

(1) When Domestic Violence Can Become Addictive: A Replacement Approach

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Victims of Post Traumatic Stress Disorder (PTSD) often continue to live within their domestic violence, in part, because of being physically addicted to the violence. The scientific study of trauma has indicated that domestic violence can create the major symptoms of PTSD. Within the study of the psychophysiology of trauma, it has been found that people who have been traumatized hold an implicit memory of the event(s), and that this memory is often expressed in the symptomatology of PTSD.

Hyperarousal is at the core of PTSD, which is brought about by the limbic system. Using the following mechanism, the limbic system responds to traumatic threat by releasing hormones that tell the body to get prepared. When a person experiences violent behavior, the hippocampus becomes suppressed and the amygdala becomes active, releasing highly charged emotional memories. This discharge of chemicals from the amygdala has addictive chemical properties.

In my work with clients I have come to believe that what we know about the relationship between experience and PTSD, and what we know about limbic system functioning are related. The mind and body becomes accustomed to and physically dependent upon the symptoms of PTSD. In my "clinical case studies" of victims of domestic violence, clients have been successfully treated using a combination of replacement activities (such as physical exercise, team sports, and adventure sports) in combination with traditional treatment modalities (emergency shelter care, support groups, and individual psychotherapy). In these cases, I believe that ongoing and continual physical activities that reduce the chemical output of the amygdala assist to maintain the emotional stability of the victim. Exercise alters brain chemistry, thereby increasing the victim's ability to make appropriate decisions regarding their continued involvement in violent interpersonal relationships.

(2) Interprofessional Collaboration in Health and Human Services

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Nationally, there is increased recognition that future and current health, mental health, and human services must be grounded in innovative, collaborative, and cross-disciplinary learning activities. JMU hosted a conference, Interprofessional Collaboration 2003 (*IPC 2003*), that brought together professors and practitioners from diverse disciplines. All the participants shared a commitment to working in higher education-local community partnerships to accomplish education and training goals, while addressing relevant service needs. *IPC 2003* participants had the opportunity to hear from and talk with academicians, administrators, and practitioners from model programs and projects successfully meeting interdependent training and service needs.

The poster session will present information to help participants interested in working in collaborative relationships become familiar with:

- 1) state-of-the-art resources and literature in interprofessional collaboration, education, practice, and scholarship;
- 2) model programs that address the best practices and values of IPC (e.g., commitment to diversity, serving the underserved, innovative and interdisciplinary education/training,).

The session will provide an opportunity for us to share knowledge, skills, and lessons-learned with other educators, practitioners, and scholars and participate in discussions and planning for the future development of the IPC movement at JMU.

(3) The resting states of the eye, visual fatigue, and monitor viewing position

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Previous researchers have shown large individual differences in measures of the resting states of the eyes, namely the accommodative (where our eyes focus; DF) and vergence (where are eyes are aligned; DV) systems. However, no useful relationship has been found between these two resting measures. The present study investigated whether either of these measures were related to a third resting state of the eyes, namely resting gaze elevation (at what vertical height do the eyes rest; GE) and whether any of these measures were related to where an individual positioned a computer monitor. All three resting states were measured from 117 participants. No significant correlations were found between the three resting states. To investigate whether DF, DV, or GE were related to the preferred computer monitor position, a subset of the participants (N = 69) were asked to use a fully-adjustable computer monitor. Participants' viewing distance and angle were then measured. Monitor viewing distance was not related to DF or DV distances, and viewing angle was not related to GE. This indicates that participants must be using other criteria for placement of computer monitors. The relationship between resting states and visual fatigue will also be discussed.

To date, undergraduates Joseph Dunsmoor, Grace Kim, Paige Massie, and Marissa Waite have helped with experimental design and data collection. This research supported by a grant from the Office Ergonomics Research Committee, Inc.

(4) High Power Radiofrequency (HPRF) Source Scaling

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High power radiofrequency sources may be used to intentionally disrupt electronic systems. To assist in the development of system protection strategies this research has developed first-order scaling relationships for estimating range-to-effect vs. size of high power RF sources. A hypothetical modular solid-state source was used to develop a first principles scaling relationship. Unclassified system upset and damage thresholds from early tests of unprotected electronics are used for purposes of illustration. The effort has resulted in a simple power law equation relation between source weight and range-to-effect. By providing estimates of range-to-effects vs. HPRF source size, this scaling relationship, although approximate, may be useful for bounding system protection requirements. The presentation will discuss the relation and include a hypothetical application example that uses the source scaling relationship to compare protecting a system with shielding vs. establishing physical security perimeters around the system.

(5) Are Different Goals Activated and More Beneficial in Different Types of Academic Situations?

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Although achievement goal theory has emerged as a predominant framework for understanding student motivation, much debate still surrounds how many types of achievement goals exist and which goals are advantageous to pursue. The purpose of the current research was therefore twofold. First, we wanted to test the validity of a recently proposed 2 x 2 achievement goal model and whether it could be replicated. Second, we wanted to test whether students were more advantaged by pursuing one particular type of goal or a combination of goals in their coursework. In particular, Barron and Harackiewicz (2000; 2001) identified four patterns of findings that would reveal advantages of multiple goal pursuit, and we were interested in extending prior research on selective goal benefits. In other words, different achievement goals may be better suited for different types of academic situations, and students who can selectively shift between goals depending on the situation may be particularly advantaged. For example, students may benefit by pursuing mastery achievement goals in courses that they are interested in (e.g., courses in their major) and pursuing performance achievement goals in courses that they are required to take but lack interest in (e.g., courses in general education). To test these ideas, we took advantage of naturally occurring general education coursework at our university in which motivation for taking these classes can vary widely. We predicted that different achievement goals would be activated, and that different goals would be linked to success in the class depending on students' primary reason for taking the class.

(6) Infrared, Fiber-optic, and Photogrammetric Measurement Technology for Use in Future Solar Sail Missions

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An effort is ongoing that is to contribute to the development of a low-mass measurement system that will serve as a prototype system for future solar sail missions. A focused research and development program has been established that will lead to a measurement protocol to obtain accurate temperatures from a metallized sail membrane using thermal imaging, and also a protocol to use fiber-optic sensors for determining the performance of deployable booms. Once the protocols are demonstrated, thermal imaging and fiber-optic technology can be incorporated into a low-mass instrumentation package capable of accurate, incisive monitoring of solar sails during a near-term flight experiment.

During this study experiments will be conducted to (i) characterize the thermal properties of the membrane surface; (ii) validate thermal measurements using [an un-cooled, micro-bolometer type infrared imager](#); (iii) [investigate the current state](#), applicability, and mass savings [of using fiber-optic](#) rather than conventional measurement technologies; and (iv) [support the selection of targeting techniques for photogrammetry by conducting comparison studies of target size and shape](#). The modeling and experimental methods developed and results acquired to date will be described.

(7) Paradigm Shift in Economic Thinking about Health Insurance?

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Surveys have shown that the majority of U.S. economists believe that health insurance creates welfare loss by “forcing” covered persons to use health care past the point where benefits equal costs. Consequently, with notable exceptions, economists have been opposed to various policies promoting universal health insurance in the U.S., since such policies would result in massive welfare losses. Recently, though, the paradigm that is the cornerstone of the welfare loss argument has come under theoretical attack. A compelling alternative explanation of the consequences of the purchase of health insurance is gradually replacing the “Pauly” argument which demonstrates the welfare loss from health insurance. The new paradigm explains why a welfare gain results from the purchase of health insurance by emphasizing the “access” motive over the “usage” result of purchasing health insurance. If the new paradigm withstands professional scrutiny, attitudes of professional economists can be expected to shift.

(8) Health Risks Associated With Nutritional Ergogenic Aid Use in High School Football Players

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The purpose of this study was to survey high school football players to determine their use of nutritional ergogenic aids, and the reasons given, influencing factors, and practices reported regarding their use. A total of 174 eligible student athletes were selected to participate, and 142 completed questionnaires were analyzed. The football players answered 13 questions regarding their practices, influencing factors, reasons for using, side effects experienced, demographic information, and frequency of use of ergogenic aids. The study revealed that 75% of the subjects admitted using ergogenic aids. Ephedra was the one most commonly used (66%) followed by RedBull™ (38%). Subjects' use was influenced by friends and teammates, and the primary reasons listed for supplement use were to increase weight and improve athletic performance. The most common method of obtaining the ergogenic aids was from a convenience store. Sixty-four percent indicated that the ergogenic aids were effective, and 50% revealed that they experienced side effects, including diarrhea, rapid heart rate, dehydration, and muscle cramps. Tests of differences of proportion were used to determine any statistically significant differences between ergogenic aid use based on grade level, status as a starter, and playing position. The analyses revealed a statistically significant relationship between grade level and starting status, but there was no relationship between ergogenic aid use and position played. The authors conclude that these athletes may be at risk for health problems associated with ergogenic aid use, but this information may help professionals developing sports nutrition programs in meeting the educational needs of young athletes.

(9) Auxiliary Power Units: Fuel Cell Market Niches?

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In the late 1990's many major automotive companies were announcing plans to market fuel cells in the next seven years. Obstacles such as cost and infrastructure continue to hinder large-scale commercialization of fuel cells as main propulsion systems in vehicles. DaimlerChrysler and BMW are investigating the use of fuel cells as auxiliary power units (APUs), and several manufacturers are exploring mild-hybrid vehicle applications. The fuel cells could be used in lieu of engine idling, to power engine accessories, and to replace diesel engines in trailer refrigeration units. The use of fuel cell APUs is especially compelling because it not only reduces energy and environmental impacts, but has the potential to reduce costs and improve driver safety (by reducing noise and vibration). Thus, unlike many technologies that benefit either the public or private interests, APUs have the potential to serve both. The five-year old Auxiliary Power Research Program at the Institute of Transportation Studies, University of California, Davis (ITS-Davis) is a multi-million dollar, joint government-industry effort focused on fuel cell market analysis, simulation modeling, and technology development. Undergraduate researchers at JMU are working in cooperation with ITS-Davis researchers exploring accessory load patterns and fuel cell power-assist applications. JMU research projects include: truck operations characterization, fuel cell niche market identification, and fuel cell APU demonstration in Shenandoah National Park. Additionally, JMU students are breaking new ground with measurements of thermal characteristics and noise. Sample results to date include:

- Line-haul truck engines are at idle ~34% of total run time with a mean annual idle duration of 1,700 hours per year per truck;
- APUs in heavy-idling trucks could reduce overall line-haul truck diesel consumption by 6-14%; and,
- payback for near-term commercial fuel cell APUs may be as little as 2.6 to 4.5 years.

(10) A National Survey of Occupational Therapists in School Based Practice

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School based practice is the second largest work setting for occupational therapists in the United States. The law providing occupational therapy to students with disabilities in the schools, the Individuals with Disabilities Education Act, undergoes periodic reauthorizations. In preparation for advocacy efforts during a reauthorization, the American Occupational Therapy Association (AOTA) sponsored a national survey of school based practitioners to learn of issues of importance to occupational therapists practicing in the schools. A survey asking for demographic information, quantitative information about various practices in the schools and open-ended qualitative questions was developed.

The survey was mailed to two thousand occupational therapists, randomly selected within each state, who indicated on the AOTA annual membership survey that they worked in the schools. It was also published in a weekly magazine mailed to all AOTA members. Over fifteen hundred responses were received.

The Survey provided valuable information to the AOTA in their advocacy efforts, as well as providing information about preservice preparation of occupational therapists working in the schools and continuing education needs.

This survey was replicated by another occupational therapist in 2002 in preparation for the current reauthorization of the Individuals with Disabilities Education Act. That data is currently being analyzed and will be compared with the data from the original national survey.

(11) Recovery of Graded Response and Partial Credit Parameters in MULTILOG and PARSCALE

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The graded response and partial credit models are item response theory (IRT) models used with polytomous items--items that have three or more score points or response categories. Polytomous items include projects and portfolios and open-ended test items, as well as survey items where participants respond using a Likert-type scale. The graded response and partial credit models show the probability, across the ability or trait distribution, of earning or choosing each score or option. Two commercial software packages, MULTILOG and PARSCALE, are available for estimating the item parameters for these models. Though there have been a number of comparisons of IRT software for dichotomous items, there has been very little published comparing software for polytomous items. Using simulated data, MULTILOG and PARSCALE were compared on their recovery of item and trait parameters under the graded response and generalized partial credit item response theory models. The shape of the trait or ability population distribution (normal, skewed, or uniform) and the sample size (250 or 500) were varied. Parameter estimates were essentially unbiased under all conditions, and the root mean square error was similar for both software packages. The choice between these packages can therefore be based on considerations other than the accuracy of parameter estimation.

(12) Influences on Infant Vowel Acoustics

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An investigation into the intrinsic or inherent acoustic characteristics of infants' vowels was undertaken. The fundamental frequency (or pitch) and duration of the first vowel of CVCV utterances was measured for American, French, and Welsh infants. The American and French infants' fundamental frequency was dependent upon vowel height (vowels with a high tongue position are considered high vowels, while vowels with a low tongue position are considered low vowels): the higher the vowel height the higher the F0. The Welsh infants F0 did not exhibit the same pattern. Welsh low vowels were higher in F0 than both the mid and high vowels. The result was unexpected since most studies of adult phonetics have found a positive correlation between tongue height and F0. Indeed the suspected reason behind this correlation is that muscles of the larynx are indirectly connected to muscles of the tongue via the hyoid bone suggesting that this should be a universal relation. All three language groups did produce longer tense (long) than lax (short) vowels although the extent of the difference was greater for the American (31ms) than for the French (10ms) or the Welsh (6ms). Results suggest that since most studies of intrinsic characteristics of adult vowels are in English, further investigation of intrinsic vowel characteristics of French and especially Welsh should be conducted.

(13) Strengths-Based Crisis Intervention Approaches to Preventing Youth Suicide

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Suicide is the second leading cause of death among Virginia youth and their suicide rate has increased 32% since 1975. For background information, this poster presentation provides national and state epidemiological data concerning suicide trends. It also relates such factors as age, gender, and geographic setting to rates across the United States and in Virginia.

Based on the recent and exciting perspectives of positive psychology, chaos and complexity theories, constructivism, and emotional intelligence, we have developed specific crisis intervention techniques that promote resilience by building on personal strengths and social resources. These techniques include offering the LUV Triangle, assessing both risk and resilience, looking for the survivor in the crisis story, managing emotional arousal, and developing a contract for choosing life.

The poster describes practical tools for intervening with youth in crisis, collaborating with parents, involving peers as positive sources of support, and using the media to prevent suicide. It also provides information on resources, including suicide prevention organizations, web sites, and hotline numbers.

(14) Vulnerabilities and Protection of Supervisory Control and Data Acquisition (SCADA) Systems

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SCADA systems are often defined as the digital controls that exist at the point where computers meet the infrastructure they run; and their vulnerability is a consequence of their connectivity and visibility. Their typical functions include: data acquisition and handling, polling process controllers, checking alarms, performing calculations, logging and archiving process information. SCADA systems have application in manufacturing, power generation and distribution, water treatment and distribution. They have therefore been recognized as critical national infrastructure that must be protected. Our research is funded in part by I³A and is looking at a holistic approach to SCADA security. We plan to identify vulnerable node points within a SCADA network and generate combinations or layers of protection that will ensure both data and the physical infrastructure protection. The solution set will include some traditional network security agents, physical asset management and control systems, and embedded agents in control hardware or devices. We have involved ISAT graduate and undergraduate students at every level of this effort and are negotiating with CISCO Systems and other companies that have expressed interest in partnering with us.

(15) Using Community Development Teams to Transport Science to Practice

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The Challenging Horizons Program (CHP) is a school based treatment program for middle school students with ADHD that has gone through some of the initial phases of the Clinic-Based Treatment Development Model process during the last four years. Previous studies have documented significant improvements in school functioning with average effect sizes in the moderate to large range and small to moderate effect sizes in the area of social functioning. The CHP has operated at a local middle school for four years and been staffed by graduate and undergraduate students. However, the long-term goal of this project has been to develop a treatment program that could be implemented in public secondary schools without these additional staff resources. Prior to initiating a recently funded (VTSF) five-year clinical trial of the program, community development teams spent a year revising the manual and training materials to adapt them for use by practicing educators, counselors, psychologists, school administrators, and physicians. In addition, a medication protocol and web based collaboration mechanism for physicians, counselors, and educators were added to the psychosocial interventions in the CHP. Community development teams consisted of clinical researchers, students, educators, counselors, school administrators, and parents. Feasibility ratings of practitioner-generated obstacles to implementation were collected on the program, as it existed before and after the collaborative work of the development teams. In addition, qualitative data was collected from participating professionals and parents. The results of these assessments and implications for the process of transporting science to practice will be presented.

(16) COMPARISON OF CARDIORESISTANCE, RESISTANCE AND CARDIOVASCULAR TRAINING ON SELECTED HEALTH INDICES

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PURPOSE: This study was designed to compare the effects mode of training on selected health indices. **METHODS:** Fifty-seven untrained men and women (42.6 ± 10.0 years) were randomly assigned to cardioresistance (CR), resistance (RS), or cardiovascular (CV) groups for twelve weeks of exercise training. Percent body fat (%BF), resting blood pressure (SBP, DBP), total cholesterol (TC), LDL-cholesterol (LDL), HDL-cholesterol (HDL) and resting blood glucose (GLU) were assessed before and after training. **RESULTS:** A significant reduction in %BF was found in R (35.9 ± 8.4 to $34.0 \pm 8.3\%$) but not in CR (31.1 ± 6.5 to $29.7 \pm 7.5\%$) or CV (33.2 ± 10.0 to $32.5 \pm 10.5\%$). The R group demonstrated a significant increase in HDL (47.0 ± 16.7 to 55.7 ± 18.9 mg/dl). No other changes in lipid values were found in any group. Significant decreases were found in SBP for CR (117.5 ± 12.7 to 113.3 ± 9.0 mmHg) and DBP for CR (81.4 ± 8.9 to 77.7 ± 7.2 mmHg) and CV (80.2 ± 12.2 to 75.8 ± 11.1 mmHg). Significant reductions in GLU were found for CV (99.3 ± 13.8 to 86.1 ± 14.1 mg/dl) and R (99.9 ± 23.5 to 88.5 ± 9.8 mg/dl). Pre and post-training GLU for CR (87.7 ± 6.8 and 89.7 ± 7.2 mg/dl) were comparable to CV and R post-training values. **CONCLUSION:** The data suggest that CR, CV and R training are associated with moderate improvements in various health indices. This finding is important in view of the need for variety in programming to increase exercise compliance. Furthermore, future studies should examine the impact of mode on individuals that are at moderate to high risk for CAD.

(17) Electron Microscopy and Computational Laboratory

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The analysis of protein crystals using electron microscopy provides information about protein structure and function. The microscopy laboratory is a self-sufficient research facility equipped with a Zeiss EM 10 transmission electron microscope, sample preparation laboratory, darkroom, optical diffractometer, and image processing facility. Please tour the facility in HHS Room 0004.

In this laboratory, undergraduate students have conducted research projects on protein kinase C (pK) and green fluorescent protein (GFP). Their results have provided insight into how these proteins function in biological systems.

Failures in the regulation of protein kinase C have been detected in a variety of cancer cells. By determining the structure of pK, novel therapies may be developed in the battle against cancer. This research was a collaboration with colleagues at the the University of Virginia.

Green fluorescent protein is representative of a class of proteins used in organisms that release light in the form of bioluminescence. In collaboration with the JMU Biomanufacturing Laboratory, GFP has been purified, crystallized, and analyzed by electron microscopy.

(18) Child and Adolescent Well-Being in the Schools: An Interdisciplinary, Collaborative Approach

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Positive psychology is a movement away from pathology, or what is wrong with an individual, to a more proactive focus on strengths and “building on what is right.” This team of faculty and students came together because of our collective interest in positive psychology and the well being of children and adolescents. We are developing a collaborative, mutually beneficial relationship with Shelburne Junior High School in Staunton, Virginia to identify and potentially impact school-based factors that contribute to student well being. The team will work with the school community to support a school climate that fosters overall student well being, including academic, behavioral and social functioning. This collaboration will provide information that can be helpful for school administrators in long-term planning and in communication efforts with parents, community leaders, state agencies and other constituents.

Specific outcomes of our collaboration with Shelburne include providing:

- an assessment of students' perceptions of school climate
- information about student characteristics such as wellness and life satisfaction (e.g., problem solving, creativity, emotional wellness, school satisfaction, and peer satisfaction)
- consultation and school-based interventions that complement Shelburne's School Improvement Plan
- a synthesized report regarding the data analysis and interpretation for use by Shelburne administrators and faculty in long-term planning.

This project marks the initial phase of on-going partnership between JMU and local public schools.

(19) Knowledge and Acceptance of Genetically Modified Foods Among JMU Students

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The purposes of this study were to determine the knowledge and acceptance levels of genetically modified (GM) foods among JMU students, whether knowledge would predict acceptance of GM foods, and what sources students trust when receiving information about GM foods.

A web-based survey was developed containing an explanation of GM foods, a knowledge quiz, a section asking whether specific foods would be purchased if they were available, and questions regarding the level of trust an individual would feel if receiving information concerning GM foods from specific sources. An e-mail was sent to 550 randomly selected JMU students giving the web address and asking the student to complete the survey. One hundred forty-four students (26.1%) responded.

Males were more knowledgeable about GM foods than females ($p=0.009$) although less than half the students scored $\geq 60\%$ on the knowledge test. Knowledge of GM foods did not predict willingness to consume the foods ($p=0.064$).

Students would purchase less than half the products listed (mean 5.2 of 12 foods). Males would buy more GM foods than females ($p=0.008$). Students as a whole were more accepting of GM *plant* products than GM *animal* products ($p=0.000$).

There was no difference in knowledge level based on college, but students enrolled in the College of Science and Mathematics and CISAT (HS, ISAT, Nur, Kin) were more accepting of GM foods than were student in other colleges or majors ($p=0.048$).

Students did not rate any of the listed information sources as highly trustworthy. The least trusted sources were companies that develop GM food products and environmental groups.

(20) Applying GIS on Catalina Island, California

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Catalina Island lies twenty-six miles off the coast of California at Los Angeles. Because the Island was privately held (Wrigley Chewing Gum family) for most of the last Century, it has remained largely undeveloped and undisturbed. It consists mostly of very rough, mountainous topography, covered by a rich chaparral vegetation, and surrounded by a very beautiful, crenulated coastline of coves, bays and cliffs.

Approximately three-fourths of the Island was granted by the Wrigley family to the Catalina Island Conservancy, for the purpose of managing and conserving its rich natural and historical resources. The primary tool at the core of this management is the Geographical Information System (GIS).

The author spent two summer months living on the island and working with the Conservancy to expand the application of modern technology to its management task. For example, an early stage of GIS dataset building involves the inventory of what currently exists. One of the primary, modern methods of doing this involves Global Positioning System (GPS) fieldwork to map various terrain features. Another source of much useful data is aerial photography and satellite imagery. The author used these tools to work with other specialists there and produce new data layers such as 3D representations of the Island. The capabilities of the JMU "Spatial Analysis Computer Lab" could be utilized to create new ways of looking at this interesting and beautiful landscape. Work continues, and interested cooperators are sought.

(21) Speech Understanding Problems in Elderly Listeners: Hearing Loss vs. Age

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In 1988 the Committee on Hearing and Bioacoustics and Biomechanics (CHABA) of the National Research Council presented evidence confirming that elderly listeners experience greater difficulty with speech understanding than do young listeners. It has always been thought that the difficulty in understanding speech was caused by the high-frequency hearing loss of the typical elderly listener. Subsequent research has suggested that there are additional suprathreshold distortion factors that may be present in impaired ears and particularly in elderly impaired ears. Research conducted in the JMU Psychoacoustic Research Lab suggests that most of the variability in speech recognition performance can be accounted for by high-frequency hearing loss and that, in fact, the reported suprathreshold distortion is present in all impaired ears and is no greater in elderly ears than predicted based upon their hearing loss. Three scientific approaches to the problem will be illustrated: 1) comparison of group performance to an audibility-based acoustical index, 2) between-group comparisons (young normal-hearing vs. elderly normal-hearing vs. elderly hearing-impaired), and 3) within-group correlation and regression analyses. Subject groups consisted of one group of 8 young normal-hearing listeners, one group of 8 elderly normal-hearing listeners, and one group of 12 elderly hearing-impaired listeners. Calculations of the acoustical index suggest that accurate estimations of listener performance can be made based only upon the measured hearing loss of each listener. Between-group differences in temporal processing, a suprathreshold distortion factor, can be accurately predicted for elderly normal-hearing and hearing-impaired listeners by use of the modified power law. Finally, up to 94% of speech-understanding performance can be accounted for by measures of audibility alone.

(22) The Use of Humor in Nursing Homes

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Laughter is a common and expected behavior in human communities and its therapeutic properties have begun to be recognized for both patients and professionals. Professionals caring for patients in nursing homes are addressing complex health needs, and unfortunately, often for terminal illnesses. The study to be described in the poster session was an effort to understand the current use of humor in nursing homes. Based on the premise that humor, used appropriately, can remediate the stressors of illness, disability, and an institutional environment for staff and residents, as well as family members of residents, an exploratory effort was undertaken.

In an effort to expand options for nursing home staff as a stress-reducing factor and increase humorous experiences hoping to increase the quality of life of residents, I conducted survey research on all the long-term care facilities licensed by the Commonwealth of Virginia. The survey was mailed to 262 facilities, addressed to the activity director, and completed by full time activity staff. The responses will hopefully provide a basis for future efforts to develop a resource of humorous activities and interactions, as well as develop a support system for human services professionals on humor as a healing modality. The results also provided information that described activity directors and staff, resident needs and limitations, and examples of the successful use of humor in this setting. This poster session will include a description of the methodology, the population, and illustrations of the results.

(23) Assessing General Education Outcomes

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General Education, Cluster Five, Individuals in the Human Community, was re-conceptualized from interdisciplinary packages into two integrated areas: Wellness and Socio-cultural. A subset of the Socio-cultural Area is the focus of this report. The original thirteen content-referenced goals were replaced with five cognitive process goals and measurable objectives referenced on critical thinking skills. A 30-item scenario-based instrument, constructed to assess the cognitive-process goals, was pilot tested within selected psychology courses and with a sample of the 2003 incoming Freshman class. Results of the pilot test are reported. Implications of the pilot test are discussed.

(24) PScore©: An Excel/VBA application for scoring and ranking R&D projects

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This poster presents PScore©, an Excel-based R&D project ranking decision support tool with a Visual Basic for Applications (VBA) graphical user interface. Proposed R&D projects are evaluated by peer review team members using a Likert-scale questionnaire that addresses four criteria: relevance, risk, reasonableness, and return. Evaluator questionnaire responses and project cost requirements are input to Excel worksheets, and criteria weights and total available funding are input to VBA forms. A multiplicative/additive algorithm that explicitly incorporates tradeoffs among the criteria is used to calculate a merit score for each project, which is then combined with a scaled funds request to obtain a project value index. To aid management decision making, projects can be ranked either by merit or by value, and merit and value data can be displayed graphically using pre-designed Excel charts. An example R&D program comprising twelve projects and four evaluators is presented to demonstrate the proposed usefulness of PScore© for R&D project ranking.

(25) Connecting Sociotropy-Autonomy, the Interpersonal Circumplex, and the Personality Disorders

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This research attempted to demonstrate that there were underlying similarities among Beck's cognitive theory, Timothy Leary's Circumplex, and the personality disorders in the DSM. Recent factor analytic work on Beck's concepts of Sociotropy and Autonomy revealed two distinct factors underlying each dimension. Explanatory and confirmatory factor analyses of the Sociotropy-Autonomy Scale were conducted on two separate samples of over 1,000 psychiatric patients in each sample. Analyses revealed two factors underlying Autonomy, which were labeled Independent Goal Attainment (IGA) and Sensitivity to Others' Control (SOC), and two factors underlying Sociotropy, which were called Preference for Affiliation (PFA) and Fear of Criticism and Rejection (FCR). These results suggest potentially interesting parallels with Interpersonal Circumplex Models. Since Leary first proposed the Circumplex in 1957 as consisting of two orthogonal dimensions of dominance-submission and affiliation-hostility, numerous studies have confirmed the validity of this two dimensional model. What is particularly fascinating about the results of the factor analytic work on Sociotropy and Autonomy is the degree to which the four subfactors correspond to the four poles of the circumplex. This new conceptualization was then used to provide a graphic representation of interpersonal relating that could be used to compare and contrast responses of individuals with various personality disorders diagnosed based on DSM criteria. A priori predictions about where the personality disorders would fall on the grid were largely confirmed. The analysis suggests that an effective, empirically based merger between the previously disparate ideas of Sociotropy-Autonomy, the Circumplex Model, and the personality disorders can be achieved.

(26) Congenital Axonal Neuropathy: A Case Study

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Congenital axonal neuropathy (CAN) is a rare disorder infrequently reported in pediatric neurology literature. A 33 month-old presented to the James Madison University Speech-Language-Hearing Applied Laboratory with CAN, trache, vent-dependence, hypotonia and PEG. Communication status revealed minimal vocal output and use of six nonstandard signs. Receptive skills were strong. CAN and implications for the SLP are presented. Dysphagia (including the VFMB), augmentative communication and parental education are emphasized for this unique case.

(27) Amplified Consonant Discrimination by Hearing Impaired Adults

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Research Question: how much is consonant discrimination improved for hearing impaired adults by amplification with digital hearing aids?

The most common hearing problem in the adult population is high frequency sensori-neural hearing loss. With this loss, consonants are more difficult to understand than vowels. Sensori-neural loss is caused by damage to the inner ear and/or the auditory nerve and involves both a problem of decreased sensitivity and reduced discrimination ability. A hearing aid can amplify sound to correct for the loss of sensitivity, but amplification cannot correct the inner ear/nerve damage that creates reduced discrimination for speech.

VC (vowel-consonant) nonsense syllable stimuli were presented to normally hearing adults and hearing impaired adults with two different degrees of hearing loss characterized as gradually and precipitously sloping. Hearing impaired subjects responded in both unaided and aided conditions. Amplification was provided through a commercially available high quality digital hearing aid. Subjects responded to nine (9) stimulus conditions. Across the nine (9) conditions, the audibility of high frequency acoustic cues was systematically varied using low-pass filtering.

All experimental conditions showed sharply improving consonant discrimination for low-pass filtering conditions through 1800 Hz. Very limited improvement was observed for stimulus conditions with filter cut-offs above 1800 Hz. Normals achieved a mean best performance of 97% while the impaired groups each peaked at 70%. The gradually sloping group demonstrated improvement with amplification: 38% unaided & 70% aided. The precipitously sloping group did not benefit from amplification: 66% unaided & 70% aided.

(28) The Institute for Innovation in Health and Human Services

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This poster presentation will provide information about the Institute for Innovation in Health and Human Services (IIHHS) including its mission, initiatives, examples of current projects, and partnership programs. The Institute is a University-wide initiative designed to facilitate cross-disciplinary education, research and outreach activities; promote campus-community collaboration and partnerships; and foster student service learning experiences that are responsive to community identified needs. Focused broadly in the health and human service arena, the Institute serves as an umbrella and links persons and programs around areas of common interests from across departments, colleges and divisions within the university, as well as among partners within the community.

The University has an obligation to be an active player within the community. Relationships formed provide opportunities to develop learning experiences founded in "real needs" identified by community partners, thus greatly enhancing the quality, relevance, and effectiveness of student learning. We believe that when students have the opportunity to learn, research, and serve with students from other disciplines they will gain both an understanding and valuing for those disciplines; this in turn enhances their effectiveness as team players when they enter the world of work. The Institute motto, $1 + 1 = 3$ reflects the belief that more can be accomplished through collaborative efforts; the goal of Institute initiatives is the achievement of win-win outcomes.

(29) JMU's Rapid Manufacturing Laboratory

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JMU's Rapid Manufacturing Laboratory is part of the Center for High Performance Manufacturing (CHPM), which is housed jointly at Virginia Tech and at James Madison University. CHPM is funded through the Commonwealth Technology Research Fund, and has the mission to help manufacturing firms (especially those in Virginia) become high-performance manufacturers in their respective industries via research and development of enabling tools and technologies and the successful transfer and implementation of these items.

The center supports a critical need of the Commonwealth in terms of providing assistance to Virginia manufacturing firms striving to maintain competitiveness in the continually evolving global manufacturing and distribution environment. This is accomplished via research and development of enabling tools and methodologies in areas such as lean and agile manufacturing, re-configurable manufacturing and assembly systems, manufacturing logistics, supply chain engineering, advanced composites fabrication, and rapid prototyping & tooling.

The CHPM laboratory at JMU focuses on the enabling technologies of rapid prototyping and tooling, polymeric materials development, and injection molding. The CHPM research emphasis at JMU is to synergistically combine these technologies into a flexible manufacturing capability for limited-run production of plastic parts. The CHPM laboratory at JMU is located in HHS 0001, and is used for undergraduate and graduate education, externally sponsored research programs, and is available for industrial use on a fee-for-service basis.

This poster will summarize the capabilities of the Rapid Manufacturing Laboratory and will show some examples of the projects that are under way utilizing these capabilities.

(30) A Socioeconomic Development Plan for the Town of Pointe-a-Raquette on the Island of La Gonave, Haiti

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The island of La Gonave is situated off the coast of Haiti to the west of Port-au-Prince. Haiti is regarded as the poorest country in the Western Hemisphere and La Gonave as the second poorest place in Haiti. There is little government involvement on, or assistance to the people of, the island. The majority lack access to sufficient food, clean water, adequate housing and formal employment. Few have electricity and all rely on charcoal for cooking. Three CISAT faculty visited the island in March 2003 to evaluate the potential for faculty and student projects on the island. After two additional trips and interviews with over 50 townspeople, medical and other service personnel, the local priests and government officials, a decision was made to focus on the town of Pointe-a-Raquette.

Pointe-a-Raquette is the second town in size on the island in terms of total population with approximately 1,500 inhabitants. Today, projects that focus on telecommunications and energy are underway. Projects in the areas of nutrition, environmental remediation, education and road improvement are in the planning stages. A course in which students will design a prototype house for the island, one that incorporates climate, available building materials, energy, water, cooking and sanitation needs, is planned for Fall 2004. The town of Pointe-a-Raquette is a classroom for CISAT faculty and students. It provides a setting for research and project development and gives students applied, hands-on, real-world experience. At the same time, it is improving the lives of, and giving hope to, a growing number of Haitians.

(31) Getting the Picture: Data Visualization in Education

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Many, if not most, students are visual learners and often do not connect with the vocabulary-rich and jargon-laden way in which we teach science and other technical disciplines. Current research efforts in many fields have also resulted in a huge amount of image-based data. My research focuses on identifying tools, developing curricula and providing in-service training for pre-college and college faculty in the use of these tools with their students. Work to date has focused on image processing and geographic information systems (GIS) as the most promising tools.

Our research has shown that while it can take a few years for these tools to take root and grow in a teacher's classroom, students reap the benefits, particularly students who are drawn to the inquiry-based nature of the tools (high-achieving students are often challenged by these tools as there is not one "right" answer). Students with limited English proficiency also benefit from this pedagogy as they don't need to climb the vocabulary mountain to be able to access the material.

Our current efforts are focused on developing curricula and professional development for the use of GIS by teachers in grades 6-12 science and social studies. This work leads into some interesting questions of how children process spatial information and how their spatial thinking skills develop. In the poster, I'll demonstrate some of these tools and chat with you about possible connections to your own discipline.

(32) Spatial Data Clearinghouse for Humanitarian Demining

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Humanitarian Demining includes any activity associated with ameliorating or eliminating the landmine problem and its effects in a mine-affected country. Also it provides assistance to and rehabilitates its victims. Almost 30,000 people are killed or injured every year because of a land mine. 69 countries worldwide are affected by landmines and about 60-80 million landmines are buried worldwide.

Geographic Information Systems (GIS) are used to map and monitor minefields, and they are a critical technology that manages the removal of landmines. The most important part of creating a GIS for humanitarian demining is the selection of the appropriate spatial data. The Spatial Information Clearinghouse (SIC) was created on the idea to have a one-stop place for all mine-related GIS and spatial data issues. The clearinghouse is publicly available on the Internet and currently contains 9500 metadata records worldwide. The URL for the SIC is <http://www.maic.jmu.edu/sic/>.

The Spatial Data Clearinghouse Initiative is a funded project of the US Department of State through the Mine Action Information Center at James Madison University. The overall scope of the project is to maintain and update the web site of the Spatial Information Clearinghouse and to enhance and update the information about GIS and copyright laws. In addition, the SIC collects metadata worldwide so that each mine-affected country is fully referenced.

(33) Thermal Sensor Microfabrication and Related Research Activities

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Thermocouples are widely used for temperature measurement and other thermal sensing tasks. A thermopile, consisting of series-connected thermocouples, provides a greater output voltage than a single thermocouple junction. This enhanced sensitivity makes thermopiles particularly useful when small temperature changes must be measured. Microfabricated thermopiles have the additional advantages of ruggedness and compact size. In addition to their widespread applications in infrared detection and calorimetry, thermal sensors have also served as the basis of chemical sensors and biosensors capable of detecting selected antigens. Microfabricated thermopiles are an attractive type of thermal sensor for these applications.

We describe the microfabrication and characterization of thermopiles having up to 24 sensing junctions. Chromium-nickel devices were fabricated on glass substrates, and aluminum-silicon devices were processed on silicon wafers. Sensitivities as high as approximately 7 mV/°C were measured for the aluminum-silicon devices. The thermal mass of the sensing region of these devices was reduced by etching a well in the back surface of the silicon substrate, beneath the sensing junctions. The time constants of our fastest sensors were 33 ms. This work represents one example of undergraduate research carried out in our microfabrication laboratory (cleanroom). Other examples are also described, including solid state electrochromic devices, and silicon photovoltaic cells with textured surfaces, conventional metal grid contacts, and transparent conducting oxide contacts. The cleanroom is used during the academic year for laboratory courses and project work, including ISAT senior projects. During the summer, the laboratory is used for the NSF Research Experience for Undergraduates (REU) and related programs.

(34) Can Patient Predisposition to Reflex Sympathetic Dystrophy Be Screened

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Reflex Sympathetic dystrophy (RSD), or Complex Regional Pain Syndrome (CRPS), is a puzzling and potentially devastating complication that can occur after injury or trauma to any part of the upper and lower extremity. Clinical forms of RSD can vary from minor involvement of a single digit to severely impeded function of an entire extremity. Persons who develop RSD may find that therapeutic interventions can require a great amount of time and expense to increase performance in functional areas. A predisposition to RSD has been previously identified in the literature that involves physiological and psychological factors. A screening assessment has been developed to examine anecdotal lifestyle, physiological and psychological factors that can be involved in the development of RSD after acute injury or elective surgery.

(35) Women Living with Low Back Pain - The Impact on Lifestyle Balance: A Phenomenological Pilot Study

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Low Back Pain affects an ever-increasing number of Americans, ranking second only to colds as the most common cause of sick leave in the United States. The U.S. Department of Health and Human Services recognizes it as the second most common cause of disability. While the economic costs of medical treatment, prescription drugs, and lost work production days are high, perhaps of even greater consequence is the price of the individual's pain, decreased occupational performance, decreased sense of well-being and increased emotional distress. Utilizing a phenomenological qualitative research methodology, this in-progress study explores and describes the lived experiences of women with chronic low back pain as they attempt to perform their typical occupations of daily living. Via in-depth semi-structured interviews, women will describe and ascribe meanings to their affective responses to their physical limitations. Additionally, they will provide insight into their motivation and ability to engage in desired roles, social and professional relationships, self-care, leisure, work/productivity, sleep, and spiritual expression. Subquestions will identify barriers and supports, coping strategies, and losses that have been encountered secondary to the condition. Responses from co-researcher/participants will be examined and synthesized to create a vivid, accurate, and rich description of the emergent themes. The transactional relationship between three key elements of the Person-Environment-Occupation Model (Law et al., 1996) guides the conceptualization of the study.

(36) SOCIAL NORMS MARKETING FOR TOBACCO PREVENTION WITH MIDDLE, HIGH AND UNIVERSITY STUDENTS – USE OF TOBACCO SETTLEMENT FUNDS

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The Anti-Tobacco Media Blitz (ATMB) is a social-norms marketing program selected for implementation in the City of Harrisonburg and Rockingham County (Virginia). The ATMB was selected to target the general youth population at in-school and out-of-school activities. While social-norm marketing has become a popular health promotion model on college campuses, it has not been a model typically utilized at the middle and high school level, mostly because of the cost and time involved. In addition to the unique opportunity to utilize social norms marketing at the middle and high school level, this program is also unique in that it included students across the ages – university, high school and middle school - to work as creative development teams. These creative development teams designed, developed, evaluated and delivered five tobacco-free messages. The campaign used posters, radio, television and peer-led activities to deliver the messages. Evaluation of the campaign has been constant, and included assessment of message retention and demonstration of positive behaviors. Our methodology, the five-step social norms marketing model, with emphasis on the student-centered evaluation, will be presented.

(37) Rural Family Caregivers' Perspectives on Facilitators and Deterrents to the Use of In-Home Respite Care

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Problem: Respite services are identified as a pressing need by many caregivers. Yet the phenomenon of low use, or very late use, of services and supports by caregivers has been widely reported, even when the services are available, accessible, and affordable. Studies of respite utilization have not included caregivers who refuse services; and utilization of in-home respite has not been studied specifically. Little is known about the extent to which specific interventions correspond to caregivers' perceptions of what they need and would find useful.

Aim: This qualitative and descriptive study explored factors that influence caregivers' decisions to use or not to use respite services.

Method: Using a grounded theory method, data from in-depth interviews with 15 caregivers were transcribed and analyzed using Nvivo software and constant comparative analysis by the investigative team.

Findings: Emergent themes include family relationships, loss/grieving, trust, caregiver self-knowledge, caregiver purpose/role/sense of obligation, family/cultural taboo's, decision-making process, seeking/asking for help, barriers to asking for help and defining moments. Caregiver distress is a major over-arching theme that emerged once all the data was analyzed. Caregiver distress seems to be influenced in four areas that are both distinct and interrelated: "normal" aging stressors, family issues, unresolved grief and inadequate assistance. This theme is strongly linked to the themes of barriers to, and decision-making about, receiving respite care. There seems to be an inverse correlation between the level of caregiver distress and the willingness to seek out, and accept, in-home respite services. This study will lead to definitions of caregiver distress and a working model of the interrelatedness of caregiver distress to decision-making about in-home respite care.

(38) Integration of PDAs into a Healthcare Informatics Curriculum A pilot project at James Madison University

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Hand held computers are used extensively in health care today as personal devices. Their potential as information collection, analysis, and management tools has not yet been fully realized, and their integration into the larger information infrastructure of organizations is just beginning. Exposing students to emerging technologies now gives them valuable knowledge and experience to take to the workforce. Exposing faculty to emerging technology helps them devise creative ways of integrating them into their teaching.

In the fall of 2002, two librarians in CISAT, Jennifer McCabe and John McGehee, acquired a collection of handheld computers (PDAs) for distribution to students and faculty in CISAT. Funding was provided through the Dean of CISAT and the Dean of Libraries and Educational Technologies. Initially all students and faculty in the interdisciplinary Introduction to Informatics for Healthcare Professionals course were lent PDAs. Remaining devices were distributed among a few Physician Assistant students, Geography faculty, Communication Sciences and Disorders faculty, and a few other faculty members.

The project was designed to measure two things: The efficacy of PDAs as learning tools and the students' abilities to maximize their use. Students who have used them have shown positive reactions. Faculty members have yet to address the use of PDAs in a formal way. Numerous interesting applications and research questions have emerged, including:

- Use of PDAs to keep track of student activities in clinical settings
- Study of whether PDAs augment classroom learning or replace the acquisition of a separate skill

(39) Functional Augmentative Communication in a Broca's Aphasia

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ABSTRACT: This report presents a case in functional use of the Enkidu Portable Impact device for a severe Broca's aphasic. Treatment interventions improving accuracy and timeliness of responses are highlighted. Family education was integral to patient's improvements. Although the patient has strong family support, it inhibited communicative opportunities. Family training to optimize patient's use of the device are reviewed. The AHSA FACS is incorporated as a measure of pre-post therapeutic function with comparative ratings completed by the patient, spouse, and speech pathologist.

(40) Biodiesel : A Fuel for the Future

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The twentieth century's technological advances, extended lifespan, increased mobility and improved quality of life can be attributed largely to the accessibility and affordability of fossil fuels. The ongoing debate over when the peak in production will occur and prices will begin to rise is moot; if we want to retain the quality of life and the mobility that we currently have, we will begin in earnest to build infrastructure for fossil fuel alternatives. One well-established alternative that has beneficial effects on our health, environment, climate, economy and prospects for peace is biodiesel, which can be substituted anywhere that petroleum diesel is used. Biodiesel is produced through a simple chemical reaction from natural oils, obtained from diverse plant and organic feedstocks, for example, algae, corn, soybeans, rapeseed, and coconut palm, used vegetable oil and waste products of the meat industry. The biodiesel program in ISAT, under the auspices of the Alternative Fuel Vehicle Program, has many facets: manufacturing and testing, testing biodiesel emissions, building a biodiesel hybrid vehicle, using the co-products of biodiesel manufacturing, building databases, building infrastructure, developing educational materials, and performing community outreach and technology transfer. The results of this work are intended to increase the acceptance of biodiesel at all levels -- from individuals in Harrisonburg to communities in the developing world.

(41) Use of Domain Scores and Posturography in the Assessment of Concussion

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The inclusion of brief neuropsychological test batteries and postural stability measures are becoming more common for the assessment of athletes who have suffered a concussion. Most research studies advocating the value of these tests have compared raw scores on individual tests prior to and following a concussion. While this method of analysis is interesting from a research perspective, it lacks the standardization techniques commonly used by neuropsychologists in the clinical setting. The purpose of this study was to evaluate the value of standardizing and then grouping neuropsychological test scores into domains and analyzing these results using a statistical model that controls for individual differences prior to injury. Neuropsychological tests, symptomology, and posturography measures were obtained pre-season and serially at days 1, 2, 3, and 10 post-injury on 23 college athletes who suffered a concussion and 18 college athletes who did not suffer a concussion. The injured group consisted of 17 football players, 5 women soccer players and 1 cheerleader. Using the AAN concussion grading scale, 3 athletes had a grade 1 injury, 19 athletes had a grade 2 injury and 1 athlete had a grade 3 injury. Neuropsychological scores were converted to standard scores and then combined into the cognitive domains of attention, learning, speed of information processing, concentration, memory and verbal fluency. A repeated measures analyses of covariance, with the baseline test serving as the covariate, was used to evaluate the data. Univariate post-hoc tests were performed. Significant group differences were found on self-reported symptoms ($p=.001$), speed of information processing ($p=.005$), mean stability ($p=.002$), and vestibular function ($p=.003$) between the injured and control groups. Group by day planned comparisons found that speed of information processing and composite balance measures demonstrated significant differences through day 10 post-injury while symptoms and the vestibular ratio remain significant only through day 3. The use of neuropsychological domain scores and posturography measures, when controlled for baseline performance, demonstrate slightly prolonged recovery yet reflect a pattern consistent with previously reported data.

(42) LOOKING-GLASS SCIENCE: A NEW PARADIGM FOR THE 21ST CENTURY

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When Alice went *Through the Looking-Glass* (Carroll, 1872, 1991), she began to see her world anew. Lewis Carroll's prescient observations on the future of science are startling as one begins to unwrap the metaphors he was offering in the 19th century to predict what was to come. For example, once through the mirror, Alice discovered that the clock on the other side was alive and had the "face of a little old man" who grinned at her (p. 136). Modern science had been founded on the metaphor of the clock. When Galileo and others began to point their telescopes at the sky, they concluded that all motion in the universe was clock-like: perfectly periodic and predictable. Psychologists who adopted this view reasoned that all things within the universe must therefore be clockworks—even human beings; their inner-life being understood as nothing but simple cause and effect. But Alice realized that in the Looking-Glass world, such methods could never capture her essence. "Oh, what fun it will be, when they see me through the glass in here, and can't get at me!" (p. 136). Traditional methods of astronomy and physics do not apply to this world. However, there is a new science that holds some promise for moving closer to an explanation of the workings of the universe. The twin notions of chaos and complexity are beginning to account for how things come into existence, and how systems are maintained in the midst of persistent entropy.

(43) The use of *E. coli* expressed proteins of *Yersinia pestis* for the Development of Vaccines against Pneumonic Plague

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Yersinia pestis, the causative agent for bubonic and pneumonic plague, is a leading candidate for use in biological warfare. The currently licensed vaccine for *Yersinia pestis* is ineffective against lethal aerosol plague challenge. Collaboration between JMU and the U.S. Army Medical Research Institute of Infectious Diseases (USAMRIID) has been established to utilize recombinant DNA technology in an effort to produce a more efficacious vaccine. Recombinant DNA technology has enabled a new approach to vaccine development and production (termed "recombinant vaccines") that has shown to be effective against a number of pathogenic organisms. Rather than using a virulent whole cell or infectious viral particle, parts or "subunits" of the infectious agent are used to elicit an immune response. However, the simple nature of these vaccines could allow scientists of rogue nations or terrorist groups to design biological countermeasures capable of bypassing this immunity. Our research is focused on the development of complex vaccines made of many protein components that may prove to be more difficult to counter. Identification of the molecules within the subunit (usually surface or secreted proteins) permits cloning of the genes encoding these proteins into non-virulent bacteria such as *E. coli*. We have cloned a collection of genes from *Y. pestis* that code for secreted and outer membrane proteins. These genes have been expressed in the common bacteria *E. coli* and the recombinant proteins purified by affinity chromatography. The purified proteins will be tested at USAMRIID by injection into animal model systems to induce protective immunity followed by a lethal challenge of aerosolized *Y. pestis*.

(44) Critical Infrastructure Risk Assessment Tool Development

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The current state of world affairs necessitates that critical infrastructure service providers in each critical sector evaluate where their systems are vulnerable and the costs associated with system degradation and down time. Even in a world free of extremist activities this information would be useful to predict damages and costs resulting from natural disasters, human error, and Murphy's Law.

Most critical infrastructure facilities and systems are functionally complex and parts of larger networks such that their system-wide failure probabilities, modes, and consequences are often not obvious. Failures may propagate with seemingly minor problems cascading to result in complete mission failure. A question of concern is which failure combinations would lead to "most-to-be-avoided" consequences.

We are developing tools that improve upon current computational models by adding prediction of behavior throughout a time interval to the evaluation of functional mission susceptibility to insults and failures addressing the interdependent subsystems of complex facilities and systems that constitute critical infrastructures.

(45) The Relation Between Alcohol Images and Expectancies and College Alcohol Use

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College students have beliefs about alcohol and the type of person who drinks (Gibbons & Gerrard, 1995). As students acclimate to the college experience they are sensitive to the social implications of their behavior. Because they are highly salient, the beliefs and risk images associated with alcohol use tend to be particularly influential in students' decision to drink. The current study examines the relation between social information about drinking and self-reported drinking behavior. A sample of 218 college students completed surveys assessing their images of drinkers, images of nondrinkers, and alcohol expectancies. Self report of drinking frequency and amount were also surveyed. Results suggest that both the drinker image and nondrinker image are related to alcohol behavior. Alcohol expectancies associated with social outcomes such as having fun with others or meeting new people were also significantly related to drinking behavior. The social environment is an important factor in influencing decisions to drink alcohol. Future interventions need to consider the social image of the typical drinker and nondrinker specific to the college campus. Images are malleable. Persuasive messages designed to change beliefs about the typical drinker on campus may influence how frequently students drink in the future.

(46) Apparent Gaze Direction in Pictured Faces

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Eyes depicted in a picture often appear to follow the viewer as one passes. This phenomenon is predicted by the geometry of pictorial space. Sedgwick (1991) showed that both the objective orientation of depicted objects and the angle of the picture plane (AP) relative to the viewer influence the virtual orientation of these objects. We conducted two experiments to assess (1) the ability to judge the direction of another's gaze (GD), using a live model and photographs of the same model, and (2) the influence of AP on apparent gaze direction. We found comparable errors in judgments of GD for both live and photo conditions. Our results also suggest two distinct regions of the sampled gaze space. In the first region, viewers consistently judged eyes to be directed at them. We found no effect of AP within this region. In the other region, we observed an additive effect of AP on GD.

(47) Effect of a 4:1 ratio carbohydrate/protein beverage on endurance exercise performance, muscle damage and recovery

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Eleven male cyclists (age = 24.5 ± 4.6 ; $VO_{2max} = 63.4 \pm 10.8$ ml·kg⁻¹·min⁻¹) were studied to compare the effects of a 4:1 carbohydrate/protein beverage (CHO/P) to an isocaloric carbohydrate only (CHO) beverage on time to fatigue, recovery and muscle damage.

Subjects performed two sets of two exercise bouts to exhaustion on a cycle ergometer. In each set, the first exercise bout was performed at 70% of VO_{2max} and the second (22-24 hours later) was performed at 80% of VO_{2max} . CHO or CHO/P (8ml/kg) were consumed every 15 minutes during exercise and a single 10 ml/kg dose was given immediately after exercise. The second set of exhaustive exercise was performed four to seven days later with the opposite beverage. Markers of muscle damage (CK and LDH) and ratings of soreness were measured prior to the first and second rides and 24- and 48-hours later.

No differences were found in time to fatigue (Day One CHO: 95.01 +/- 30.27 min, CHO/P 98.65 +/- 24.36 min; Day Two CHO: 39.30 +/- 14.17 min, CHO/P: 41.27 +/- 19.49 min). Rating of soreness 24-hours after the initial exercise bout was lower in the CHO/P trials ($p \leq 0.05$). CK levels were attenuated in the CHO/P group by 45% ($p < 0.05$) on Day Two, but plasma LDH values were not different between trials on any day. Glucose, lactate, diet, VO_2 and HR were not different between treatments.

(48) Development of Hair Cell Stereovilli Bundle Abnormalities and Hearing Loss in Belgian Waterslager (BSW) Canary

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Adult BWS canaries show an approximate 30% reduction in hair cell number and a high frequency hearing loss despite continuous hair cell regeneration. Many of the hair cells that are present have severe stereovilli bundle (SVB) abnormalities. Our previous studies showed that hair cell loss develops during the first 3 months post-hatch. The purpose of the present study was: 1) to quantify the development of hair cell loss and SVB abnormalities using SEM analysis and 2) to describe the development of hearing loss using auditory brainstem response (ABR). ABR responses were measured at intervals from post-hatch day 5 to adulthood. Basilar papillae were analyzed at similar chronological intervals. Hearing sensitivity improved in a manner parallel to non-BWS up to post hatch day 17 but gradually worsened thereafter, reaching adult-levels by 51 days post-hatch. Stereovilli bundle abnormalities could be seen as early as post-hatch day 2 but reached significant levels by 31 days post-hatch. Significant hair cell loss was reached by 66 days post-hatch. These results reveal a developmental functional deficit that appears to follow the developmental inner ear pathology. Finally, they provide the first evidence of developmental abnormalities in stereovilli bundle formation in a bird and are reminiscent of developmental abnormalities described in several mouse models of deafness. Supported by NIDCD R01DC001372

(49) Predicting HIV/AIDS Related Risk Behaviors Among Men Who Have Sex With Men: An Examination of Psychosocial Perspectives in the Atlanta Epicenter

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Objective: Men who have sex with men (MSM) are disproportionately affected by HIV/AIDS, representing more than half of all persons living with HIV and approximately 70% of HIV-infected men. While MSM no longer comprise the majority of new HIV infections, they are estimated to account for 43% of all infections – more than any group. Using Social Cognitive Theory as a framework, this study examined the influence of psychosocial constructs and demographic features on the sexual risk-taking behaviors of self-identified MSM.

Method: Two hundred nineteen MSM were drawn from an event celebrating diversity within the lesbian, gay, bisexual, transgendered, and questioning (LGBTQ) community. Seventeen independent variables were independently and collectively analyzed to determine associations with HIV sexual risk behaviors. Analysis was used to examine the factors associated with HIV risk behaviors. Factors found to be significantly correlated with HIV risk behavior were examined for predictive ability using a hierarchical multiple linear regression.

Results: Internality/externality, as well as substance use, were found to be significant predictors of HIV risk behavior. Internalized homophobia also predicted a trend in the same direction. While no demographic variables predicted engagement in risky sexual behavior, differences in levels for each psychosocial construct were evident based upon race/ethnicity, education level, employment status, income level, residence status, and HIV testing history.

Discussion: While much HIV prevention education has focused on MSM, this population continues to engage in behaviors that increase risk for contracting this disease. Moreover, the study's findings support the need for programs including topics such as sexual control, substance use, and personal identity and comfort levels.

(50) Variability Among College Students with Cochlear Implants

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College campuses are starting to see variability among young deaf students who are cochlear implant users. The current generation of students entering college constitutes the largest generation to date of students who may have worn implants since early childhood. Another group of recently implanted students arrive on campuses with newer technology but more limited implant experience. Investigating their communication profiles provides families, educators, and speech-hearing professionals with insights to the benefits these students perceive from their implants.

Fourteen college students enrolled at the Rochester Institute of Technology (RIT), some fully mainstreamed, and others enrolled at the National Technical Institute for the Deaf (NTID), a college within RIT, completed written questions and participated in interviews regarding their communication histories and current practices. Their responses reflect broad variability in spoken and sign language use, in perceived intelligibility of their speech and that of others, and in satisfaction with their implants.

(51) Laboratory for the Analysis of Behavior

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The Laboratory for the Analysis of Behavior in the Department of Psychology supports basic and applied research in behavior analysis. Behavior analysis can be differentiated from other areas of psychology in that it is focused on analyzing behavior using well established principles of learning that stress environmental variables that can be manipulated directly to change behavior. It is an experimental approach to the study of the behavior that investigates the functional relations between behavior and environmental events with the primary objectives of discovering of fundamental principles of behavior, examining how these principles can be extended over a variety of species and settings and, developing a technology of behavior change based on these principles. Current projects involve (a) assessing the behavioral effects of nutraceutical compounds, (b) analyzing the role of conditioned reinforcement in various animal training protocols, (c) assessing a delay of reinforcement gradient account of Attention Deficit – Hyperactivity Disorder (ADHD) using a nonhuman laboratory model, (d) using behavioral objectives to guide student learning and enhance student assessment and, (e) using contingency-based peer-reviews and self-assessments to improve students' scientific writing.

(52) The Beliefs, Events, and Values Inventory (BEVI) and JMU Undergraduates: Demographic by Scale Analyses

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The Beliefs, Events, and Values Inventory (BEVI) is a 494-item inventory designed to identify and predict a variety of developmental, attributional, and affective processes and outcomes that are relevant to a number of applied and research questions at both individual and social/cultural levels. The BEVI consists of three validity scales—Basic Openness, Consistency, and Congruency—and the following ten “process” scales: 1) Negative Life Events, 2) Naïve Determinism, 3) Sociocultural Closure, 4) Authoritarian Introjects, 5) Religious Traditionalism, 6) Need for Control, 7) Emotional Attunement, 8) Self-Access, 9) Separation- Individuation, and 10) Gender Stereotypes. This presentation provides additional information about the BEVI and presents analyses of four BEVI scales on the basis of various demographic indices. Information about the BEVI (e.g., test development) and implications for research and practice are also discussed.

(53) Promoting Physical Activity Among Sedentary Women Using Pedometers

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The purpose of this study was to compare the effects of a daily 10,000-step goal to a personal step goal on step counts and goal attainment in sedentary women with different baseline activity levels. Ninety-two sedentary women (M age = 43.2, SD = 12.1), separated into four cohorts, participated in three phases of data collection, including: (a) one week of monitoring baseline step counts, (b) three weeks of treatment step goals, and (c) a follow-up questionnaire. Repeated measures ANOVAs were used to assess differences in treatment (2), baseline activity level (3), and time (4). The main effect for treatment showed no difference in step counts, $F(1, 86) = 1.99, p = .162$. The primary result for attainment of step goals showed a significant interaction between treatment and baseline activity level, $F(2, 86) = 4.51, p = .014$. Consistent with goal theory, the women with low baseline step counts given a daily 10,000-step goal had significantly lower goal attainment than all other groups. For short-term interventions, self-monitoring of steps results in increased step counts regardless of whether a 10,000-step goal or a more personalized step goal is used. The results from this research support previous findings of lower goal attainment among women with low baseline step counts when assigned a daily 10,000-step goal as opposed to an easier to achieve personal step goal. Nevertheless, the lower goal attainment did not result in lower step counts over the four weeks. The study of more long-term comprehensive interventions of self-monitoring, goal setting, and personalized feedback warrants further investigation in order to promote the national strategy of moderate intensity activity for health.

(54) Relationship Between Professional Nursing Practice Characteristics and Nurse Retention

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The shortage of nurses in the United States continues to impact quality health care. It has been suggested that the context of care, or the organizational environment in which care takes place influences, nursing practice outcomes. Magnet hospital research demonstrates an association between professional nursing practice models and decreased Medicare patient mortality, higher patient satisfaction, and less nurse burnout.

This pilot study was implemented to measure hospital nurses' reports of the presence of certain hospital organizational characteristics that are commonly found in hospitals where professional nursing practice models are supported, including nurse autonomy, nurses' control over their practice, relationships with physicians, and organizational support for caregivers. Additionally, the study explored the relationship between hospital organizational characteristics that support a professional practice environment and retention of nursing staff.

During a monthly staff meeting and after obtaining consent, 26 nurses from two patient care units were asked to complete the Nurse Work-Index-Revised. The 57-item instrument measures autonomy, control over practice, nurse-physician relationship, and organizational support. These data were analyzed to determine the presence or absence of the characteristics and the association with nurse retention. The findings suggest that at this hospital Professional Nurse Practice characteristics are present at a medium high level. Nurses agreed that the characteristics were present, but did not strongly agree. Nurse retention is high suggesting a relationship between professional nurse practice characteristics and retention.

These findings provide support for implementation of professional nursing practice models in hospitals and other health care delivery institutions, and are the foundation for continued inquiry into relationships between organizational factors that influence nursing care.

(55) Measuring the Quality of Caregiver – Child Relationships: The Marschak Interaction Method Behavior Rating Scale

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“The best way of getting to know children is by observing them play.”

--Soren Kirkegaard

The quality of interaction between parents and their children is an important factor in a child's emotional, cognitive, and behavioral development (Shore, 1997). Stress in the parent-child relationship can be measured, and is thought to be an important predictor of interaction quality (Abidin, 1990). It was hypothesized that parents' perceived level of stress would influence the quality of play interactions between parent and child.

One hundred sixty-six caregiver-child dyads were assessed with two measurements: 1) the Parenting Stress Index (PSI; Abidin, 1990) to measure parents' level of stress associated with their role as caregiver, and 2) the Marschak Interaction Method Behavior Rating Scale (MIMBRS; McKay, Pickens, Stewart, 1996). The MIMBRS behavior coding system, developed for use with the Marschak Interaction Method (MIM; see Jernberg, Booth, Koller, Allert, 1991), was used to rate parent, child and dyad behaviors, with higher scores reflecting more positive interaction quality. The MIM is a structured series of play tasks for parents and children, used as a context in which to observe parent-child interactions.

Regression analyses included parents' SES level scores, as well as Parenting Stress (PSI) scores, as predictors of MIMBRS behavior scores. Parents' stress scores were negatively correlated with MIMBRS interaction quality scores. Overall, the results suggest

- ◆ Parents who are more economically disadvantaged, reported the most stress and showed more negative parent-child play behaviors.
- ◆ In contrast, parents with higher SES, reported less stress and showed more positive play with children.

(56) A Nominal Plan for Demining Operations

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The threat of land mines has become a worldwide issue. Every year thousands of civilians are killed or maimed and the economies of these countries are stifled. Under a grant from the Department of Defense, the researchers conducted a study to develop a “best practices” nominal plan for the conduct of a demining campaign. The researchers interviewed numerous field personnel and tested the resulting model with the international demining population. The final planning model increased both the efficiency and effectiveness of the demining process.

(57) Characterization of RF and DC Plasma-Deposited Thin Films For Microsensor Applications

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RF and DC plasma deposited thin-films are being investigated for their potential application in micro-sensors. Films of germanium, antimony, bismuth, aluminum oxide, vanadium, and vanadium oxide are evaporated and sputtered onto substrates of glass and oxidized silicon wafers. These films are characterized in terms of their thickness, electrical resistivity and thermoelectric properties.

A test apparatus has been constructed to measure the thermoelectric properties and Seebeck Coefficient of thin-films. The Seebeck effect is the voltage generated by a material per degree temperature difference. By integrating the test apparatus with LabVIEW, simultaneous voltage-temperature data is collected. Current results are presented and discussed. These characteristics have applications in our NSF-REU Program and in our microsensor development and characterization research.

(58) Early results from a study of ammonium ion deposition in the Shenandoah Valley of Virginia

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The Shenandoah Valley of Virginia has many poultry houses thought to be the cause of increased ammonium deposition. Rain gauges were placed at four sites in the valley and the precipitation was tested for nitrate, sulfate and ammonium ions. The first year of the study found that the valley in general has a higher than national average ammonium level in rainfall, there is a strong seasonal increase in ammonium concentration during the spring, and that close proximity to these poultry houses shows even more impact. Data also indicates that ammonium ion concentrations are higher in lower rainfall events. The study is in its early stages, with limited statistical evaluation, and expects more complete results over the next 5 years. This project is funded by the EPA's Chesapeake Bay Program

(59) Understanding Barriers to Children's Use of Medical, Mental Health and Dental Services

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Access to health care continues to be a major problem for many children and youth, particularly for minority and low income families. Prior studies show that utilization of service, and ultimately health status, are impacted by access to care (Hahn and Flood, 1995). Access to care is influenced by the existence of barriers to care, which can be either direct barriers (e.g., lack of insurance, family income level, lack of a usual source of care) or indirect barriers (e.g., language, geography, lack of knowledge, transportation, etc.) (Fraser, 1997). This paper presents results of a study of barriers to care for children in three geographic areas of a large mid-Atlantic state. A representative, random sample of households was surveyed (n=459) using a detailed questionnaire that addressed children's health problems, utilization of services, and parent/guardian perceived barriers to care. Surveys were distributed through local public schools. Findings show variation in the existence of health problems and use of services. Also, findings show variation in barriers to care that affect children's use of medical, mental health and dental services. Direct barriers such as insurance coverage, cost of care and having a regular provider limit children's access to all three services. However, indirect barriers such as "system factors" (e.g., provider office hours, waiting lists and the ability to get a referral) and "personal/ family factors" (e.g., getting time off work and the perceived value of mental health treatment) are also reported. Implications for services delivery and suggestions for reducing barriers to care are discussed.

(60) Emerging Leaders of Dietetics During the American Civil War

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This author's intent is to spark greater awareness of history of the dietetics profession by highlighting the contributions of individuals in the special feeding of armies during the American Civil War (1861-1865). Remarkable women and men made significant contributions to feeding of sick and wounded soldiers during this time. While dietetics was founded as a profession in the early 1900's, advancement toward the field was occurring during the war years prior to this. Numerous individuals emerged as leaders in providing nutritious food to soldiers, and where possible, meeting special dietary requirements of sick and wounded soldiers. Despite the huge number of casualties during those years, it is probable that many lives were saved by this early practice of dietetics, as individuals employed management skills, problem solving ability, initiative, ingenuity, and dedication to battling the odds of wartime malnutrition and disease.

(61) Research on Indoor Air Quality

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Projects are planned or underway in four areas: a database on emissions of volatile substances from materials found in buildings; a simplified procedure for measuring emissions of volatile organic compounds from materials; a database on radon concentrations in homes in the Shenandoah Valley; and testing the effectiveness of air cleaners in protecting occupants of critical infrastructure buildings during incidents when toxic airborne particles are present.

The **database on emissions** is a compilation of measurements of emissions from various building materials and consumer products that have been reported in the scientific literature. It currently consists of data from about 8000 different measurements on several hundred materials and products.

A **simplified procedure for measuring emissions** is needed by companies that cannot afford the research-quality methods currently used by major manufacturers of building materials and consumer products. I hope to work with JMU students at the undergraduate and graduate levels to develop simplified procedures.

The **database on radon concentrations** will build on measurements that have been made in the central Shenandoah Valley over the past 10 years. I hope to make measurements in parts of the valley that are under-represented, and prepare a map of these data, perhaps in GIS format that includes relevant geologic and demographic data.

The work on testing the **effectiveness of air cleaners** is underway as an ISAT senior thesis project. Its basic purpose is to investigate whether off-the-shelf, relatively inexpensive room air cleaners can protect occupants of critical infrastructure facilities from particulate chemical or biological agents.

(62) Effects Of Weight-Bearing And Non-Weight-Bearing Activity On Bone Mass Density In Female Collegiate Athletes

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The purpose of this study was to investigate the effects of weight-bearing and non-weight-bearing sports and menstrual status on bone mineral density in female collegiate athletes. Subjects were 63 females, 18-22 years, from four different sports: volleyball, cross country, gymnastics, and swimming. A three day food record was used to determine average daily calcium intake. A women's health survey determined menstrual status and oral contraceptive use. AccuDEXA bone densitometer measured bone mass density (BMD) and air plethysmography was used to measure body density. Results of this study showed that sport type had statistically significant effects on BMD ($p < 0.05$) when controlling for oral contraceptive use, calcium intake and menstrual status. Bonferroni pairwise comparisons revealed that the volleyball group's BMD was significantly different ($p < 0.05$) from the other groups. Comparing BMD means, volleyball and swimming had higher BMD levels than cross country and gymnastics. Calcium intake, percent body fat, oral contraceptive use and menstrual status had no significant effects on BMD. Using pairwise comparisons, the swimming group had a higher percent body fat level and body mass index (BMI) than runners and gymnasts. Results also indicated that volleyball, a weight-bearing activity, had higher BMD values compared with the other weight-bearing sports (cross country and gymnastics) and the non-weight-bearing sport (swimming). Interestingly, when compared to cross country runners and gymnasts, swimmers had higher BMD values. These results may indicate that swimmers, despite participation in a non-weight-bearing sport, maintained high BMDs because they possessed a high BMI.

(63) International Labor Migration to Taiwan: The Role of the State in Labor Export and Economic Restructuring

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Foreign laborers from Thailand, the Philippines, Indonesia, and most recently Vietnam have been welcomed to work in Taiwan under short term contracts since 1989. However, that welcome has always been extended both within the boundaries of a socially constructed view of foreign workers in general, as well as constructions specific to the source countries for these workers. Taiwan's regulation of foreign workers includes the institution of a wide variety of rules intended to keep strict control over these workers, with the Taiwanese government citing reasons for such guidelines as the need for social stability with regard to issues of health, welfare and citizenship. This research chronicles the regime of formal and informal regulation of migrant laborers in Taiwan. Formal regulation of foreign workers has attempted to limit their impact on the host society through administrative, temporal and political means. Informal regulations instituted by employers have also been instituted to further tighten control of workers. Explanation of this combination of formal and informal regulatory regimes points to attempts to "discipline" workers and discourage them from making formal complaints to Taiwanese government agencies, diplomatic institutions representing workers' home countries or non-governmental organizations. As a result, foreign laborers are placed in the awkward position having to choose between being (super)exploited during their work contracts or having their work contracts canceled and being involuntarily repatriated.

(64) Effect of Duration of Blindness on Selected Aspects of Fitness Among Women

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It has been reported that infants and children who are blind tend to be less physically active and have higher percentages of body fat than their sighted peers. If the pattern continues or is replicated in adulthood, both factors may further contribute to increased obesity. In addition, because balance underlies every aspect of movement performance, it is reasonable to assume that when vision is altered or obscured that balance is deleteriously affected. In the absence of visual balance cues, kinesthetic and vestibular input continues to provide cues for balance but it is unclear how long it takes to learn to rely upon these cues. Therefore, the purpose of this study was to determine if adult women who have been blind for relatively long (+10 years) or short (1 year or less) durations differ in measures of dynamic balance and percent body fat.

Of the seven legally blind women (ages 37-78) who served as subjects, four were blind for a minimum of ten years, and three had been blind for one year or less at the time of the study. The women participated in an exercise program that was conducted twice a week for 45 minutes per session over a four-month period. Each session included cardiovascular endurance, muscular endurance, and flexibility exercises. Specific assessment methodology and conclusions of this study will be presented.

(65) Is Probability Matching Smart? Associations Between Probabilistic Choices and Cognitive Ability

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People's responses often deviate from the performance considered normative on tasks involving probabilistic reasoning and judgment. Consider, as an example, the task used with the first set of participants ($n = 445$) in the present study. The participants were asked to identify the global strategy they would use in trying to maximize their winnings when predicting the outcome of each roll of a hypothetical die with 4 red faces and 2 green faces. Although the optimal strategy is to select the most probable color for each roll of the die, the majority of participants indicated that they would use a suboptimal probability matching strategy—that of predicting the high probability color on 2/3 of the trials and the low probability color on 1/3 of the trials. A similar probabilistic choice task was used with a second set of participants ($n = 715$) who were asked to choose from among five different strategies. Once again the maximizing response was selected by only a minority of participants. A third set of participants ($n = 422$) was presented with a more continuous, or trial-by-trial task. This time the utility maximizing response was chosen by only one half as many students as the probability matching response. Importantly, in each version of the tasks, participants preferring the utility maximizing response were significantly higher in cognitive ability than participants showing a probability matching strategy. These findings can most easily be accommodated by a traditional heuristics and biases interpretation wherein participants high in computational ability are more likely to carry out the rule-based cognitive procedures that lead to maximizing behavior.