yielded four times as much photolysis product as a similar non-purged solution.

(3) Catalytic formation of $\cdot\text{OH}$ from H_2O_2 was also studied using CuSO_4 catalyst. This system seems the most efficient with a total of 77% of the dissolved benzene converted into phenol.

(4) The photochemistry of HONO/ NO_2^- system is the subject of a parallel study. Hydroxyl radicals formed by the photolysis of this system are scavenged by benzene. Products formed include para-nitrosophenol (PNP) and phenol.

Analytical techniques for isolating and quantifying phenol from H_2O_2 reactions were also designed to identify PNP. Reaction products were analyzed using UV/Vis spectroscopy. However, possible HONO photolysis products had nearly overlapping absorbances. Therefore, both the HPLC with a C_{18} column and GC were also used. Neither of these instruments were useful in analyzing the products sufficiently. Presently, product analysis using a silica gel column on the HPLC is in progress.

PHOTOCHEMISTRY OF NITROUS ACID AND NITRITE ION

Jane A. Johnson and Timothy R. Rettich*

Department of Chemistry, Illinois Wesleyan University

A study of the solution phase photochemistry of nitrous acid/nitrite ion system in both water and nonaqueous solvents has been undertaken. Photolysis at 365nm of the aqueous system is known to form hydroxyl radical and nitric oxide. The relative contributions of the molecular and ionic forms to the photochemical production of radicals is unknown. Scavenging reactions of the hydroxyl radicals in aqueous and nonaqueous solution are used to determine the relative production of $\text{OH}\cdot$ formed by photolysis of HONO and NO_2^- .

Molecular nitrous acid is isolated from its conjugate base by extraction into various solvents. Extraction of an aqueous mixture of nitrous acid and nitrite ion with benzene, selectively puts only HONO into the organic phase. The products of the photolysis of this benzene solution indicate hydroxyl radical formation. Nitrite ion dissolves in aprotic solvents, such as DMF and DMSO, without the formation of nitrous acid. The study of the photochemistry of such solutions is currently in progress.

IDENTITY FORMATION AND SEX ROLE ORIENTATION OF COLLEGE STUDENTS AND WORKING YOUTHS.

Ann Kramer, Department of Psychology, IWU, Dr. Jeong-Ran Kim*

According to Erikson (1968), identity development is a major task during the adolescent period, and it is influenced by cultures and subcultures. One important type of the adolescent's subculture is school setting or work setting. Extensive research has been conducted on the identity formation of students such as college or high school students, but research with non-school working youths has been rare. Since students and working youths experience different subcultural environments, they may experience different paths of identity formation. Therefore, the present study is designed to compare students' identity development with that of working youths. It was hypothesized that more college students are in the moratorium status and more working youths are in the identity achieved or foreclosure status. Also, it was hypothesized that more college students have an androgynous orientation compared to that of working youths. Approximately forty subjects for each group were obtained and were asked to complete the Extended Version of the Ego Identity Status to assess their identity formation. To assess their sex role orientation, they completed Bem's Sex Role Inventory. Oneway analysis of variance with post hoc tests and Chi Square will be used to test the hypotheses. The expected results are such that more college students will be in the moratorium status and more working youths will be in either the foreclosed or identity achieved statuses. Also, it is expected that more college students will have an androgynous orientation compared to that of working youths.

CHOICE, COMMITMENT, AND TIME HORIZON

Sandra Lyn, Dept. of Psychology, IWU, James Dougan*

Timberlake, Gawley, and Lucas (1986) found that rats were unable to anticipate future resources that were delayed by 16 minutes or more. This 16 minutes during which rats were able to anticipate future food is called the time horizon. The present experiment seeks to examine why the animals could not anticipate beyond this time horizon and also to test whether it could be lengthened. In most sessions, a single response bar (left or right) was presented at the start of the session. One bar was associated with 30 minutes of a progressive ratio schedule. The other bar was associated with the same progressive ratio schedule, followed by 5 minutes of free food. The bar that was presented alternated randomly from day to day. Once every four sessions, both bars were presented at the start of the session, and the animals were allowed to choose between them. Consistent choice of the progressive ratio and free food bar suggests "anticipation" over a 30 minute gap.

A COMPARISON OF PERSONALITY TYPE & LEARNING STYLE OF ELEMENTARY EDUCATION MAJORS, MATH MAJORS, AND MATH PROFESSORS: CULTURES IN CONFLICT

Jane Martin, Education Department, IWU, Dianne S. Mancus*

National concern exists regarding the math performance of women and minorities. At IWU, faculty and students have reported frustration and dissatisfaction with Math 105, Mathematics for Elementary Teachers, a class composed almost entirely of females. An examination of the Illinois Wesleyan experience might shed light on the national situation.

It was hypothesized that elementary education students would differ from math majors and professors on the Myers-Briggs Type Indicator (MBTI), a self-report instrument derived from Jung's theory of personality types. In addition, differences in learning style as determined by performance on the Productivity Environmental Preference Survey (PEPS) were expected. It was hypothesized that personality type and learning style of math majors would resemble math professors.

The elementary education junior class (n=20 females), upper-level math majors (n=21, 7 females and 14 males), and math professors (n=4, identity unknown, however, 5 of 6 IWU math faculty are male) were administered both instruments by the Director of the Career Center. ACT math scores for elementary education students in the study ranged from 17 to 34 (mean=24.65, mode=23.00, median=24.5).

No significant differences were found among the three groups on the PEPS for factors such as persistence, motivation, and structure. MBTI profiles of math students and math professors were alike but elementary education students differed dramatically. Statistically significant differences were found between elementary education and math students on the Thinking-Feeling scale ($z=2.94$, $p<.01$). The proportion of elementary education students whose preference on the T-F scale was Feeling (80%, n=16) differed significantly from that of math majors who preferred Feeling (33%, n=7). Differences were found between elementary education students and math faculty on the Sensing-Intuitive Scale ($z=1.67$, $p<.1$). Fifty-five percent (n=11) of the elementary education students preferred intuitive cognitive processing as compared to 100% of the faculty (n=4). Significant differences between education students and math faculty were found on the Thinking-Feeling Scale ($z=2.4$, $p<.05$).

The education students' dominant type, Feeling, (40%, n=8) was the third auxiliary, the weakest type, for 50% of the participating math faculty (n=2). Conversely, Thinking, the dominant type for those math faculty, was the education students' third auxiliary. According to MBTI research, students often resist and take an emotionally defensive posture when teachers' dominant type challenges their third auxiliary. Students learn best in classes which utilize their dominant type and gradually strengthen the third auxiliary.

PRIME DESERT n -TUPLETS OF LENGTH k

Derek M. Marusarz, Dept. of Mathematics, IWU, George Polites *

The necessary condition for prime desert n -tuplets of length k has been found but it is still not known what will *guarantee* their existence. To this end, a construction process has been devised to search for them and various theorems have been looked at to find a theoretical solution to the problem. This talk will treat basic definitions and examples in this research, show what has been done with the theoretical aspects and will treat the efficiency of the construction process.

CARBON AT THE PERMIAN-TRIASSIC EXTINCTION BOUNDARY

Clayton E. McCormack, Dept of Chemistry, IWU, Wendy S. Wolbach*

Wolbach *et al.* (1985, 1989) discovered an increased abundance of inorganic carbon with the morphology of soot across the Cretaceous-Tertiary (K-T) boundary, presumably from major wildfires. Their evidence supported the theory that a giant meteorite impacted with the Earth causing the world-wide mass extinction at the K-T boundary and triggering the fires. The K-T extinction has been investigated in order to explain the disappearance of the dinosaurs and other major species living at that time, but the paleontological record suggests the *largest* mass extinction occurred at the Permian-Triassic (P-Tr) boundary 245 million years ago.

Recent evidence supports large-scale volcanism as the cause of the P-Tr extinction. Elemental analysis of sedimentary rocks from the boundary indicates an enrichment of certain elements and depletion of others relative to average baseline values consistent with the rock being derived from volcanic ash. In addition, the Siberian traps have been dated, within experimental error, to coincide with the P-Tr extinction. It is hoped that further chemical evidence will reveal a possible connection between volcanism and the extinction event.

The procedures used by Wolbach *et al.* have been used to isolate elemental and organic carbon residue from twelve sedimentary rock samples in the Changxing Formation (Zhejiang Province) of eastern China dated to the P-Tr boundary. The carbonate and silicate components of the sample were removed through alternating treatments with HCl and HF. After drying the residue, consisting of a mixture of elemental and organic carbon, a fraction was removed for measurement of the isotopic carbon ($^{13}\text{C}/^{12}\text{C}$) composition and mass abundance. The remaining residue was isothermally oxidized with dichromate for >500 hours while mass loss was monitored. This procedure is necessary to destroy the more reactive organic carbon (kerogen), leaving the less reactive elemental carbon. The isotopic composition of any remaining elemental carbon will be determined. In addition, the morphology of the carbon will be studied using a scanning electron microscope to determine whether the carbon has the morphology of soot and thus might have resulted from major fires relating to the extinction event. Even in the absence of soot, abundance and isotopic data might still yield important clues indicating either a possible cause of the mass extinction at this boundary or the environmental changes occurring at the time.

PORTRAIT OF A LEADER: CAROLINE FLATT RUPERT

Cynthia R. Miller, School of Nursing, Donna Hartweg*, Joseph
Freedman*

The existence of the Caroline Flatt Rupert Endowed Chair for Nursing and the Caroline Rupert Award for Outstanding Nursing Senior served as impetus to question the relationship of this woman to Illinois Wesleyan University and to the nursing profession in general. Archival materials at Sheean Library, A.E. Livingston Health Sciences Library, and the Midwest Nursing History Center in Chicago were reviewed and later validated and enriched through oral interviews of relatives and colleagues.

A profile emerged of a nursing leader whose life pattern was similar to those of other influential women of the era. As a young, determined nursing leader, Caroline Flatt Rupert combined a brief professional life with one of social and political community action to significantly impact nursing, nursing education, and the public health in central Illinois. Following graduation from the Illinois Training School for Nurses of Chicago in 1894, she became the first Superintendent for Nurses at Brokaw Hospital and the founder of the Brokaw School for Nurses in Normal, Illinois. A marriage to L.S. Rupert changed the character of her influence from her formal leadership as Superintendent to that of professional and political leader for nursing education and the public health in the region. Successful lobbying in the State Legislature for stricter nursing education standards was one of the exceptional accomplishments for this woman, who herself did not yet have the right to vote. Through her roles in numerous women's organizations in Bloomington-Normal and through support of her husband's status in the community, she was also able to impact public health decisions at the local level. Caroline Rupert's commitment and belief in the importance of strong education for nurses, including that at the University level, led to her support for the relationship which developed between Illinois Wesleyan and the Brokaw School for Nurses. Letters written shortly before her death revealed the strength of those beliefs and her love for nursing education at Illinois Wesleyan. This commitment was formally expressed through her establishment of the nursing award and the endowed professorship for nursing.

NEURAL ACTIVITY RECORDED FROM SEGMENTAL GANGLIA AND THE VENTRAL NERVE CORD OF *Nereis virens*

Michael J. Monfils, Dept. of Biology, IWU, J. Robert Hippensteele*

The neural network of *N. virens*, a polychaete marine clam worm, is cephalized into a brain region and a ventral nerve cord (VNC). Bundles of neurons (nerves) exiting and entering the VNC function as a link in the control of the periphery. Aggregations or collections of nerve cell bodies, called ganglia (singular; ganglion), lie within each serial body segment of these animals. This nervous system controls many of the regulatory and behavioral functions.

One function which *N. virens* exhibits is vasomotion (the periodic increases and decreases in blood vessel diameter). Data which demonstrated vasomotion does exist was collected in a previous study (Monfils, unpublished data). If one can record neural (electrical) activity from these animals, this information could be analyzed along with visual data of vasomotor activity obtained simultaneously. This would be done in an attempt to more precisely determine the nature of neural control of vasomotion.

In order to accomplish this goal, a technique, applicable to this study, must be developed for recording neural activity. Recordings are made from either single or multiple cells in either the VNC or segmental ganglia. Single cell recordings are usually done either intracellularly (within the cell) or extracellularly (outside the cell) but those from a group of neurons can only be done extracellularly. The technique used for single-cell recordings typically employs a glass microelectrode, filled with a conducting medium, which is either inserted into the neuron (for intracellular), or apposed to the outside of a cell and held there via differential pressures (for extracellular). Tip diameters must be hollow and small enough (on the order of micrometers = 1/1,000 of a millimeter) so that the only contact made is between an individual cell and the microelectrode tip. This can only be accomplished by "pulling" a small diameter hollow glass tube into a very thin strand at the tip.

Once the ability to effectively measure neural activity has been accomplished, the next step will be to record neural and vasomotor activity simultaneously. Only then will a correlation of neural and vasomotor activity be able to be determined.

PERCEPTIONS OF FEELINGS AND CONCERNS OF NEW FATHERS AND THE EFFECTS OF EPIDURAL ANESTHESIA ON THEIR SPOUSES

Susan M. Monger, School of Nursing, IWU, Connie Dennis*

The use of epidural anesthesia as an intervention for pain relief has increased in the labor and delivery setting over the past years. Literature has not identified what effects the addition of this technology has had on the normal childbirth process and those participating in childbirth, specifically the new father.

The purpose of this study is to identify and explore first-time father's perceptions of their feelings and concerns during various phases of the labor and delivery experience in which epidural anesthesia is used. The study addresses the following research questions: a) What are the perceptions of first-time fathers regarding their feelings and concerns at each of the following three stages in the labor and delivery experience: pre-epidural, post-epidural, and at time of delivery of their newborn? b) Do the levels of concerns and feelings differ during the different stages identified previously?

The convenient sample consisted of first-time fathers whose newborns were delivered in a small Midwest, rural community hospital. Subjects who met the following criteria: a) married at least one year; b) first baby for both father and mother; c) completion of childbirth education classes; d) epidural anesthesia during childbirth were included in the convenient sample (n=10). Fathers were surveyed through self administered questionnaire which was partly derived from The Barry Expectant Fathers Stress Index (BEFSI) . Prior to administration, the questionnaire was reviewed by a panel of expert nurses for content and readability.

The data from the questionnaires regarding perceptions and relevant demographic data was analyzed using the Statistical Package for the Social Sciences (SPSS/PC+). Implications for future research and conclusions are delineated.

RELIGIOUS OUTSIDERS IN CONTEXT: BILLY SUNDAY AND PACIFIC GARDEN MISSION

Jonathan Moore, Dept. of History, IWU, Paul Bushnell

Perhaps the most colorful revivalist in American religious history, Billy Sunday excited early twentieth-century crowds with his acrobatic sermons and his simple message of Christ's salvific love. Criticized for his lack of sophistication and theological depth, Sunday nevertheless struck an emotional cord in the hearts of thousands of urban Americans who responded to his message. Despite his uniqueness, Sunday was more than just a successful flash in the American religious pan; rather, Sunday's mining of American souls, especially before 1920, greatly contributed to a larger fundamentalist movement at the turn of the century.

To assess Sunday's place in American fundamentalism, this paper first considers the personality, theology and tactics of the man himself. Crucial to this is an examination of his own conversion experience. On south State Street in Chicago, the young baseball player committed his life to Jesus Christ at Pacific Garden Mission, a place with its own rich and influential history. Positioning itself as a warrior against urban evils, the Mission's coupling of evangelism and social responsibility bear similarities to Sunday's post-conversion work. The modern Mission closely resembles its historical forerunner, and this paper will more clearly define its character against that of a very different Christian social service program, the Salvation Army's Freedom Center.

A comparison of these two modern religious groups reveals the problems of an imprecise vocabulary. Both speak of "success," but each certainly defines this in different ways. This moves the paper into a discussion of definitional issues in trying to describe the historical Mission and Sunday as well. The labels "fundamentalist" and "evangelical" necessarily connote certain characteristics, not all of which apply to the Mission and Sunday. In addition to operating outside the perceived religious mainstream, each operated free from the institutional structures within which even some fundamentalists existed. This further calls into question definitional appropriateness, and some new definitions will be proposed.

Finally, this paper will conclude by reassessing the respective historical places of Billy Sunday and Pacific Garden Mission and reasserting each's importance in early twentieth-century American religious history.

DESTRUCTION OF THE MORAL VALUES: VILLAGE PROSE OF THE 60'S

Meghan Murphy, Dept. of Foreign Languages, IWU, Marina Balina*

Village prose has always existed in Russian Literature. In the 19th Century, Pushkin wrote on village themes. There were other Russian writers who also wrote about the village life such as Tolstoy and Goucharov. After the Bolshevik revolution, Soviet writers used village prose to express their feelings about the political and social changes that were occurring. At this time the village prose writers created a false picture about the village. This style of prose which glossed over any problems with the Soviet system was called "Social Realism". After World War II, there was a massive movement from the villages to the cities. This movement took place because of the extensive damage that the village experienced as a result of the war. Stalin's forced collectivization of all of the farms in Russia also made the existence of a peasant population almost impossible. This migration also caused a destruction of the customs and values of the countryside. At this point in time, many writers changed their emphasis in village prose from positive change to the destruction of the Russian morality. In the late 50's and early 60's the village prose writers were more critical of the countryside. This new openness was caused by two events, the death of Stalin and the 20th Party Congress. Stalin died in 1953 and after his death there was a great change in censorship of Russian authors. No longer did writers have to praise collectivization of the villages in order to be published. In addition to this, in 1959 the 20th Party Congress made a statement denouncing the "cult of personality" that Stalin possessed. With this denunciation, writers could criticize the Stalin era easier.

Three novellas illustrate an emphasis on the peasants problems. *Carpenters Stories* by Belov shows how the peasants respect the ancient Russian culture but how it is being destroyed against their will. *Matryena's Home* by Alexander Solzhenitsyn is a bittersweet tale of the hard life of a peasant woman. Finally, *Three, Seven Ace* by Vladimir Tendryakov shows how the Soviet system has no roots, such as religion, to support the laws which make morality an impossible dream.

With all the political and social freedoms of the late 50's and early 60's, the village prose was able to show the true destruction of moral values in Russia.

NURSING EDUCATION AT ILLINOIS WESLEYAN UNIVERSITY: 1923 to 1976.

Lori Ann Musser, School of Nursing, IWU, Donna Hartweg* and Joseph
Freedman*

The purpose of this research was to reveal the history of Illinois Wesleyan University's (IWU) School of Nursing from the earliest affiliations with Brokaw Hospital's School for Nurses to the formation of the free standing baccalaureate program. Two research questions were formulated: 1) How did Brokaw Hospital School for Nurses and Illinois Wesleyan come together? 2) What were the critical factors which contributed to the development of IWU School of Nursing?.

To address the questions historical research methods were utilized. First, archival research was conducted at Illinois Wesleyan's Sheean Library, at A.E. Livingston Health Sciences Library of BroMenn Regional Medical Center, and at the Midwest Nursing History Museum at the University of Illinois, Chicago campus. Oral interviews were subsequently conducted with three past administrators and one past faculty member from the School of Nursing.

The findings suggested the primary force to be the determination and drive of three nursing leaders at key points in the program's development. Maude Essig, Director of Brokaw Hospital School for Nurses from 1924 to 1938, changed the standards for admission to be consistent with those of the University and also, acquired important necessary educational resources. Margaret Griffin, Director of Brokaw School of Nursing of IWU, worked closely with Dean William Beadles to establish plans for the integration of the school, dispelled opposition from the medical staff, realized the importance of a public health curriculum, and sought to enhance the educational aspects of the School of Nursing. The third leader, Mary D. Shanks was director of IWU Brokaw Collegiate School of Nursing from 1960 to 1976. During this time, she established the philosophy and objectives for the School, received initial NLN accreditation, overcame opposition from the medical staff, and obtained financial resources and support from the community.

Yet, determination and drive were not the only commonalties among the three leaders mentioned above. Documentation of a genuine interest in the professional lives of the students and graduates and a commitment to the growth of the profession was found in all three directors.

THE DEVELOPMENT OF AN IMPROVED EXTRACTION METHOD FOR THE DETERMINATION OF COCAINE METABOLITE IN HUMAN URINE

Leanne M. Nieu Kirk, Department of Chemistry, Illinois Wesleyan University,
David N. Bailey*

Benzoyl ecgonine (BE) is the primary metabolite of cocaine. Detection of BE in urine is therefore an indication of cocaine usage. The goal of this research is to improve the extraction efficiency in order to increase the sensitivity of the method of determining cocaine usage through urine analysis.

A standard extraction technique was developed to efficiently extract BE from aqueous solution. Ultraviolet/visible spectroscopy was used to determine the extraction conditions for which optimum extraction of BE into organic solvent occurred.

EXTINCTION-INDUCED AGGRESSION IN LABORATORY RATS

Amy K. Rajala, Dept. of Psychology, IWU, Dr. James Dougan*

In a study by Azrin et al. (1966), it was found that pigeons attacked other pigeons when the transition from a food reinforcement schedule to an extinction schedule was employed. This "frustration" that appears due to the implementation of an extinction schedule, however, has not been widely studied in the laboratory rat. Examples of the types of phenomena that have been given attention with regard to laboratory rat aggression are male aggression in a mixed-sex colony toward male intruders, attack elicited by the application of aversive stimuli, and female-elicited aggression of male rats living in colonies. The expression of aggressive behaviors in rats appears to be highly responsive to developmental, experiential, and contextual variables. The present study focuses upon aggression displayed toward two characteristically different objects when an extinction schedule is employed with a laboratory rat. By using an extinction paradigm with rats bar-pressing for food, the present study examines aggression in this context by measuring the intensity and type of aggressive behaviors displayed toward the two different objects as well as looking at what other clues may lead to "frustration".

SEQUENCING OF A CALMODULIN-LIKE GENE FROM *ARABIDOPSIS*.

Tamara Ross, Dept. of Biology, IWU
Research conducted at the University of Illinois-Urbana/Champaign
with Ray Zielinski*

Calcium-binding proteins, such as calmodulin, play important physiological roles in plants and animals (Means & Dedman, 1980 and Dieter, 1984). Many calmodulin-like proteins exist in animals, but none had been found in plants prior to the screening of an *Arabidopsis* cDNA (DNA obtained by reverse transcription from the mRNA which codes for the protein) library with a barley calmodulin cDNA probe (Ling & Zielinski, 1989). The positively hybridizing fragment was subcloned into a phage vector, pBS (Zielinski lab, unpublished). The purpose of this project was to devise a restriction-enzyme map and use this to develop subclones to obtain the complete nucleotide sequence for the gene coding for the calmodulin-like protein. Some sequence was obtained, but further work must be done to sequence the entire gene.

REINFORCER PREDICTABILITY AND BEHAVIORAL ECONOMICS

Lauri L. Shields, Dr. James Dougan*. Illinois Wesleyan University.

According to behavioral economic theory, the obtained cost of a reinforcer should be inversely related to the supply of that reinforcer. This prediction has recently been confirmed by Dougan (In Press). The present study investigates whether the effect is related to reinforcer "predictability." A reinforcer is "predictable" if regularly occurring cues (such as presentation of a stimulus or the passage of time) signal the availability of the reinforcer. A reinforcer is "unpredictable" if there are no cues which signal its availability. In the present experiment, animals were exposed to four sets of simple interval schedules. Schedules ranged from being highly predictable to unpredictable. According to economic theory, the obtained behavioral cost from conditions with the most predictive schedules should be highly similar to the functions from the least predictable schedules.

MAQUILADORAS AND CHICAGO: MEASURING THE EFFECTS OF TRANSNATIONAL BUSINESS MIGRATION ON A COMMUNITY.

Thomas M. Smith, Dept. of Economics, IWU, Dr. Margaret Chapman*

This study focuses on a new and rapidly growing phenomenon in the United States, the movement of domestic firms to maquiladoras in Mexico. Migration from one area to another is a viable solution to production problems for many firms; moving to a new location is often one way an industry can cut production costs. As of 1965, the passage of the Border Industrialization Program by Mexico and the U.S. Government allowed U.S. firms to move their production facilities into a production zone within the Mexican border. As of 1991, 30 firms from the Chicago area had moved their production facilities from the Chicago Metropolitan area to Mexico. This study is concerned with the transnational migration of companies' production facilities from the Chicago area and how it affects employment, wages, value added and output in other sectors of the economy in the Chicago Metropolitan area.

It is my hypothesis that the loss of jobs in the Electronics Industry in Chicago has a rippling effect that causes lost jobs, wages, value added and output in other industries located within Chicago. I have chosen to focus on the Electronics Industry in Chicago for two reasons. First, the Electronics Industry was named by Governor James Thompson as a staple industry for Illinois, concentrated around Chicago and I 90, later designated as the Golden Corridor of Growth. This industry is both a major supplier and demander of products to and from other industries in the Chicago area, which makes it an ideal industry for this study. Second, ten electronic production plants have moved from the Chicago Metropolitan area to Mexico from 1980 - 1990, resulting in 15,391 jobs lost.

This study involves using the Input-Output model at University of Illinois, Champaign, and University of Illinois at Chicago. The R.E.A.L. model places actual data concerning the Chicago Metropolitan area into an interindustry and final demand matrix. Through mathematical and matrix manipulation, the model will be able to calculate how a change in any industry will affect other industries. This change can be measured and presented in the form of a multiplier, which measures total impact of the job loss on all linked industries and in the retail sector. This study will give employment, wage, value added and output multipliers for the Electronics Industry for the Chicago Metropolitan area.

OPTIONS FOR U.S. HEALTH SYSTEM REFORM: A CRITICAL ANALYSIS

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Teodora Amoloza*

This research examines the options for American health policy and health system reform. The United States market-based health care system, involving over 1500 private insurance companies, is failing. Fewer and fewer Americans are able to afford insurance and the overall cost of the system has increased at a rate well beyond the national inflationary rate. As a result, health care in the United States has become a privilege for those able to pay. Primary objectives for reform, then, include universal access and cost-containment. The three most common types of proposals for reform include 1) tax reform proposals, 2) pay-or-play proposals, and 3) national health insurance proposals. This study compares each proposal type using key indicators, including their effect on private insurance, health care providers, businesses and consumers. Emphasis is placed on America's historic reluctance to enact national health insurance, despite its advantages for universal access and cost-containment.

FORAGING AND SIZE SELECTION OF ZEBRA MUSSELS, *DREISSENA*
POLYMORPHA, BY THE CRAYFISH, *PROCAMBARUS CLARKII*

Monica Stevens, Dept. of Biology, IWU, Gail Lima*

The Zebra mussel, *Dreissena polymorpha*, a species native to Europe was first discovered in Lake St. Clair of the Great Lakes Basin in June 1988. By September 1991, *Dreissena* was found in all five of the Great Lakes and had spread through many connecting waterways and inland rivers. Due to their dispersal abilities and reproductive strategy, *Dreissena* are continuing to rapidly expand their populations. *Dreissena* have been documented to have negative effects on the ecological equilibrium of ecosystems. In addition, *Dreissena* have become an important fouling organism on water intake pipes and boats. Little is known about the ecological role of *Dreissena* in the United States. Much research is needed in order to understand and control this rapidly spreading species. Zbigniew (1974) reported an incidence of the crayfish, *Orconectes limosus*, leading to the extinction of *Dreissena* in a water supply channel in Poland.

My study examined the foraging and size selection of *Dreissena* by the crayfish, *Procambarus clarkii*. Five crayfish were tested in the laboratory in individual two gallon tanks. The profitabilities of *Dreissena* and two other food items (earthworm pieces and plant detritus) were determined by comparing handling times with prey digestible organic matter. Experiments were conducted to determine the size of mussels preferred by *Procambarus* and the amount of mussels consumed in a day. An optimal foraging model was utilized to determine whether *Procambarus* prey selectively in order to maximize their net energy gain and to determine their preference for *Dreissena* in relation to other food items. Optimal foraging theory predicts that most animals are capable of distinguishing between prey types of different profitability and selecting the most profitable ones in terms of energetic gain per unit handling time (Charnov 1976). The results of this study will be presented at the conference and will be important to further understanding of the possible impact crayfish will have as predators on *Dreissena* in the United States.

**THE EFFECTS OF ACUTE ADMINISTRATION OF THE 5-HT NEUROTOXIN
PCA ON THE EXPRESSION OF MALE RAT COPULATORY BEHAVIOR:
A COMPARISON WITH MDMA**

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Dr. Wayne Dornan*

3,4 Metylenedioxymethamphetamine (MDMA) is a potent neurotoxin which produces 5-HT nerve terminal degeneration in the CNS in both rodents and primates. Dornan et al (1991) reported that subcutaneous injections of MDMA (40mg/kg) every 12 hours for 4 consecutive days to sexually vigorous male rats produced a transient disruption in the expression of male sexual behavior when compared to saline injected controls. One week after the first injection, MDMA induced a disruption in the expression of male rat copulatory behavior when compared to saline injected controls. In MDMA treated males that did display ejaculatory behavior, however, both the ejaculation latency and the post-ejaculatory interval were dramatically lengthened when compared to controls. This inhibition was not seen, however, at a lower dose of 20mg/kg. One week after the first behavioral test, sexual behavior in MDMA treated rats appeared unaffected despite a marked depletion of 5-HT and 5-HIAA content. Presently, little is known about the effects on the expression of male rat copulatory behavior following administration of other amphetamines which are selective 5-HT neurotoxins. In this study, the effects on male rat copulatory behavior of parachloroamphetamine (PCA), a neurotoxin similar to MDMA, was examined. PCA (10mg/kg and 20mg/kg) or saline (1ml/kg) were administered intraperitoneally to sexually vigorous male rats. These doses of PCA have been shown to produce 5-HT neurotoxicity in the CNS of the rodent. Three days following the injection, a motor activity test was scored and a variety of parameters of male sexual behavior were assessed. One week later the males were tested again. The results of this study revealed that neither neurotoxic doses (10mg/kg and 20mg/kg) of the 5-HT neurotoxin PCA produces the transient disruption of male rat copulatory behavior seen when the similar 5-HT neurotoxin MDMA is administered on a neurotoxic regimen.

THE EFFECTS OF A COMPLEX ENVIRONMENT ON SPATIAL MEMORY IN RATS AS MEASURED BY THE RADIAL ARM MAZE

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Previous research has demonstrated the superiority of rats raised in a complex environment in problem solving traits. The complex environment consists of multiple climbing toys, tunnels, and in this case, an exercise wheel. The focus of the present study was to compare spatial memory abilities between rats raised in a complex environment and rats raised in a normal laboratory environment. Spatial memory is the ability of a rat to organize and relate its surroundings according to its relative position in the environment. This is measured by performance standards on the radial arm maze. Rats are placed on a center platform and has eight arms to choose from, all of which are baited. The rat then uses its spatial memory capabilities to orient itself and "remember" which arms it has previously visited and which arms it has not. Eight male litter mates were weaned at approximately 28 days, with 4 being reared in the complex environment and 4 placed in the normal laboratory environment. At approximately 66 days, rats were tested on the 8-arm maze. It is believed that those rats raised in the complex environment will display superior memorization skills, as opposed to those raised in the normal laboratory environment.

AN EVALUATION OF THE SIXTH GRADE CRIMINAL JUSTICE EDUCATIONAL PROJECT

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Teodora Amoloza*

Developed by McLean County Circuit Judge W. Charles Witte, the Sixth Grade Criminal Justice Educational Project seeks to introduce area students to the criminal justice system by providing an understanding of basic procedures and fostering respect for the system. The program consists of classroom review of a criminal justice outline and a mock trial utilizing a case study/role play approach.

This evaluation examines the effectiveness of the Sixth Grade Criminal Justice Educational Project in meeting the objectives established at the program's inception. Specifically, this study measures student participants' respect for the criminal justice process and their learning of related terms and procedures. A sample of thirty sixth grade students from Oakdale Elementary School in Normal, Illinois was used to obtain data. Preliminary findings indicate that the students gained a significantly better understanding of the criminal justice system from participating in the program. The program appears to have a less substantial impact on students' respect for the criminal justice process.

FURTHER EVIDENCE FOR THE ROLE OF NEUROKININS IN THE EXPRESSION OF MALE COPULATORY BEHAVIOR

Krista L. Vink, Dept. of Psychology, IWU, Dr. Wayne Dornan*

Accumulating evidence indicate that neurokinins (neuropeptides synthesized in the brain) play a role in the neural regulation of male rat copulatory behavior. Recently we reported on the effects of intracerebral injections of two novel neurokinins on male rat sexual behavior. Bilateral injections of neurokinin K (NKK) into the medial preoptic area (MPOA) produced a marked disruption in the expression of male rat sexual behavior, while injections of neurokinin A (NKA) had no effect. In this study, a four part experiment was conducted. Experiment 1 was conducted in an attempt to replicate the NKK induced inhibition of male copulatory behavior observed previously. Experiment 2 examined the question of whether the effects observed previously are specific to the MPOA by assessing the effects of NKK into the caudate-putamen (an area which contains neurokinin receptors) on male copulatory behavior. In experiment 3, the effect of another novel neurokinin, neurokinin y (NKy), on male sexual behavior was assessed following bilateral injections into the MPOA. Lastly, in order to ascertain whether the effects on male copulatory behavior were mediated via a neurokinin receptor (NK-2) animals were pre-treated with a selective NK-2 receptor antagonist followed by bilateral injections of saline, NKK, or NKy into the MPOA. In support of a previous study in this lab, our results indicate that bilateral injections of NKK markedly inhibited the expression of male copulatory behavior when compared to injections of saline ($X^2 = 10.5$, $df = 1$, $p < .001$). In contrast, bilateral injections of NKy, failed to effect the expression of male copulatory behavior in sexually vigorous male rats when compared to control injections. Bilateral injections of NKy did, however, produce marked increases in intromission and mount latencies. No other behavioral parameter of male copulatory behavior was affected.

¹ OCCUPATIONAL SEGREGATION AMONG GENDER - A LOOK AT THE FUTURE

² BRENDA WEIL, DEPARTMENT OF ECONOMICS, IWU, MICHAEL SEEBORG*

³This study takes a socio-economic approach to occupational segregation and studies the implications of segregation for men and women. The study centers around the "crowding hypothesis" developed by Barbara Bergmann. This hypothesis states that because women are denied access to many occupations, they are crowded into a limited number of remaining occupations.

Barriers to entry into certain occupations are identified. These barriers include statistical discrimination, overt discrimination, and education and training differences between men and women.

The continuation of occupational discrimination also depends upon the speed which new jobs open up in traditionally male occupations and traditionally female occupations. If opportunities in male-dominated fields expand rapidly and/or jobs in female-dominated occupations expand slowly, the prospects for more rapid integration are favorable. Recent Bureau of Labor Statistics projections are utilized to determine whether future trends will favor integration. Finally, policy implications of the findings will be discussed.

THE ADAPTATION OF FLOUR MILLING BASED COMPANIES
TO ENVIRONMENTAL CHANGE

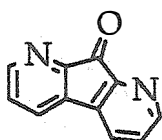
Thomas Welge, Dept. of Business Admin., IWU, Cyril Ling*

This study focuses on five United States food processing companies, Archer Daniels Midland, Cargill, ConAgra, General Mills, and Pillsbury, which are linked together by either a longstanding presence and/or large current participation in the flour milling industry. This study attempts to identify the critical junctures and environmental changes which forced these organizations to adapt, to explore the reasons behind the decisions, and to assess the results of these decisions. The primary framework for analysis in this study is the work of Michael Porter, particularly his concept of industry structure and evolution. Research was conducted in three steps. A survey of literature in both contemporary business policy/strategy theory and the history of the industry was initially conducted. Next, specific research was conducted to determine financial and economic characteristics for each organization. Finally, interviews were conducted with members of upper-level management of the selected organizations and with industry observers. Using this information conclusions were drawn about the business strategy and policy decisions of these five companies.

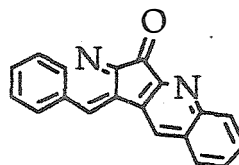
SYNTHESIS OF 1,8-DIAZADIBENZO[b,h]FLUOREN-9-ONE FOR USE AS A FINGERPRINTING AGENT

Brian Werner and Forrest J. Frank, Illinois Wesleyan University

In the detection of latent fingerprints, 1,8-diazafluoren-9-one (1) is used. It reacts with amino acids to give a fluorescing product. The objective of this research is to prepare an analog, 1,8-diazadibenzo[b,h]fluoren-9-one (2), which reacts similarly with the amino acids. However, the increased conjugation in (2) should improve the fluorescence of the product away from background fluorescence which is a problem with 1,8-diazafluoren-9-one.



(1)



(2)

COMPARISON OF BODER TEST OF READING AND SPELLING PATTERNS WITH WECHSLER INTELLIGENCE SCALES

Todd West, Dept of Psychology, IWU, Robert Lusk*

The conceptualization behind the Boder Test of Reading and Spelling Patterns (BTRSP) has received favorable support from the literature. However, there is some controversy concerning the ability of the BTRSP itself to successfully discriminate among the accepted sub-types of dyslexia. Little research has been performed assessing the actual validity of the BTRSP. The Wechsler Adult Intelligence Scale - Revised (WAIS-R) and the Wechsler Intelligence Scale for Children - Revised (WISC-R) are well accepted measures of intelligence. The present study examined the relationship between the BTRSP sub-types and sub-test of the Wechsler intelligence scales. Mixed results were obtained. Predictions that were supported include the following: Dysphonetics were significantly lower in their Verbal IQ (VIQ) than in their Performance IQ (PIQ); Dyseidetics had a higher VIQ than Dysphonetics; Dysphonetics were lower than the WAIS-R normative group on the sequencing factor; Dysphonetics were not different from the WAIS-R normative group on the perceptual/organization factor.

DEMOGRAPHIC CHARACTERISTICS OF AN ADULT LEARNING DISABLED POPULATION

Pamela Wiegartz, Dept of Psychology, IWU, Dr. Robert Lusk*

Although learning disabilities (LD) are widely discussed in the literature, many aspects of the field remain ambiguous and confusing. The validity of research on LD is compromised by the use of discrepant definitions. These incompatible and often insufficient criteria also make it nearly impossible to draw generalizable conclusions from many studies. Further, there has been surprisingly little research done describing demographic characteristics of the LD population, with most of these studies focusing on children. Prior studies have indicated correlations between learning disabilities and such factors as handedness, gender, prior family history of the disorder and birth trauma. The present study investigates the strength of these correlations in the adult population using more generalizable DSM-III-R criteria. Subjects were 90 adults referred to a psychology clinic and diagnosed as learning disabled. A control group of 70 adults also referred to the clinic for learning problems but not diagnosed as LD was also employed. All subjects completed an information gathering questionnaire which collected background data such as ethnicity, income, handedness, occupation, family history of LD and childhood illness and injury. Comparisons were made between LD subjects and the non-LD control group and no significant differences were found in handedness, family history of LD or frequency of birth trauma between the groups. These results question the strength of the correlations found in previous studies and illustrate the need for further research in the area.

LEARNING DISABLED STUDENTS' PERFORMANCE ON THE CHILD BEHAVIOR CHECKLIST.

Dawn A. Wright, Department of Psychology, IWU, Dr. Robert Lusk*

The research to date on the behavioral and emotional problems of learning disabled students has focused mainly on young boys. In the present study, learning disabled children of both sexes and several age groups were evaluated: boys 6-11, boys 12-16, girls 6-11, and girls 12-16. A majority of the studies in this area have been done by Michael Epstein (e.g. Epstein, Cullinan, & Lloyd, 1986). Epstein and his colleagues used the Behavior Problem Checklist (Quay & Peterson, 1975) to determine which behavioral/emotional items, rated by teachers of learning disabled students, loaded on certain scales. However, this instrument has been shown to be relatively unreliable (Martin, 1988); therefore, the Child Behavior Checklist (CBCL) (Achenbach & Edelbrock, 1983) was used in the present study. Forty-three learning disabled students were evaluated using the parent version of the CBCL. The parents rated their children on a variety of behavioral/emotional problems which load on factor analytically derived scales. It was hypothesized that the learning disabled children would differ from the clinical and non-clinical samples on certain subscales of the CBCL. The clinical and non-clinical samples are the original samples upon which the CBCL norms are based. Analyses were performed to test these hypotheses and significant differences were found between the learning disabled sample and both normative groups. In addition, it was found that the learning disabled children were significantly different from the non-clinical normative group on twenty-two of the twenty-six CBCL subscales.

1 IN SITU HYBRIDIZATION SCREENING OF A LAMBDA LIBRARY FOR
CHROMOSOME SPECIFIC DNA: THE ISOLATION OF A RABBIT
CHROMOSOME NUMBER 9 PROBE

2 Nicole Zook, Dept. of Biology, IWU/Dept. of Medical Microbiology &
Immunology, Southern Illinois University School of Medicine, Leonard
Maroun*

3 Down's syndrome, a disease which affects 1 of every 783 newborns, is the result of aneuploidy of human chromosome 21. The closely related rabbit chromosome 20 can be used as a model for the study of the cause of the misdistribution of this chromosome during meiosis. The procedure, called karyotyping, requires long hours behind the microscope; however, it can be replaced with the more accurate, time-efficient restriction fragment length polymorphism (RFLP) assay. The purpose of this study was to test the feasibility of finding a chromosome specific probe by searching a lambda library using IN SITU hybridization. IN SITU hybridization involves annealing a radioactive DNA probe directly to metaphase chromosomes fixed to a microscope slide. A photographic emulsion is spread over the slides. Photographic grains appear over the chromosome to which the DNA has annealed thus identifying the chromosome from which the probe DNA originated (FIG. 1). Probe DNA was phenol extracted from lambda phage virus clones that carry rabbit DNA inserts. Inserts were purified by gel electrophoresis (FIG. 2). Using this procedure, a chromosome 9 probe was discovered in the 86 phage DNA clones isolated (FIG. 3). This suggests that a larger search would be capable of finding the chromosome 20 probe needed to develop a rabbit model for Down's syndrome.

