THE RELATIONSHIP BETWEEN BIRTH ORDER AND IPIP BIG-FIVE FACTOR MARKERS. Laura A. Boettcher & Gayle T. Dow, Ph.D. Dept. of Psychology, Christopher Newport University, Newport News, VA, 23606. The purpose of this project is to investigate how one's birth order (only, youngest, middle, and oldest) potentially impacts scores of the IPIP Big-Five Factor Markers. Traits such as extraversion, agreeableness and neuroticism can be swayed by birth order. Birth order researchers have found that common traits exist within only, oldest, middle, & youngest born individuals, specifically first-borns tend to be more conscientious, whereas later-borns tend to be more agreeable. An online survey was completed by 192 participants with questions regarding participants' birth order and 50 questions from the IPIP. The IPIP Personality measure considers questions using the Big 5 personality model-extraversion, agreeableness, neuroticism, openness & conscientiousness. It was hypothesized that the youngest-borns would score higher on the agreeableness and openness. Trends emerged for extraversion and neuroticism.

STIMULUS DISCRIMINATION DURING AN INSTRUMENTAL LEARNING TASK IN *DANIO RERIO*. _Morgan A. Cote-Coble_ & *Christina Philyaw, Dept. of Psychology, Christopher Newport University, Newport News VA 23606.* Using an instrumental choice procedure, 12 zebrafish (*Danio rerio*) were tested for their ability to discriminate between a stimulus associated with food reward (S+) and a stimulus associated with no food reward (S-). The subjects swam to the end of a T-maze and made a choice between two distinctly colored arms. Two squads of 6 fish were tested. For 6 of the subjects, the blue arm served as the S+ and was followed by a single bloodworm, while the green arm served as the S-. For the other 6 fish, the blue stimulus served as the S- and the green stimulus served as the S+. The right or left position of each S+ was randomly determined at the beginning of each trial. Subjects completed 3 trials per day until choice stabilization was evident, in which the same stimulus (S+ or S-) was selected in 8 out of 10 trials. Overall, 6 of the 12 subjects preferred the S+ over the S- while 2 fish failed to stabilize on a single reward; trials with the other four fish are nearing completion with most of them trending towards preference for the S+. Replicate trials are currently being conducted using another squad of naive subjects. The preference for signaled reward indicates that *Danio rerio* can be used for instrumental choice research, and future studies should use an inbred strain of *Danio rerio* to reduce genetic variability that may contribute to individual differences in the acquisition of instrumental responding.

Statistics

SUPPORT VECTOR MACHINES WITH THE RAMP LOSS AND THE HARD MARGIN LOSS. J.P. Brooks, Dept. of Stat. Sci. and O.R., Virginia Commonwealth University, Richmond, VA 23284. The support vector machine (SVM) is a well-established method for classification based on an approach that emphasizes minimizing misclassification error while maximizing the distance between sets of correctly

classified observations. In training models, SVM uses a measure of error that is based on the Euclidean distance of observations from the separating surface. In the interest of increasing the robustness of SVM, we present two new integer programming formulations that incorporate the ramp loss and the hard margin loss, respectively. These formulations are able to accommodate nonlinear kernel functions that have made traditional SVM popular. The consistency of SVM with these loss functions is established. Analysis of simulated and real-world data sets indicates that Ramp Loss SVM is preferred over both Hard Margin Loss SVM and the traditional Hinge Loss SVM in the presence of outliers when a low-rank kernel function is employed.

EVALUATING STATISTICAL SIGNIFICANCE IN SUPERSATURATED DESIGNS. David J. Edwards, Dept. of Statistical Sciences and Operations Research, Virginia Commonwealth University, Richmond, VA 23284 & Robert W. Mee, Dept. of Statistics, Operations, and Management Science, Univ. of Tennessee, Knoxville, TN 37996. Two-level supersaturated designs (SSDs) are designs that examine more than n-1 factors in n runs. Although literature involving the construction of SSDs is plentiful, less has been written about analysis of data from these designs. Perhaps this is due in large part to the dearth of actual applications. Whether using forward selection or all-subsets regression, it is easy to select models from SSDs that explain a very large percentage of the total variation. Hence, naïve p-values can persuade the user that included factors are indeed active. We propose the use of a global model randomization test in conjunction with all-subsets to more appropriately select candidate models of interest. For settings where the number of factors is too large for repeated use of all-subsets to be applied repeatedly, we propose a short-cut approximation for the p-values based on the beta distribution. Finally, we propose a randomization test for reducing the number of terms in candidate models with small global p-values.

USING SIMULATION OPTIMIZATION TO CONSTRUCT EFFICIENT SCREENING STRATEGIES FOR CERVICAL CANCER. Laura A. McLay & Chris Foufoulides, Dept. of Stats. & Oper. Res., Virginia Commonwealth Univ. Cervical cancer is the second most common type of cancer in women worldwide. Because cervical cancer is usually asymptomatic until the disease is in its advanced stages, cervical screening is of central importance towards combating cervical cancer. Alternative screening strategies are evaluated from an economic point of view through cost-effectiveness analysis. In the literature, however, studies perform cost-effectiveness analysis on a limited number of de facto screening policies. At present, no attempt has been made to construct efficient screening strategies through optimization, before cost-effectiveness analysis is applied. In this study simulation optimization is used to construct efficient screening strategies for cervical cancer by properly timing the screenings. The constructed strategies are highly cost-effective when a small number of lifetime screenings is available, and are more cost-effective than screening strategies used in practice or considered in the literature so far, indicating the value of optimal timing for other screened diseases as well.

EVALUATING THE ASYMPTOTIC LIMITS OF THE DELETE-A-GROUP JACKKNIFE FOR MODEL ANALYSES. Phillip S. Kott, National Agricultural Statistics Service, Department of Agriculture, Fairfax VA 22030 & Steven T. Garren, Department of Mathematics and Statistics, James Madison University, Harrisonburg VA 22807. The delete-a-group jackknife can be e ectively used when estimating the variances of statistics based on a large sample. The theory supporting its use is asymptotic, however. Consequently, analysts have questioned its e ectiveness when estimating parameters for a small domain computed using only a fraction of the large sample at hand. We investigate this issue empirically by focusing on heavily poststrati ed estimators for a population mean and a simple regression coe cient, where the poststrati cation take place at the full-sample level. Samples are chosen using di erentially-weighted Poisson sampling. The bias and stability of delete-a-group jackknife employing either 15 of 30 replicates are evaluated and compared with the behavior of linearization variance estimators.

INFORMATION REDUCTION FOR BIAS AND VARIANCE ESTIMATION. Leonard A. Stefanski, Dept. of Stat., N.C. State Univ., Raleigh, NC 27696-8203. The jackknife and bootstrap are two well-known methods of reducing bias and estimating variance. Simulation-extrapolation is a method of reducing bias and estimating variance in measurement error models that works by adding more error to the observed data. Omitting an observation (jackknife), sampling from the observed data (bootstrap), and adding noise to data (simulation-extrapolation) are all ways of reducing information in a data set. In this talk I show that all three methods are conceptually similar when viewed in terms of information reduction, and argue that doing so is sometimes advantageous.

Structural Biology, Biochemistry and Biophysics

NEUROSTEROID REGULATION OF IONOTROPIC GLUTAMATE RECEPTORS. Sarah Rhoads & Lisa Gentile, University of Richmond. AMPA, NMDA and kainate receptors belong to the ionotropic glutamate receptor (iGluR) family. As binding to glutamate, a major fast excitatory neurotransmitter, causes activation of these channels, they play an important role in synaptic plasticity, memory and learning. Our research focuses on understanding how these receptors are regulated binding for potential applications in conditions such as Alzheimer's and Parkinson's disease. The data presented here is aimed at understanding the differential regulation of NMDA receptors by the endogenous neurosteroids pregnenolone sulfate (PS) and 3α-hydroxy-5β-pregnan-20-one sulfate (PREGAS). PS potentiates the activity of NMDA receptors containing an NR2B subunit while it inhibits those containing an NR2D subunit. PREGAS negatively regulates all iGluRs. Intrinsic and extrinsic fluorescence studies will be presented that confirm the binding of the NMDA NR2B S1S2 and amino terminal domain (ATD) to both PS and PREGAS. Unlike the NR2B subunit, the NR2D S1S2 domain does not bind to PS and PREGAS, however the NR2D ATD does bind to both neurosteroids. Data from isothermal titration calorimetry and Stern-Volmer