

Saturday, October 9, 2010

Viewing: 11:30 am – 6:30 pm

Presenters at Posters: 12:30 pm – 1:30 pm

Location: Exhibit Hall

**Adipose Inflammation****103-P****Synchronous In-Vivo Large-Scale Transcriptional Profiling in Human Peripheral Blood Mononuclear Cells, Myocytes and Adipocytes**

Jack W. Kent Jr., Raul A. Bastarrachea, Karin Haack, Paul B. Higgins *San Antonio, TX*; Jac Charlesworth *Hobart, Australia*; Esther C. Gallegos-Cabrales, Edna J. Nava-Gonzalez, Ricardo M. Cerda-Flores *Monterrey, Mexico*; Victor M. Hernandez-Escalante *Merida, Mexico*; V. Saroja Voruganti, John M. Proffitt, Harald H.H. Goring, John Blangero, Anthony G. Comuzzie, Shelley A. Cole *San Antonio, TX*

**Objective:** High-throughput technology allows gene expression profiling for the entire transcriptome. While absolute levels of expression differ across tissues, their relative rank may be similar for many genes. Our aim was to identify genes whose expression in circulating mononuclear cells (PBMCs) reliably predicts expression in other tissues. **Research methods:** We recruited 4 males from Monterrey (BMI < 25 [2]), BMI > 30 [2]) and obtained PBMCs and tissue biopsies (subcutaneous adipose and quadriceps muscle) from each subject. RNA was analyzed using Illumina Human-6 v2 Expression BeadChips. **Results:** We examined 17,128 autosomal RefSeq gene transcripts in every subject in at least one tissue type. 78.6% were detectably expressed in two or more tissues, 61.3% in all three. We treated the three tissue types as repeated within-individual measures of expression and computed the reliability of each transcript as its intraclass correlation coefficient. The pool of highly reliable transcripts was enriched for genes related to immunity, development, and metabolic disease, while the least reliable transcripts were enriched for genes with tissue-specific functions (e.g., connective tissue development) or cell turnover/cell death. **Discussion:** We obtained synchronous in-vivo expression profiles of PBMCs, quadriceps muscle, and subcutaneous fat. Most genes were detectably expressed in multiple tissues, and RNA levels were correlated between tissue types (range  $r = 0.61-0.75$ ). Reliability of transcript expression across tissues was correlated with published evidence of cis-regulation, suggesting that proximal sequence variants may be especially consistent in different cellular environments. These results provide a tool for remote exploration of adipocyte function via correlated expression in other tissues.

**104-P****Eicosapentaenoic Acid Improves Adipose Tissue Inflammation in Part Via Downregulation of Adipose Angiotensinogen Secretion**

Nishan S. Kalupahana *Knoxville, TN*; Kate Claycombe *East Lansing, MI*; Sarah Fletcher *Knoxville, TN*; Patrick Wortman *Chattanooga, TN*; Naima Moustaid-Moussa *Knoxville, TN*

We have previously shown that eicosapentaenoic acid (EPA), a long-chain n-3 polyunsaturated fatty acid of marine origin, is able to both prevent and reverse high-fat (HF) diet-induced insulin resistance (IR) and adipose tissue inflammation in mice. Interestingly, however, EPA was only able to prevent but not reverse HF diet-induced weight gain and adiposity. Thus, EPA appears to improve IR and adipose inflammation (AI) in obese mice via weight- and adiposity-independent mechanisms. To gain insight into such mechanisms, we studied adipose tissue of C57BL/6J mice initially fed a HF diet for 6 weeks followed by a HF-EPA diet for 5 weeks. These mice exhibited body and fat pad weights comparable to mice fed the HF diet throughout the 11 weeks. Gonadal and inguinal adipose tissue histology showed that the HF-EPA group had a significantly lower mean adipocyte area compared to the HF group. The HF-EPA group also had nearly 50% lower angiotensin II (Ang II) levels in their gonadal adipose tissue compared to the HF group. Analysis of conditioned media from cultured 3T3-L1 adipocytes showed that EPA significantly reduced secretion of angiotensinogen (Agt), the precursor peptide for Ang II, from adipocytes. In conclusion, the EPA-mediated improvements in IR and AI in obese mice seem to be at least in part due to EPA-induced adipocyte hypotrophy. This effect could be mediated in part via reduced local Ang II levels possibly due to EPA's ability to reduce Agt secretion from adipocytes. Grant support: AHA, USDA, UT AgResearch and UT-ORC.

**105-P****Lipid-Antioxidant Blend For Modulating Chronic Inflammation in Type 2 Diabetes**

Padmavathy Krishnan, Suzette Pereira *Columbus, OH*; Tapas Das *Singapore*; Stephen DeMichele, Neile Edens *Columbus, OH*

A novel nutritional lipid-antioxidant blend enriched in eicosapentaenoic acid, gamma-linolenic acid and antioxidants (EPA/GLA/antioxidant) is known to reduce acute inflammation and improve clinical outcomes in critically ill patients. However its' anti-inflammatory effects on chronic inflammation associated with Type 2 diabetes has not been determined. This study evaluated the efficacy of the lipid-antioxidant blend on modulating chronic inflammation using Zucker diabetic fatty (ZDF) obese rats (model of Type 2 diabetes). Zucker diabetic fatty (ZDF) obese (fa/fa) male rats (6wk) were randomized to receive either, an isocaloric isolipid control blend (CONTROL, n=12), or lipid-antioxidant blend (EPA/GLA/antioxidant) (TEST, n=12), by gavage (10 ml/kg BW/day) for 6 weeks. Biweekly measurements of fasting plasma glucose, insulin, and inflammatory biomarkers were taken. After 6 weeks of treatment, the TEST group had significantly reduced levels of circulating inflammatory markers: CRP, IL-1b and MCP1 (p-value <0.05) with no change in glucose and insulin levels between groups. Adipose tissue-specific inflammatory marker gene expression levels were measured by qPCR (SABiosciences qPCR array). Compared to CONTROL, the TEST animals showed decreased gene expression of various pro-inflammatory cytokines (CCL4, CCL6, CCL9, etc.), integrins (ITGAM & ITGB2) and cytokine receptors (Ccr1, Ccr5, IL2rb, TNFRSF1B). (p-value <0.05). After 6-week treatment, the TEST group showed a trend towards improving insulin sensitivity compared to control although it did not reach statistical significance (p-value=0.2) as determined by an insulin tolerance test (ITT). Collectively, these data indicate that the lipid-antioxidant blend may be a useful nutritional intervention for modulating progression of chronic inflammation associated with Type 2 Diabetes.

**106-P****High-Fat Feeding Expands Inflammatory Monocyte Subsets in Outbred CD-1 Mice**

Kelley Strohacker, Whitney L. Breslin, Katie C. Carpenter, Nadia Agha, Thomas W. Lowder, Brian K. McFarlin *Houston, TX*

Weight gain is known to disrupt the innate immune system, which can be assessed by examining blood monocytes. The purpose of this study was to determine how dietary macronutrient content effected weight gain and monocyte subset concentration over a period of 12 weeks. CD-1 mice were divided into 4 groups (N=10 per group): stock control (13.5% fat, CN), 30% fat (F30), 45% fat (F45) and 60% fat (F60). Non-lethal, blood samples (~70 mL) were collected bi-weekly throughout the 12-week treatment. Monocyte subsets (non-classic - CD115<sup>+</sup>/Gr-1<sup>Low</sup>, intermediate - CD115<sup>+</sup>/Gr-1<sup>Int</sup> and classic - CD115<sup>+</sup>/Gr-1<sup>High</sup>) were assessed using flow cytometry. Data were analyzed using a repeated measures ANOVA; significance was set at P<0.05. At week 12, total monocyte concentration was 123% greater in F60 compared to CN mice (P<0.05) while classic, intermediate and non-classic subset concentrations were 441%, 204% and 110% greater, respectively, compared to CN (P<0.05). Furthermore, the ratio of inflammatory (classic and intermediate) to non-inflammatory (non-classic) monocytes was 0.89 in F60 compared to 0.41 in CN (P<0.05). Consumption of a 60%-fat diet led to an elevation in total monocytes as well as an increased proportion of monocytes that respond to inflammatory stimuli, suggesting immune dysfunction in the blood compartment. Based on these findings, assessing blood monocyte subset characteristics may be beneficial in mouse obesity models.

**107-P****Inflammatory Profile of Subcutaneous Adipose Tissue and in the Systemic Circulation in Obese Minorities: Influence of Gender and Ethnicity**

Kim-Anne Le, Swapna Mahurkar *Los Angeles, CA*; Chen Xie, Andrew S. Greenberg *Boston, MA*; Hooman Allayee, Michael I. Goran *Los Angeles, CA*

**Objective:** Adipose tissue contributes to inflammation and potentially mediates the relationship between obesity and insulin resistance. We aimed to determine ethnic and gender differences in various aspects of inflammation within adipose tissue and in the circulation. **Methods:** Markers of

inflammation were determined in 21 Hispanic and 17 African-Americans (BMI>30 kg/m<sup>2</sup>, 18-25 years). Circulating markers included: plasminogen-activator-inhibitor-1 (PAI-1), monocyte-chemoattractant-protein-1 (MCP-1), tumor-necrosis-factor- $\alpha$  (TNF- $\alpha$ ) and interleukin (IL)-8. Subcutaneous adipose tissue (SAT) biopsies were obtained for histological measurement of crown-like-structures (CLS), indicating adipocyte death, and gene expression of inflammatory pathways by Illumina microarrays. SAT, visceral adipose tissue (VAT) and hepatic fat fraction (HFF) were measured by MRI. Results: Hispanics had higher circulating PAI-1 (130 $\pm$ 11 vs 94 $\pm$ 9 pg/mL, P<0.05) and MCP-1 (0.39 $\pm$ 0.03 vs 0.30 $\pm$ 0.03 pg/mL, P<0.05) than African-Americans, without any gender difference. In contrast, CLS tended to be higher in males than females (P=0.08), but similar across ethnicities. Expression of inflammatory genes and pathways were higher in males than females (fold-change>1.2, P<0.05) without any ethnic difference. Plasma MCP-1 was related to VAT (r=0.45, P=0.006) and HFF (r=0.34, P=0.04), and TNF- $\alpha$  to VAT (r=0.43, P=0.008) and HFF (r=0.34, P=0.04). There were no relationships between circulating markers of inflammation and CLS. Conclusion: Obese Hispanics have higher systemic inflammation than African Americans, while markers of inflammation within SAT are higher in males than females. Thus, gender may predominantly affect SAT inflammation, while ethnic differences in inflammation are reflected in the circulation and related to VAT and liver fat.

### 108-P

#### Exercise Attenuates Increases in Body Weight and Monocyte Concentration in CD1- Mice Consuming a High-Fat Diet

Whitney L. Breslin, Kelley Strohacker, Nadia Agha, Katie C. Carpenter, Thomas W. Lowder, Brian K. McFarlin *Houston, TX*

Exercise training is believed to protect against diet-induced weight and subsequent disease development, leading to antidotal reports that it is possible to be healthy even when the BMI is >30. Given the disease consequences of intentional weight gain, we choose to complete our study using a mouse model of diet-induced weight gain. The purpose of this study was to determine how aerobic exercise training prior to or during a period of high-fat feeding alters weight gain and immunity in outbred CD-1 male mice. Mice were divided into four groups (N=10 mice/group): 4-weeks of treadmill running followed by 6-weeks sedentary (EX-SED), 4-weeks sedentary followed by 6 weeks of treadmill running (SED-EX), 10 weeks of treadmill running (EX), and 10 weeks sedentary (SED). Mice consumed a 10%-fat diet for weeks 1-4 and a 60%-fat diet for weeks 5-10. We measure total monocyte concentration and monocyte subset concentrations as an index of immunity. We also measured body weight and body composition bi-weekly. At week 10, SED-EX had the lowest body weight, and the lowest monocyte concentration (P<0.05). No differences in subset proportions existed between groups. Exercise prior to high-fat feeding did not provide a lasting protective effect against the pro-inflammatory effects of diet-induced weight gain. The present study demonstrates the importance of lifelong exercise training as a counter to diet-induced weight gain.

### 109-P

#### The Effects of Exercise and a Low-Fat Diet on Disease Risk and Monocyte TLR2/TLR4/CD80/CD86 Expression in Mice

Katie C. Carpenter, Kelley Strohacker, Whitney L. Breslin, Nadia Agha, Richard J. Simpson, Thomas W. Lowder, Brian K. McFarlin *Houston, TX*

To determine if 8-weeks of aerobic exercise training, combined with a low-fat diet reverses weight-gain induced changes in monocyte concentration, monocyte TLR2/TLR4/CD80/CD86 expression, glucose and cholesterol. CD-1 mice consumed a high-fat (60% fat) diet for 12-months. Mice were then fed a low-fat diet (10% fat) and randomly assigned to either (N=6/group): V-EX (voluntary wheel running), F-EX (forced treadmill running), or SD (sedentary). A sedentary control group (CN) consumed a low-fat diet for the entire study duration. Weekly saphenous vein blood samples were analyzed using 3-color flow cytometry and handheld analyzers. V-EX lost 36.4% and F-EX lost 27.1% of baseline body weight over the 8-weeks (P<0.001). V-EX ran 4.4x more than F-EX (P<0.001). At week 8, TLR2 monocyte concentration was 6x higher than week 1 (P=0.002). TLR2 expression increased by 22.9% by week 8 from baseline (P=0.002). At week 8, TLR4 concentration was

33.3% higher than baseline (P<0.001). Week 4 CD80 expression was 42% greater for V-EX than SD (P=0.013). CD86 expression increased 18.6% from baseline to week 8 (P<0.001). CN had 26% higher glucose levels than V-EX (P=0.009). Short-term exercise and low-fat diet consumption caused significant weight loss and increased TLR2/TLR4/CD80/CD86 expression. Only voluntary exercise reversed the increases in glucose from 12-months of high-fat feeding. Since V-EX ran significantly more than F-EX; more research is needed to determine if the mode or distance caused the changes.

### 110-P

#### Sex-Dependent Depot Differences in MMPs and Inflammation of Adipose Tissue Remodeling in Mice

Yuanyuan Wu, Mi-Jeong Lee, Susan K. Fried *Boston, MA*

We reported (Grove et al, IJO, 2010) gonadal (GON) and inguinal (ING) sc adipose tissues of high fat (HF) fed obese female compared to male mice (C57/BL6) are less inflamed. Microarray and RT-qPCR studies revealed significant sex and depot differences in the expression of metalloproteinases, enzymes that remodel adipose tissue in obesity. While MMP12 (macrophage metalloelastase) was much higher in GON of HF males, as expected since the latter tissue shows high rates of infiltration with macrophages and rates of remodeling, it was barely detectable in GON of females which showed almost no remodeling. In contrast, MMP3 (stromelysin-1/progelatinase) was higher (3-fold) in ING vs. GON in both sexes fed HF. We followed up by comparing the mRNA expression of MMPs, 3 and 12, in age-matched mice fed low compared high fat diets for 14 weeks, and extended studies to the mesenteric depot, a visceral depot. Results for depot differences were similar in LF and HF. In addition, we found a sex difference in MMP3 in LF (F 3x>M) but not HF mice. MMP12 expression in visceral but not sc depots is greater in male fed both diets compared to females. In addition, MMP12 expression was ING<mesenteric<GON in both LF and HF fed males. In contrast, there was not clear depot difference in MMP12 expression in females. We conclude that epididymal fat of males does not function a 'true' visceral phenotype of remodeling in response to HF diets. The function of the MMP3 expression in sc adipose tissues merits further investigation.

### 111-P

#### Perivascular Visceral Adipose Tissue Transplantation Triggers Local Atherothrombosis in ApoE-/- Mice

Miina K. Öhman, Wei Luo, Wissam Abdallah, Chiao Guo, Hana M. Russo, Daniel T. Eitzman *Ann Arbor, MI*

Background: Obesity is associated with an increased risk for complications of atherosclerosis. The obesity-related vascular risk is primarily related to excess visceral adiposity. The direct role of visceral adipose tissue on vascular complications is unclear. Methods and Results: Apolipoprotein E deficient (ApoE-/-) recipient mice underwent transplantation of visceral (n=14) or subcutaneous (n=13) fat (from donor ApoE-/-mice) around the right common carotid artery. After surgery, mice were fed standard chow for 4 weeks followed by Western diet for 4 weeks. Mice were sacrificed 8 weeks post-operatively and aortic trees were removed and analyzed for atherosclerosis by surface oil-red-O staining and cross-sectional analysis. Cross sections of fat transplants were analyzed for macrophage content by Mac-3 staining. No differences were observed in the macrophage content of visceral or subcutaneous fat transplants (38.1 $\pm$ 2.2 vs 33.6 $\pm$ 2.0 %, p=NS). Mice receiving visceral fat exhibited increased lipid-rich lesion surface area locally in the right common carotid artery compared to mice receiving subcutaneous fat (24.9 $\pm$ 4.2 vs. 14.3 $\pm$ 2.8 % of right common carotid area, respectively, p=0.05). Lesion thickness (neointima/media ratio) was greater in mice transplanted with visceral adipose tissue compared to mice with subcutaneous adipose tissue (0.65 $\pm$ 0.24 vs. 0.02 $\pm$ 0.01, respectively, p=0.016). Furthermore, mice with visceral fat transplants displayed more complicated lesions with extensive fibrin staining and intraplaque hemorrhage compared to mice receiving subcutaneous fat. Serum Mcp-1 was also higher in mice transplanted with visceral fat compared to subcutaneous fat (66.0 $\pm$ 5.6 vs. 46.7 $\pm$ 2.0 pg/ml, respectively, p=0.005). Conclusion: Perivascular visceral adipose tissue transplantation leads to accelerated atherosclerosis with evidence of atherothrombosis.

**112-P**

**Eicosapentaenoic Acid (EPA) Regulates Inflammatory and Hypertensive Mediators in Mouse and Human Adipocytes**

Nalin Siriwardhana, Avik Mukherjee, Wenting Xin, Nishan S. Kalupahana, Suzanne Booker, Naima Moustaid-Moussa *Knoxville, TN*

Excessive secretion of angiotensinogen (Agt) and pro-inflammatory cytokines has been linked to obesity and associated metabolic disorders with a common feature being inflammation. While n-3 and n-6 polyunsaturated fatty acids (PUFAs) are known to modulate adiposity and inflammatory status, PUFA mediated regulation of adipose renin-angiotensin system and the specific mechanisms by which PUFAs modulate the endocrine functions of adipose tissue remain unclear. Thus, we investigated the effects of eicosapentaenoic acid (EPA, n3-PUFA) and arachidonic acid (AA, n6-PUFA) on expression and secretion of Agt and pro-inflammatory cytokines and expression of adipogenic and lipogenic markers in 3T3-L1 adipocytes. Treatments lasted up to 48 hours and culture media as well as cell extracts (RNA and proteins) were prepared. Agt expression and secretion was only detected in differentiated mature adipocytes. Further, non-differentiated pre-adipocytes were not responsive to PUFA. Both fatty acids increased intracellular Agt protein expression in 3T3-L1 adipocytes and AA dose-dependently increased Agt secretion into culture media while EPA dose-dependently decreased Agt. In agreement with its pro-inflammatory effects, EPA (not AA) significantly reduced Interleukin-6 (IL-6) and Monocyte chemoattractant protein-1 (MCP-1) secretion. Similarly, EPA-treated differentiated human adipocytes from both lean and obese subjects significantly reduced secretion of MCP-1, IL-6, and IL-8. EPA dose dependently decreased the NF-kB activation measured in 3T3-L1 adipocytes stably transfected with NF-kB responsive reporter (NF-kB-Luc) while AA treatment reported the opposite. These studies demonstrate that EPA down-regulate the secretion of inflammatory and hypertensive mediators from adipocytes and those activities were at least partially mediated via repression of NF-kB activation.

**Epigenetics/Fetal Origins**

**113-P**

**Low Birth Weight in Rats Is Associated With Chronic Hyperphagia and Reduced Plasma Leptin Levels**

Rani J. Qasem, Elizabeth A. Yablonski, Jing Li, Hee Man Tang, Laura Pontiggia, Anil P. D'mello *Philadelphia, PA*

Background: Low birth weight is associated with increased susceptibility to obesity during adulthood. Chronic hyperphagia is a major contributing factor towards the development of obesity. The objective of this study was to determine if low birth weight programs chronic hyperphagia. Methodology: Maternal protein restriction during pregnancy and lactation was used to produce low birth weight. Pregnant rats were fed a control purified diet (CTRL group, 19% protein) or an isocaloric low protein diet (LP group, 8% protein) during pregnancy and lactation. Offspring of both groups were weaned on day 28 onto normal laboratory chow. Body weight and food consumption were frequently measured until day 65. Plasma leptin concentrations were determined on day 65. Results: In the post-weaning period, the LP offspring exhibited persistent hyperphagia accompanied by higher feed efficiency. Consequently, and in contrast to CTRL offspring, the LP offspring demonstrated a markedly accelerated rate of growth during the transition from the lactation to the post-weaning period. Plasma leptin concentrations were significantly lower in the 65 day old male LP offspring [CTRL: 387±33 pg/ml (mean±SEM); LP: 215±37 pg/ml, P=0.003]. The lower leptin concentrations probably accounts for their chronic hyperphagia. Plasma leptin concentrations also tended to be lower in the female LP offspring [CTRL: 229±33 pg/ml; LP: 154±15 pg/ml, P=0.089]. Conclusions: Low birth weight induced by maternal protein restriction programs chronic hyperphagia and decreased plasma leptin concentrations in the adult offspring. These conditions can increase the susceptibility of these offspring to obesity later in life.

**114-P**

**Placental Leptin Gene DNA Methylation Adaptation to Gestational Diabetes**

Luigi Bouchard, Stephanie Thibault, Simon-Pierre Guay, Marta Santure *Saguenay, Canada*; Alexandre Monpetit *Montreal, Canada*; Julie St-Pierre *Quebec, Canada*; Patrice Perron *Sherbrooke, Canada*; Diane Brisson *Saguenay, Canada*

Background: Prenatal exposure to detrimental fetal environment such as gestational diabetes mellitus (GDM) is associated with an increased risk to develop obesity and its metabolic complications. Although the molecular mechanisms are still largely unknown, it has been suggested that epigenetics could account for such a relationship. Being known as a strong candidate gene for obesity and to be regulated through epigenetic mechanisms, the leptin gene has been selected for this study. Aim: To verify whether GDM alters placental epigenetic profile. Methods: Placenta tissues and maternal and cord blood samples were obtained from 48 women including 23 with GDM. Leptin DNA methylation and gene expression levels were measured using the Sequenom EpiTYPER system and quantitative real-time RT-PCR respectively. GDM was assessed following a 75g-oral glucose tolerance test (OGTT) at 24-28 weeks' of gestation. Serum leptin levels were measured using ELISA. Results: We have first shown that placenta leptin gene DNA methylation levels were correlated with glucose levels (2-h post-OGTT) in women with GDM (placenta fetal side:  $r_s = -0.44$ ;  $p \leq 0.05$ ; placenta maternal side:  $r_s = 0.53$ ;  $p \leq 0.01$ ) but not in controls. Leptin gene DNA methylation levels were also associated with leptin gene expression repression ( $r_s \geq -0.30$ ;  $p < 0.05$ ) but not with leptin circulating levels. Nevertheless, the placenta leptin gene expression accounted for 16% ( $r_s = 0.40$ ;  $p < 0.05$ ) of circulating leptin levels. Conclusion: Leptin gene DNA methylation profile shows adaptations to GDM that have the potential to induce functional changes. These epigenetic changes provide novel mechanisms that could contribute to explain the long-term health effects associated with fetal programming.

**115-P**

**MicroRNA-Mediated Gene Regulation Is Different in Placental Tissues From Obese and Not Obese Pregnant Women at Delivery**

Maddalena Ferrigno, Carmela Nardelli, Laura Iaffaldano, Filomena Quaglia, Pasquale Martinelli, Lucia Sacchetti, Valentina Capobianco, Rosa Di Noto, Elisabetta Mariotti, Luigi Del Vecchio, Lucio Pastore *Naples, Italy*

Epidemiological studies indicated that human adult diseases can be originated in uterus, as a result of changes in development during suboptimal intrauterine conditions that could alter the structure and function of the tissues. This process is called "fetal or intrauterine programming." Experimental data indicate that the epigenetic regulation of fetal genes could be an important mechanism of the fetal programming of obesity. The aim of this study was to evaluate, in the placentas from obese and not obese pregnant women at delivery, the presence of a different miRNA-mediated regulation of the gene transcription. We recruited 5 not obese (BMI < 30 kg/m<sup>2</sup>) and 10 obese (BMI > 30 kg/m<sup>2</sup>) pregnant women, to the term of the pregnancy. Total RNA was purified from sections of placentas collected during the Caesarean delivery. A panel of 365 human miRNAs was evaluated by the TaqMan Array Human MicroRNA Panel v1.0 (Applied Biosystems) system. By the TargetScan program we selected the target genes of the miRNAs differently expressed in obese and not obese pregnant women, while the Gene Ontology program was used to identify the biological processes in which such genes were predicted to be involved. The results evidenced that: 1) 78% of the miRNAs studied were expressed in the placental tissue; 2) 48% of the miRNAs showed a different expression in obese and not obese placentas; 3) gene targets of the overexpressed miRNAs belonged to the TGFβ- and insulin-signaling pathways. Grant: CEINGE – Regione Campania (Conv. – DR n°2362 del 27/12/2007) and MIUR-PRIN 2008.

116-P

### The Methyl-CpG-Binding Domain Protein Gene (MBD2) Polymorphisms Associated With Obesity in a Small Group of Obese Adults Without Diabetes Mellitus, Hypertension, or Dyslipidemia

Doina Kulick, Karen Schlauch, Cynthia Corley Mastick *Reno, NV*; James Lau *Stanford, CA*

**Background/Objectives:** The ascertainment of phenotype data is fundamental to all genetic association studies and is often not given enough consideration in the study design. Our objective is to investigate associations between obesity and genotypes in a small cohort of adults with extreme obesity and matched lean controls. **Methods:** Twenty obese adults (BMI  $\geq$  40 kg/m<sup>2</sup>) and 20 lean adults (BMI  $\leq$  25 kg/m<sup>2</sup>) were included in this pilot study. All subjects were Caucasian, male and female, older than 40, and had no medical history of diabetes mellitus, hypertension, dyslipidemia, coronary artery disease, hypothyroidism, hyperthyroidism, Cushing's disease, bulimia or anorexia. DNA was extracted from saliva samples and genotyped using the Affymetrix® Human SNP Assay 6.0 including 900,000 SNPs. Genotype data were processed via strict quality control standards. Simple linear models with obesity as the dependent variable, and genotype as the independent variable were studied for each SNP, and those SNPs-obesity associations having p-values  $\ll$  0.05 were further examined. **Results:** A number of SNPs near the methyl-CpG-binding domain protein gene (MBD2) displayed strong association with obesity in our cohort. **Discussions/Conclusions:** The MBD2 is part of the family of genes known to play an important role in DNA-methylation. SNPs in the MBD2 gene are reported in the literature to be associated with several types of cancer (breast, colon, prostate). Our findings raise the hypothesis of a role of MBD2 in obesity. This study was supported by NIH grant P20 RR-016464 of the INBRE Program of the National Center for Research Resources.

117-P

### Regulation of Adipogenic Transcription Factor (PPAR $\gamma$ ) in Newborns Exposed to Maternal Obesity and Maternal Under-Nutrition

Mina Desai, Jennifer Yee, Guang Han, Tie Li, Michael G. Ross *Torrance, CA*

**Objective:** Exposure to either under-nutrition or over-nutrition in early life results in offspring which exhibit adult obesity. Increased adiposity may be mediated via upregulation of adipogenic transcription factor, PPAR $\gamma$ , which promotes adipocyte differentiation and lipid storage. PPAR $\gamma$  transcriptional activity is repressed by co-repressor complexes (SIRT1 and NCoR/SMRT) which bind to promoter regions of PPAR $\gamma$  target genes and inhibit transcription. Conversely, co-activators SRC1/TIF2 directly activate PPAR $\gamma$ -mediated transcription. We determined the protein expression of PPAR $\gamma$  and co-repressors/co-activators. **Methods:** FR dams were 50% food-restricted from pregnancy day 10 to term. HF dams were fed a high fat diet (60% k/cal) from 3 weeks of age, mated at 11 weeks, and maintained on the HF diet throughout pregnancy. A control group were fed ad libitum laboratory chow (10% k/cal). Newborns were delivered spontaneous, sacrificed at day one of life, and adipose tissue protein expression analyzed (Western Blot). **Results:** In both normal birth-weight (HF) and growth restricted (FR) newborns PPAR $\gamma$  was upregulated (2-fold and 3.5-fold, respectively). In HF newborns, co-repressors (SIRT1, NCoR, SMRT) were downregulated while the co-activator SRC1 was upregulated. In contrast, in FR newborns co-repressors (SIRT1, SMRT) were upregulated with unchanged TIF2. **Conclusion:** The underpinning contributory factor in both HF and FR newborns is enhanced adipogenesis and lipogenesis. However, PPAR $\gamma$  activity is enhanced under limited or excess nutrient availability via different mechanisms: HF-mediated downregulation of co-repressors versus FR-mediated upregulation of co-activators. Therapeutic interventions for the prevention of offspring obesity will require target-specific modalities dependent upon the primary etiology.

118-P

### Fetal Growth Restriction Alters Lipid Homeostasis in the Adult Offspring

Elizabeth A. Yablonski, Rani J. Qasem, Jing Li, Hee Man Tang, Laura Pontiggia, Anil P. D'mello *Philadelphia, PA*

**Background:** Maternal protein restriction during pregnancy and lactation, a commonly used model to induce fetal growth restriction, produces offspring with low birth weight and persistently lower body weight. The objective of the present study was to determine the effect of fetal growth restriction on lipid homeostasis in the adult offspring. **Methods:** Dams were administered either an 8% protein diet (LPD) or 19% protein control diet (CTRL) throughout pregnancy and lactation. All offspring were weaned onto laboratory chow on day 28 post-birth. Plasma, liver, and muscle triglyceride content was determined in 65 day old male offspring from both groups. The amount of hepatic Sterol Regulatory Element Binding Protein-1c (SREBP-1c), a regulator of hepatic lipogenesis, was measured using Western Blot. **Results:** LPD offspring exhibited a decrease in plasma triglyceride concentrations [LPD: 78.5 $\pm$ 7.6 (mean  $\pm$  SEM); CTRL: 136.7 $\pm$ 16.0 mg/dL, P < 0.05] that was accompanied by a marked reduction in liver triglyceride content [LPD: 5728 $\pm$ 401; CTRL: 8256 $\pm$ 828  $\mu$ g triglyceride/g tissue P < 0.05]. There were no significant differences between the two groups in gastrocnemius, and soleus muscle triglyceride content or hepatic SREBP-1c levels [LPD: 2.3 $\pm$ 1.0, CTRL: 2.1 $\pm$ 1.0 chemiluminescence units]. **Conclusions:** Fetal growth restriction induced by maternal low protein diet programs alterations in lipid homeostasis as evidenced by decreased serum triglyceride levels and decreased liver triglyceride content in the adult offspring. The lack of effect on hepatic SREBP-1c amount suggests that the decrease in liver triglyceride content is not due to alterations in lipid synthesis.

119-P

### Prenatal Protein Deficiency Alters Circadian Rhythms in Core Clock Oscillator Gene and Protein Expression in the Offspring

Armand Centanni, Gregory Sutton *Baton Rouge, LA*

The mechanisms linking intrauterine growth retardation (IUGR) with adulthood obesity and diabetes are unknown. Previous studies performed in our lab have demonstrated an altered circadian phenotype in 8 wk old male C57Bl/6J mice subjected to protein malnutrition in utero coupled with altered glucose homeostasis. By 20 wks of age, undernourished offspring (UO) from pregnant C57Bl/6J dams fed a protein deficient diet (6% protein) developed obesity and signs of Type II Diabetes compared to control offspring (CO) born to dams fed a control (20% protein) diet. Gene expression of Rev-erb $\alpha$  a component of the circadian clock mechanism in liver was dramatically reduced in UO at 8 wk of age. Rev-erb $\alpha$  repressed genes involved in circadian regulation (Bmal1 and Per2) were increased in UO mice. Surprisingly, protein expression of Rev-erb $\alpha$  in UO liver did not oscillate and was expressed at similar levels at circadian time points (CT) 1200 and 2400 (noon and midnight) suggesting gene expression and protein translation are misaligned compared to CO. Glycogen synthase kinase-3 and protein kinase B, two second messenger signaling molecules that play a role both directly and indirectly in Rev-erb $\alpha$  regulation through cell surface signals were also misaligned in UO liver, suggesting potentially cell surface alterations may play a role in impaired clock controlled processes in these mice. We conclude that UO mice exhibit a metabolic disorder involving abnormal circadian patterns of gene and protein expression. Altered Rev-erb $\alpha$  expression and function may be a key factor in metabolic dysregulation associated with IUGR.

120-P

### Maternal Overweight Induces Integrative Changes in Gene Expression in the Offspring in Metabolically Active Tissues

Kartik Shankar, Ping Kang, Ying Zhong, Martin Ronis, Thomas M. Badger *Little Rock, AR*

Male offspring exposed to maternal overweight (OW) during gestation (Sprague Dawley rats) gain greater body weight and fat mass (p < 0.005), and develop insulin resistance when fed high-fat diets (45% fat). Hepatic microarray analyses at postnatal day 21 (PND21) revealed a reprogramming of lipogenic and lipid degradative pathways in offspring of OW dams. This was associated with increased expression of SREBP-1 and 20 downstream

lipogenic effectors, and decreased adiponectin-PPAR- $\alpha$ /AMPK signaling. In this report we examined global gene expression in white adipose tissue (WAT) and gastrocnemius skeletal muscle (SM) of offspring at PND21, using Affymetrix GeneChip Rat 230 2.0 microarrays. Exposure to maternal OW altered the expression of 258 transcripts in the offspring WAT (compared to 147 transcripts in the liver). Strikingly expression of lipogenic transcripts was commonly upregulated both in WAT and liver, but not in the SM. Expression of FASN (3-fold), SREBP-1(1.7-fold), ChREBP (2.5-fold), ACLY (4.5-fold), ELOVL6 (3.6-fold), adiponutrin (4.8-fold) in the WAT was increased ( $p < 0.05$ ), consistent with increases in the liver. In contrast, SM gene expression in the offspring of OW dams did not show increased lipogenic genes. However, mRNA expression of UCP-2 was decreased ( $p < 0.05$ ) in both liver (3-fold) and SM (1.7-fold) in offspring of OW dams. Further, mRNA levels of UCP-1 were significantly lower (1.7fold) in brown adipose tissue of OW dam offspring. Our findings strongly suggest that maternal obesity coordinately increases lipogenic profiles in the liver and WAT, and programs multiple aspects of energy-balance regulation in the offspring. (Support ARS-CRIS6251510000500D and R01DK084225).

**121-P**  
**Maternal Protein Restriction During Pregnancy and Lactation Alters Liver Triglyceride Secretion Rate in the Adult Male Offspring**

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Background: Maternal exposure to low protein diet during pregnancy and lactation decreases liver triglyceride content in the adult male offspring. The objective of the present study was to determine if the decreased liver triglyceride content is caused by an increase in the triglyceride secretion rate (TGSR) out of the liver. Methods: Pregnant rats were fed a control purified diet (CTRL group, 19% protein) or an isocaloric low protein diet (LP group, 8% protein) during pregnancy and lactation. Offspring of both groups were weaned onto normal laboratory chow on day 28. On day 94, rats were intravenously injected with 300 mg/kg of tyloxapol, an agent that blocks the peripheral utilization of serum triglyceride. Blood samples were collected before and at 30, 60, and 90 min after the injection. Triglyceride accumulation rate was computed from the slope of the serum triglyceride concentration versus time plot and TGSR was calculated by multiplying the accumulation rate by plasma volume. Triglyceride clearance was calculated by dividing the TGSR by the basal serum triglyceride concentration. Results: LP offspring exhibited a 35% decrease in serum triglyceride concentration accompanied by a decrease in the liver TGSR [LP:  $0.45 \pm 0.02$  mg/min (mean $\pm$ SEM; n=9); CTRL:  $0.59 \pm 0.05$  mg/min,  $P < 0.05$ ]. There was no difference in triglyceride clearance between the two groups. Conclusion: LP offspring exhibited a lower liver TGSR which therefore cannot account for the decrease in their liver triglyceride content. The lower TGSR coupled with unchanged triglyceride clearance might account for the decrease in serum triglyceride concentrations in the LP offspring.

**122-P**  
**Increased Dopaminergic Activity and Improved Depression-Like Behavior By Repeated Fasting/Refeeding Cycles in Rats That Experienced Neonatal Maternal Separation**

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Spague-Dawley rat pups were separated from dam for 3 h daily during PND 2-14 (MS) or left undisturbed (NH). Half of NH or MS pups were deprived from food every other day from PND 28 (NH/RF or MS/RF). NH/C or MS/C had free access to chow throughout the experimental period. Rats were sacrificed at two months of age, at the end of fasting or refeeding day, following a week of behavioral sessions. Tissue contents of dopamine and its metabolites DOPAC and HVA in the hippocampus and nucleus accumbens (NAcb) were analyzed by HPLC. On the last fasting day, dopamine contents in each brain region appeared not to be influenced by MS experience. However, after the last refeeding, dopamine contents in the hippocampus and NAcb of MS pups, but not of NH, were increased by RF cycles. The hippocampal dopamine increase in MS/RF appeared to be associated with a decreased post-synaptic degradation, and the NAcb with a decreased pre-synaptic degradation. Behavioral tests were performed after refeeding when all rats were satiated. RF cycles increased ambulatory activity, decreased immobility

duration during Porsolt swim test in MS pups, but not in NH pups. Behavioral scores during elevated plus maze test revealed anxiogenic effects of MS experience, and the scores of NH and MS were not significantly affected by RF cycles. Results reveal that RF cycles may sensitize dopaminergic activities in the hippocampus and NAcb responding to food consumption in MS rats, perhaps, leading to an anti-depressant effect.

**123-P**  
**Supplementing a High-Fat/Sucrose Diet With Prebiotic Fiber (Oligofructose) Differentially Affects Glucose Metabolism and Appetite Hormones in Rats Raised in Small Versus Large Litters**  
 Danielle T. Reid, Raylene A. Reimer *Calgary, Canada*

Adverse nutrition during childhood may be linked to metabolic changes and obesity in adulthood. Few studies have attempted to reverse these programmed early effects with a subsequent dietary intervention. Our purpose was to determine if rats overnourished during the suckling period have lower weight gain and improved gut satiety hormone profiles when weaned onto a prebiotic fiber (oligofructose, OFS) enriched diet. Small litters (SL, 3 pups/litter) and large litters (LL, 12/litter) of male Sprague-Dawley rats were randomized to high energy density diet (HE) or HE + 10% OFS for 16 wk. DEXA and an oral glucose tolerance test were performed. Plasma satiety hormones and glucose were measured. Gene expression for proglucagon, ghrelin and PYY was analyzed using real-time PCR. At weaning, SL body weight was higher ( $p < 0.05$ ) than LL. At 19 wk, OFS reduced body weight and percent body fat compared to C ( $p < 0.05$ ) and the magnitude of reduction was greater in LL than SL. OFS significantly decreased area under the curve (AUC) for glucose and GIP and tended to increase PYY AUC compared to C. The interaction between OFS and litter size affected GLP-1 AUC with the direction of change opposite in SL and LL. There was a trend for increased PYY mRNA levels in OFS versus C ( $p < 0.06$ ). Overall high fiber feeding resulted in a favorable satiety hormone response in SL rats but blunted body fat loss compared to LL rats suggesting that oligofructose reversed some but not all of the effects of overnutrition during the suckling period.

**124-P**  
**Pre- and Neo-Natal Exposure to Maternal High Protein or Prebiotic Fiber Diets Impact Offspring Growth and Lipid Metabolism**  
 Megan C. Hallam, Raylene A. Reimer *Calgary, Canada*

Background: Extremes in birth weight (BtW) and early weight gain have been linked to later obesity and metabolic dysfunction. We examined the effect of maternal high fiber or protein diet on growth and metabolism in offspring. Methods: Virgin Wistar dams were fed a control (C), high protein (40%) (HP) or high prebiotic fiber (25%) (HF) diet from conception to weaning. Offspring consumed C diet until 14 wk followed by high fat/sucrose diet to 22wk. Body weight was measured weekly. Fasting non-esterified fatty acids (NEFA) and liver triglycerides (TG) were measured. Hepatic gene expression was analyzed. Results: Female offspring of HF dams were smaller at birth than C and HP and at wk 22 than HP, but larger at 1 wk ( $p < 0.02$ ). BtW did not differ in males but HF were larger than HP and C at 1 wk and remained larger than HP at 2 wk. Female NEFA levels were higher in HP than C and HF. TG were higher in HP and C than HF females ( $p < 0.02$ ). HF and HP females had lower hepatic PPAR $\gamma$  mRNA levels than C. In males, HP had higher NEFA than HF and C and higher TG in HP and C versus HF. Hepatic PPAR $\gamma$  mRNA in males was upregulated in HF versus HP. Conclusion: Increased growth velocity in HF offspring in the suckling period did not adversely affect adult body weight or lipid metabolism. As we have shown previously with post-natal HP diet, prenatal exposure to HP diet impaired lipid metabolism in offspring.

**125-P**  
**SIRT1/PGC1-Mediated Mechanism For Neonatal Non-Alcoholic Steatohepatitis in Offspring Exposed to Maternal Obesity**  
 Mina Desai, Jennifer Yee, Diana Wolfe, Guang Han, Michael G. Ross *Torrance, CA*

Objective: Obesity and metabolic syndrome are associated with non-alcoholic fatty liver. SIRT1, a nutrient sensor, regulates hepatic lipid homeostasis via transcriptional co-activator (PGC-1). Activation of SIRT1 protects from diet-induced obesity and metabolic abnormalities. We have shown that maternal obesity and high fat (HF) diet prior to and during pregnancy

results in normal birth weight newborns. When nursed by HF dams, these offspring (HF) demonstrate early onset of obesity and lipid abnormalities. We hypothesized that hepatic lipid content of HF offspring would reflect a primary lipid dysfunction. We determined the hepatic lipid content and expression of SIRT1, PCG-1 and its downstream targets involved in fatty acid oxidation (PPAR $\alpha$ ), lipogenesis (SREBP1) and gluconeogenesis (HNF4a). Methods: HF dams were fed a high fat diet (60% k/cal) from 3 weeks of age, mated at 11 weeks, and maintained on the HF diet throughout pregnancy and lactation. A control group were fed ad libitum laboratory chow (10% k/cal). All offspring were nursed by their own dams. At 3 weeks of age, hepatic triglyceride content and protein expression (Western Blot) were analyzed. Results: At 3 weeks of age, HF males had significantly increased hepatic triglyceride (260 $\pm$ 10 vs 159 $\pm$ 13 mg/g liver). However, hepatic SIRT1 (1.8-fold), PCG1a (1.5-fold) and PGC-1b (1.7-fold) were upregulated. Notably, HNF $\alpha$  (0.6-fold) and PPAR $\alpha$  (0.5-fold) were down-regulated whereas SREBP1 (2.1-fold) was upregulated. Conclusion: In the HF offspring, fatty liver results from reduced fatty acid oxidation (PPAR $\alpha$ ) and enhanced lipogenesis (SREBP1). The paradoxical SIRT1 and PGC-1 upregulation and PPAR $\alpha$ /HNF4 $\alpha$  downregulation suggest dysregulated signaling and/or epigenetic modification.

**126-P****Maternal High-Fat Diet During Pregnancy and Lactation Programs the Offspring for Metabolic Syndrome and Leptin Resistance in Mice**

Ana Maria Volpato, Eduardo Magalhaes, Kallie Fonseca, Livia Capuxim, Marcia Aguilu, Carlos Alberto Mandarim-de-Lacerda, Marcelo Lima de Gusmao Correia *Rio de Janeiro, Brazil*

Fatty diet during pregnancy in rat dams programs for metabolic syndrome (MS) in the offspring. We tested the hypothesis that the offspring of dams fed high fat diet during pregnancy and lactation develops MS and leptin resistance. Pregnant C57BL/6 mice (n=20) were fed either standard chow (SC; 19% fat) or high fat diet (HF; 49% fat). After weaning, male offspring was divided in two groups according to diet of dams and offspring: SC(dams)/SC(offspring) and HF/SC (n=5-6/gp). MS was characterized by weight gain curve, glycemia and tail-cuff systolic pressure. Leptin resistance was assessed through food intake after intracerebroventricular (ICV) injections of leptin (5 $\mu$ g) or vehicle. HF/SC mice (1.40g $\pm$ 0.06) were heavier than SC/SC (1.27 $\pm$ 0.01, p<0.01) at birth but not at weaning (data not shown). At 90 days, HF/SC animals were heavier than SC/SC (25.72 $\pm$ 0.04, 24.35g $\pm$ 0.29, respectively, p<0.05). Glycemia and systolic pressure were not different in SC/SC and HF/SC mice (data not shown). Leptin substantially reduced food intake in SC/SC (after veh: 3.63 $\pm$ 0.48g, after leptin: 1.76 $\pm$ 0.46g, p<0.05) but not in HF/SC mice (after veh: 3.17 $\pm$ 0.46g, after leptin: 2.45 $\pm$ 0.49g, p=NS) indicating leptin resistance. In conclusion, HF diet during pregnancy and lactation programs the offspring to the development of obesity without changes in systolic pressure or glycemia. Importantly, HF/SC mice exhibit leptin resistance that could mechanistically contribute to the development of obesity.

**CNS Regulation of Energy Balance****127-P****Brain Signaling in Reward Deficiency, and Effect of Cognitive Dietary Restraint on Rewarding Value of Food**

Margriet S. Westerterp-Plantenga, Jurriaan Born *Maastricht, Netherlands*

Background: Eating behavior is homeostatically as well as non-homeostatically controlled. Methods: Liking and wanting related brain-signaling was discriminated and linked to BMI, energy- state, energy-intake and dietary restraint (F1 of TFEQ). Fifteen female subjects (21.5 $\pm$ 0.4y, BMI=22.2 $\pm$ 0.4, F1=9.7 $\pm$ 1.4) completed two fMRI scans: one fasted; one satiated. During each scan subjects rated liking and wanting of food images on a four-point scale and chose a meal to eat immediately afterwards. Energy-intake and visual analog scores for hunger and satiety were assessed. Imaging data were analyzed with BrainvoyagerQX and for region of interest analyses in SPSS16. Results: Decreased post-meal hunger (-52mmVAS;p<.001) confirmed the fasted and satiated states. Post-meal wanting- but not liking-ratings were decreased (-1.6;p<.001) as well as liking- and wanting-related brain-signaling. Wanting activation in the striatum, hypothalamus,

anterior-insula was a function of BMI (r=-.4;p<.03); in the hypothalamus it was a function of hunger and satiety (r=.5 and r.6;p<.05). Post-meal liking activation in the striatum, anterior-insula, cingulate cortex and also wanting in the lateral globus pallidus predicted energy-intake (r<-.4, p<.05). F1 predicted liking- and wanting-related activation in the amygdala, putamen and for liking in the thalamus, cingulate-cortex, and striatum (r-.4;p<.05) suggesting suppression of liking-related signaling. Liking- and wanting-related activation in the nucleus accumbens correlated to F1: positively pre-meal (r.4;p<.05); liking correlated inversely post-meal (r-.5;p<.01) indicating inhibition of reward. Conclusion: Relationships between reward-related brain-signaling and BMI, respectively energy-intake underscore a reward-deficiency related risk for non-homeostatic eating. Relationship between transient pre-to post-meal reward-related brain-signaling and F1 indicates successful dietary restraint.

**128-P****The Effects of Acute Energy Imbalance on the Neuronal Response to Visual Food Cues**

Marc-Andre Cornier, Jamie Bechtell, Andrea Salzberg, Jason Tregellas *Aurora, CO*

This study was designed to examine the effects of acute energy imbalance on the neuronal response to food images. Nineteen individuals were studied on three occasions (Eucaloric, Overfed, Underfed) in a randomized crossover design. Each study period included 3 days of run-in diet, one day of controlled feeding, and one day of testing. On the controlled feeding day individuals were provided with basal energy needs for eucaloric and 40% above and below basal energy needs for overfed and underfed. On testing days, individuals consumed a breakfast shake equal to 25% of the energy provided during controlled feeding. fMRI was performed in the fasted state during eucaloric condition and in the acutely fed state during eucaloric, overfed and underfed conditions. fMRI was performed while subjects were presented with visual stimuli of neutral control objects, neutral foods, and foods of high hedonic value (HF). Responses to HF as compared to objects are reported here. The fasted state was associated with significant insula and somatosensory cortex activation. These responses were attenuated in the acutely fed state. The fed state was also associated with increased prefrontal cortical response. Underfeeding resulted in increased insula and visual, parietal and somatosensory cortical responses, while overfeeding resulted in greater posterior cingulate response. In summary, acute changes in energy intake are associated with significant changes in the neuronal response to visual food cues. The insula, in particular, appears to play an important role in the interaction between the response to visual food cues and alterations in energy balance.

**129-P****Enhanced Sensory Processing and Decreased Reward Responses By Video Food Stimulation in Obese Subjects**

Gene-Jack Wang, Dardo Tomasi, Elisabeth Caparelli, Ruiliang Wang, Frank Telang, Millard Jayne, Christopher Wong *Upton, NY*; Nora Volkow *Rockville, MD*; Joanna Fowler *Upton, NY*; Eduardo Dunayevich *La Jolla, CA*

Sensory and hedonic processing of food appeals is associated with overeating behaviors. We assessed changes in brain activity during video food stimulation in obese women. Methods: Twenty-six obese women (31.8 $\pm$ 8.8 y/o) with BMI of 34.2 $\pm$ 2.8 were compared with 15 age-matched non-obese women (BMI: 28.8 $\pm$ 0.8) with functional MRI. The blood oxygenation level dependent (BOLD) responses were measured in food deprived (14 hrs) subjects with a customized 10-minutes blocked food video. This task contrasts 5-minute video fragments of the subjects' favorite food dishes against 5-minutes video control fragments. Images were analyzed using SPM2 and clusters (> 100 pixels) with p < 0.001 (corrected for multiple comparisons) were considered significant. Results: The task induced stronger activation in the occipital cortex, left anterior insula and the thalamus and deactivation in the anterior cingulate in both groups. Obese women had greater activation in the left anterior insula but lesser activation in bilateral orbitofrontal cortex than non-obese women. BOLD changes in left posterior parietal region were correlated with BMI (r = 0.52, p < 0.0005). Conclusions: Compared to non-obese women, obese women had greater activation in brain regions involved with sensory and hedonic processing. They had

decreased activation during video food stimulation in brain regions involved with reward responses. This mechanism could reflect decreased sensitivity to food reward, which triggers the craving for more food to compensate for the unmet expectation of reward with food consumption.

**130-P****Differential Encoding of Food Pictures in Successful and Unsuccessful Dieters**

Florence J. Breslin, Rebecca J. Lepping, Trisha M. Hay, Laura E. Martin, Amanda S. Bruce *Kansas City, KS*; Anthony M. Lynch, Megan Summerville, Joseph E. Donnelly *Lawrence, KS*; Cary R. Savage *Kansas City, KS*

Some people have trouble losing weight, even in a standardized, validated diet intervention; for those individuals, food may be an overly conspicuous stimuli leading to lack of adherence and minimal weight loss. Imaging data were available for 38 participants (mean BMI: 36.04±3.8) that underwent a food-motivation fMRI paradigm prior to participating in a group based diet intervention; at 12 weeks, 28 participants had successfully lost at least 7% of their baseline weight. Imaging data were compared between participants that lost 7% or greater (Successful) body weight to those participants who had less than 7% weight-loss (Unsuccessful). Participants viewed food and non-food (animal) images prior to (Pre-meal), and following (Post-meal), a standardized 500 kcal meal. Preliminary results using random effects GLM analysis revealed a significant interaction in the post-meal condition of image type by diet success in the right hippocampus [TAL X=21, Y=-25, Z=-8; t=5.07, p(FDR)<0.05]. Inspection of this region indicated that unsuccessful dieters showed suppressed response to food images and enhanced response to non-food images when compared to successful dieters. Successful dieters responded equally to food and non-food images in this region of the hippocampus. Despite differential brain responses, post-scan memory testing revealed no significant differences between the groups on memory for either the food or the non-food images. This region of hippocampus has previously been implicated in object encoding. Preliminary results indicate that this area is less responsive to food images in unsuccessful dieters. Supported by R01DK080090.

**131-P****Exenatide Increases Hypothalamic Connectivity in Obese Men: First Evidence of Central appetite modulating Effects in fMRI Analyzed With Eigenvector Centrality Mapping**

Haiko Schloegl, Arno Villringer, Stefan Kabisch, Annette Horstmann, Joeran Lepsien, Karsten Mueller, Juergen Kratzsch, Franziska P. Busse, Burkhard Pleger, Michael Stumvoll, Gabriele Lohmann *Leipzig, Germany*

Exenatide is a glucagon-like peptide-1 (GLP-1) analog, used in clinical practice for treatment of type-2-diabetes. It increases energy intake and reduces body weight in long-term treatment in humans, but the underlying physiological mechanisms are still unclear. To investigate its central nervous effects we performed functional magnetic resonance imaging (fMRI) in 20 male obese (body mass index 28.4 - 42.8 kg/m<sup>2</sup>, mean 34.6 kg/m<sup>2</sup>; age 20 - 47 years, mean 28 years) while intravenously administering exenatide. Infusion rate was 0.12 pmol/kg/min., total duration of infusion was 2.5 hours, the study design was cross-over, placebo controlled, double-blind and randomized. Inside the scanner subjects rated pictures of food regarding their tastiness. We used a recently published parameter-free method called 'eigenvector centrality mapping' (ECM) for assessing functional connectivity in each voxel (Lohmann et al. 2010). ECM attributes a centrality value to each voxel reflecting its degree of connectedness. Results showed a statistically significant global maximum for higher centrality (which suggests a higher connectivity) in hypothalamus in the exenatide condition compared to placebo. The hypothalamus is a key region for the control of energy homeostasis, where from animal data it is known that GLP-1 receptors are present and involved in regulation of energy uptake. Our results demonstrate that peripherally administered exenatide mediates centrality in food-related networks. This shows for the first time a modulation of central networks regulating energy homeostasis after exenatide infusion and suggests a central nervous mechanism for the reduction of energy intake under influence of exenatide.

**132-P****Changes in Brain Activation to Food Pictures Following Bariatric Surgery**

Jared Bruce, Laura Hancock *Kansas City, MO*; Rebecca J. Lepping *Kansas City, KS*; Amanda S. Bruce, Brandon Roberg *Kansas City, MO*; Stephen Malley *Shawnee Mission, KS*; Cary R. Savage *Kansas City, KS*

Background: Bariatric surgery has been shown to produce significant weight loss, but little is known regarding potential brain mechanisms of these effects. The purpose of this study is to determine whether bariatric surgery impacts brain function in regions previously implicated in reward and cognitive control. We predicted significant changes, pre- to post- surgery, in paralimbic and prefrontal regions. Methods: To date, we have scanned five obese female participants (ages 31-50) with functional magnetic resonance imaging (fMRI), before (mean BMI=40) and 12 weeks after (mean BMI=35.9), adjustable gastric banding weight loss surgery. We used a validated food motivation paradigm, comparing brain activation between food and nonfood pictures. fMRI data were analyzed using BrainVoyager QX, random effects, and whole brain correction. Results: Following surgery, participants showed decreased brain activation to food versus nonfood pictures in paralimbic regions implicated in food motivation and reward: anterior cingulate cortex, medial prefrontal cortex, and left orbitofrontal cortex. In contrast, they demonstrated increased activation to food versus nonfood pictures in bilateral anterior prefrontal cortex (BA 10), a region implicated in cognitive control and inhibition. Conclusion: This is one of the first studies to examine functional brain changes related to bariatric surgery. Following surgery, participants showed reduced activations in regions associated with food motivation and increased activations in regions associated with cognitive control. Results provide preliminary evidence that adjustable gastric banding alters brain function in regions known to regulate reward and cognitive control.

**133-P****Electroretinography For Estimating Food-Induced Brain Dopamine**

Jennifer A. Nasser *Philadelphia, PA*; Kenneth Merhige, Carla Wolper, Pascal Kolak, Sami A. Hashim *New York, NY*

Current methods for estimating brain dopamine and its response to food stimuli in humans are invasive and expensive (lumbar puncture, PET imaging). A non-invasive and simple method for estimating brain dopamine would advance the study of human eating behavior as it relates to obesity. To this end, we evaluated the application of electroretinography (ERG), whose signal (cone B wave amplitude) is dependent upon dopamine release in the retina, to the correlation of brain dopamine response (under conditions of food and methylphenidate-induced stimulation of dopamine) with self-reported eating behavior (BES and TFEQ-CR). Also, we assessed the increase in ERG signal under methylphenidate (20 mg) and oral food (chocolate brownie) stimulated conditions. Four men and 2 women (BMI 31 ± 6, Age 40 ± 10) completed the study to date. Baseline ERG signal correlated positively with BES (r = .88, p = .05), as did methylphenidate and food stimulated signals (r = .93, r = .88; p < .05; methylphenidate and food respectively). Methylphenidate and food stimulated ERG signals correlated negatively with TFEQ-CR (r = -.93, r = -.97, p < .02; methylphenidate and food respectively). Repeated measures ANOVA was significant after controlling for TFEQ-CR (F = 26, p = .014 (methylphenidate); F = 8.3, p = .064 (food)). These pilot data suggest a novel use for ERG in studying human eating behavior in obesity. This study was funded by a pilot grant from the New York Obesity Research Center.

**134-P****Gender Differences in the Role of Hot Executive Cognitive Function in Childhood Food Intake and Substance Use**

Nathaniel R. Riggs, Donna Spruijt-Metz, Mary Ann Pentz *Alhambra, CA*

One factor related to obesity and substance use is neuropsychological function. Executive function (EF) represents neurocognitive skills involved in self-regulated, goal-directed behavior. "Hot" EF skills are those neurocognitive skills related to the control of emotionally-driven, impulsive behavior. Investigated were gender differences in hot EF prediction of food intake and substance use prevalence in 4<sup>th</sup> graders. Participants included 1,005, 4<sup>th</sup> grade children assessed at baseline and five month follow-up of a school-based obesity prevention program entitled Pathways. At both waves,

participants completed self-report surveys that included items assessing hot EF (inhibitory control, emotional control), food intake (high calorie junk food, fruit, and vegetable), and substance use (cigarette, alcohol) prevalence. Covariates included age, grades, ethnicity, free lunch status, and intervention condition. General linear models demonstrated that hot EF skills at baseline predicted pre-post change in high calorie junk food intake and substance use prevalence for boys only. Girls and boys with hot EF proficiency consumed equal amounts of high calorie junk food (boys and girls  $X=2.23$ ,  $S.E.=.07$ ). Boys with hot EF problems consumed significantly more junk food ( $X=2.51$ ,  $S.E.=.10$ ) than girls ( $X=2.19$ ,  $S.E.=.10$ ). Similarly, girls and boys with hot EF proficiency demonstrated similar substance use prevalence (boys  $X=0.17$ ,  $S.E.=.02$ , girls  $X=0.14$ ,  $S.E.=.02$ ), whereas boys with hot EF problems demonstrated greater substance use ( $X=0.26$ ,  $S.E.=.03$ ) than girls with hot ECF problems ( $X=0.13$ ,  $S.E.=.03$ ). Results suggest that hot EF may play a different role in junk food and substance use intake for boys and girls. One potential implication for obesity prevention is to focus on the promotion of hot EF, particularly in young boys.

**135-P****Circulating Triglycerides and Leptin Resistance: A Test of the Triglyceride Hypothesis**Joseph R. Vasselli *New York, NY*; Molly Spilka *Lynbrook, NY*

Recently, it was shown that feeding a high fructose diet (HFru) for 6 months to lean rats induces a state of leptin resistance, as determined by a leptin injection feeding test and response to a high fat (HF) diet (Shapiro et al., 2008). The HFru-fed rats had significantly elevated triglycerides (TG), suggesting that leptin resistance may be the result of elevated TG (Banks, 2004). We tested this hypothesis in rats in which circulating TG were elevated in two different ways: first, by feeding a HFru diet for 90 days, and second, by administration of a TG emulsion (20% Intralipid®, IL), immediately prior to testing. Four groups of young male S-D rats ( $n=7$ ) were fed ad libitum either 60% by calories HFru or HF diets, rat chow (CH), or rat chow with IL administration for testing only (CH-IL). Body weight (BW) of the HF group was elevated at 90 days ( $p<0.01$ ), with no other BW differences seen. The groups were then injected with 0.75 mg/kg of rLeptin i.p., and food intake (FI) was monitored over the following 24 hrs. The CH-IL group was given 3 x 3.33 ml of IL by gavage (total 20 Kcal) at 2-hr intervals before injection. At testing, TG levels of the HFru and CH-IL groups were 652.9 and 328.7 mg/dl, vs 195.7 and 143.3 for CH and HF, respectively ( $p's<0.05$ ). Injected leptin led to reductions of 24-hr FI of 15.8, 17.0, and 28.4% for the CH, CH-IL, and HFru groups, respectively ( $p's<0.05-0.01$ ), with no reduction of FI for the HF group. Our data question the hypothesis that elevated TG alone can induce a state of leptin resistance.

**136-P****Prevention and Reversal of Diet-Induced Leptin Resistance and Obesity With a Sugar-Free Diet Despite High Fat Content**Alexandra Shapiro, Yongxin Gao, Kit-Yan Cheng, Philip J. Scarpace *Gainesville, FL*

Chronic consumption of a Western-type diet, containing both elevated sugar and fat, results in leptin resistance and obesity. We hypothesized that fructose, as part of the sugar component of Western-type diets, is one causative ingredient in the development of leptin resistance and that removal of this component will prevent the leptin resistance and preclude the development of the subsequent dietary obesity. We examined whether feeding a sugar-free 30% high-fat (SF/HF) diet prevents leptin resistance and whether removal of fructose from a 40% fructose 30% fat diet (HFru/HF) in an isocaloric manner can reverse established leptin resistance and decrease body weight. The HFru/HF diet resulted in impaired anorexic and body weight responses to both peripherally (0.6 mg/kg, assessed on day 65 of the diet) and centrally (1.5ug/day, assessed on days 129-134) administered leptin, whereas SF/HF fed rats were fully leptin responsive. Switching the HFru/HF fed animals to the SF/HF diet reversed the leptin resistance (assessed 18 days after the diet switch) and decreased body weight. The present study demonstrates that a diet containing both high fructose and fat leads to leptin resistance and obesity while an isocaloric SF/HF diet does not. Moreover, removal of fructose from this diet reverses the leptin resistance and weight gain. These data suggest that fructose is the bioactive component of a high-fat/high sugar diet that is essential for induction of leptin resistance and dietary obesity.

**137-P****Feeding During the Circadian Light Phase Leads to Weight Gain in Clock Mutant But Not Leptin Deficient Ob/Ob Mice**Deanna M. Arble, Joseph Bass, Martha H. Vitaterna, Fred W. Turek *Evanston, IL*

Recent animal studies linking energy regulation with the circadian clock have raised the possibility that the timing of feeding may impact weight gain independently of caloric intake and energy expenditure. For example, C57BL/6J (B6) mice fed a high fat diet (HFD) during the light phase gain more weight than those fed a HFD during the dark phase despite similar caloric intake and locomotor activity. The present study used circadian (Clock) and leptin-impaired (ob/ob) mutant mice to examine metabolic effects during a circadian desynchronized feeding (DF) protocol. During DF, Clock and ob/ob mice were fed a HFD either during the light or dark phase for 6-8 weeks. Ob/ob mice were additionally implanted with an osmotic leptin pump at either the start of DF or at week 6. Similar to B6 mice, Clock mice fed during the light weighed more than Clock mice fed during the dark suggesting that DF may lead to weight gain independently of a fully functional Clock gene. However, ob/ob mice did not gain more weight when fed during the light suggesting a role for leptin in DF-induced weight gain. Interestingly, the addition of leptin pumps failed to cause differences in body weight, suggesting the importance of a leptin expression rhythm in DF-induced weight gain. Together, these findings indicate that synchrony between circadian cues and metabolic processes play an important role in the regulation of energy balance and body weight control.

**138-P****Examination of Neuronal PTP1B in Cold-Induced Thermogenesis**Bart De Jonghe, Matthew R. Hayes, Ryohichi Banno, Karolina Skibicka, Derek Zimmer, Theresa M. Lechner, Amber Alhadeff, Kerisha Bowen, Scott Kanoski, Harvey J. Grill, Kendra K. Bence *Philadelphia, PA*

Protein tyrosine phosphatase 1B (PTP1B) is a ubiquitously expressed phosphatase which regulates metabolism via central circuits. POMC neuron-specific deletion of PTP1B in mice (POMC-PTP1B<sup>-/-</sup>) results in reduced high-fat diet-induced body weight and adiposity, increased energy expenditure, and improved leptin sensitivity. To examine the thermoregulatory ability of leptin-hypersensitive POMC-PTP1B<sup>-/-</sup> (KO) mice, we evaluated core temperature and spontaneous activity responses to acute (24 hr) and sustained (4 d) cold exposure (4°C), or leptin (2 µg/g BW per day, i.p.) treatment, compared to WT controls. Acute cold exposure (24 hr) did not affect locomotor activity of WT mice, but caused a significant decrease in locomotor activity of POMC-PTP1B<sup>-/-</sup> mice; activity was suppressed to a similar extent in WT and KO mice during days 3 and 4 of cold exposure. Leptin increased body temperature during the light cycle similarly in WT and KO mice but did not affect locomotor activity in either group at the dose tested. Body weight and epididymal white adipose tissue weight was similar between WT and KO mice after cold exposure. However, brown adipose tissue (BAT) weighed significantly more in POMC-PTP1B<sup>-/-</sup> mice compared to WT controls after both cold exposure time points. These studies suggest that PTP1B in POMC neurons may play a role in acute cold-induced reduction in spontaneous activity, but does not regulate cold-induced changes in core temperature. In addition, PTP1B-deficiency in POMC neurons leads to BAT hypertrophy, providing a potential mechanism for the increased energy expenditure in these mice. This work was supported by NIH DK082417, DK019525, DK021397.

**139-P****Effect of Brain-Derived Neurotrophic Factor (BDNF) in the Ventromedial Nucleus of Hypothalamus (VMH) on High Fat Diet-Induced Obesity**ChuanFeng Wang, Rebecca Godar, Yuqiao Dai, Heather Bainter, Charles J. Billington, Catherine M. Kotz *Minneapolis, MN*

We showed that acutely injecting BDNF in the VMH significantly reduced body weight (BW) by decreasing energy intake (EI) and increasing energy expenditure (EE). In the current study we determine whether BDNF in the VMH reverses obesity induced by a high fat diet (HFD). Seventy-two male SD rats were fed HFD and twelve rats control diet (CD) for 9 weeks, and then bilaterally cannulated in the VMH. The rats on HFD were divided into tertiles based on their fat mass (FM) rank: high, intermediate and low (H, I, and L). Each group was further divided into 2 subgroups (with balance of



BW and FM); BDNF or artificial cerebrospinal fluid (aCSF), then injected every other day for 20 days to measure EI, EE, BW and FM. In parallel, 12 CD rats were given aCSF. Compared to CD rats, HFD induced significant increases in EI after day one, FM after day three and BW after week four. Compared to aCSF treatment, BDNF significantly reduced BW, FM, liver size and serum leptin in all groups. BDNF reduced EI in I and L groups, but not in H groups. BDNF significantly increased EE and physical activity in H group, suggesting that BDNF-induced EE elevation was the factor that reduced BW and FM. Relative to aCSF-treated CD rats, BDNF-treated L subgroup had similar EI, BW, and FM. In conclusion, nine-weeks of HFD feeding elevate EI, BW and FM. BDNF in the VMH reverses HFD-induced obesity, suggesting that BDNF may be an effective treatment for obesity.

**140-P**

**The GLP-1 Analog Liraglutide Activates Brainstem and Hypothalamic Neurons Involved in Appetite Regulation**

Jacob Jelsing *Frederiksberg C, Denmark*; Kirsten Raun *Maaloev, Denmark*; Niels Vrang *Frederiksberg C, Denmark*; Mads Tang-Christensen, Kirsten Dahl, Lotte Bjerre Knudsen *Maaloev, Denmark*

The Glucagon-Like Peptide-1 (GLP-1) analog liraglutide is emerging as an important drug for the treatment of diabetes. However, in both rodents and man liraglutide also reduces appetite and lowers body-weight. To identify the possible brain sites mediating liraglutide induced anorexia, we examined the expression of the immediate early gene c-Fos in male Sprague-Dawley rats. Rats were terminated by perfusion fixation 4 and 8 hrs following sc administration of liraglutide (lira, 0.1mg/kg), brains were removed and immunoreacted for c-Fos. In the forebrain liraglutide significantly increased c-Fos-ir nuclei in the central nucleus of amygdala (veh 32±11; lira sc 115±12) and in the hypothalamic paraventricular nucleus (PVN; veh 42±5; lira sc 43±8; p<0.05). Conversely, liraglutide significantly reduced c-Fos-ir nuclei in the arcuate nucleus (veh 45±10; lira sc 16±4). In the hindbrain, liraglutide significantly increased c-Fos in the area postrema (AP; veh 49±8; lira sc 188±20), in nucleus of the solitary tract (NTS; veh 27±5; lira sc 150±17) and lateral parabrachial nucleus (IPBN; veh 13±4; lira sc 87±15; lira ip 117±13). Immunofluorescence was used to characterize liraglutide activated neurons. In the AP, liraglutide induced c-Fos in tyrosine-hydroxylase (TH)-ir neurons (veh 0±0; lira sc 12.4±1.7; p<0.05), whereas neither GLP-1-ir nor TH-ir neurons were activated in the NTS. In the PVN, liraglutide induced c-Fos in corticotrophin-releasing hormone-ir (CRH) neurons (veh 2±1; lira sc 16±5). In summary, the data demonstrate that liraglutide activates the functional continuum involved in appetite regulation extending from the AP/NTS complex via the IPBN and amygdala to the PVN.

**141-P**

**Melatonin Treatment Prevents Obesity-Induced Changes in 24 h. Variations of NPY and POMC Gene Expression at the Mediobasal Hypothalamus in Male Rats**

Judith Rios-Lugo, Pilar Cano Barquilla, Vanesa Jimenez-Ortega, Pilar Fernandez-Mateos, Ana Isabel Esquifino Parras *Madrid, Spain*

Obesity is a metabolic disorder that is characterized by marked changes in the secretory patterns of hormones, inflammatory cytokines and neuro-modulators. The aim of this work was to analyze if melatonin treatment along with the hyperlipidic diet prevents the deleterious effects of obesity on Neuropeptide Y (NPY) and proopiomelanocortin (POMC) genes expression. NPY gene expression, in control animals reached the highest values during the first phase of the dark period (between 21:00 and 01:00 h.). Melatonin treatment (30 micrograms/mL of drinking water) did not modify the control pattern except for a single peak shown at 01:00 h. Obesity markedly increased the expression of NPY around the clock; that returned to that in controls, in hyperlipidic-fed rats treated with melatonin. POMC gene expression, in control animals reached the highest values at 01:00 h. during the night. Melatonin treatment decreased the POMC gene expression during the dark phase of the photoperiod at any point considered. Obesity increased POMC gene expression during the light phase of the photoperiod and shift-advanced 4 h the maximal value of POMC gene expression to 21:00 h. Melatonin treatment in obese rats partially recovered the POMC expression during the dark phase of the photoperiod. These data suggest that melatonin administration partially prevents deleterious effects of obesity on POMC and NPY gene expression.

**142-P**

**Pharmacology of AMR-MCH-22, an Antagonist of the MCH<sub>1</sub> Receptor for the Treatment of Obesity**

Peter Guzzo, Matthew D. Surman *Albany, NY*; Sharon Cheetham *Nottingham, United Kingdom*; Bruce Sargent, Michele Luche, Mark Hadden, Alan Henderson, Xiao-Wu (May) Jiang, Yuri Khmelnskiy *Albany, NY*; Steven Vickers, Jean Viggers *Nottingham, United Kingdom*

Melanin-concentrating hormone (MCH) is a cyclic 19 amino acid neuro-peptide involved in appetite regulation and energy homeostasis. Antagonists of the MCH<sub>1</sub> receptor have been shown to be a promising new approach for the treatment of obesity. AMR-MCH-22 was identified as a selective, high affinity antagonist of the human MCH<sub>1</sub> receptor (K<sub>i</sub> = 7.0 nM: radioligand assay; IC<sub>50</sub> = 47 nM: functional Ca<sup>2+</sup> flux assay). In a panel of >85 GPCRs (including MCH<sub>1</sub>), ion channels and cytochrome P450s, AMR-MCH-22 showed at least 400-fold selectivity for the MCH<sub>1</sub> receptor. AMR-MCH-22 demonstrated significant reductions in body weight in a 28-day feeding study in male diet-induced obese (DIO) C57BL/6J mice. At twice daily oral doses of 5 and 15 mg/kg and a once daily dose of 30 mg/kg, AMR-MCH-22 produced weight losses of 12.3%, 17.3% and 18.1%, respectively. The weight loss corresponded to statistically significant reductions in food intake. Body composition analysis indicated that weight loss caused by AMR-MCH-22 was due to selective reductions in fat mass for all dose groups. An OGTT following 28 days of dosing indicated improvements in glucose tolerance and insulin sensitivity. Ex vivo MCH<sub>1</sub> receptor occupancy at 24 hours post dose correlated very well with weight loss (R<sup>2</sup> = 0.9979). These data indicate that AMR-MCH-22 is a selective, high affinity MCH<sub>1</sub> receptor antagonist that causes significant weight loss in a mouse model of obesity with concomitant changes in metabolic plasma parameters (decreased leptin and increased adiponectin levels). AMR-MCH-22 is currently progressing into Phase I clinical trials for the treatment of obesity.

**143-P**

**The β-Cell Hormone Amylin Reduced Preference for Both Fat and Sugar in a Two-Diet Food Choice Paradigm in Rats**

Jennifer R. Athanacio, J.K. Wilson, Carrie Wittmer, Christine M. Mack *San Diego, CA*

The β-cell hormone amylin is a short-term satiety signal known to reduce food intake and body weight in rodents and humans. Food choice experiments in rats show amylin agonism to shift preference, relative to controls, away from both a pure sucrose diet following restraint stress and a high fat/high sucrose diet during peripheral infusion. To identify the diet constituent(s) responsible for this shift in preference, the present study characterized the effect of sustained amylin infusion (50 µg/kg/d, SC implanted osmotic pump) in a two-diet food choice paradigm where rats were presented with diet combinations varying in fat and sugar content. Male Sprague-Dawley rats (285.3g±1.2) were fed ad libitum one of five food choice combinations for 4 weeks and throughout 4 weeks of amylin infusion (n=8-10/group): low fat/high fat (LF/HF), low fat/low fat+sucrose (LF/LFS), low fat+sucrose/high fat+sucrose (LFS/HFS), high fat/high fat+sucrose (HF/HFS) or low fat+sucrose/high fat (LFS/HF). For the LF/HF combination, untreated rats consumed a greater percentage of total calories from the HF diet (93.9±3.4%). ANOVA for the LF/HF diet combination showed amylin to significantly decrease preference for the HF diet by 11.1±3.7% compared to pretreatment (p<0.05). For the LF/LFS diet combination, untreated rats preferred the LFS (83.7±2.1%). Amylin treatment significantly reduced preference for the LFS diet by 22.6±5.1% (p<0.05). Amylin had no effect on any other diet combination. A shift in preference occurred only in diet combinations specific for either fat or sugar, suggesting a possible role of amylin in modulating reward pathways in the brain.

**144-P**

**A Role of NELL2 on the Regulation of Feeding Behavior in Rat**

Jin Kwon Jeong *Rochester, NY*; Jae Geun Kim, Byung Ju Lee *Ulsan, South Korea*

Mammalian neural tissue specific epidermal growth factor-like repeat domain containing protein (NELL2) has been suggested to play roles for development, survival and activity of neurons. We investigated possible involvement of NELL2 in the control of feeding behavior in rat brain. NELL2 was highly expressed in the hypothalamic nuclei controlling central feeding behavior such as the ventromedial hypothalamic nucleus,

paraventricular nucleus and arcuate nucleus (ARC). Furthermore, all proopiomelanocortin (POMC) and neuropeptide Y (NPY) positive neurons in the ARC expressed NELL2. NELL2 gene expression in the hypothalamus was increased by fasting for 1 day. Blockade of NELL2 expression in the hypothalamus resulted in a reduction of daily food intake followed by loss of body weight without change of daily water intake. Interestingly, NELL2 did not directly affect transcription of POMC and NPY. These data suggest that NELL2 is controlled by metabolic state and regulates feeding behavior without direct effect on POMC and NPY synthesis in the adult male rat brain.

#### 145-P S6K1-Dependent Modulation of the Hypothalamic Melanocortin System

Caterina Catania, Elke Binder, Federico Massa, Samantha Clark, Daniela Cota *Bordeaux, France*

In free-feeding, the mTOR downstream target S6 kinase 1 (S6K1) is activated (phosphorylated) in both Pro-opio-melanocortin (POMC)- and Agouti-related protein (AgRP)- expressing neurons of the arcuate nucleus (ARC) of the hypothalamus. POMC and AgRP produced in the ARC oppositely regulate the activity of melanocortin receptors located in the hypothalamic paraventricular nucleus (PVN), all together constituting the hypothalamic melanocortin system. We therefore used mice lacking S6K1 (S6K1<sup>-/-</sup>) to investigate the role of this kinase in the control of the hypothalamic melanocortin system. In free-feeding, S6K1<sup>-/-</sup> mice eat slightly, but significantly more than their wild-type (WT) littermates. Under re-feeding, a condition known to activate POMC neurons, expression of the neuronal marker c-fos is significantly reduced in the ARC of S6K1<sup>-/-</sup> mice. S6K1<sup>-/-</sup> mice also have significantly less POMC-labeled cells in the ARC and POMC-labeled projections in the PVN. However, POMC mRNA levels are comparable to those observed in WT mice and properly respond to changes in the body's energy status. In the same fashion, mRNA levels of AgRP in the ARC and AgRP-labeled projections in the PVN are similar between WT and S6K1<sup>-/-</sup> mice. Synaptic inputs onto parvocellular neurons of the PVN result also altered in S6K1<sup>-/-</sup> mice. We are currently evaluating whether the changes in the melanocortin system that we have observed so far might underlie the resistance to the anorectic action of leptin, a phenomenon that we have previously described in this animal model. Supported by INSERM Avenir Programme, FRM, Region Aquitaine and Marie Curie International Reintegration Grant.

#### 146-P Development of Methodology for the Measurement of Overnight Lipid Infusions In Vivo in Papio Hamadryas

Raul A. Bastarrachea, Paul B. Higgins *San Antonio, TX*; Sonya Veron *Dallas, TX*; V. Saroja Voruganti, Maggie Garcia-Forey, Patrice Frost, Anthony G. Comuzzie *San Antonio, TX*; Elizabeth J. Parks *Dallas, TX*

Recent recognition of the strength of primate models in investigating metabolic disorders has resulted in an expanded need for in vivo research techniques. Our aim was to establish methodology to measure turnover rates of plasma free fatty acids (RaFFA) and glycerol (RaGlyc) in baboons (10.0 ± 3.6y, 30.8 ± 1.4kg). Animals underwent 8-hr, overnight isotope infusion studies while fasting. Part I of the project evaluated the effect of different sedatives on RaFFA, assessed using <sup>13</sup>C<sub>4</sub> palmitate (7 μmol/kg/min). For the first 3 animals, studies were performed with no sedation, with complete ketamine sedation, and with minimal midazolam infusion (0.02-0.05 mg/kg bolus, followed by 0.02 - 0.10 mg/kg/hr), with the latter treatment allowing for the most consistent steady state values. In Part II, 5 animals underwent simultaneous measurement of RaFFA and RaGlyc (d<sub>5</sub>-glycerol, 5 mg/kgLBM/h) to quantitate adipose lipolysis. FFA and glycerol concentrations were 548 ± 70 and 86 ± 7 μmol/L, respectively. RaFFA and RaGlyc were 65 ± 53 and 29 ± 20 μmol/kg fat mass/min and the intra-adipocyte reesterification rate was 44 ± 30%, similar to that observed in humans. From midnight, a decline in FFA turnover was mirrored by reductions in FFA concentrations, and the same was true for glycerol turnover and concentrations. Concurrent changes in the kinetics of both FFA and glycerol indicated physiologic validity of the model. This methodology will support needed research to determine the in vivo mechanisms by which weight loss and other treatments improve the metabolic disorders of obesity.

#### 147-P Diet-Induced Obesity in Dogs Associates With Alterations of Sympathovagal Balance and Sleep Architecture

Ana Valeria B. Castro, Cathryn M. Kolka *Los Angeles, CA*; Josiane Broussard *Chicago, IL*; Darko Stefanovski *Los Angeles, CA*; Harry Whitmore, Florian Chapot *Chicago, IL*; Erlinda L. Kirkman, Richard N. Bergman *Los Angeles, CA*

Alterations in sleep pattern and/or in the autonomic nervous system are associated with obesity. However, there are few experimental models that allow exploring the mechanisms of the aforementioned association. The aim of the present study was to develop a method to assess sleep architecture and sympathovagal balance during the development of obesity in a canine model. We used a non-tethered telemetric method to record approximately 24 h EEG, EMG and ECG simultaneously from male dogs (n: 2) before and during 6 weeks of high fat feeding (HFD). Sleep stages were analyzed visually (30s epochs) and sympathovagal balance by power spectral analysis of heart rate variability (HRV- 5 min epochs). The preliminary results showed an overall decrease in the relative sleep efficiency, wake time and stage NREM durations and an increase in stage REM duration. We also observed an increase in time domain parameters of HRV and a decrease of the ratio between low frequency and high frequency components of heart rate implying an increase in heart vagal tonus during the development of high fat diet-induced obesity. Although preliminary, our results suggest that impaired sympathovagal balance and alterations in sleep architecture develop during high fat feeding. Our present model will allow further investigation of the mechanisms involved in diet-induced alterations of sleep architecture and of sympathovagal balance.

#### 148-P Mathematical Modeling of Energy Metabolism, Fuel Selection, and Body Weight Change in C57BL/6 Mice

Juen Guo, Kevin D. Hall *Bethesda, MD*

The mouse has become the most important model organism for investigating molecular mechanisms of body weight regulation and metabolic control. To quantitatively integrate data on mouse metabolism and body composition change, we developed a mechanistic mathematical model of energy expenditure in adult male C57BL/6 mice. Our model was built using a time-invariant curve relating body fat and fat-free masses that defines how metabolic fuel selection adapts in concert with diet changes for varying degrees of energy imbalance. We also modeled how energy expenditure depends on food intake, body composition, physical activity, and tissue deposition efficiency at a constant environmental temperature. Using data that was not used for model development, we validated our model by accurately predicting the dynamic changes of body weight and fat mass in C57BL/6 mice when various measured time-courses for food intake were provided as model inputs. The model also predicted how the 24 hour respiratory quotient varied dynamically in response to changes of diet composition and energy content. Because the C57BL/6 mouse is a common background strain for transgenic and knockout mouse models, we propose that our “background” mathematical model can be modified to simulate the energy metabolism of various mouse models of obesity and obesity resistance. Thus, comparison of our mathematical models of “background” and “mutant” mouse energy metabolism will provide an integrative physiological context for understanding how molecules quantitatively exert their effect on metabolism and body weight regulation.

#### 149-P Carnitine Supplementation Fails to Enhance Fat Loss in Obese Rats Regardless of Diet Composition

Kathleen V. Axen, Julie Roddy, Michael Griesinger, Yinka Olufawo, Ann Glassman, Funmilayo Bomide, Kenneth Axen *Brooklyn, NY*

L-carnitine, a cofactor involved in the transport of fatty acids across the mitochondrial membrane, is marketed as a “fat burner”. Since carbohydrate metabolism inhibits carnitine action, and high-fat diets provide more fatty acids, we hypothesized that carnitine supplementation would be more effective with a VLC (very-low carbohydrate, high-fat) diet than with an isocaloric HC (high-carbohydrate, low-fat) diet. This hypothesis was tested using 36 male Sprague-Dawley rats that were first made obese and glucose intolerant by 8 wk *ad lib* consumption of a high-fat

(HF, 15% carbohydrate, 60% fat) diet. HF rats at wk 8 were divided into three weight-matched groups: 1) VLC rats consumed a calorie-restricted (~65% of control intakes) 5% carbohydrate, 60% fat diet; 2) HC rats consumed an isocaloric 60% carbohydrate, 15% fat diet; and 3) HF rats consumed the HF diet *ad lib*. Calorie-restricted VLC and HC rats were further subdivided into a “+” group that received carnitine (5 g/kg of diet) and a “-” group that received a formulated carnitine-free diet. Compared with HC rats, VLC rats at wk 12 had similar body weights and hepatic lipid concentration, greater visceral ( $p < 0.01$ ) and total body fat ( $p < 0.02$ ), and higher plasma glucose levels during *ip* glucose tolerance tests ( $p < 0.05$ ). Carnitine supplementation had no effect on any of these results (VLC+ ~ VLC- and HC+ ~ HC-). These findings show that carnitine supplementation (at ~10 times the recommended dosage for humans) failed to enhance fat loss or affect glucose tolerance in sedentary obese rats on calorie-restricted diets, regardless of diet composition.

**150-P**  
**Development of a Tissue-Specific Knock-Out Model for XL $\alpha$ s;**  
**A Signalling Protein Involved in the Regulation of Body Weight,**  
**Adiposity and Energy Expenditure**

Stefan O. Krechowec, Antonius Plagge *Liverpool, United Kingdom*

The development of animal models of obesity provides an essential tool for investigating the complex neuroendocrine and metabolic systems involved in regulating body weight. Similarly, models of obesity resistant leanness can afford equally important insights into physiological regulatory pathways that could be exploited for obesity treatment or prevention. One unique model of extreme leanness is the XL $\alpha$ s knock-out mouse. XL $\alpha$ s (eXtra Large  $\alpha$ ) is an NH<sub>2</sub>-extended variant of the ‘ $\alpha$ -stimulatory’ subunit of the trimeric G-protein, G $\alpha$ s. At birth knock-out mice display poor feeding, increased neonatal mortality and very limited adipose development, while adult survivors go on to develop a healthy exceptionally lean, glucose-tolerant, insulin-sensitive, hypermetabolic phenotype, showing increased sympathetic tone and weighing ~45% lighter with less than half the body fat of wild-type controls. Given the highly complex phenotypes generated by global gene knockouts a more refined conditional approach is necessary to precisely identify the mechanisms arising from the tissue- and cell-specific effects of Gnasxl (XL $\alpha$ s) deletion. In this study we describe the development of a tissue-specific Gnasxl knock-out mouse through the use of a novel conditional gene-trap targeting strategy. Tissue-specific Cre expression causes an inversion/activation of a silent gene-trap cassette, resulting in truncation of XL $\alpha$ s and the formation of a lacZ fusion protein. This conditional Gnasxl knock-out provides the tool necessary to dissect the individual tissue-specific mechanisms that contribute to the lean and hypermetabolic phenotype exhibited by global Gnasxl knock-out mice. Progress in the analysis of whole brain and hypothalamus-specific XL $\alpha$ s deletions will be presented.

**151-P**  
**Differential Brain fMRI Activity Following a Mixed Nutrient or Protein Enriched Meal in Rats**

David Min, Ursula I. Tuor, Henry S. Koopmans, Prasanth K. Chelikani *Calgary, Canada*

Background: Functional Magnetic Resonance Imaging (fMRI) has been used for studying global changes in brain regions that are responsive to glucose ingestion. The homeostatic and hedonic centers in the brain that are engaged in sensing other macronutrients in the gut remain largely unknown. We applied fMRI to characterize the spatio-temporal changes in the rat brain following intragastric (IG) infusion of isocaloric amounts of either Ensure (mixed nutrient meal) or Beneprotein (high protein meal). Methods: Brain images were acquired with a 9.4T magnet during IG infusion of saline (n=7), or 12 kcal of either Ensure (n=13) or Beneprotein (n=6) in anesthetized rats. Patterns of fMRI signal change were determined using cluster and correlation analyses. Changes in blood parameters (gases, glucose, gut hormones) were also monitored. Results: Our data indicate that: 1) Nutrient infusions produced a globalized decrease in fMRI signal with 43%, 34% and 8% of voxels within the brain correlating to a decrease following Ensure, Beneprotein, and Saline treatments, respectively, 2) Nutrient infusions resulted in a significant reduction in

fMRI signal in the hypothalamus, thalamus, hippocampus and caudate putamen, 3) Ensure produced a significant reduction in fMRI signal within the cortex and cerebellum whereas protein effected the amygdala, and 4) Despite a nutrient-induced elevation in circulating concentrations of pCO<sub>2</sub>, glucose, Peptide YY and Glucagon-like peptide-1, only glucose contributed significantly to the variation in the observed fMRI signal changes. Conclusion: Nutrients in the gut produced a globalized decrease in fMRI signal intensity in numerous homeostatic and hedonic centers, with the cortex and cerebellum primarily sensing calories, and the amygdala responding specifically to protein. Funded by NSERC.

**Energy Expenditure**

**152-P**  
**Temporal Trends in Sleeping Energy Expenditure in Healthy Adults and Adolescents**

Gregory McMahon, Robert J. Brychta, Catherine R. Marinac *Bethesda, MD*; Maciej Buchowski *Nashville, TN*; Kong Y. Chen *Bethesda, MD*

Introduction: Sleeping energy expenditure (SEE) has previously been reported to decrease throughout the night in women, with the temporal trend (SEE slope) inversely correlated with BMI, weight, and FFM. However, it is unclear if this is also the case in men or adolescents. Purpose: The aim of this study was to determine the association between SEE slope and BMI in non-obese and obese adults and adolescents. Methods: Twenty-nine healthy adult participants (age = 40.3 ± 11.9 yrs, BMI=31.2 ± 9.1 kg/m<sup>2</sup>, 22 females), and forty-four adolescents (age = 15.0 ± 1.6 yrs, BMI=25.3 ± 5.9 kg/m<sup>2</sup>, 26 females) each spent a night in human respiratory chamber to assess energy expenditure. Activities and diet were standardized, as was the chamber temperature (23.5±0.3°C). Sleeping EE slope was calculated as the linear regression over time during the sleeping period. Results: SEE slope was significantly negative (SEE decreasing with time) in adults (-0.0004 ± 0.0003 kcal/min<sup>2</sup>,  $p < 0.05$ ) and in adolescents (-0.0001 ± 0.0002 kcal/min<sup>2</sup>,  $p < 0.05$ ), while SEE slope in adolescents was significantly different than the adults ( $p < 0.001$ ). No sex difference was observed in SEE slope for either group. SEE slope was associated with BMI in only adults (-1.5x10<sup>-5</sup> x BMI + 6.0x10<sup>-5</sup>,  $p < 0.05$ ). Normalizing the SEE slope by individual average sleeping EE did not change the relationships. Conclusion: We confirmed a previous finding that SEE slope was negatively associated with BMI in adults. SEE slope in adolescents was blunted and not associated with body composition.

**153-P**  
**Further Evidence to Demonstrate the Existence of Adaptive Thermogenesis: Results From a Systematic Review on Weight Loss and Energy Expenditure**

Alexander Schwartz, Eric Doucet *Ottawa, Canada*

Background: Adaptive thermogenesis posits that the reduction in resting EE (energy expenditure) is greater than what can be expected from decreases in body mass and composition. Numerous studies have shown EE to fall out of proportion to body mass but controversy persists. Objective: The purpose of this analysis was to revisit adaptive thermogenesis through a systematic review. A subgroup involving 64 sets of data (n=1415) from a prior systematic review was analyzed for weight loss-induced changes in resting EE, FM and FFM. The studies were weighted and multiple regression analyses were performed looking at the effect of changes of FM and FFM on both the absolute and relative decreases in resting EE. Harris-Benedict and Mifflin prediction equations were then used on a subgroup (n = 608 women) to obtain predicted values of resting EE before and after weight loss. Results: Changes in FM and FFM explained 11.1% of the variance seen in relative resting EE changes during weight loss ( $p < 0.01$ ). Further analysis indicated that the actual relative decrease of resting EE (-15.5 ± 2.2 kcal/kg weight loss) was greater than that predicted with the equations of Harris-Benedict (-9.6 ± 0.03 kcal/kg weight loss;  $p \leq 0.01$ ) and Mifflin (-10.0 ± 0.03 kcal/kg weight loss;  $p \leq 0.01$ ). Conclusions: Given the large sample size, this analysis provides strong evidence in favour of adaptive physiological modifications during weight loss that result in greater than expected changes in resting EE.

## 154-P

**A Wavelet-Based Filter For Optimizing Dynamic Energy Expenditure Measurements in Human Metabolic Chambers**Robert J. Brychta, Monica C. Skarulis, Kong Y. Chen *Bethesda, MD*

Human metabolic chambers are designed to measure dynamic energy expenditure (EE) in conditions representative of quasi-free-living state by measuring changes in room oxygen (O<sub>2</sub>) and carbon dioxide (CO<sub>2</sub>) levels. However, relatively large room sizes required for patient comfort make measuring small changes in room gas concentrations difficult, making robust noise removal algorithms necessary. Consequently, we used CO<sub>2</sub> and nitrogen infusions to assess the ability of a central-difference algorithm with a wavelet-based correction to eliminate noise during periods of simulated short impulsive movements of 1 to 2 minutes long, exercise periods of 5 to 30 minutes, and steady-state rest of >2 hours. We compared the performance of the wavelet method to the Henning method, which is commonly used to compute steady-state EE for several current human metabolic chambers. When compared to the measured infusion references (N=15), the wavelet algorithm demonstrated significantly lower mean absolute error (MAE, 0.42 vs. 0.98 kcal/min, p<0.01) and significantly higher coefficient of determination (R<sup>2</sup>, 0.87 vs. 0.11) values than the Henning algorithm. Similarly, during simulated exercise periods, the wavelet-based method showed lower MAE (0.42 vs. 2.09 kcal/min, p<0.01) and higher R<sup>2</sup> (0.97 vs. 0.41) compared to the Henning method. Additionally, there was no significant difference between the two methods in MAE and R<sup>2</sup> during steady-state resting periods, independent of the simulated resting metabolic rate (from 1-3 kcal/min). In summary, the wavelet-based approach efficiently reduces noise, retains important dynamic changes, and maintains stability during resting periods. Future studies will apply the wavelet algorithm to human in vivo data.

## 155-P

**Caloric Expenditure Is Stimulated By a Single Bout of *Lycium barbarum* Combined With Indigestible Fiber, or Combination of These in Various Food Forms Indicated by Resting Metabolic Rate in Healthy Human Adults**Harunobu Amagase, Richard Handel *Phoenix, AZ*

Background: *Lycium barbarum* (*L. barbarum*) increases resting metabolic rate (RMR). We investigated combination effect of *L. barbarum* and indigestible fiber on RMR. Methods: *L. barbarum* juice (GoChi<sup>®</sup>=Product 1) and 3 fiber-containing products (dietary supplement containing *L. barbarum* and fiber=TAIslim<sup>®</sup>=Product A; chewable confection =TAIslim<sup>®</sup> SKINNY=Product B; meal replacement shake=TAIslim<sup>®</sup> Shake=Product C) were used. Indigestible fiber content was negligible in Product 1, and Product A, B, and C contains 5, 1 and 5 g, respectively. Healthy adults (n=6, age=34.5 y) consumed single bout of all test sample on different days after 12 h fast. RMR was measured by indirect calorimeter immediately before (baseline) and at 1, 2 and 4 h post-intake. A nutritional beverage (158 kcal) and test sample were provided at the completion of the 1<sup>st</sup> RMR baseline measurement. Results: Baseline RMR was 1,633 kcal in average. RMR at 1 h post-intake was significantly increased from baseline by 6.7±1.9% (mean±SEM) with the control (nutritional beverage only), 12.7±1.2% with Product 1, 13.4±4.0% with A, 11.8±2.2% with B, 19.7±8.5% with C, or 26.0±4.6% with combination of Product A+B, respectively. RMR in the control returned to baseline within 2 h. Conversely, RMR at 4 h post-intake with consumption of Product 1, A, B, C or Product A+B remained elevated by 5.1±2.0%, 5.1±2.7%, 7.2±2.3%, 9.0±4.3% or 11.7±4.6% over baseline, respectively, representing statistically higher levels than the control all times (P<0.05). Conclusions: These results suggest that, compared to control, indigestible dietary fiber may have combination effects with *L. barbarum* exhibiting long-lasting stimulating effects on caloric expenditure in humans.

## 156-P

**Classification of Physical Activity and Prediction of Energy Expenditure By a Wearable Shoe Sensor**Edward Sazonov *Potsdam, NY*; Raymond Browning *Fort Collins, CO*; Nadezhda Sazonova *Potsdam, NY*; Yves Schutz *Lausanne, Switzerland*; James O. Hill *Aurora, CO*

Aim: Accurate estimates of daily and activity energy expenditure (EE) are essential for weight management success. Estimates of (EE) are more accurate when associated with a particular posture or activity. We developed a novel shoe-based physical activity monitor that can recognize

postures and activities and accurately estimate EE. Subjects: Eleven subjects (4 males and 7 females, age 18 – 44 yr, weight 55 – 100.9 kg, height 61 – 71 in., BMI 18.7 – 39.4 kg/m<sup>2</sup>). Methods: Conventional footwear was modified by adding a wireless sensor system consisting of five pressure sensors and a three-dimensional accelerometer. Subjects performed several activities (sitting, standing, walking and cycling) with different levels of intensity. Actual EE was measured via a portable indirect calorimetry system. A population model was developed for predicting postures and activities from the pressure and acceleration data. An EE model using the same sensors was built for each posture and activity. We then compared the predicted vs. measured EE for each activity. Results: The device accurately predicted EE with root-mean square errors of 0.21 METs for sitting, 0.24 METs for standing, 0.77 METs for walking and 0.83 METs for cycling. Conclusion: The simple shoe device is capable of accurate recognition of postures and activities, resulting in accurate estimates of EE. Incorporating this unobtrusive device into conventional footwear may help individuals monitor their posture allocation, activity duration and daily EE resulting in improved weight management outcomes.

## 157-P

**Increased Fat Intake Progressively Decreased Energy Expenditure and Increased Fat Balance in Both Lean and Obese Adults**Edward L. Melanson, Wendolyn S. Gozansky, Daniel Barry, Paul S. MacLean, James O. Hill *Aurora, CO*

We compared the effect of increasing dietary fat intake under isocaloric (RMR×1.5) conditions on 24 h energy expenditure (EE) and substrate oxidation in 7 lean (LN, BMI=22.4±2.6 kg/m<sup>2</sup>, age=30±8 yrs, mean±SD) and 8 obese (OB, BMI=35.5±4.2 kg/m<sup>2</sup>, age=38±6 yrs) sedentary adults. 24 h EE and substrate oxidation were measured using room calorimetry during two conditions; 1) a control, low fat diet (LF 20% fat, 65% carbohydrate, 15% protein); and 2) a high fat diet (HF, 50% fat, 35% carbohydrate, 15% protein). The HF diet was consumed for 5 days, and subjects were studied in the room calorimeter on day 2 (HF2) and 5 (HF5). 24 h EE (mean±SE) was similar on LF and HF2 in both LN and OB. However, 24 h EE was significantly reduced on HF5 compared to LF in both LN (2201±98 vs. 2277±97 kcal/day) and OB (2984±178 vs. 3078±168 kcal/d), resulting in a significant increase in energy balance on HF5 compared to LF in both LN (138±66 vs. 70±44 kcal/d) and OB (63±59 vs. -30±40 kcal/d). 24 h fat oxidation increased during HF in both groups, but fat balance was positive on HF2 (LN: 29±10, OB: 27±17 g/d) and HF5 (LN: 22±12, OB: 24±9 g/d). Thus, an increase in fat intake during isocaloric feeding resulted in a gradual decrease in 24 h EE, perhaps due to a decrease in spontaneous physical activity. Although 24 h fat oxidation increased in both groups, fat balance also increased. Importantly, the ability to adapt to an increase in dietary fat was not impaired in obesity.

## 158-P

**Effect of Weight Loss on Physical Activity and Activity Energy Expenditure**Klaas R. Westerterp, Alberto Bonomi *Maastricht, Netherlands*

Activity energy expenditure (AEE) is the component of daily energy expenditure, which is influenced by the physical activity (PA) performed and by the weight of the body displaced. This study aimed at analyzing the effect of weight loss on PA and AEE. Body weight and PA of 66 obese subjects were measured at baseline and after 12 weeks of 67% energy restriction. PA was measured using a tri-axial accelerometer (Tracmor) and quantified in counts (Cnts/d). The Tracmor recordings were also processed using a classification algorithm to recognize 6 common activity types engaged during the day. AEE was estimated from Tracmor counts with a doubly labeled water validated equation. Body weight decreased by 14±5 kg. After weight loss, PA increased by 9±27% (95% CI: +2, +15), explained by the decrease in body weight (R<sup>2</sup>= 7%; P<0.05). After weight loss subjects engaged significantly less in sedentary activities (-26±90 min/d, P<0.05), and more in walking (+11±21 min/d, P<0.05) and bicycling (+4±14 min/d, P<0.05). The reduced body weight induced a 0.6±0.2 MJ/d decrease of AEE, while the change in PA induced

a  $0.1 \pm 0.3$  MJ/d increase in AEE. Consequently, AEE decreased by  $0.5 \pm 0.3$  MJ/d after weight loss. On average, a substantial 63% increase in PA could restore baseline levels of AEE. In conclusion, excess body weight can limit PA in obese individuals. The reduced AEE following weight loss can be compensated only with a considerable reduction of sedentary time by increasing ambulatory activities.

**159-P**  
**Effects of Catechins and Caffeine on Energy Expenditure and Fat-Oxidation: A Meta-Analysis**

Margriet S. Westerterp-Plantenga, Wolfgang Viechtbauer, Rick Hursel  
*Maastricht, Netherlands*

Background: Different outcomes of controlled studies on the effect of catechins and caffeine on 24h energy expenditure (EE) and fat oxidation (FO) have been reported in several studies. Purpose: To elucidate by meta-analysis whether or not green tea indeed plays a role in thermogenesis and substrate oxidation. Methods: English-language studies about EE and FO after catechins, caffeine or an epigallocatechin gallate (EGCG)-caffeine mixture vs. control, were identified through PubMed and based on the references from retrieved articles. Out of 39 studies initially identified, a total of 6 articles fitted the inclusion criteria and provided useful information from 24h respiratory-chamber studies for a meta-analysis on EE and FO. Effect-sizes (mean change in EE or FO during treatment versus control condition) were computed and aggregated based upon a random-effects model. The influence of several moderators on the effect-sizes was examined. Results: Catechins and caffeine increase EE significantly over 24 hrs ( $\mu = 446.5$  kJ (5.0%);  $p < .001$  and  $\mu = 413.1$  kJ (4.6%);  $p < .001$ ) respectively. Fat oxidation, however, was only increased by catechins ( $\mu = 12.2$  g (16.0%);  $p < .05$  and  $\mu = 9.5$  g (12.4%);  $p < .11$ ) respectively. A dose-response effect on EE occurred with an average increase of 0.44 kJ/mg for caffeine and 0.53 kJ/mg for catechins ( $p < 0.001$ ). Conclusions: Catechins, caffeine or an EGCG-caffeine mixture stimulate energy expenditure dose-dependently by 0.4-0.5 kJ/mg administered. Fat-oxidation was significantly increased, only after catechin ingestion. Acknowledgements: Abdul Dulloo, Angelo Tremblay, Luc Tappy, and William Rumpel are gratefully acknowledged for contributing with their original data.

**Intervention Studies – Behavioral and Other**

**160-P**  
**Short Sleep Duration Tends to Lower Resting Metabolic Rate and Peak Activity Level Relative to Habitual Sleep in Normal Weight Subjects**

Amy L. Roberts, Michael Kelleman, Marie-Pierre St-Onge  
*New York, NY*  
 Short sleep has been related to weight gain and obesity, however, few studies have examined the impact of sleep duration on energy balance. The objective of this randomized crossover study was to assess energy balance under periods of habitual or short sleep duration. Seventeen healthy, normal weight men and women, age 30-45 y, completed the 2 study phases: 9 hours/night (habitual sleep) or 4 hours/night (short sleep) bedtimes. Resting metabolic rate (RMR) was measured after 4 nights of sleep monitoring during which subjects consumed a controlled, weight maintenance diet. RMR during short sleep tended to be lower than during habitual sleep ( $1466.8 \pm 163.4$  vs.  $1520.6 \pm 168.7$  kcal/d,  $P = 0.065$ ). A subset of the subjects ( $n = 9$ ) were monitored with Actigraphy during each inpatient stay. There was a trend for peak activity to be lower during the short sleep phase relative to habitual sleep ( $6800 \pm 605$  vs.  $5241 \pm 605$  activity counts,  $P = 0.06$ ), indicating that subjects tended to reach the “hard level” (6.0-8.99 metabolic equivalents [METS]) of activity during habitual sleep, but only the “moderate level” (3.0-5.99 METS) during short sleep. Although total and average activity levels were not significantly different between the two phases, the data were in the same direction. Our results suggest that short sleep time may result in lower resting metabolic rate and possibly also lower activity level when compared to habitual sleep. If maintained over time, these effects could explain some of the association observed between short sleep duration and obesity.

**161-P**  
**Randomized Controlled Trial of a Personal Digital Assistant (PDA) as Adjunct to Group Obesity Treatment For Veterans**

Bonnie Spring  
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*Philadelphia, PA*; Jennifer M. Duncan,  
 H. Gene McFadden  
*Chicago, IL*; Andrea T. Kozak  
*Rochester, MI*; Stephanie W. Russell, Andrew Demott, Alexander Pictor, Donald Hedeker  
*Chicago, IL*

Among veterans receiving care at the VA, 73% are overweight and 33% are obese (Das et al, 2005). Group obesity treatment via the MOVE! program is the standard of care for obesity treatment at the VA, produces modest weight loss, and is available free of charge to all veterans. The PDA+ trial tests whether provision of a PDA for diet and activity self-monitoring and decision support will enhance weight loss outcomes. Overweight and obese veterans referred to the MOVE! program were randomized ( $N=69$ ) to receive either MOVE! group treatment alone (Control  $n = 35$ ) or MOVE! treatment plus PDA (PDA+  $n = 34$ ). Of the 60 participants that provided 3-month follow up data, average age was 58.1 (SD=11.9); mean baseline BMI was 36.0 (SD=4.4); 86.7% ( $n=52$ ) were male; 64.9% ( $n=37$ ) had less than a college degree. There were no significant differences between treatment groups on these variables. Patients randomized to PDA+ entered their diet and physical activity on the device, monitored decision support thermometers to track calorie intake and activity relative to daily goals, and transmitted their data to study staff. At 3-month follow-up, weight loss was substantially greater for PDA+ ( $M = -9.73$ ,  $sd=10.04$ ,  $n=30$ ) than Control ( $M = -1.93$ ,  $SD=5.49$ ,  $n=30$ ) [ $F(1,58) = 13.94$ ,  $p < .001$ ]. Results suggest that use of a PDA tool to self-monitor diet and activity is feasible by older adults with low technology literacy and can dramatically enhance weight loss initiation. Follow-up is ongoing to determine whether differences persist through the 6 and 12 month assessments. \*Supported in part by VA RRD grant F442291

**162-P**  
**A Randomized Trial Testing the Effects of Social Reinforcement on Weight Loss**

Tricia M. Leahey, John G. Thomas, Jessica Gokee LaRose, Rena R. Wing  
*Providence, RI*

Background: Given the importance of social influence on health behavior change we tested a weight loss intervention involving social reinforcement. Methods: Participants ( $N=62$ ; 84%Female; 94%Caucasian; age=51.9±9.0; BMI=34.7±4.5) were randomized to 6-months of behavioral weight loss treatment that involved social reinforcement (BWL+SR) or standard treatment (BWL). Group cohesion activities were conducted in both groups. However, participants in BWL+SR remained in group only if they met weight goals. If they did not, they were required to meet separately with a new interventionist, and could not return to group until they met weight goals. We hypothesized that making access to the group contingent on weight loss should improve overall weight loss and reduce the number of participants who failed to meet weight loss goals. Results: There was no evidence that BWL+SR improved weight loss (BWL+SR: -10.0±4.9kg, BWL: -10.8±6.4kg), nor did it decrease the number of individuals who failed to achieve weight loss goals ( $n=10$ ;  $n=10$ ). There was a trend for participants in BWL+SR who did not meet goals to lose more weight when removed from group (and perhaps trying to re-enter) compared to matched participants in BWL ( $-1.0 \pm 0.7$ kg vs.  $-0.4 \pm 0.9$ kg;  $p = .11$ ;  $d = .74$ ). Conclusion: Weight loss treatment that implements social reinforcement by removing individuals from group who are not meeting weight goals and making their return to group contingent upon meeting weight goals may improve weight loss and motivation in the short-term, but once participants return to group, these effects are lost.

**163-P**  
**Test-Retest Reliability of the Paffenbarger Physical Activity Questionnaire in Overweight and Obese Adults**

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*Chapel Hill, NC*; Amy D. Otto  
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*Chapel Hill, NC*; Wei Lang  
*Winston-Salem, NC*; John M. Jakicic  
*Pittsburgh, PA*

Physical activity is commonly assessed using questionnaires. However, few studies have reported on the reliability of interview-administered physical activity questionnaires in overweight and obese adults. This study assessed the reliability of an interview-administered physical activity questionnaire

in sedentary adults, and examined the influence of body mass index (BMI) and gender on these findings. The Paffenbarger Physical Activity Questionnaire was administered by interview to 358 subjects (BMI = 33±3.6 kg/m<sup>2</sup>; age = 42.1±9.1 years) prior to participating in a behavioral weight loss intervention at both baseline (time 1) and one week afterward (time 2). This questionnaire reports the average number of flights of stairs climbed and the number of city blocks walked each day for each of the past seven days, as well as the amount of sports, fitness, or recreation activities. Reported physical activity levels are converted into kilocalories expended per week. Results revealed no significant differences between self-reported physical activity between time 1 (609±614kcal/wk) and time 2 (601±592kcal/wk) for all subjects [paired t(357) = .26, p = .80]. Spearman rho correlation coefficient revealed weekly energy expenditures at the two time points were significantly correlated ( $r_s = 0.52$ ; p<.05). Classification by baseline BMI and gender revealed no change in the pattern of these findings. Accurate and reliable questionnaires are a practical and cost-effective method to assess physical activity. The data from this study indicates that the Paffenbarger Physical Activity Questionnaire provides a reliable measure of physical activity in overweight and obese adults that is similar to other common physical activity questionnaires.

**164-P****Predictors and Moderators of Response to Cognitive Behavioral Therapy and Medication For the Treatment of Binge Eating Disorder**

Carlos M. Grilo, Robin M. Masheb *New Haven, CT*; G. Terence Wilson *Piscataway, NJ*; Ross D. Crosby *Fargo, ND*

**Objective:** To examine predictors and moderators of response to cognitive behavioral therapy (CBT) and medication for treatment of binge eating disorder (BED). **Methods:** 108 consecutive BED patients in a randomized double-blind placebo-controlled trial received one of four 16-week treatments: fluoxetine, placebo, CBT+fluoxetine, or CBT+placebo. Structured assessments were performed monthly and post-treatment. Demographic factors, psychiatric and personality-disorder co-morbidity, clinical characteristics (binge-eating frequency, ED psychopathology), and psychological features (depression, self-esteem) were tested as predictors and moderators for four outcomes: reductions in BMI, binge eating, ED psychopathology, and depression. Mixed-effects-models analyzed all available data for each outcome variable. In each model, effects for baseline value and treatment condition were included along with tests of both prediction and moderator effects. **Results:** Mixed-effects models revealed significant predictors of greater change from baseline for weight loss (for male, college-educated, lower self-esteem, and higher depression), binge eating (for younger age, older age-onset, non-white-minority), ED psychopathology (for older age-onset, higher baseline binge frequency), and depression (older age). Mixed-effects models revealed significant moderators among patients receiving CBT for greater weight loss (for college educated) and greater reductions in ED psychopathology (for older age-onset and those with higher baseline binge frequency). Among patients receiving medication-only, greater reductions in binge eating occurred in male, white, and older participants, and greater reductions in depression occurred in older participants and those with higher self-esteem. **Conclusions:** Several markers of treatment response, over-and-above the specific effects of treatment, to two distinct treatments for BED were identified that have utility for prognosis and prescription of specific treatments.

**165-P****PDA Use Improves Adherence to Self-Monitoring in the SMART Trial**

Mindi A. Styn, Okan Umit Elci, Katie Daniluk, Stacie Groff, Carrie Littlepage, Lora E. Burke *Pittsburgh, PA*

Self-monitoring is considered the cornerstone of obesity treatment. However, many individuals find self-monitoring to be tedious and burdensome. The SMART Trial is a 24-month clinical trial that aims to determine whether using a personal digital assistant (PDA) with or without tailored daily feedback (FB) is superior to using a standard paper diary (PD) for self-monitoring. The PDA included a database for dietary nutrients and types of exercise. In the SMART Trial, 210 men and women were randomized to one of 3 groups based on self-monitoring approach: PD, PDA or

PDA+FB. All three groups received standard behavioral treatment for weight loss including calorie and physical activity goals and group intervention sessions. Here we report on the effect of the self-monitoring approach on adherence to self-monitoring in the first 12 months of treatment. The sample was predominantly female (84.8%), White (78.6%), employed full-time (82.9%), and obese (76.2%, median BMI = 33.0 kg/m<sup>2</sup>), with a median age of 49 years. Self-monitoring declined over time in all three groups. The PD group was less adherent to self-monitoring compared to the PDA (est. [SE]: 1.91 [0.56], p<.01) and PDA+FB groups (est. [SE]: 2.31 [0.55], p<.01). A trend was seen for better adherence to self-monitoring in the PDA+FB group compared to the PDA group; however, the difference was not statistically significant. Adherence to self-monitoring using a PDA appears to be superior to adherence when using a standard PD for self-monitoring. Future studies need to further explore the role of automated feedback in diet and exercise self-monitoring.

**166-P****Diabetes Prevention Program (DPP) Lifestyle Coaches Use Standard Session Content and Problem Solving as a Common Response to Participant Barriers**

Elizabeth Venditti *Pittsburgh, PA*; Linda Delahanty *Boston, MA*; Sharon Edelstein *Rockville, MD*; Mary Hoskin *Phoenix, AZ*; Lisa Mele *Rockville, MD*; Judith Wylie-Rosett *Bronx, NY*

DPP reported the benefits of lifestyle versus metformin and placebo intervention to prevent type 2 diabetes. To evaluate the translatability of this lifestyle intervention we examined available process data for 1,076 lifestyle participants collected after each treatment interaction. Coaches specified internal and external barriers to weight loss (WL) and physical activity (PA) and intervention approaches utilized. We analyzed the initial 16 session CORE and follow up POSTCORE period separately for an average of 50 sessions/participant. Top WL barriers reported during CORE were rank ordered by the percentage of participants ever experiencing them as: inconsistent self-monitoring (58%); social cues (58%); vacations/holidays (54%); too little PA (48%); and thought/mood cues (44%). PA barriers were ranked as: vacations/holidays (51%); time management (50%); thought/mood cues (30%); illness (29%), and motivation (26%). The percentage of participants reporting WL and PA barriers increased during POSTCORE by over 25%. Significantly more women, younger adults, non-whites, and those with BMI≥35 reported barriers compared to others in both treatment phases. Beyond standard session content, coaches indicated “no strategy applied” for a large percentage of participants at least once (CORE≥95%; POSTCORE≥80%). Also for a majority of participants “problem solving” - the analysis of behavior chains and formulating action plans- was reported at least once (CORE≥75%; POSTCORE≥90%). Approaches with added cost were used with a minority of participants (CORE≤10%; POSTCORE≤50%). Although participant barriers increased over time, systematic no-added-cost behavioral methods were the most common coaching response. We conclude that the DPP lifestyle treatment model can be translated in the “real world.”

**167-P****An Educational Intervention Combining Small-Group Seminars and Emails Prevents Weight Gain in Young Adults Over the First Two Years of University**

Marie-France Hivert, Myriam Doyon, Christine Brown, Jean-Pierre Cuerrier, Andre Carpentier, Marie-France Langlois *Sherbrooke, Canada*

**Background:** Weight gain during early adulthood is associated with higher risk of obesity and its complications. Adoption of healthy lifestyles at this critical time could lead to lasting healthier life. **Methods:** A randomized controlled trial testing two interventions compared to a control group: 1) small-group seminars for two years and 2) small-group seminars during the first year, followed by monthly email intervention during the second year (combined). The content of the intervention was the same: knowledge and skill-building to adopt healthy lifestyles (eating and physical activity). Primary outcome was weight change over 24 months. **Results:** At baseline, participants (n=318) were 20.7±3.3 years old, 73% were women, BMI was 23.3±3.4kg/m<sup>2</sup>, and HOMA-IR was 2.84±1.37. At baseline, students reported eating 5.2±2.4 fruits/vegetables per day and spending 2.21±1.72 kcal/kg/day in leisure activities. At 24 months, the combined intervention

group maintained their weight ( $-0.06 \pm 3.00$  kg) while the control group gained  $1.09 \pm 3.50$  kg ( $p=0.05$ ). Insulin resistance (HOMA-IR) decreased ( $-0.39 \pm 1.31$ ) with combined intervention while it increased ( $+0.33 \pm 1.43$ ) in controls ( $p=0.009$ ). The combined intervention group maintained fruit/vegetable consumption ( $+0.2 \pm 2.2$  per day) and leisure physical activity levels ( $+0.01 \pm 1.77$  kcal/kg/day) while they slightly decreased in controls ( $-0.1 \pm 2.2$  per day and  $-0.16 \pm 1.73$  kcal/kg/day – non-significant difference between groups). We found no significant difference between seminars-based only and control groups in weight or lifestyle at 24 months. Conclusions: A combined seminar+email-based 2-year intervention about healthy lifestyles prevents weight gain and improves insulin resistance in young adults.

**168-P**  
**Weight Loss Impacts Pre-Diabetes in Participants in an Ongoing Behavioral Treatment Program**

Linda Grant, Linda Gotthelf *Boston, MA*

Research has shown that weight loss is an effective means of preventing pre-diabetes from progressing into diabetes. Unfortunately, many health care professionals do not recommend intensive lifestyle change and weight loss for patients with pre-diabetes. This study assessed changes in medical risk factors and medication use in individuals who entered an HMR (Health Management Resources) Program with a fasting blood glucose between 100 - 125 mg/dL, were not on diabetes medications and had no previous diagnosis of diabetes ( $n=259$ ). The average weight loss was 48 lbs over an average of 3.2 years. The average total risk factor score (including changes in medical and lifestyle risk factors and personal health history) decreased by 29 points. 23% of cholesterol and blood pressure medications were discontinued and only 3 individuals (1%) were on oral diabetes medications or insulin at follow-up. When the data were analyzed by those whose fasting blood glucose at follow-up was  $< 100$  ( $n=175$ ) vs.  $> 100$  mg/dL ( $n=84$ ), significant differences were found. Those whose glucose was  $< 100$  lost more weight on average ( $p<.01$ : 56 lbs vs. 30 lbs) and had greater decreases in TC/HDL (14.8% vs. 10.6%) and triglycerides ( $p<.05$ : 26.3% vs. 5.3%). Additionally, for those with  $< 100$  glucose, 26.4% of cholesterol and blood pressure medications were discontinued and no patients went on diabetes medications at follow-up compared to 16.9% decrease in medications and 3 patients on diabetes medications for those  $> 100$  glucose. In general, lifestyle change and weight loss for those with pre-diabetes can positively impact medical risk factors and medication use but those who maintain lower glucose levels had greater risk factor changes.

**169-P**  
**Greater Weight Loss Leads to Greater Changes in Medication Use in an Ongoing Treatment Program**

Linda Gotthelf, Linda Grant *Boston, MA*

Research has shown that weight loss and lifestyle changes can help individuals to reduce their use of many medications. The amount of weight loss, however, may impact the actual reduction experienced. Data from ongoing treatment programs can more accurately reflect the outcomes individuals can expect. This study assessed the changes in medications and risk factors for individuals participating in the HMR Program for Weight Management ( $n=1246$ ) in 42 different clinics. All patients completed an initial health risk appraisal (HRA) upon entering the program and a follow-up HRA in maintenance between July and November, 2009. The average weight loss was 39 lbs over an average of 198 weeks (almost 4 years). The data were analyzed by 4 categories of weight change from initial to follow-up:  $> 75$  lbs (average of 110 lbs or 34.5% of initial weight), 50-74 lbs (average of 59 lbs or 22.3%), 25-49 lbs (average of 36 lbs or 15.5%) and  $< 25$  lbs (average of 8 lbs or 3.8%). Data showed a dose-response relationship between weight loss and medication elimination. Those losing the most weight ( $> 75$  lbs) had the greatest changes in medication use with 52.5% of the medications eliminated (cholesterol, blood pressure, and insulin and oral diabetes medications). For the other weight change categories, 32.8%, 21.2% and 12.7% of medications were eliminated, respectively. These data do not include changes in medication dosages. In summary, greater weight losses, on average, lead to greater reductions in medication use. Health professionals should encourage greater weight losses and reinforce the elimination or reduction in medication use as a motivating factor for individuals participating in ongoing treatment programs.

**170-P**  
**Daily Weight Monitoring May Spur Larger Weight Gains and Losses in Moderately Overweight Freshman Females**

Shawn N. Katterman, Meghan L. Butryn, Michael R. Lowe *Philadelphia, PA*

Some research has indicated that daily weight monitoring may prevent weight gain (Levitsky et al., 2006) yet other studies have found no effect (Butryn, 2006). The current study aimed to examine the effect of daily weighing in freshman females with BMIs of 23-30 kg/m<sup>2</sup> since these individuals may be particularly prone to weight gain (Ogden et al., 2007). Forty-two participants were randomly assigned to daily weight monitoring ( $n = 25$ ) or an assessment-only control group ( $n = 17$ ) for 8 weeks. Mean weight gain across conditions was 1.03 lbs ( $SD = 4.45$ ) and was not significantly different between conditions, however, a chi-square test revealed a significant effect of condition on whether or not participants maintained their weight within 3 lbs ( $\chi^2(2, N = 42) = 5.433, p = .02$ ). Specifically, 60% (24% lost weight, 36% gained) of the daily weighing group gained or lost more than 3 lbs, whereas only 24% (6% lost weight, 17% gained) of the control group had a weight change of this magnitude. Results suggest that among individuals with relatively high BMIs, daily weighing may have spurred larger weight changes in both directions. Future research should examine this relationship with larger samples and look for potential moderators of weight change in these individuals. If replicated, results suggest that frequent weighing in women with above-average body weight might paradoxically produce accelerated weight gain in a sub-set of these individuals.

**171-P**  
**Impact of a 24-Hour Complete Fast on Food Preference and Explicit and Implicit Hedonic Measures of Food Reward**

Jameason D. Cameron *Ottawa, Canada*; Graham Finlayson, John E. Blundell *Leeds, United Kingdom*; Eric Doucet *Ottawa, Canada*

Background: Food preference and hedonic processes have been shown to change in a state-dependent (i.e. hungry vs. satiated) manner, but the impact of prolonged energy deprivation on these reward-related variables has not been evaluated. Our objective was to examine the association between a 24 hour fast and food preference and the 'liking' and 'wanting' of foods. Methods: Results presented herein are from an ongoing randomized repeated measures crossover study of men ( $n=4$ ) and women ( $n=2$ ) (age= $26.8 \pm 8.8$ ) undergoing two testing sessions, one in the fed state and the other fasted. Subjective appetite sensations, explicit and implicit hedonic processes, and food preference were measured by a computer-based paradigm immediately before and after a fixed energy lunch meal. Subjects were then offered an ad libitum dessert. Energy and macronutrient intake were measured. Also measured were body weight (BW) and body mass index (BMI). Results: There were no significant changes in BW ( $77.5 \pm 22.9$  vs.  $76.8 \pm 23.1$  kg) or BMI ( $25.7 \pm 5.0$  vs.  $25.4 \pm 5.0$  kg/m<sup>2</sup>); all results herein are presented fed and fasted, respectively. For the fasting condition computer-based subjective 'liking' of high fat sweet foods was increased post lunch ( $60.9 \pm 23$  vs.  $74.2 \pm 7.2$ ,  $p<0.05$ ) alongside non-significant trends ( $p=0.1$ ) of increased ad libitum sugar ( $18.6 \pm 6.5$  vs.  $21.9 \pm 6.9$ ) and fat ( $8 \pm 4.5$  vs.  $11.3 \pm 4.2$ ) consumption; furthermore satiation did not cause a decrease in explicit 'wanting' for high fat sweet foods post lunch ( $43.2 \pm 28.2$  vs.  $70.8 \pm 12.8$ ). Conclusions: Fasting for 24 hours altered food preferences and hedonic processes, attenuating post lunch negative alliesthesia, suggesting fasting augments multiple dimensions of food reward.

**172-P**  
**Food Compensation: Do Exercise Ads Make You Overeat?**

Ellen Van Kleef *Wageningen, Netherlands*; Mitsuru Shimizu, Brian Wansink *Ithaca, NY*

Past research showed that promotional messages such as food advertising influence food consumption. What has gone largely unexplored is the effect of exercise advertising on food intake. This study experimentally tested the effects of exposure to exercise commercials on food intake at a lunch meal as compared to the effects of control commercials. Before lunch, 125 participants (71 women, 54 men) watched 8 commercials, either all related to exercise or fitness ( $n=67$ ) or neutral products (i.e. car insurance) ( $n=58$ ). The post-lunch questionnaire included body mass index, exercise habits, motivation and dietary restraint. Despite marginally higher ratings of hunger, participants being exposed to exercise commercials reduced

their caloric intake of the meal by 21.7% relative to the control condition. Watching exercise messages increased the perceived healthiness and liking of the meal. Although dietary restraint did not impact food intake, we also find that the intake reduction was more pronounced for overweight individuals. Furthermore, participants with low exercise intentions ate larger pasta portions while those with high intentions ate smaller portions. Some relevant differences were observed between these groups which suggest that the explanation might lie in the health and body consciousness evoked by the ads. These results imply that exercise messages remind people of the link between food and physical activity and prompt them to change their consumption. It also highlights the need for increased awareness that these messages have powerful influences not only on exercise behavior, but also on closely related behaviors such as eating.

**173-P****Risk Factor Changes in Participants With BMI >40 in an Ongoing Treatment Program**Linda Gotthelf, Linda Grant *Boston, MA*

Many health care professionals believe that obese individuals are unable to lose and maintain larger amounts of weight. Substantial weight loss, including weight loss maintenance, is possible in an intensive, ongoing behavioral program focusing on specific lifestyle changes. This study assessed weight, lifestyle and medical risk factor changes for individuals who entered an HMR (Health Management Resources) Program with a BMI > 40 kg/m<sup>2</sup> (n=456) and were participating in maintenance between July and November 2009 in 36 different programs. All patients completed an initial health risk appraisal (HRA) upon entering the program and a follow-up maintenance HRA. Overall, the average time between HRAs was 3.2 years and the average weight loss was 60 pounds (20.3% of initial weight). Averages, however, can mask differences in outcomes. When analyzed by weight change group (> 75 lbs, 50 to 74 lbs, < 50 lbs), a dose-response relationship was found in the total risk factor score, a summary of changes in lifestyle and medical risk factors and personal health history. Those losing > 75 lbs (average of 114 lbs, 34.7% of initial) decreased total risk factor scores by an average of 36 points, those losing 50-75 lbs (average of 59 lbs, 20.1%) decreased by 33 points, and those losing < 50 lbs (average of 26 lbs, 9.4%) decreased by 25 points. On average, although patients who lost > 75 lbs started at the highest BMI (50 kg/m<sup>2</sup>), they had the greatest overall changes and ended with risk factor scores below the “average healthy American”. Making substantial lifestyle changes in physical activity and diet to lose larger amounts of weight can positively impact on risk factors, even in the longer-term.

**174-P****Changes in Medical Risk Factors and Medication Use With Participation in an Ongoing Treatment Program**Linda Grant, Linda Gotthelf *Boston, MA*

Weight loss has been documented to lower medical risk factors and medication use. Health professionals, however, differ on the amount of weight loss they recommend as necessary for such medical improvements. This study assessed changes in medical risk factors and medication use for individuals who entered an HMR (Health Management Resources) Program with a BMI > 40 kg/m<sup>2</sup> (n=456) and were participating in maintenance between July and November 2009. The average weight loss was 60 pounds (20.3% of initial weight) over an average of 3.2 years. Data were analyzed in 3 weight change groups: the average weight loss was 114 lbs (34.7% of initial weight) for those in the > 75 lb group, 59 lbs (20.1%) in the 50 to 74 lb group, and 26 lbs (9.4%) in the < 50 lb group. There was a dose-response relationship between groups (p<.01) in all measured medical risk factors (total cholesterol/HDL, triglycerides, fasting glucose, systolic and diastolic blood pressure). There was also a dose-response relationship between percent of medications eliminated (reduction in dose was not included) for those entering on cholesterol, blood pressure or diabetes medications (oral or insulin). Those losing > 75 lbs eliminated 52% of medications at follow-up vs. 24.8% and 19.6%, respectively, for the other 2 groups. While the medical standard of 5-10% of initial body weight is worthwhile, clearly, the more weight people lose, the greater the reduction in medical risk factors and the greater the decrease in medication use.

**175-P****Young Obese Subjects Do Not React Differently to Mental Stress Than Lean Ones: Oman Family Study (OFS)**Deepali S. Jaju, Sulayma Albarwani, Riad Bayoumi, Said Al Yahyee, Mohammed Hassan Muscat, *Sultanate of Oman*

Background: Limited information is available on comparative differences in cardiovascular reactivity of young obese and lean subjects. Objective: To study hemodynamic and autonomic reactivity to mental stress in obese and lean subjects (18-35years) selected from five multigenerational Arab families which participated in OFS and having a high degree of consanguinity and environmental homogeneity. Methods: Data of anthropometry, lipid profile, fasting and 2-hour glucose and insulin and cardiovascular parameters were extracted from OFS for all obese (N=70; BMI >30Kg/m<sup>2</sup>; Males 41%; age 26.1+6.7years) and lean subjects (N=230; BMI 18.5-24.9Kg/m<sup>2</sup>; males 39%; age 22.7+6.3years). The hemodynamic parameters were recorded during 10 minutes of rest and 3 minutes of mental stress (Word conflict test; WCT) using impedance cardiography (TFM, CNSystems). Spectral analysis of R-R intervals was used to deduce autonomic parameters. Baroreceptor sensitivity (BRS ms/mmHg) was estimated using the sequence method. Reactivity to WCT was analyzed using repeated-measures ANOVA adjusted for age. Results: Compared to lean, obese subjects had significantly higher waist circumference, TG, LDL, insulin resistance, resting systolic BP (SBP; P=0.003) and total peripheral resistance index (P=0.0001). They had significantly lower resting stroke and cardiac indices, total power spectral densities (P=0.02) and BRS (P=0.02). There was no difference in hemodynamic and autonomic reactivity between the two groups. Conclusion: Although obese subjects had higher resting SBP and sympathetic drive and lower BRS, they had similar cardiovascular reactivity to mental stress compared to lean subjects, indicating that obesity does not influence cardiovascular reactivity to mental stress in this young Arab population.

**176-P****Beyond Text-Messaging: The Development and Early Outcomes of a Next-Generation Mobile Phone Intervention For Weight Control**J. Graham Thomas, Rena R. Wing *Providence, RI*

Background: Behavioral weight loss treatment is generally effective, but outcomes are variable, possibly because interventions are not tailored to patients' specific needs, and patients receive no support between treatment sessions. Mobile phones show great promise for improving weight loss outcomes. They are widespread, internet-connected, capable of performing complex functions, and always in the owner's possession. Methods: “Health-E-Call” is a 12-week weight loss program using internet-enabled smartphones to deliver sophisticated, tailored, multimedia intervention and support. In addition to weekly face-to-face treatment, participants use mobile phones to: (a) self-monitor daily weight, food intake, and exercise, (b) identify, monitor, and intervene upon their own specific problem behaviors, (c) receive real-time feedback on self-monitoring records, and (d) view brief videos with instructions for modifying behavior in specific situations as they occur (e.g., restaurant eating). Results: Twenty participants are being accrued via open enrollment. The first three participants have completed an average of 5 weeks in Health-E-Call, achieving an average weight loss of 11.8 lbs (2.4 lbs./wk). Complete self-report records have been submitted on 99.2% of days. Despite variability in comfort using technology, participants report very high levels of satisfaction with the program. Ease of self-monitoring, real-time feedback, and increased accountability are reportedly the most helpful treatment components. Conclusions: Weight loss treatment delivered via mobile phone is feasible, acceptable to patients, and highly effective. Full data will be available for 10 participants by the annual meeting.

**177-P****Motivational Interviewing to Improve Weight Loss in Overweight Patients: A Systematic Review and Meta-Analysis of Randomized Controlled Trials**Marni J. Armstrong, Tony A. Mottershead, Paul E. Ronksley, Brenda R. Hemmelgarn, Ronald J. Sigal *Calgary, Canada*

Background: Motivational interviewing is a directive, patient-centered counseling style that aims to help patients explore and resolve ambivalence surrounding behavior change. It has emerged as a useful approach to help individuals with health behavior change, particularly within the addictions



field. However, the effectiveness of motivational interviewing in weight loss interventions is unclear. **Methods:** We undertook a systematic review and meta-analysis of randomized controlled trials (RCTs) to evaluate the effectiveness of motivational interviewing for weight loss among overweight/obese individuals. Following the PRISMA (Preferred Reporting Items for Systematic reviews and Meta-analyses) guidelines, electronic databases were systematically searched for RCTs evaluating behavior change interventions using motivational interviewing in overweight or obese adults with body mass index (BMI) > 25.0 kg/m<sup>2</sup>. **Results:** The search strategy yielded 3,540 citations, of which 101 were selected for full text review. 15 studies met the inclusion criteria and 12 were included for meta-analysis. A total of 977 intervention and 798 control participants with a mean age of 51.8 (7.3) years were included in the analysis. Motivational interviewing was associated with a reduction in BMI (weighted mean difference (WMD), -0.20kg/m<sup>2</sup>; 95% CI, -0.42, 0.02kg/m<sup>2</sup>) and a significant reduction in body weight (WMD, -1.32kg; 95% CI, -1.98, -0.67kg), compared to controls. Restriction of studies investigating change in body weight as the primary outcome demonstrated an enhanced effect of motivational interviewing on reduction in body weight (WMD, -1.90kg; 95% CI, -2.41kg to -1.38kg). **Conclusion:** Motivational interviewing appears to enhance weight loss in overweight and obese patients compared to controls.

**178-P**  
**Links Among Mothers' Disinhibited Eating, Children's Disinhibited Eating, and Children's Adiposity**

Jaclyn M. Zocca, Lauren B. Shomaker, Marian Tanofsky-Kraff, Kelli M. Columbo, Gina R. Raciti, Susan Z. Yanovski, Jack A. Yanovski *Bethesda, MD*

**Background:** Disinhibited eating behaviors—such as binge eating and eating in the absence of hunger (EAH)—are familial and have been linked to pediatric obesity. Few studies, however, have examined the relationship of parents' disinhibited eating with children's eating and adiposity. We, therefore, investigated the direct and indirect associations of mothers' binge eating and EAH with children's loss of control (LOC) eating, EAH, and adiposity. **Methods:** 288 youth (49% female, age 13.5±2.7y, BMI-z 0.8±1.1) reported their LOC eating by interview and questionnaire. Children completed a questionnaire to measure EAH. Child adiposity was estimated by BMI-z and air displacement plethysmography. Mothers reported their binge eating and EAH by questionnaire and also reported their highest, non-pregnant BMI (30.3±7.6 kg/m<sup>2</sup>). **Results:** In structural equation models that controlled for mothers' BMI in all analyses, mothers' binge eating related specifically to children's LOC eating, and mothers' EAH related to children's EAH (Ps<0.001). Despite moderate associations between binge/LOC and EAH within mothers and within children, links between mothers' binge eating and child EAH, and between mothers' EAH and child LOC were not significant. Mothers' binge eating was indirectly associated with children's adiposity through child LOC eating (P=0.01). Likewise, mothers' EAH was indirectly associated with children's adiposity through child EAH (P=0.03). **Discussion:** Mothers and children share similar disinhibited eating styles, which may reflect both genetic and environmental influences. Longitudinal data are required to investigate whether maternal eating plays a role in shaping the development of children's disinhibited eating behaviors and vulnerability for obesity.

**179-P**  
**Obesity and Comorbid Psychiatric Concerns: Effects of a Family-Based Behavioral Treatment For Childhood Obesity in a Diverse Sample**

Thrudur Gunnarsdottir, Urdur Njardvik, Anna Sigridur Olafsdottir *Reykjavik, Iceland*; Linda Craighead *Atlanta, GA*; Ragnar Bjarnason *Reykjavik, Iceland*

**Background:** Limited data exists on the effects of family-based behavioral treatment (FBBT) for children with concurrent psychiatric and/or learning-related concerns. **Objective:** To assess the effects of FBBT including children with comorbidities. **Methods:** Eighty-four obese children (mean-BMI-SDS=3.11,-aged-7.5-13.6-years) and a participating parent started treatment. Sixty-one families completed treatment and were followed for one year post treatment. Measurements included height, weight, reports of psychological well-being (SDQ, MASC, CDI, Piers-Harris), and academic competencies. **Results:** At baseline 55% of the participating children exceeded cutoff scores for psychiatric and/or learning-related

concerns. The presence of a comorbid condition was not associated with treatment drop-out (p>0.05). BMI-SDS decreased significantly from pre to post treatment (mean-difference=0.40-points-sd=0.29,-F(2,60)=110.31,-p<0.001) which was maintained at one-year follow-up (F(2,60)=1.33,-p=0.253). Children who were initially above the clinical cutoff on parent-reported hyperactivity (SDQ-subscale-T-score≥65) reduced their BMI-SDS less during treatment than children with lower hyperactivity scores (t(59)=-2.2,-p<0.05) whereas children who were initially above the clinical cutoff for social anxiety (MASC-subscale-T-score≥65) reduced their BMI-SDS significantly more than children with lower social anxiety scores (t(58)=2.49,-p<0.05). The social anxiety effect was still present at one year follow-up (t(58)=2.22,-p<0.05), but not the hyperactivity effect (p>0.05). No differential response was shown for children with higher depression, lower self-concept or academic concerns. **Conclusions:** Obese children are a heterogeneous group, with a high rate of comorbid conditions. Children who had greater difficulties with impulsive behavior lost less weight in standard FBBT, perhaps because they find it particularly difficult to refrain from overeating. Tailoring FBBT to address comorbid concerns might improve treatment outcomes for certain subgroups.

**180-P**  
**Purchasing and Commuting Patterns of 4th-6th Graders Before and After School**

Stephanie S. Vander Veur, Kelley E. Borradaile, Tara Alexis McCoy, Tina Nguyen, Swapna Mehta, Sandy B. Sherman, Brianna Sandoval, Allison Karpyn, Joan Nachmani, Gary D. Foster *Philadelphia, PA*

Schools are a common venue to conduct obesity prevention programs for children. However, even the most effective school-based programs could be undermined by competitive food offerings proximal to schools. The purpose of this study was to investigate the before- and after-school purchasing and commuting patterns of ethnically diverse, urban students. A 16-item questionnaire was administered at baseline before any intervention occurred. Data were obtained from 10 K-8 schools where (mean ± SD) 82.1 ± 7.4% of students were eligible for free or reduced price meals. Participants were 4th-6th grade students (N = 702; 56.3% females) with a mean age of 11.0 ± 1.0 y. Most participants were African American (43.5%) or Hispanic (30.6%). Almost half were overweight (17.8%) or obese (27.2%). 71.3% of children reported either walking to or from school; 4.1% in the morning only, 13.4% in the afternoon only, and 53.8% in both the morning and the afternoon. Nearly three quarters (72.2%) reported either buying food or drink in the morning or the afternoon; 13.0% in the morning only, 14.4% in the afternoon only, and 44.8% in both the morning and afternoon. On average, children reported spending \$1.96 (± 1.35) per trip on food or drink before (\$1.99±1.35) or after (\$1.94±1.47) school. These data suggest that the time between home and school may be a useful target for behavioral and/or environmental strategies to prevent obesity among low-income, ethnically diverse children.

**181-P**  
**Sleep Duration and Weight Status Among Ethnically Diverse 6th-8th Graders**

Alexis Wojtanowski, Kelley E. Borradaile, Tara Alexis McCoy, Stephanie S. Vander Veur, Sandy B. Sherman, Brianna Sandoval, Joan Nachmani, Gary D. Foster *Philadelphia, PA*

Previous studies have shown a relationship between sleep duration and obesity but most were conducted in ethnically homogeneous, young, and predominantly healthy weight children. The purpose of this study was to assess the relationship between hours of sleep and weight status in ethnically diverse 6<sup>th</sup>-8<sup>th</sup> graders. Data were obtained from 10 K-8 schools where (mean ± SD) 82.1 ± 7.4% of students were eligible for free or reduced price meals. Heights and weights were measured, and participants self-reported the time they went to bed and the time they woke up on both weekdays and weekends. Participants (n = 510) were 57.1% female, predominantly African American (38.4%) or Hispanic/Latino (31.4%), with a mean age (mean ± SD) of 13.0 ± 1.0 y. Almost half were overweight (18.0%) or obese (29.2%). General linear models were used to assess the relationship between relative weight and hours of sleep after controlling for school. Models with and without outliers (defined as < 5 hours or > 12 hours of sleep) were similar. Children reported sleeping 8.6 ± 1.4 and 9.6 ± 2.2 hours on weekdays

and weekends, respectively. There was no relationship between weight category (underweight, healthy weight, overweight, obese) and hours of sleep on weekdays ( $p = .59$ ) or weekends ( $p = .48$ ). Similarly, there was no relationship between BMI z-score and hours of sleep on weekdays ( $p = .94$ ) or weekends ( $p = .06$ ). These data suggest that sleep duration is not associated with weight status among ethnically diverse 6<sup>th</sup>-8<sup>th</sup> grade students.

### 182-P Breakfast Consumption Among Low-Income, Ethnically Diverse 6th-8th Graders

Tara Alexis McCoy, Kelley E. Borradaile, Alexis Wojtanowski, Amy Virus, Stephanie S. Vander Veur, Sandy B. Sherman, Brianna Sandoval *Philadelphia, PA*; Gretchen Van Wye *New York, NY*; Joan Nachmani, Gary D. Foster *Philadelphia, PA*

There are growing efforts to increase school breakfast consumption. However, the frequency of breakfast consumption outside of school is unknown. The purpose of this study was to assess morning food and drink consumption patterns among ethnically diverse 6<sup>th</sup>-8<sup>th</sup> graders. Data were obtained from 10 K-8 schools where (mean  $\pm$  SD) 82.1  $\pm$  7.4% of students were eligible for free or reduced price meals. Heights and weights were measured and participants self-reported (in the morning before lunch) whether they had eaten or drunk anything that morning from: home; corner store/restaurant; school cafeteria; or classroom. Participants ( $n = 457$ ) were 56.5% female, predominantly African American (36.8%) or Hispanic/Latino (34.4%), with a mean age (mean  $\pm$  SD) of 13.0  $\pm$  1.0 y. Almost half were overweight (18.6%) or obese (29.3%). Approximately 25% (23.6%) reported consuming no food or drink, 47.9% reporting consuming food or drink from one location, and 28.4% reported consuming food or drink from  $\geq 2$  locations on that morning. Differences between students who did or did not consume anything in the morning were assessed using general linear models and Cochran-Mantel-Haenszel statistics after controlling for school. There were no differences between these two groups with respect to age ( $p = .93$ ), gender ( $p = .86$ ), race/ethnicity ( $p = .22$ ), or weight category ( $p = .94$ ). Efforts to increase school breakfast consumption should consider the significant variability of morning food or drink consumption among low-income, ethnically diverse children.

### 183-P Psychological Distress May Decrease Strength of Self-regulation in Obese Adolescents in CBT Immersion Treatment

Daniel Kirschenbaum, Kristina Pecora Kelly *Chicago, IL*; Julie Germann *Dallas, TX*

The results of numerous studies indicate that psychological distress negatively impacts success in weight control. However, the mechanisms by which this occurs remain unclear. The present study included obese young people enrolled in two Wellspring Camps, a cognitive-behavior therapy (CBT) immersion treatment. We tested the hypothesis that psychological distress negatively impacts effortful self-regulated behaviors during weight loss. Participants in Wellspring Camps during 2009 ( $n = 252$ ; 90.9% female; M age=15.7; M BMI= 36.0; M % overweight = 68.8; M attendance = 5.8 weeks) received a very low-fat diet, a goal of >10,000 steps per day, and intensive CBT. Initial assessments included BMI, psychological distress, binge eating, and 48-hour dietary recall. Process measures assessed consistency of self-monitoring and journaling and number of steps recorded daily on pedometers. Results indicated that participants very significantly improved (all  $P < .0001$ ): % overweight (Ms= initial 69% to end 53%), psychological distress, and fitness (M reduction in timed mile= 16.2 m to 13.6 m). Hierarchical multiple regression analyses showed that elevated initial psychological distress (which was correlated with binge eating) predicted decreased consistency of self-monitoring and decreased activity levels. The powerful impact of the intervention (rate of weight loss 300% higher than typically reported for outpatient treatment) may have obfuscated the potential impact of initial distress on weight change during camp. However, prior research suggests that the degree of reduction in strength of self-regulation that was observed during treatment (especially decreased self-monitoring) may well predict failure in the long run for some of those who began treatment with elevated levels of psychological distress. A 1-year follow-up is in progress.

### 184-P Parent Behavioral and Environmental Changes Associated With Weight Loss in Obese Children

Kerri Boutelle, Guy Cafri *La Jolla, CA*; Scott Crow *Minneapolis, MN*

A comprehensive behavioral treatment program for childhood obesity includes a focus on improving parenting skills and behaviors, however, there is no data as to which of these is most effective. Eighty obese children and their parents participated in a 5-month behavioral treatment program, as part of a trial comparing a parent-only to parent+child treatment. Measures were administered at baseline, post-treatment, and 6-month follow-up. Outcome measures were BMI and BMI-Z. Predictors were time, condition, time by condition interaction, gender, household income, weighing frequency, home food environment, parenting style, parent caloric intake, parent physical activity level, restriction of child intake, encouragement of child, doing activity with child, and parent BMI. Analyses showed the only significant predictor of child weight loss was parent BMI. For child BMI as the outcome, the effect of parent BMI was  $b = .343$ ,  $p < .001$ , 95% confidence interval: (.90, .496). A within-subjects interpretation suggests that changes in parent BMI are associated with a change in their child's BMI. Specifically, a 1 unit decrease in parent BMI is associated with a .343 reduction in child BMI, controlling for all other variables in the model. A similar effect was observed when BMI-Z was the outcome. These results are consistent with other studies which identify parent weight loss as the best predictor of child weight loss. Future intervention studies should focus on parent weight loss to improve child weight loss.

### 185-P Playing Video Games Promotes Overconsumption of Food: A Randomized Crossover Study in Adolescents

Jean-Philippe Chaput, Trine Visby, Signe Nyby, Lars Klingenberg, Nikolaj T. Gregersen *Copenhagen, Denmark*; Angelo Tremblay *Quebec, Canada*; Arne Astrup, Anders M. Sjødin *Copenhagen, Denmark*

Objective: To examine the acute effects of playing video games on various components of energy balance. Methods: Using a randomized crossover design, 22 healthy, normal weight male adolescents (mean  $\pm$  SD age: 16.7  $\pm$  1.1 years) completed two 1-hour experimental conditions, namely video game play and rest in a sitting position, followed by an ad libitum lunch. The primary endpoints were spontaneous food intake, energy expenditure, stress markers, and appetite sensations. Results: Heart rate, systolic and diastolic blood pressure, and mental workload were significantly higher during the video game play condition compared to the resting condition ( $P < 0.01$ ). Energy expenditure was significantly higher during the video game play condition compared to resting (mean increase over resting: 89 kJ,  $P < 0.01$ ). Ad libitum energy intake after the video game play condition exceeded that measured after rest by 335 kJ ( $P < 0.05$ ), resulting in a positive energy balance of 246 kJ (59 kcal,  $P < 0.05$ ) after one hour of video game play. Interestingly, the eating speed was the same for both conditions. The increase in food intake associated with playing video games was also observed without increased feelings of hunger and was not compensated for during the rest of the day. Conclusions: A single session of video game playing promotes overconsumption of food regardless of appetite sensations. Future studies should address whether the "eating in the absence of hunger" associated with the practice of seated video games is more related to an impairment in satiety signals capacity or to the mental-stress-induced reward system.

### 186-P Lifestyle Intervention Using Interactive Guided Imagery<sup>SM</sup> (IGI) Increases Intuitive Eating (IE) Behaviors Which Are Associated With Reduced Adiposity in Obese Latina Female Adolescents

Tanja C. Adam, Kati Konersman, Elyse Resch, Marc J. Weigensberg *Los Angeles, CA*

Background: Intuitive eating is a non-dieting, health-promoting approach to food choices and physical activity. IGI is a mind-body therapeutic modality that holds promise for motivating behavioral change. Objectives: 1. To determine effects of a randomized, 12-week pilot lifestyle + IGI intervention in obese Latino adolescents on measures of IE; 2. To determine whether intervention-induced changes in IE are related to changes in adiposity. Methods: Obese Latino teens (14M/15F, age 15.3 $\pm$ 0.9, BMI 35.9 $\pm$ 5.2) received 12 weekly lifestyle education classes promoting IE behaviors, and

were randomized to receive either weekly individual IGI sessions (n=15), or non-health-related computer classes (CC, n=14). Adiposity was assessed by air plethysmography. IE behaviors were assessed using Hawks' IE Scale, consisting of 4 subscales. ANCOVA determined differences between groups and sex for changes in IE; partial correlations determined relationships between IE change and adiposity change. Results: IGI group had greater increases in Total IE score (0.32±0.36 vs. 0.15±0.29, p<.05) and Extrinsic Eating subscale score (0.23±0.65 vs. -0.22±0.41, p<.05) across the intervention compared to CC group. Self-Care subscale scores increased in the IGI group in girls only (1.25±0.35 vs. 0.45±0.72, p<.05). Changes in Extrinsic Eating (r=-0.60, p<.05) and Antidieting (r=-0.59, p<.05) subscale scores were inversely correlated with changes in percent body fat in girls only, adjusting for baseline values. Conclusion: This pilot intervention provides preliminary evidence that IGI increases IE behaviors, and that increases in IE behaviors may lead to reduced adiposity in obese girls.

**187-P**  
**Effects of Multidisciplinary Long-Term Therapy on Pro and Anti-Inflammatories Adipokines in Obese Adolescents**

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Background: Increasing evidence indicates that chronic mild inflammation linked to obesity is closely associated with the development of insulin resistance and cardiovascular disorders. A number of bioactive substances secreted from fat tissue, referred to as adipokines, could contribute to the complications of obesity through the regulation of inflammatory and immune responses. Objectives: To verify the effects of multidisciplinary long-term therapy on pro (adiponectin) and anti-inflammatories (TNF $\alpha$  and Leptin) adipokines in obese adolescents. Methods: 126 adolescents from both genders, aged 14 to 16 years old, were divided in two groups: sedentary obese (BMI higher than 95 percentile); and physically active eutrophic (BMI between 25 and 85 percentiles). Obese adolescents were submitted to a multidisciplinary long-term therapy (24 weeks), composed by physical exercise, nutritional, physiological and clinical support. Body composition was assessed by plethysmography and blood levels of TNF- $\alpha$ , Leptin and adiponectin by Elisa (phenox peptides), all evaluations were performed at three times: baseline, 12 and 24 weeks after intervention. Results: The results showed that as expected, at baseline obese adolescents presented higher values of leptin (p<.0000) and TNF $\alpha$  (p<.0001) than normal weight, no differences were observed to adiponectin. After interventions 24 weeks of therapy, there was a decrease in leptin, an increase in adiponectin and no changes in TNF $\alpha$ , in obese ones, and the alterations were higher in boys than girls. Conclusion: We could suggest that multidisciplinary long-term therapy was effective to improve the inflammatory profile in obese adolescents.

**188-P**  
**Effects of Sleep Restriction on Energy Balance in Adolescents**

Lars Klingenberg, Jean-Philippe Chaput *Copenhagen, Denmark*; Poul Jennum *Glostrup, Denmark*; Ulf Holmback *Uppsala, Sweden*; Arne Astrup, Anders M. Sjodin *Copenhagen, Denmark*

Background: Many behavioral factors in today's obesogenic environment may contribute to a positive energy balance and obesity. Coinciding with an increase in body weight, reduction in sleep time has been observed and epidemiological evidence shows a U-shaped relationship between sleep duration and BMI. Experimental data in adults are conflicting, but suggest that short-term sleep restriction leads to alterations in metabolic and endocrine functions. Aim: This intervention study aims to examine the effects of restricted sleep on energy balance. We hypothesize that short-term sleep curtailment is accompanied by an up-regulation of appetite-stimulating hormones, an increased spontaneous energy intake, and a reduced spontaneous physical activity. Methods: Male adolescents (n=24, iso-BMI<25kg\*m<sup>2</sup>, 15-19y) are recruited for this randomized, crossover study. Each participant is engaged, for 3 nights, in each of the two following conditions: (1) Short sleep (4h/night, 03:00-07:00); and (2) Long sleep (9h/night, 22:00-07:00). Sleep length is measured objectively using polysomnography. On day 3 we measure 24h energy expenditure in a

respiration chamber. The metabolic response to a standard meal is measured using a ventilated hood system. Appetite sensations are assessed using visual analogue scales followed by an ad libitum meal to evaluate spontaneous energy intake. Physical activity is measured using accelerometry. The primary endpoints are energy expenditure, spontaneous food intake, appetite sensations, spontaneous physical activity, and profiles of appetite-related hormones. Results: The study is ongoing and will be finished by the end of 2010. Interim results on energy expenditure, energy intake, appetite sensations, and physical activity will be presented at the meeting.

**189-P**  
**Latino Adolescent Lifestyle Modification Program: Pilot Study**

Margaret R. Rukstalis, Marcella Jativa, Eliana Piedrahita, Sharon Madalis, Adrienne Bakse, Chelsie L. Hauer, William J. Cochran *Danville, PA*; Robert I. Berkowitz *Philadelphia, PA*

Background: Latino adolescents are among those most at risk with limited access to treatment for obesity. Primary care (PC) interventions are urgently needed for Spanish speaking families. Methods: Treatment manuals for a 16-week PC intervention for adolescents with Body Mass Index (BMI)>28 kg/m<sup>2</sup> and their parents were tailored and translated into Spanish to emphasize family lifestyle goals that promote weight loss and maintenance. Results: Seven adolescents (2 F, 5 M), mean age 15.5 +1.5, mean BMI 35.4+ 3.55 consented to participate in group lifestyle modification program in primary care. Text was written in English and translated to Spanish using fewest and simplest words. Topic bullets and checklists helped emphasize behavior changes for healthy eating and increase physical activity. The acronym JOVEN (youth in Spanish) was used to focus on treatment goals:

- J Juntos (Family Meals, Role Models, Family Physical Activities)
  - O Optimismo (Think Positive, Have Fun)
  - V Viviende Saludable (Measure Healthy Habits, Eat 3 meals, Shop Smart)
  - E Ejercicio (Exercise): 60+ minutes/d physical activity, < 2 hours/d screen time
  - N Nutricion (Nutrition): Monitor and measure daily food, beverages, and caloric goal to reduce 500 calories/day [5-9 servings of vegetables (3+) and fruits (2); 4 servings of grains; 3 servings of low/no fat dairy; 2 servings of lean protein; <1 serving of high fat or high sugar food; 0 sugar beverages]
- Conclusions: All Latino parents and majority of adolescents used the Spanish translation of treatment manuals. Results of the adolescent LMP will be discussed.

**190-P**  
**Binge Status and Depression as Predictors of Weight Loss in a Multi-Site Randomized Trial of a Commercial Weight Loss Program**

Nancy E. Sherwood *Minneapolis, MN*; Cheryl L. Rock, Shirley W. Flatt *La Jolla, CA*; Njeri Karanja *Portland, OR*; Bilge Pakiz *La Jolla, CA*; Cynthia Thomson *Tucson, AZ*

Background: Successful weight loss and maintenance are challenging, underscoring the importance of understanding predictors of short and longer-term success. Factors such as binge eating and depression have been identified as poor prognostic indicators for weight loss. These analyses examine whether baseline binge eating and depression status are predictive of weight loss in women enrolled in a randomized clinical trial of a commercial weight loss program. Method: Adult women (n=442) were randomized to one of three treatment arms, Jenny Craig (JC) Centre-based, JC Direct (telephone-based), and usual care (UC) and are being followed for 24 months. Baseline values on the Eating Disorders Examination Questionnaire (EDE-Q) and the Beck Depression Inventory were used to predict 24-month weight change. Results: Among participants in the JC programs, baseline binge eating status was marginally associated with weight loss success (6.3 kg versus 8.1 kg for non-bingers, p < .09). There was also a non-significant trend for those with higher BDI scores to lose less weight than those with lower BDI scores (4.1 kg for those with high BDI scores versus 7.7kg) Conclusions: Results suggest that binge eating and depression status are marginally predictive of weight loss success. Future analyses will examine whether changes in binge eating and depression are associated with long-term weight loss maintenance.

## 191-P

**School Nurse-Delivered Intervention For Overweight and Obese Adolescents: Outcomes From a Randomized Controlled Trial**

Lori Pbert, Sue Druker *Worcester, MA*; Mary Ann Gapinski *Boston, MA*; Lauren Gellar, Robert Magner, George Reed *Worcester, MA*; Stavroula Osganian *Boston, MA*

School nurses have tremendous potential to treat adolescent overweight and obesity as they have the skills to provide weight-related guidance and can easily be accessed by students. This pilot study evaluated the feasibility and potential efficacy of a school nurse-delivered intervention model in reducing BMI and improving dietary quality, physical activity and sedentary behavior in overweight and obese adolescents. Overweight and obese adolescents were recruited from 6 high schools in Massachusetts. Schools were pair-matched and randomly assigned to one of two conditions, each consisting of six individual sessions with the school nurse: counseling intervention, or an information attention-control comparison program consisting of pamphlets provided by the school nurse. Assessments completed at baseline, 2- and 6- month follow-up consisted of questionnaires, physiological measurements, accelerometer assessment, and 24 hour dietary recalls. Eighty four overweight and obese adolescents were recruited; 100% were retained at both follow-up assessment points. Participants in the intervention condition reported greater decreases in fast food intake at 2 months (IRR 0.55, 95% CI 0.35,0.86) and 6 months (IRR 0.50, 95% CI 0.32,0.78); hours/day of TV and video games at 2 (IRR -0.95, 95% CI -1.55,-0.36) and 6 months (IRR -0.84, 95% CI -1.64,-0.04), and soda intake at 2 (IRR 0.56, 95% CI 0.39, 0.81) and 6 months (IRR 0.62, 95% CI 0.44, 0.88) relative to baseline. There were no significant differences in physical activity, caloric intake, or BMI. This pilot study demonstrated that a school nurse-delivered intervention is feasible to deliver and can improve adolescents' self-reported key obesogenic behaviors.

## 192-P

**Lifestyle Intervention Using Interactive Guided Imagery<sup>SM</sup> (IGI) Improves Sedentary Behaviors in Obese Latino Adolescents**

Marc J. Weigensberg, Quintilia Avila, Adrianna Padilla, Bo Loy, Emily E. Ventura, Michelle Munevar, Christianne J. Lane, Ting Liu, Michael I. Goran, Kati Konersman, Donna Spruijt-Metz, *Los Angeles, CA*

**Background:** IGI is a mind-body complementary-alternative medicine modality that holds promise for reducing stress and motivating behavioral change. **Objective:** Determine effects of a pilot 12-week lifestyle + IGI intervention in obese Latino adolescents on BMI, insulin resistance, dietary intake and physical activity measures. **Methods:** Obese Latino teens (14M/15F, age 15.3±0.9, BMI 35.9±5.2) were randomized to receive either: 12 weekly lifestyle education classes plus 12 individual IGI sessions (IGI Group, n=15); or same lifestyle classes plus 12 computer classes unrelated to health (to control for contact time, CC Group, n=14). IGI sessions focused on stress reduction (3 sessions) and behavior change (9 sessions). BMI, insulin resistance (HOMA-IR), insulin sensitivity (Si by IVGTT), dietary intake (3 day records), and physical activity (3-day recall) were measured pre-post intervention. **Results:** Combined groups showed ~18% reduction in HOMA-IR (4.63±2.87 vs 3.81±2.20, paired t-test, p<.05), but there were no significant between-group differences in changes in HOMA-IR, Si, or BMI (by ANCOVA, adjusting for age, sex, baseline measures). IGI group showed large reduction in sedentary leisure activities compared to CC (-65.8±109.4 vs +73.8±143.9 min/d, Effect Size (ES)=1.07, p<.02), and moderate increase, though nonsignificant, in moderate physical activity (+33.3±130.6 vs -53.3±175.6 min/d, ES=.57, p=.18). IGI group reduced caloric intake vs CC (-277.3±512.4 vs +142.5±623.9 kcal/d, large ES=.74, p=.2). **Conclusions:** These pilot data suggest this lifestyle intervention may improve insulin resistance independent of adiposity change, and that IGI may be a good modality for improving lifestyle behaviors that could reduce obesity-related disease risk over a longer term.

## 193-P

**Predictors of Change in Metabolic and Cardiovascular Risk Factors Among Overweight Women Participating in a Clinical Weight Loss Trial**

Cynthia Thomson *Tucson, AZ*; Shirley W. Flatt, Cheryl L. Rock *La Jolla, CA*; Njeri Karanja *Portland, OR*; Bilge Pakiz *La Jolla, CA*; Nancy E. Sherwood *Minneapolis, MN*

Weight loss is associated with improvements in metabolic and cardiovascular risk factors including glucose, insulin, C-reactive protein (CRP), and blood lipids. Less is known about the baseline characteristics associated with improvements in these risk factors during weight loss. In a sample of 442 overweight/obese women participating in a weight loss trial applying either a commercial weight loss plan or dietetic counseling, we sought to identify predictors of metabolic improvement with weight loss. Participants had a mean age of 44(10) yrs, a BMI of 33.9(3.4) kg/m<sup>2</sup>, and body weight of 92.1(10.8) kg at enrollment. 50.5% of women demonstrated elevated CRP; mean total cholesterol and glucose were at upper normal limits; mean insulin levels were 17.8(8.8). At 12 months significant reductions in body weight, waist circumference, and step-test performance were demonstrated (P=0.0001). Cholesterol decreased from 196(36)mg/dL to 189(36)mg/dL; HDL-C remained stable; CRP was reduced from a median of 3.0mg/L to 1.9 mg/L. Change in weight demonstrated a positive predictive value in relation to change in cholesterol, insulin, glucose and triglycerides. Baseline level of the biomarker showed the greatest predictive value for change with beta coefficients of -0.455, -.396, -.217 and -.253 for insulin, cholesterol, glucose and triglycerides, respectively. Age, waist circumference, step heart rate and weight were not generally associated with change. This suggests that pre-intervention screening for at risk women should include an assessment for the presence of elevated biochemical risk factors. This approach would increase the statistical power to significantly modify metabolic/cardiovascular risk factors in weight loss intervention trials.

## 194-P

**Does Parent Behavioral Intervention Improve Weight Reduction in Youth With Down Syndrome?**

Richard Fleming *Waltham, MA*; Aviva Must *Boston, MA*; Carol Curtin, James Gleason, Renee Scampini, Melissa Maslin *Waltham, MA*; Keith Lividini *Boston, MA*; Elise Stokes, Linda Bandini *Waltham, MA*

**Background:** Obesity is a significant problem in youth w/Down syndrome (DS). Tailored interventions are lacking. **Objective:** To compare weight loss in two interventions: 1) nutrition/activity education (NAE), 2) NAE with parent-directed behavioral intervention (NAE+BI). **Methods:** 21 participants with DS, ages 13-26, were randomly assigned to NAE or NAE+BI. Both groups met for 16, 1.5-hour sessions over 6 months, with weekly sessions from BL to 10 wks (intensive), bi-/tri-weekly sessions from 10 wks to 6 months (tapered) and follow-up from 6 months to 12 months (maintenance). Participants received diet plans for 0.5 lb/wk weight loss and a light/moderate physical activity (PA) plan. NAE provided nutrition/PA knowledge with practice. NAE+BI added parent training in behavioral intervention. **Results:** 18 of 21 participants completed the study at 12 months. Attendance by interval was 90% for intensive and 69% for tapered. Linear mixed effects regression compared weight change in NAE vs. NAE+BI at each interval. Intermittent missing data were imputed using LOCF. Data for dropouts were imputed assuming 1-kg/yr of weight gain from last observation. A mean between-group difference was observed over time (p<0.01). Within-group weight change was compared across intervals, controlling for gender. For NAE, no significant change was observed in any interval. For NAE+BI weight declined significantly in the intensive (Mean (SD))=1.98 (0.91) kg, p=0.03 and tapered intervals =2.76 (1.14) kg, p=0.02, but not at follow-up=1.99 (1.21), p=0.10. **Conclusions:** This preliminary study supports the promise of parent training in behavioral intervention for youth with DS. A full-scale trial is warranted.

**Intervention Studies – Diet and/or Physical Activity Adult  
 195-P**

**Comparison of a Very Low-Carbohydrate Diet and a Low-Fat Diet on Eating-Related Disinhibition, Restraint, and Hunger**

Jennifer J. Otten, Matthew Buman, Michaela Kiernan, Christopher Gardner, Abby King *Stanford, CA*

Background: Compared with very low-carbohydrate diets, low-fat diets are associated with improved psychological well-being and mood. They have not been examined in relation to psychological measures specific to eating-related behaviors. Better self-regulation of eating behaviors, such as greater restraint and less disinhibition and hunger, are associated with better weight control. We examined whether following a low-fat diet (i.e., Ornish) improved reported eating behaviors specific to weight control more than a very low-carbohydrate diet (i.e., Atkins). Methods: Premenopausal women (BMI= 32.1±3.4 kg/m<sup>2</sup>, Age= 42.2±5.5, 73% white) were randomly assigned to Atkins (n=77) or Ornish diets (n=76). Weekly instruction occurred during the first two months, with 6 and 12-month follow-up. Disinhibition, restraint, hunger (Eating Inventory), 24-hour dietary recalls, and BMI were measured at baseline, 2, 6, and 12 months. Mixed effects analyses were used. Results: Although total energy intake was comparable, Atkins and Ornish groups had different macronutrient intakes (carbohydrate, protein, and fat) at most time points (ps < .001). Atkins group had greater weight loss at 2 and 6 months (ps<.05). From 0-2 months (after controlling for weight change), both groups had lower disinhibition and higher restraint (ps<.001), and Atkins had lower hunger (p=.05). However, from 2-12 months, Atkins had greater rebound toward baseline than Ornish for disinhibition (p=.02), and marginally for hunger and restraint (ps = .06). Conclusions: Macronutrient intake may affect self-regulation of eating behaviors such that improvements are sustained for shorter durations in Atkins versus Ornish. A greater departure from usual dietary intake in Atkins versus Ornish may help explain these findings.

**196-P**

**Hoodia Gordonii Purified Extract: Effects of 15-Day Repeat Consumption on Ad Libitum Energy Intake, Body Weight and Body Fat Percentage in Healthy, Overweight Women**

Wendy A. Blom, Salomon L. Abrahamse *Vlaardingen, Netherlands*; Caroline L. Ward *Godmanchester, United Kingdom*; David J. Mela *Vlaardingen, Netherlands*

Extracts from *Hoodia gordonii*, a succulent plant, have been shown to decrease food intake and body weight in animals, and proposed as possible food ingredients for weight management. To assess the efficacy of repeat consumption of *Hoodia gordonii* purified extract (H.g.PE) in humans, healthy, overweight women (25-45% body fat by DEXA), received either H.g.PE (n=25) or placebo (n=24), for 15 days. Pilot testing established the appropriate dosing and formulation to achieve desired plasma kinetics of putative active components. Subjects were resident in a clinic for the full experimental period, which began with a 4-day run-in period (1 day of no product followed by 3 days of placebo). In the 15 day treatment period, subjects received 2 servings/day of 1110 mg H.g.PE or placebo formulated in yogurt drinks, consumed one hour before breakfast and dinner. They were otherwise allowed to eat ad libitum from standardized menus. Mean ad libitum energy intake declined over time in the total study group as a whole, but this did not differ significantly between the H.g.PE and placebo treatment groups (absolute difference = 121.3 ± 96 kcal (std. err.); ANCOVA: p = 0.214). Concomitant with the reduction in energy intake, body weight decreased in both treatment groups by about 1.2 kg, but with no significant treatment group differences in this or in percentage body fat. In conclusion, 15-day repeat consumption of H.g.PE had no discernible effect on energy intake, body weight or body fat percentage relative to a placebo.

**197-P**

**Glycemic Index and Potato Consumption: Effects on Glucose Metabolism and Body Composition**

Jody Randolph *Davis, CA*; Indika Edirisinghe *Summit-Argo, IL*; C. Tissa Kappagoda *Davis, CA*; Britt Burton-Freeman *Summit-Argo, IL*

Introduction: The utility of low glycemic index (LGI) diets for weight loss is debated. The purpose of this study was to assess whether LGI-energy restricted (ER) diets are superior to high glycemic index (HGI)-ER diets in promoting weight loss and weight-related effects on glucose metabolism.

Design: In a 12-week, 3 arm, randomized control trial, overweight (BMI 28.8 ± 3.2) men and women (46.4 ± 14.2 yr, n= 52) were counseled to follow 1 of 3 dietary interventions, each incorporating potatoes: ER (-500 kcal/d) LGI or HGI diet, or a control diet (CD) with limited dietary advice. Changes in weight, body composition (by DEXA), glucose tolerance (by OGTT), and triglycerides were determined at wks 0 and 12. Results: Modest weight loss was observed in all groups 0-12 wk: HGI-ER (-1.3 ± 2.3 kg (p=0.04) range -5.1 to + 2.5 kg), LGI-ER and CD (p>0.05). Preferential loss of lean versus fat tissue was apparent in HGI-ER (~60% of weight loss) vs. LGI-ER (~17%). Fasting glucose increased after 12 wk HGI-ER (95 ± 2 vs 98 ± 4 mg/dL, p= 0.06) as did glucose intolerance (OGTT AUC 246 ± 16 vs 271 ± 26 mg-hr/dL, p=0.03). Conclusion: LGI diets are not superior to HGI diets for weight loss; however, HGI diets appear to negatively impact glucose metabolism independent of weight loss, likely a function of lean tissue loss. Potatoes, a HGI food were consumed by all groups, suggesting that the total profile of the diet vs one food drives weight and metabolic outcomes.

**198-P**

**High Flavanol Cocoa and Dark Chocolate Reduce Cortisol Response to Stress**

Sheila G. West, Danette L. Smith, Ann C. Skulas-Ray, Lauren Ventola, Courtney A. Whetzel, Laura Cousino Klein *University Park, PA*

Several studies have shown that cocoa and dark chocolate improve vascular function and reduce blood pressure. Because of the link between obesity and cortisol reactivity to stress, we examined the effects of cocoa/chocolate on cortisol responses to stress in 30 overweight / obese adults in a randomized, placebo-controlled, crossover study. We measured cardiovascular and cortisol responses to standardized stressors (speech task, cold pressor) at baseline and after 4 wk of treatment (2 wk washout). During the CHOC treatment, participants consumed 37 g/d dark chocolate and a sugar free cocoa beverage [total flavanols (TF) = 744mg/d mg/d]. Color-matched controls included a low-flavanol chocolate bar and a sugar-free, non-cocoa beverage (CONT) (TF = 0 mg/d). Treatments were similar in calories and fatty acids. Cortisol significantly increased following the stressor tasks, and the CHOC treatment reduced cortisol by ~30% (p's<0.001 vs placebo and baseline). Most importantly, body weight was unchanged and did not differ across treatments. Given the bidirectional relationships between cortisol and obesity, it is encouraging that consuming dark chocolate and a cocoa beverage attenuated cortisol response to stress. However, average blood pressure and heart rate (collapsing across the rest and stress periods) was 2-3% higher on the CHOC treatment vs. CONT (p's < 0.01), and there were no changes in mood or perceived stress. Replication of these findings is needed to better understand the physiologic effect of cocoa and dark chocolate during stress. Funded by: The Hershey Company/The Hershey Center for Health and Nutrition

**199-P**

**Weight Management in Primary Care: 1-Year Results of the Think Health! (Vive Saludable!) Study**

Shiriki Kumanyika, Etienne Phipps, Jennifer E. Fassbender, David B. Sarwer, Kelly C. Allison, Knashawn H. Morales, Russell Localio, Thomas A. Wadden *Philadelphia, PA*

Introduction: Primary care settings are critical access points for obesity treatment. Methods: The Diabetes Prevention Program lifestyle intervention was adapted for testing in 5 primary care practices. The randomized design compared: (a) "Basic Plus", which involved primary care clinician counseling plus more frequent counseling by a lifestyle coach; and (b) "Basic", involving clinician counseling only. Analyses compared 1-year weight change by treatment group and attendance. Results: A total of 219 women and 42 men (mean age 47.2 y; mean BMI 37.2 kg/m<sup>2</sup>; 65% African American; 16% Hispanic) were randomized to Basic Plus (n=124) and Basic (n=137). In 94 Basic Plus and 106 Basic participants with 1-year weight measurements, mean (95% CI) weight changes (kg) were, respectively, -1.58 (-2.65, -0.52) and -0.55 (-1.34, 0.25) (difference 1.04 (-0.27, 2.34); p=.124). In Basic Plus, participants who attended most of their treatment visits lost the most weight. Conclusion: These preliminary results suggest that Basic Plus, but not Basic, was associated with significant weight loss. The greater weight loss in Basic Plus, in association with high attendance, may reflect treatment effects and also indicate that high adherers were more engaged.

## 200-P

**Fructose and Glucose Co-Ingestion During Exercise Increases Plasma Lactate and Glucose Fluxes and Oxidation Rates as Compared to Isocaloric Intakes of Glucose**Virgile Lecoultrre, Rachel Benoit, Guillaume Carrel, Yves Schutz, Gregoire P. Millet, Luc Tappy, Philippe Schneiter *Lausanne, Switzerland*

When fructose is ingested together with glucose during exercise (GLU-FRU), plasma lactate concentration and exogenous carbohydrate (CHO) oxidation rates are increased as compared to glucose alone (GLU). The aim of this study was to investigate to what extent GLUFRU increased lactate kinetics and oxidation rate, gluconeogenesis from lactate ( $\text{GNG}_L$ ) and from fructose ( $\text{GNG}_F$ ). On three occasions, seven men exercised 120 min while ingesting 1.2 g/min glucose + 0.8 g/min of either glucose (GLU) or fructose (GLUFRU). Lactate and glucose fluxes and fate of fructose were investigated by means of stable isotope tracers. Lactate appearance, disappearance and oxidation rates ( $120 \pm 6$ ,  $121 \pm 7$  and  $127 \pm 12 \mu\text{mol/kg/min}$ , respectively) were significantly increased ( $p < 0.001$ ) in GLUFRU vs. GLU ( $94 \pm 16$ ,  $95 \pm 16$  and  $97 \pm 16 \mu\text{mol/kg/min}$ , respectively).  $\text{GNG}_L$  was negligible. In GLUFRU,  $\text{GNG}_F$  and fructose oxidation leveled off after 100 min at  $18.8 \pm 3.7$  and  $38 \pm 4 \mu\text{mol/kg/min}$ , respectively. Plasma glucose appearance rate was significantly higher ( $p < 0.01$ ) in GLUFRU vs. GLU ( $91 \pm 6$  vs.  $82 \pm 9 \mu\text{mol/kg/min}$ ). CHO oxidation rate was higher ( $p < 0.05$ ) in GLUFRU. In summary, the utilization of fructose was accounted for 50% by an increase in lactate production and direct oxidation and for 50% by liver  $\text{GNG}_F$  and subsequent oxidation. Fructose increased total CHO oxidation through an increased lactate oxidation, presumably occurring in muscle.

## 201-P

**The Human Gut Microbiota is Associated With Nutrient Absorption and Overnutrition**Reiner Jumpertz *Phoenix, AZ*; DucSon Le Ho *Chi Minh City, Vietnam*; Peter J. Turnbaugh *Cambridge, MA*; Cathy Trinidad *Phoenix, AZ*; Jeffrey I. Gordon *Saint Louis, MO*; Jonathan Krakoff *Phoenix, AZ*

Background: Culture-independent methods allow the role of the human gut microbiota in regulating nutrient absorption to be assessed in new ways. Methods: Energy excretion and the composition of the microbiota were measured in 12 lean and 9 obese individuals who consumed diets of 2400 and 3400 kcal/d for 3 days in a random crossover design. Food and stool calories were measured by bomb calorimetry. The microbiota was analyzed by sequencing bacterial 16S rRNA genes in total fecal community DNA. Results: Nutrient absorption (stool calories as percent of ingested calories) showed substantial inter-individual and temporal variation, but was not different between lean and obese subjects on either experimental diet (2400:  $4.9 \pm 1.8\%$  vs.  $4.8 \pm 1.4\%$ ,  $p = 0.87$ ; 3400:  $3.8 \pm 1.1\%$  vs.  $4.6 \pm 1.8\%$ ,  $p = 0.24$ ). However, lean individuals absorbed significantly more calories consuming 3400 vs. 2400 kcal/d ( $-1.3 \pm 1.9\%$ ,  $p = 0.04$ ). The relative abundance of the two major bacterial phyla, the Firmicutes and Bacteroidetes, was positively and negatively associated with nutrient load which was most apparent on the high calorie diet in the whole cohort ( $r = 0.47$ ,  $p = 0.04$ ;  $r = -0.47$ ,  $p = 0.04$ ). The change in Bacteroidetes: Firmicutes ratio relative to baseline was positively and negatively associated with nutrient absorption in lean individuals ( $r = 0.52$ ,  $p = 0.01$ ;  $r = -0.50$ ,  $p = 0.02$ ). A 20% change in their proportional representation was associated with a change in nutrient absorption of ~150 kcal. Conclusions: This inpatient study reveals that (i) the gut microbiota varies in response to nutrient load; (ii) these changes are associated with nutrient absorption; (iii) follow-up comparisons of lean versus obese individuals using more elaborate study designs are needed.

## 202-P

**Does Eating a Late Dinner Induce Weight Gain? - The Effect of Delaying Dinner-Time on Energy Metabolism, Hunger, Metabolite Levels**Rika Yokoyama, Shinichiro Takashima, Hideto Takase, Mitsuhiro Katashima *Tokyo, Japan*

Background: Delaying eating dinner till later in the evening, a common practice among business people, is a diet pattern known to cause weight gain. The effects of eating dinner later on metabolism, however, have not been comprehensively examined, and the mechanisms that lead to

obesity are unclear. Objective: In the present study, we compared energy metabolism, hunger, and metabolite levels in healthy men eating with a Late-Dinner diet pattern (LD pattern) and eating with an Early-Dinner diet pattern (ED pattern). Design: Ten men ( $\text{BMI } 23.1 \pm 2.2 \text{ kg/m}^2$ ) participated in this crossover trial. Their 23-hour-energy expenditure and fuel utilization was measured in a respiratory chamber from 12:30 pm on one day to 11:30 am on the following day. In the chamber, the subjects consumed lunch and breakfast at the same time (13:00/8:00), and dinner at either 19:00 (ED pattern) or 22:00 (LD pattern). Appetite values were assessed every 1 hour using a Visual Analogue Scale (VAS) Sheet and blood metabolite levels were measured 1 hour after each meal (at 14:00, 20:00 or 23:00, and 9:00). Results: Total energy expenditure was significantly lower in the LD group compared with the ED group ( $P < 0.05$ ). The VAS hunger and appetite score before dinner was increased in the LD group ( $P < 0.05$ ). Insulin and blood glucose levels were drastically elevated after dinner in the LD group ( $P < 0.01$ ). Conclusion: Eating dinner late was associated with lower total energy expenditure, increased hunger, and postprandial insulin over-secretion and hyperglycemia, which might lead to obesity and diabetes over a prolonged period.

## 203-P

**Weight Loss, Coronary Heart Disease Risk Reduction, and Adipokine Profile Improvement By Alternate Day Fasting**Krista A. Varady, Surabhi Bhutani, Monica Klempel *Chicago, IL*

The ability of alternate day fasting (ADF) to modulate adipocyte parameters in a way that is protective against coronary heart disease (CHD) has yet to be tested. Accordingly, we examined the effects of ADF on adipokine profile, body composition, and CHD risk indicators in obese adults. Sixteen obese subjects participated in a 10-week trial with three phases: 1) 2-week control phase, 2) 4-week ADF controlled feeding phase, and 3) 4-week ADF self-selected feeding phase. After 8 weeks of treatment, body weight and waist circumference were reduced ( $P < 0.05$ ) by  $5.7 \pm 0.9 \text{ kg}$ , and  $4.0 \pm 0.9 \text{ cm}$ , respectively. Fat mass decreased ( $P < 0.05$ ) by  $5.4 \pm 0.8 \text{ kg}$ , while fat free mass did not change. Plasma adiponectin was augmented ( $P < 0.05$ ) by 30% from baseline. Leptin and resistin concentrations were reduced ( $P < 0.05$ ) by 21% and 23%, respectively, post-treatment. LDL cholesterol and triacylglycerol concentrations were 25% and 32% lower ( $P < 0.05$ ), respectively, after 8 weeks of ADF. HDL cholesterol, C-reactive protein, and homocysteine concentrations did not change. Decreases in LDL cholesterol were related to increased adiponectin ( $r = -0.61$ ,  $P = 0.01$ ) and reduced waist circumference ( $r = 0.39$ ,  $P = 0.04$ ). Lower triacylglycerol concentrations were associated with augmented adiponectin ( $r = -0.39$ ,  $P = 0.04$ ) and reduced leptin concentrations ( $r = 0.45$ ,  $P = 0.03$ ) post-treatment. These findings suggest that adipose tissue parameters may play an important role in mediating the cardio-protective effects of ADF in obese humans.

## 204-P

**Lifestyle Intervention Improves Heart Rate Recovery From Exercise in Adults With Type 2 Diabetes: Results From the Look AHEAD Trial**Paul M. Ribisl, Judy L. Bahnson, Sarah A. Gaussoin, Wei Lang *Winston-Salem, NC*; John M. Jakicic *Pittsburgh, PA*; Tina Killean *Shiprock, NM*; Dalane W. Kitzman *Winston-Salem, NC*; William C. Knowler *Phoenix, AZ*; Kerry Stewart *Baltimore, MD*

Purpose: Reduced rate of decline in heart rate during recovery after exercise (HRR) is a marker of autonomic dysfunction and is associated with type 2 diabetes (T2DM) and increased risk of cardiovascular disease (CVD) morbidity/mortality. We examined whether HRR could be improved by intensive lifestyle intervention (ILI) in diabetes, and if so, how this was mediated. Methods: HRR response was calculated by a standard formula ( $\text{Peak HR} - \text{HR@ 2 min recovery}$ ) after a sub-maximal treadmill test ( $> 80\% \text{ HRmax}$ ) and after 1 year of treatment in 4589 overweight/obese adults (59 yr) with T2DM enrolled in Look AHEAD, a randomized trial of ILI and diabetes support and education (DSE). Results: After 1 year there were significant ( $p < .0001$ ) differences in both weight change ( $-0.7 \pm 5.0$  vs.  $-8.6 \pm 8.2 \text{ kg}$ ) and percent fitness improvement ( $+6.4 \pm 22.0$  vs.  $+22.3 \pm 30.4 \text{ percent}$ ) in DSE vs ILI, respectively. While no differences in HRR between DSE vs ILI existed at baseline, after 1 year of intervention, there

was a significant ( $p < .0001$ ) treatment effect in HRR ( $+3.2 \pm 0.3$  beats/min) favoring ILI over DSE. After further adjustment for the effects of age, gender, and risk factors related to the metabolic syndrome, the treatment effect remained significant ( $p < .0001$ ). Mediation analysis revealed that weight loss completely mediated the treatment effect on HRR response, while fitness gain only partially mediated this effect. Conclusion: Weight loss and physical fitness gains improve Heart Rate Recovery, a variable associated with autonomic dysfunction and cardiovascular risk in adults with T2DM.

**205-P**

**Acute Effects of Whey Protein Isolate on Cardiovascular Risk Factors in Overweight, Post-Menopausal Women**

Sebelly Pal, Vanessa Ellis *Perth, Australia*

**Introduction:** The health benefits currently associated with increased dairy intake may be attributable to the whey component of dairy proteins. The purpose of this study was to investigate the acute effects of dietary whey protein on lipids, glucose and insulin, and resting energy expenditure in overweight/obese postmenopausal women, a population highly susceptible to cardiovascular disease. **Methods:** A 3-way crossover design study was conducted where 20 overweight or obese, postmenopausal women were randomised to consume either 45g whey protein isolate, 45g sodium caseinate or 45g of glucose in conjunction with a breakfast meal. Blood samples were taken for up to 6 hours. **Results:** There was no significant change in postprandial incremental area under the curve (AUC) for total cholesterol, low-density lipoprotein, high-density lipoprotein, non-esterified fatty acids, Apo B48, insulin and leptin between groups. However, there was a significant decrease in the appearance of triglycerides (TG) in the blood by 21% and 27% after consuming the whey meal compared to glucose and casein meals respectively, as measured by AUC. There was also a significant reduction by 27% and 32% in the AUC for TG:ApoB48 ratio in the whey group compared to the glucose and casein groups, respectively. There was a significantly lower AUC for blood glucose with whey and casein compared to glucose. **Conclusion:** These findings suggest that a single dose of whey protein can decrease arterial exposure to smaller TG-enriched lipoprotein particles compared to the glucose and casein meals in the postprandial period in overweight/obese, postmenopausal women.

**206-P**

**Influence of Past Weight Cycling on Weight Loss and Physiological Changes During a 12-Month Randomized Controlled Trial of Diet and/or Exercise in Overweight Post-Menopausal Women**

Caitlin Mason, Liren Xiao, Ikuyo Imayama, Angela Kong, Karen Foster-Schubert, Catherine R. Duggan, Ching-Yun Wang *Seattle, WA*; Kristin L. Campbell *Vancouver, Canada*; Catherine M. Alfano *Bethesda, MD*; Cornelia M. Ulrich *Seattle, WA*; George L. Blackburn *Boston, MA*; Anne McTiernan *Seattle, WA*

**Purpose:** To investigate weight change and physiological outcomes in response to a diet and/or exercise intervention in women with and without a history of weight cycling. **Methods:** Overweight, sedentary postmenopausal women were randomized to one of four groups: calorie-reduced diet with 10% weight reduction goal ( $N=118$ ), 225 min/week moderate-to-vigorous intensity aerobic activity ( $n=117$ ), both diet and exercise ( $n=116$ ), or control ( $n=87$ ). Women were followed for 12 months, with 91% retention. Participants were categorized as non-, moderate- (loss/regain  $\geq 4.5\text{kg} \geq 3$  times), or severe-cyclers (loss/regain  $\geq 9.1\text{kg} \geq 3$  times). Trend tests and linear regression using GEE modeling were used to compare adherence and changes in weight, body fat, waist circumference, blood pressure, insulin resistance (HOMA), C-reactive protein, leptin, adiponectin and interleukin-6 between cyclers (moderate + severe) and non-cyclers within each intervention arm, adjusting for baseline BMI. **Results:** Moderate ( $n=103$ ) and severe ( $n=77$ ) cyclers were heavier and had less favorable profiles than non-cyclers at baseline. Mean weight loss was -8.4% in non-cyclers and -9.1% in cyclers assigned to diet ( $p=0.29$ ), -2.4% in both cyclers and non-cyclers assigned to exercise ( $p=0.80$ ), and -9.9% in cyclers and -12.1% in non-cyclers assigned to diet + exercise ( $p=0.06$ ). No differences in adherence or in the physiological response to these interventions were detected between groups, except for a greater improvement in HOMA among weight-cyclers compared to

non-cyclers randomized to exercise only ( $p=0.04$ ). **Conclusion:** A history of weight cycling does not impede successful participation in lifestyle interventions or alter the benefits of diet and/or exercise on anthropometric and physiological outcomes.

**207-P**

**Lean Body Mass and Insulin Sensitivity in Obese Post Menopausal Women After Weight Loss: A MONET Study**

Caroline Y. Doyon, Isabelle J. Dionne, Eric D B. Goulet *Sherbrooke, Canada*; Denis Prud'homme *Ottawa, Canada*; Remi Rabasa-lhoret *Montreal, Canada*; Martin Brochu *Sherbrooke, Canada*

**Introduction:** It is generally believed that insulin sensitivity (IS) is positively correlated to lean body mass (LBM). However, recent cross-sectional studies showed that insulin resistant obese postmenopausal women have greater LBM compared to insulin sensitive women. **Objective:** To study the association between LBM and IS before and after a weight loss intervention. **Methods:** 122 obese post-menopausal women ( $57.6 \pm 4.6$  years) were studied. Outcome variables were: LBM by DXA, visceral (VF) and abdominal fat (AF = Subcutaneous fat+VF) by CT scan, IS by euglycemic-hyperinsulinemic clamp. Then, subjects were categorized as insulin sensitive (ISo; relative glucose disposal  $\geq 12.6$  mg/min·kg LBM) or insulin resistant (IRo; relative glucose disposal  $< 12.6$  mg/min·kg LBM). **Results:** In both groups, significant correlations were observed between LBM and AF (ISo:  $r=0.592$ ; IRo:  $r=0.598$ ;  $p<0.01$ ). However, only in IRo group, LBM was significantly and negatively correlated to IS ( $r=-0.567$ ;  $p<0.01$ ) even when adjusted for VF or AF (VF:  $r=-0.485$ ; AF: LBM-IS  $r=-0.441$ ;  $p<0.01$ ). In addition, weight-loss induced changes in LBM were significantly correlated with changes in VF or AF but not with changes in IS ( $r=0.337$ ;  $r=0.348$ ; respectively;  $p<0.01$ ). **Discussion:** Contrary to expectations, we found an inverse correlation between LBM and IS in insulin resistant women but not in insulin sensitive women, even when adjusted for VF. However, our results do not support that a decrease in LBM after weight loss would improve IS in insulin resistant women.

**208-P**

**A Technology-Based System Is an Effective Alternative to an In-Person Weight Loss Intervention**

Christine A. Pellegrini *Chicago, IL*; Steve Verba, Annie Mishler, Blake Justice, Tracey Murray, John M. Jakicic *Pittsburgh, PA*

This study compared changes in weight elicited with an in-person intervention, a technology-based intervention, and a combination of both. Fifty-one adults (Age:  $44.2 \pm 8.7$  years; BMI:  $33.7 \pm 3.6\text{kg/m}^2$ ) participated in a 6-month behavioral weight loss program and were randomized to Standard Behavioral Weight Loss (SBWL), SBWL+ Technology System (SBWL+FIT), or Technology System alone (FIT). All groups were instructed to reduce energy intake and progressively increase exercise. SBWL and SBWL+FIT attended weekly in-person sessions. SBWL+FIT also received the BodyMedia FIT System® that included a wearable technology to monitor energy expenditure, and website to monitor energy intake and achievement of behavioral goals. FIT was provided with the BodyMedia FIT System® and received brief monthly intervention telephone calls. Retention was significantly ( $p=0.005$ ) different between groups (SBWL+FIT = 100%, FIT = 77%, SBWL = 53%). Completers analysis showed no difference in 6 month weight loss between SBWL+FIT ( $8.8 \pm 5.0$  kg,  $8.7 \pm 4.7\%$ ), FIT ( $7.6 \pm 6.6$  kg,  $8.3 \pm 7.1\%$ ), and SBWL ( $7.1 \pm 6.2$  kg,  $7.8 \pm 6.9\%$ ). Intent-to-treat analysis revealed significant differences in weight loss (SBWL= $3.7 \pm 5.7\text{kg}$ , SBWL+FIT= $8.8 \pm 5.0\text{kg}$ , FIT= $5.8 \pm 6.6\text{kg}$ ) ( $p<0.05$ ). Percent weight loss was not statistically different ( $p<0.11$ ) between the groups (SBWL= $4.1 \pm 6.3\%$ , SBWL+FIT= $8.7 \pm 4.7\%$ , FIT= $6.3 \pm 7.1\%$ ). The technology-based system used in combination with a brief monthly telephone call produced similar, if not greater weight loss compared to SBWL. In combination with an in-person weight loss program, this technology enhanced retention of participants and trended towards enhancing weight loss. The use of this technology system may be a feasible and effective alternative to traditional in-person weight loss interventions. Supported by the Obesity and Nutrition Research Center (DK46204)

## 209-P

**A High Carbohydrate/Average Protein Diet Is Less Efficacious at Promoting Weight Loss Among Women Compared to Men: Subgroup Analysis From POUNDS Lost**

Corby Kyle Martin, George A. Bray, Donna H. Ryan *Baton Rouge, LA*; Vincent J. Carey *Boston, MA*; Catherine M. Champagne, Donald A. Williamson *Baton Rouge, LA*; Stephen Anton *Gainesville, FL*; Nancy Laranjo, Frank M. Sacks *Boston, MA*

Background: POUNDS Lost demonstrated similar long-term weight loss among diets varying in macronutrient composition. It is unclear, however, if weight loss among subgroups of participants is influenced by the macronutrient composition of diets. Methods: In a randomized controlled trial, 811 overweight and obese adults were assigned to one of four diets that varied in the percent of energy from carbohydrate, protein, and fat: 65-15-20 (high carbohydrate/average protein), 55-25-20 (high carbohydrate/high protein), 45-15-40 (low carbohydrate/average protein), or 35-25-40 (low carbohydrate/high protein). Weight loss did not differ significantly among diets after 2 years (Sacks et al., 2009). The present analysis relied on 645 participants who completed the trial (80%). Subgroup (sex, race, age, education, income level, body mass index, insulin level, insulin resistance) by diet interactions were evaluated with analysis of variance. Results: A sex by diet interaction was identified ( $p=.05$ ). Weight loss (mean $\pm$ SD) did not differ by sex on the low carbohydrate/average protein (men:  $-4.2\pm 8.6\%$ , women:  $-4.6\pm 7.9\%$ ), low carbohydrate/high protein (men:  $-4.1\pm 7.5$ , women:  $-4.4\pm 6.9$ ), or high carbohydrate/high protein (men:  $-6.5\pm 7.2\%$ , women:  $-4.6\pm 7.3$ ) diets, but women lost significantly less weight than men on the high carbohydrate/average protein diet (men:  $-5.5\pm 9.0\%$ , women:  $-1.8\pm 6.7\%$ ). Conclusions: Women lost the least amount of weight on the high carbohydrate/average protein diet, which is similar in macronutrient composition to commonly prescribed weight loss diets. Research is warranted to identify the mechanisms responsible for this effect and to maximize weight loss efficacy for subgroups of patients. The findings have implications for personalized medicine and individualizing diets for women.

## 210-P

**Does Engaging in a Variety of Physical Activities Improve Maintenance of Physical Activity and Body Mass Index Reduction During an Adult Behavioral Obesity Intervention?**

Jeremy Steeves, Dixie Thompson, Hollie Raynor *Knoxville, TN*

Objective: This study examined if engaging in a variety of physical activities was related to energy expended in physical activity (PA) and body mass index (BMI) during an 18-month adult behavioral obesity intervention. Methods: Secondary data analysis was conducted of adults participating in a randomized trial examining two isocaloric dietary prescriptions who engaged in  $> 1$  PA at 6 months and completed measures of PA and weight at 0, 6, and 18 months ( $N=98$ , age =  $51.9 \pm 9.5$  yrs; baseline BMI  $34.2 \pm 4.4$  kg/m<sup>2</sup>; 55.1% female; 93.9% white). Participants received the same PA goal: 200 min/week of moderate intensity PA and 10,000 steps/day. The Paffenbarger PA Questionnaire assessed the number of different PAs engaged in weekly and kcals/week from PA. At end of treatment (6 months), participants were classified according to PA variety choices: Non-variety (only 1 PA;  $n=45$ ) or Variety ( $> 2$  PAs;  $n=53$ ). Analysis of covariance, with demographics, condition, and baseline PA and BMI controlled, assessed relationships between activity variety at 6 months and kcals/week from PA and BMI at 18 months. Results: At 18 months, kcals/week from PA were greater in Variety vs. Nonvariety ( $2716 \pm 2098$  kcals/week vs.  $1252 \pm 1256$  kcals/week,  $p < 0.05$ ). BMI was also lower in Variety vs. Nonvariety ( $30.1 \pm 4.6$  kg/m<sup>2</sup> vs.  $32.7 \pm 4.9$  kg/m<sup>2</sup>,  $p < 0.05$ ). Conclusion: Greater PA variety may aid with maintenance of energy expended in PA and BMI reduction in obese adults during a behavioral obesity intervention.

## 211-P

**High-Intensity Exercise Training to Improve Relative Strength in Overweight-to-Obese Postmenopausal Women: A Six-Month Clinical Intervention Study**

Stephane Choquette, Isabelle J. Dionne *Sherbrooke, Canada*

Background: Deleterious changes in body composition in aging women include concomitant loss in lean body mass (LBM) and gains in fat mass (FM). This insidiously leads to functional impairment, as weaker individuals must carry a heavier body weight. In this study, we postulate that

a moderate volume of high intensity exercise could improve the ratio of strength to body weight (relative strength [RS]), despite minimal changes in body weight. Methods: 74 overweight ( $29.7\pm 3.2$  kg/m<sup>2</sup>) postmenopausal women aged  $58.9\pm 5.3$  y participated in this 6-mo study. The exercise group ( $n=35$ ) trained 3 times / week for 1-hour. The exercise program consisted in resistance training (85% of maximal strength [1RM]) and aerobic training (90% of HRmax). Outcome measures were: body composition (DXA), anthropometrics, 1RMs, grip strength (GS) and RS for upper body [GS (kg)/weight (kg)] and lower body [Leg press 1RM (kg)/weight (kg)]. Results: Compared to controls, trainers improved hip circumference ( $-2.6\pm 4.1$  cm,  $p=.035$ ) and arms LBM ( $+1.2\pm 0.7$  kg,  $p=.000$ ). Trends were also observed for waist circumference ( $p=.075$ ), total FM ( $p=.080$ ), total FM% ( $p=.060$ ) and leg LBM ( $p=.087$ ). Body weight remained unaltered in both groups ( $p=.413$ ). However, exercisers improved RS by  $22\pm 19\%$  ( $p<.001$ ) and  $63\pm 48\%$  ( $p<.001$ ), for upper and lower body indexes respectively. Conclusions: High intensity exercise training was well tolerated and increased significantly RS, primarily through gains in muscle strength. These results give insights in clinical management of mobility function in overweight individuals, especially those who are not responsive to weight reduction interventions. Funded by the Canadian Institutes of Health Research.

## 212-P

**Food and Nutrient Intakes and Associations With Successful Weight Loss and Maintenance: The Weight Loss Maintenance Trial**

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Dietary components effective in weight maintenance efforts have not been adequately identified. We determined in-depth changes in consumption of macronutrients, fruits, vegetables, low-fat dairy and dietary fiber and their impact on weight loss during Phase I of the Weight Loss Maintenance (WLM) trial and sustained during Phase II. WLM was a clinical trial with an initial 6-month weight loss intervention (Phase I). Successful weight-loss participants were randomized to Phase II (30 months). Participants ( $n=828$ ) were from four different sites in the US. Changes in food group and macronutrient intake associated with changes in weight during both phases were outcome measures. Linear regression models adjusted for change in total energy examined relationships between changes in dietary intake and weight for each time period. Site, age, race, sex, and race-sex interaction were covariates. Participants substituting protein for fat intake lost, on average, 0.33 kg per 6 months during Phase I ( $p<0.001$ ) and 0.07 kg per 6 months during Phase II ( $p<0.001$ ) per 1% increase in protein. Increased intake of fruits and vegetables was associated with weight loss in Phases I and II: 0.29 kg/per 6-months ( $p<0.001$ ) and 0.04 kg/per 6-months ( $p=0.0062$ ), respectively, per 1-serving increase. Substitution of carbohydrates for fat and protein for carbohydrates produced weight loss during both phases. Increased dairy intake was associated with significant weight loss during Phase II ( $-0.17$  kg per 6-months per 1-serving increase,  $p=0.002$ ), but not in Phase I. Dietary fiber was not associated with weight loss during either phase. Increasing fruits, vegetables, and low-fat dairy can be part of calorie-controlled diets to achieve and maintain weight loss.

## 213-P

**Psychosocial Functioning of Class III Obese Adults in Primary Care Settings: Results From the Louisiana Obese Subjects Study (LOSS)**

Valerie H. Myers, Donna H. Ryan, William D. Johnson, Claudia Leonardi, Brooke L. Barbera *Baton Rouge, LA*; GERALYN DATZ *Hattiesburg, MS*; Phillip J. Brantley *Baton Rouge, LA*

LOSS evaluated an intensive medical intervention, compared to usual care, for people with BMI 40-60 kg/m<sup>2</sup> in 7 primary care sites and one research center in Louisiana. Participants were randomly assigned to an Intensive Medical Intervention (IMI) or Usual Care (UC) condition. IMI had three phases: Phase 1 (900 Kcal liquid diet), Phase 2 (pharmacotherapy, structured diet, and group behavioral counseling), and Phase 3 (weight loss maintenance strategies). UC consisted of a self-guided weight



loss internet program. The influence of psychosocial functioning in the weight control literature is well demonstrated, however, few studies have examined psychosocial functioning among the extreme obese receiving non-surgical treatment. The present study compared changes in psychosocial functioning from baseline to year 1 between the treatment conditions. Quality of life (SF-36), perceived stress (PSS-12), and depressive symptoms (CES-D) data were collected (IMI: n=91; UC: n=62). For the IMI group, general physical well-being significantly increased from baseline to year 1 ( $p<.0001$ ). However, emotional well-being ( $p<.05$ ) decreased and perceived stress ( $p<.05$ ) increased from baseline to year 1. No significant changes were indicated in the UC group between baseline and year 1. Comparative analyses revealed physical well-being was significantly higher in the IMI compared to UC at the end of year 1 ( $p<.0001$ ). These results suggest that an intensive medical weight loss program produced mixed responses in psychosocial functioning. Improvement in physical well-being may be due to the influence of physical activity in the IMI group compared to the UC. Additional analyses will explore the influence of these variables on treatment outcomes.

**214-P**  
**Weight Loss Induced By Low Carbohydrate or High Carbohydrate Diets Does Not Improve Serum 25(OH)D Concentrations**

Stephanie A. Miksa, Diane Stadler, Njeri Karanja *Portland, OR*

Prevalence studies suggest that vitamin D deficiency is more common in individuals who are overweight or obese than those who are not. Reasons for this difference are not well understood but are attributed to sequestration of vitamin D in adipose tissue at the expense of maintaining normal serum concentrations, reduced sunlight exposure and lower dietary vitamin D intake. The goal of this study was to determine how serum 25-hydroxy-vitamin D[25(OH)D] concentrations changed with weight loss among overweight and obese individuals consuming low carbohydrate (LC) or high carbohydrate (HC) diets. Secondary analysis of samples collected during a randomized controlled trial were used to assess the impact of a 6 month behavioral weight loss intervention of adherence to HC (n=59) and LC (n= 60) diets on change in 25(OH)D concentration. Weight, body composition, dietary intake, and fasting serum 25(OH)D were measured before and after the intervention. In this study, 90% of participants had 25(OH)D concentrations <30 ng/ml with 40% at <20 ng/ml, regardless of dietary assignment. Mean body mass loss was  $9 \pm 6$  and  $8 \pm 6$  kg and fat mass loss was  $6 \pm 5$  and  $5.5 \pm 5$  kg in the LC and HC diet groups, respectively. Changes in serum 25(OH)D concentrations were not different between diet groups (mean:  $-2 \pm 6$  ng/ml) nor were they influenced by weight loss. Mean serum 25(OH)D concentrations remained the same despite significant weight and fat mass loss. Vitamin D supplementation is strongly recommended for overweight and obese individuals living in the Pacific Northwest.

**215-P**  
**Preventing Body Fat Gain in Women Being Treated For Breast Cancer**

Zora Djuric, Jennifer Ellsworth, Anne Weldon, Caroline Richardson, Kenneth Resnicow, Ananda Sen *Ann Arbor, MI*

Both weight gain and obesity have been linked with worse breast cancer survival, and increases in body fat can occur during breast cancer treatment. In this pilot study, we investigated the feasibility of conducting a weight control intervention during breast cancer treatment. The study randomized women to receive written materials and pedometers with or without telephone counseling. The goals of the counseling were to decrease fat intake, increase fruit and vegetable intakes and to include at least 30 minutes of moderate to vigorous exercise daily. The counseling stressed self-monitoring and incorporated principles of motivational interviewing. A total of 40 women were enrolled, and all were within 2 weeks of initial chemotherapy treatment. This was 53% of the women who were referred to the study. Retention of subjects for 12 months was 75% overall and women who had lower physical activity and diet quality at baseline were more likely to withdraw. In the control arm that received written materials and pedometers, body fat by DXA increased by two percentage points, and women with lower BMI at baseline tended to gain more body fat than women with

initially higher BMI. In the telephone counseling arm, conversely, improvements in targeted behaviors, blood carotenoids, blood pressure, body fat, and leptin levels were observed. This data indicates that telephone support was helpful for making lifestyle changes to prevent body fat gain during treatment for breast cancer. Subjects in the intervention arm indicated high satisfaction with the study. This approach could be useful for maximizing health in cancer survivorship.

**216-P**  
**Change in Serum Vitamin D Status With and Without Supplementation in Subjects Following an Energy Restricted Diet: A Pilot Study**

Maureen Molini-Blandford, Karmella Thomas, Raymond A. Plodkowski, Quang T. Nguyen, Anpalaki Ragavan, Jessica Krenkel, Sachiko T. St. Jeor *Reno, NV*

Serum 25-hydroxyvitamin D (25-OHD) deficiency has been increasing and may worsen in overweight/obese patients who are actively losing weight. This 12-week pilot study compared the effect of vitamin D-3 (D3) supplementation versus placebo on vitamin D status in patients enrolled in a meal replacement (MR) weight loss program receiving a minimum Recommended Daily Allowance (RDA) for vitamin D (400IU). Data analysis was conducted on 25-OHD levels at baseline and 12 weeks for 28 overweight/obese patients (BMI  $36.43 \pm 7.25$  kg/m<sup>2</sup>; age  $44.43 \pm 10.85$  yrs; 25 females/3 males) completing the study. The study consisted of three groups: subjects receiving an individualized weight loss calorie prescription with usual food intake (C); subjects receiving daily prescribed MR's and a placebo daily (MR-P); and, subjects receiving daily prescribed MR's plus supplemental D3 (2000IU) daily (MR-S). 25-OHD levels were low (<32 ng/ml) in 89.3% of subjects at baseline. 25-OHD levels increased by  $17.55 \pm 10.97$  ng/ml in MR-S (n=10),  $6.56 \pm 6.46$  ng/ml in MR-P (n=12), and  $1.52 \pm 4.72$  ng/ml in C (n=6). The change in 25-OHD level was significant between MR-S and C ( $p=0.001$ ), but not between MR-P and C. Despite 64.3% of subjects maintaining low 25-OHD levels after 12-weeks, 82.1% had increased levels. 25-OHD levels may not significantly increase without supplementation during a 12 week weight loss program. The degree of 25-OHD deficiency should be assessed prior to an energy restricted diet as it may impact how much 25-OHD improves with supplementation. Additional studies should evaluate the amount of vitamin D needed to bring 25-OHD within normal limits during weight loss.

**217-P**  
**A Low Carbohydrate Diet Enhances Early Weight Loss in People With Insulin Resistance**

Raymond A. Plodkowski, Sachiko T. St. Jeor, Quang T. Nguyen, George C. Fernandez, Veronica B. Dahir *Reno, NV*

Background: The best macronutrient composition for calorie restricted weight loss diets is controversial. This study hypothesized that diet composition [low fat diet (LF) vs. low carbohydrate diet (LC)] would impact the amount of weight loss in insulin resistant (IR) people. Methods: Females (n=45) 18 to 65 years old and BMI 30-40 kg/m<sup>2</sup> were recruited. IR subjects, identified by fasting insulin (>15 uIU/mL) were randomly assigned to either a LF diet (60% carbohydrate, 20% fat and 20% protein) or a LC diet (45% carbohydrate, 35% fat and 20% protein) administered utilizing calorie-controlled foods. Results: No significant baseline differences were observed between the LF and LC groups for mean age (51.1 versus 49.4 years,  $p=0.58$ ) or body weight (95.2 kg versus 101.5 kg,  $p=0.0883$ ). As a group, all IR subjects (LF and LC) significantly lost weight at 12 and 24 weeks ( $p<0.0001$ ). The differences between the LF and LC group in weight loss (kg) became significant at 12 weeks: 7.36 versus 8.87 kg ( $p=0.048$ ); 10.01 versus 10.72 kg at 24 weeks ( $p=0.69$ ). Conclusion: A LC diet yielded significantly more weight loss at 12 weeks, but lost its advantage as weight loss presumably improved IR. Both groups continued to lose weight at 24 weeks. Early weight loss is enhanced by a LC diet in the presence of insulin resistance. These data suggest a LC diet can be used initially in clinical practice to help improve weight loss in IR patients. A larger cohort is needed to determine significance past week 12. (ClinicalTrials.gov Identifier: NCT01034046)

**218-P****Effect of a Re-Intervention Lifestyle Approach on Prevention of Weight Regain and Long-Term Weight Loss in the Severely Obese**Amy D. Otto, Bret H. Goodpaster, John M. Jakicic, Jolene Brown, Linda Semler  
*Pittsburgh, PA*

Weight loss interventions for severely obese (Class II and III) often focus on pharmacotherapy or bariatric surgery options, and rarely focus solely on lifestyle modification (diet and exercise alone). This study examined the effects of a lifestyle intervention on change in body weight resulting from a 12-month intervention, after a non-intervention follow-up, and after a 3-month re-intervention of the lifestyle intervention in 33 severely obese (Class II: 35.0-39.9 kg/m<sup>2</sup> and Class III: >40 kg/m<sup>2</sup>) adults (BMI: 45±6.9 kg/m<sup>2</sup>, Age: 48.8±5.9 years). During the 12-month intervention and the 3-month re-intervention the participants received a reduced calorie diet (1200-2000 kcal/wk) and exercise was progressively increased to 300 min/wk. The length of the non-intervention follow-up period was 1.2±0.5 years. The 12-month intervention resulted in significant weight loss (14.6±8.6 kg, 12.2±7.4%), with 8.6±10.8 kg (7.6±9.3%) sustained weight loss following the non-intervention follow-up period (p<0.05). Thus, average weight regain was 5.6±7.2 kg (38.7% of initial weight loss) during the non-intervention follow-up period (p<0.05). The 3-month re-intervention resulted in prevention of further weight gain and induced a non-significant weight loss of 1.0±3.3 kg, resulting in total weight loss of 9.9±11.1 kg (8.3±9.6%) (p<0.05). These results demonstrate that a lifestyle intervention focusing on diet and exercise can be effective at reducing weight in severely obese; however, termination of the intervention results in significant weight regain. This suggests the need for continued long-term intervention, and periodic re-intervention may facilitate prevention of weight regain, resulting in the ability to sustain significant long-term weight loss.

**219-P****Risk Factor Reduction and Amount of Weight Loss Within a Short-Term Comprehensive Program Using a Partial Meal-Replacement Diet**Joshua D. Brown, Vanessa A. Milsom, Gail E. Cronan, Patrick M. O'Neil  
*Charleston, SC*

Background: Studies with average weight losses of 5-10% commonly show average improvement in obesity-associated risk factors. Fewer data address the question of whether weight losses limited to 5-10% produce improvements or whether greater losses cause greater improvements, especially within relatively short-term programs. Methods: We examined archival data from male (n=35) and female (n=121) overweight or obese adults who completed a 15-week comprehensive weight loss program including a partial meal replacement low-calorie diet. Fasting lipids and blood glucose were assessed pre- and post-treatment. Changes in these risk factors were assessed for the whole sample and according to amount of weight lost (<5%, 5-10%, >10%). Results: Mean weight loss was 10.02% (SD=4.57%) of baseline weight. For the entire sample, significant reductions (ps<.05) were seen on total, LDL and HDL cholesterol, triglycerides and glucose. Patients who lost >10% experienced greater improvements in total and LDL cholesterol than did patients who lost 0-5% and 5-10%, with no differences between the latter two groups or on the other risk factors. Patients losing 5-10% showed improvements in total and LDL cholesterol and triglycerides but not glucose or HDL. Among subjects with baseline values of the risk factor beyond recommended cut points, significant (p<.05) reductions were seen on triglycerides (N=41), total cholesterol (N=65), LDL cholesterol (N=113), and glucose (N=56), but not on HDL (N=82). Conclusions: Weight loss of 5-10% appears to produce improvement in some, but not all risk factors. Greater weight loss is associated with greater improvements.

**220-P****Nutritional Correlates of Energy Density Before and During a 12-Week Weight Loss Trial**Patrick M. O'Neil, Tonya F. Turner, Laura M. Nance, Gail E. Cronan, Robert J. Malcolm, Susan M. Pechon, *Charleston, SC*; Stephanie L. Rost, Karen Miller-Kovach *New York, NY*

Background: Cross-sectional population studies show that more energy-dense dietary intakes feature greater caloric and fat consumption. Less is known about nutritional correlates of energy density among participants in weight loss programs.

Methods: 108 completers (of 132 enrolled adults, BMI 27-35) of a 12-week weight-loss trial kept a 3-day food diary at screening, Week 6 and Week 12. They were given a structured food plan under one of two randomly assigned systems, and asked to attend weekly group meetings. Energy density [mean daily caloric intake (foods + non-water beverages)]/[mean daily weight of all intake excluding water] at each assessment was calculated. Results: Treatment groups did not differ on weight loss or macronutrient intake (%kcal) and were combined for analyses. Energy density declined from screening to Weeks 6 and 12. At all times, higher energy density was significantly (ps<.05) associated with greater caloric (rs=.20 to .27), fat (rs=.32 to .47) and saturated fat (rs=.29 to .36) intake, and lower fiber consumption (gm/1,000 kcal; rs=-.27 to -.34) and weight of intake (rs=-.63 to -.72). Energy density was negatively related to protein intake at screening (r=-.30) and to carbohydrate intake at Weeks 6 and 12 (rs=-.26 to -.35) (ps<.01). At no time was energy density significantly related to intake of calcium, sodium, zinc, iron, Vitamins A,C,D,E, or alpha-tocopherol. Conclusions: Before and during weight loss, energy density based on food and non-water beverages was consistently related to intake of calories, fat, saturated fat and fiber. Variations in energy density did not affect intake of the vitamins and minerals examined.

**221-P****Changes in Dietary Energy Density With Participation in a 12-Week Weight Loss Trial Using a Commercial Format**Patrick M. O'Neil, Gail E. Cronan, Tonya F. Turner, Laura M. Nance, Robert J. Malcolm, Susan M. Pechon *Charleston, SC*; Stephanie L. Rost, Karen Miller-Kovach *New York, NY*

Background: Energy density of dietary intake (kcal/gm) is related to total energy intake and BMI in the population. Less is known about how it changes in short-term weight loss programs or relates to weight loss. Methods: A 12-week weight-loss trial compared two randomly assigned structured food plans. Subjects (132 adults, BMI 27-35) were given limits in their randomly assigned system and asked to attend weekly group meetings. Subjects kept a 3-day food diary at screening, Week 6 and Week 12. Complete intake records were obtained on 108 subjects. Energy density at each point was [mean daily caloric intake (foods + non-water beverages)] / [mean daily weight of all intake excluding water]. Results: Groups did not differ on weight loss or nutrient intake and were combined for analyses. Average weight loss was 3.01% (SD=2.23%) at Week 6 and 4.30% (SD=3.74%) at Week 12. Both daily caloric intake and weight of intake were significantly lower at Weeks 6 and 12 than at Screening (ps<.01), with the drop in caloric intake proportionately greater than that in weight of intake. Thus, energy density decreased significantly from Screening (M=1.09, SD=.28) to Week 6 (M=.96, SD=.31) and Week 12 (M=.97, SD=.29), ps<.005. Lower energy density was related to greater weight loss at Weeks 6 and 12 (rs=-.203 and -.237, respectively, ps<.05). Conclusions: Energy density based on food and non-water beverages appears to be a meaningful nutritional variable that responds to a weight loss intervention and relates to weight loss.

**222-P****Comparison of Compliance to a Low-Carbohydrate High-Protein, or Low-Fat High Fiber Diet**Mitali Shah, Megan R. Ruth, Ava M. Port, Ashley C. Bourland, Caroline M. Apovian *Boston, MA*

Background: A major limitation of dietary interventions is non-compliance to diet, which affects outcome measures. Thus, we sought to determine compliance to two isocaloric diets and resulting differences in macronutrient composition on select outcome measures. Methods: Obese subjects (88% female, 21-61 yr, BMI 32.3-44.6 kg/m<sup>2</sup>) were randomized to a low-carbohydrate high-protein (LCHP), or low-fat high fiber (LFHF) diet for 12 wk (n=8/group). Weight, waist circumference and % body fat (by DXA) were measured at week 0 and 12. Visit attendance (≥9 visits), 3-d food record completion (≥4 records) and macronutrient intake (±10% recommended) defined compliance. Composition (% kcal) of LFHF diet was 60% carbohydrate (CHO), 25% fat, and 15% protein. LCHP diet consisted of ≤40 g CHO/d and up to 60% fat and remainder from protein. Differences between groups were determined by Student's T-test (P<0.05). Results: All subjects complied with visit attendance and 88% in both groups were compliant with food records. Neither group met macronutrient requirements.

Percent kcal of protein (LCHP-34% vs. LFHF-21%,  $P < 0.0001$ ), fat (LCHP-53%, LFHF-25%,  $P < 0.0001$ ), and CHO (LCHP-10.2%, LFHF-53%,  $P < 0.001$ ) differed between diets. The LCHP group had a 3% greater decrease in % body weight compared to LFHF group ( $P < 0.004$ ) with the same caloric intake. Change in waist circumference or % body fat did not differ. Conclusion: There was excellent compliance with visit attendance and food record completion for both groups, but poor compliance with macronutrient recommendations. The greater change in % body weight in LCHP subjects was not due to caloric intake, but possibly due to differences in macronutrient intake.

**223-P**  
**Clinical Evaluation of a Novel Partial Meal Replacement for Obese Adults**

Robert L. Dubin, Joshua T. James, Jamie G. Barrie *Venice, FL*

Background: Commercially available partial meal replacements (PMRs) are regaining popularity for weight loss in the United States and Canada. They provide potential dietary options for managing overweight and obese patients. Many of these programs lack clinical evidence to support efficacy and safety. The aim of this study was to evaluate the use of a novel PMR in obese patients. Methods: We performed a retrospective analysis/chart review of obese adults (N=103) treated with Ideal Protein®. Completers and non-completers were assessed. A simultaneous control group of 40 similarly matched patients receiving physician counseling alone was used for comparison. Results: The treatment group included 66% females; mean age 56.8±14.5 years. Mean Body Mass Index was 35.3±6.2 kg/m<sup>2</sup>. Sixty-one patients (59%) completed at least 4 weeks of the hypocaloric low-carbohydrate low-fat based program per protocol. Mean total weight loss in this group was 16.2±5.9% with mean duration of treatment of 14.7±7.9 weeks. BMI decreased 5.7±2.7 kg/m<sup>2</sup>. Waist circumference decreased 13.5±7.4 cm. Mean weight loss at 12 months was 9.9±10.7% versus 1.5±5.3% in controls ( $p = 0.001$ ) with 72.5% maintaining over 5% weight loss and 50% maintaining over 10% weight loss (both  $p < 0.0001$  versus controls). Mean decrease in fat composition and fat-free mass was 15.5±11.3% and 5.9±3.9%, respectively. Reported adverse effects included constipation (29.5%) and fatigue (9.8%). Forty-one percent (N=42) were unable to complete the 4 week minimum treatment. Patients in this group were younger with less co-morbid disease. Conclusion: Although attrition rates were high, the prescribed PMR was safe, tolerable and resulted in superior outcomes versus standard care.

**224-P**  
**Short-Term Impact of Low and High Carbohydrate Weight Loss Diets on Circulating Fatty Acid and Inflammatory Marker Concentrations**

Danielle J. Podesta, Sonja Connor, Melanie Gillingham, Diane Stadler *Portland, OR*

Low carbohydrate (LC) diets are used successfully for weight loss but may induce systemic inflammation due to high dietary saturated fat content. To measure the impact of diet on inflammation, 23 healthy, obese adults completed a randomized, 6-week controlled feeding study of *ad libitum* LC (n=10) and high carbohydrate (HC; n=13) diets. Fasting blood samples were collected before and after the dietary intervention. Changes from baseline in weight, circulating saturated, omega-6 (n-6) and omega-3 (n-3) fatty acids (FA), the n-6/n-3 FA concentration ratio, and interleukin-6 (IL-6) and high sensitivity C-reactive protein (hsCRP) concentrations were compared between groups. Weight loss of -5±3kg in the LC diet group and -3±2 kg in the HC was similar between groups ( $p = 0.09$ ). Reductions in saturated FA concentrations of -599±906 µmol/L and -260±281 µmol/L in the LC and HC groups, respectively, were not different ( $p = 0.6$ ). Increases in n-6 and n-3 FA concentrations of 190±512 µmol/L and of 35 ± 99 µmol/L (LC group) and 336±706 µmol/L and 177±283 µmol/L (HC group) were not different ( $p > 0.08$ ). However, changes in the n-6/n-3 FA concentration ratios were different between the LC, -0.2 ± 2, and HC, -1 ± 1, diet groups ( $p < 0.01$ ). Changes in IL-6 and hsCRP concentrations of 0.06±1 pg/ml and 4±17 mg/dL (LC group) and 0.4±0.7 pg/ml and -0.8±2 mg/dL (HC group) were not different ( $p > 0.4$ ). These results suggest that, during active weight loss, changes in circulating FA and inflammatory marker concentrations are similar despite extreme differences in dietary macronutrient content.

**225-P**  
**A Randomized, Controlled Trial of Nutritionally Innovative Weight Loss Maintenance Interventions Delivered By Telephone**

Meghan L. Butryn *Philadelphia, PA*; J. Graham Thomas *Providence, RI*; Maria Coletta, Michael R. Lowe *Philadelphia, PA*

Background: Behavioral weight loss programs that are telephone-based may increase treatment dissemination. Long-term outcomes also might be improved by using innovative nutritional approaches, including use of meal replacements (MRs) or reduced energy density eating (REDE). Method: Primary care physicians referred participants for treatment. Treatment was delivered via weekly, 15-minute telephone calls, in which all participants learned behavioral weight loss skills. In Weeks 1 to 12, all participants followed a MR-based weight loss diet. Participants were randomly assigned to one of four weight loss maintenance interventions for Weeks 13-52. Conditions were formed by crossing 1) continued use of MRs or not, and 2) introduction of REDE diet or not. Results: From Weeks 1 to 12, participants (n = 238, 69% African American, 89% women, mean BMI = 39.5 kg/m<sup>2</sup>) lost an average of 6.1% of initial weight. As expected given the enrollment procedures, attrition during weight loss was high (44%). Participants maintained an average weight loss of 5.9% at Week 52, 3.5% at 1-year follow-up, and 2.0% at 2-year follow-up. There were no significant differences between treatment conditions ( $p = .08$ ). However, the MR and REDE conditions showed promising trends reflecting an absence of weight regain during one or both years of follow-up. (Note, data collection has been completed in 85% of the sample; data collection will be complete by time of presentation.) Discussion: Brief, telephone-based behavioral counseling supplemented with use of MR or REDE produces significant long-term weight loss for participants who are referred by physicians for treatment.

**226-P**  
**The Effect of Resistance or Flexibility Training on Total Physical Activity in Lactating Postpartum Women**

Tiffany Hinman, Katherine Pratt, Nathan Earl, James LeCheminant *Provo, UT*

Objective: To compare the effect of twice-weekly resistance or flexibility training on total physical activity (PA) in lactating postpartum women. Methods: Twenty-five lactating postpartum women (26.2±3.7 y, 67.9±8.1 kg, 25.2±3.6 kg/m<sup>2</sup>, 3.0±1.3 months postpartum) were randomized to a resistance or flexibility training group and completed 4-months of supervised or verified training. The resistance training (RT) group (n=12) trained twice weekly, completed 9 exercises (whole body) per session, and 8-12 repetitions per exercise. Sets progressed to three per exercise by month two. The flexibility training (FT) group (n=13) completed stretches for the entire body, held for 10-30 seconds per stretch, and performed twice weekly. Lower-body strength (leg-press), upper-body strength (bench press), abdominal-strength (curl-ups), lower-back flexibility, and total PA (accelerometer over 7-days) were assessed at baseline, 2- and 4-months. Results: There was a group\*time interaction for 1-repetition maximum change for each measured strength outcome with the RT group improving to a greater extent ( $P < 0.05$ ). The FT group significantly improved low back flexibility ( $P < 0.05$ ) while the RT group did not ( $P > 0.05$ ); however, a group\*time interaction did not reach significance ( $P = 0.08$ ). With adjustment for baseline PA level, there was a significant group\*time interaction ( $P < 0.05$ ) for total PA counts with the RT group increasing counts to a greater extent. Conclusions: Twice-weekly RT increases strength and may be associated with increased total PA in lactating postpartum women. Additional research is needed to confirm these results and to elucidate associated health benefits of RT in this population.

**227-P**  
**The Effect of Glycemic Index and Glycemic Load on Diabetes Control, Lipid Profiles and Anthropometrics Among Predominantly Obese Latinos With Type 2 Diabetes**

Lauren Gellar *Worcester, MA*; Brian Nathanson *Longmeadow, MA*; Lori Pbert, Milagros Rosal *Worcester, MA*

Background: The incidence of type 2 diabetes has increased dramatically, particularly among Latinos. While several studies suggest the beneficial effect of lowering glycemic index and glycemic load in patients with type 2 diabetes, no data exists regarding this issue in the Latino population. The purpose of this study was to determine the effect of lowering glycemic index and glycemic load on diabetes control, lipid profiles and

anthropometrics among Latinos with type 2 diabetes. Methods: Subjects participated in a 12 month randomized clinical trial. The intervention targeted diabetes knowledge, nutrition and physical activity. The nutrition protocol emphasized reduction in glycemic index, fat, salt and portion size and increase in fiber. The control group was given usual care. Measurements included HbA1c, fasting glucose, total, LDL and HDL cholesterol, HDL:LDL ratio, waist circumference and BMI and were collected at baseline, 4 and 12-months. Results: Two hundred fifty two Latino adults with type 2 diabetes participated in the study. Baseline mean (SD) HbA1C was 8.98 (1.87), BMI was 34.76 (6.94) age was 55.98 (11.18) years and 76.59 % were female. Reduction in glycemic index from baseline to 12 months was positively associated with a reduction in logHbA1c ( $p=0.006$ ), HDL:LDL ratio ( $p=0.037$ ) and waist circumference ( $p=0.004$ ), but not with fasting glucose, total, LDL and HDL cholesterol, or BMI. No significant associations were found between glycemic load and any measures. Conclusion: Results suggest that lowering glycemic index may have a positive effect on some markers of diabetes control, lipid profiles and anthropometrics among predominantly obese Latinos with type 2 diabetes.

**228-P****Body Popcorn Snack as Part of a Hypocaloric Diet Decreases Daily Weight and Body Fat**

Diana Kawiecki, Joshua Lowndes, Theodore Angelopoulos, James Rippe *Celebration, FL*

Introduction: Energy imbalances stemming from poor dietary choices and physical inactivity have been targeted as significant contributors to the current high prevalence of overweight and obesity in the United States. Excess body weight and body fat are risk factors for numerous chronic diseases such as metabolic syndrome, coronary heart disease, and diabetes. Snacking on high calorie, energy dense foods may exacerbate weight problems. Low-fat popcorn is a fiber-rich, whole grain, low energy-dense snack that may improve diet quality and consequently affect modifiable risk factors.

Methods: In a three-group randomized design, the effects of consuming 94% fat-free popcorn (100 kcal/day) as a component of either a MyPyramid hypocaloric diet (HypoPop,  $n=64$ ) or a usual diet (UsualPop,  $n=61$ ) were compared in men and women (BMI 27-37, 35-70 years) for 12 weeks. A third group followed their usual diet while limiting popcorn (Control,  $n=57$ ) and all three groups followed a progressive cardiovascular exercise program. Body composition was measured at baseline and week 12 using dual energy X-ray absorptiometry (DXA). Results: Modest reduction in body weight occurred in the UsualPop and Control groups. Compared to these two groups, HypoPop had significantly greater decreases in body weight ( $-12.84 \pm 7.97$  lbs), BMI ( $-2.04 \pm 1.22$ ), waist circumference ( $-4.92 \pm 3.15$  cm), body fat ( $-2.15 \pm 1.69\%$ ), and fat mass ( $-3.99 \pm 2.59$  kg) ( $p < 0.05$ ).

Discussion: Incorporating 94% fat-free popcorn as a daily snack as part of a hypocaloric diet may aid in weight loss and body composition improvements, reducing risk factors for chronic diseases.

**229-P****High Level of Satisfaction With 94% Fat Free Popcorn When Incorporated Daily Into a Reduced Calorie Diet**

Von Nguyen, Diana Kawiecki, Joshua Lowndes, Theodore Angelopoulos, James Rippe *Celebration, FL*

Introduction: Two of the primary obstacles in following a weight-loss diet are hunger and the desire to snack. As such, it is important that the effects of different snacking habits on body weight are understood. Popcorn is a whole grain food, a good source of fiber and can be found as a low-fat option, and therefore may be incorporated into beneficial snacking strategies for people following a weight-loss diet. Methods: We assessed how well tolerated the daily consumption of 94% fat-free popcorn (100Kcal) is when incorporated into a hypocaloric diet for 12 weeks. One hundred twenty five people (age  $52.2 \pm 9.3$  years) were randomly assigned into one of two groups: hypocaloric diet and popcorn ( $n=64$ ) or usual diet and popcorn ( $n=61$ ). Participants completed an exit questionnaire regarding their satisfaction with the dietary intervention. Results: Hypocaloric diet participants (% affirmative response) reported the daily popcorn snack helped them 1) stay on track with weight loss (85%), satisfy hunger (94%), 3) snack healthier (97%), and 4) produced more emotional satisfaction than their usual snacks (73%) There was not a single response of dissatisfaction with

daily consumption of popcorn. Discussion: These data suggest a daily single serving of 94% fat-free popcorn is an effective physiologic and psychological aid for adherence to a reduced calorie diet and is an appropriate choice for individuals seeking weight-loss or weight-maintenance.

**230-P****Reducing Television Viewing During a Brief Adult Behavioral Obesity Intervention**

Hollie Raynor *Knoxville, TN*; Amy Gorin *Storrs, CT*; David Bassett, Dixie Thompson *Knoxville, TN*

Introduction: Decreasing television (TV) viewing is an effective pediatric weight loss strategy yet its effect on adults is unknown. Within an 8-week behavioral obesity intervention, weight loss and the behavioral impact of reducing TV watching (10 hrs/week [TV]) to increasing physical activity (200 minutes/week [PA]) were compared. Methods: Of 24 participants, 19 participants (age =  $54.2 \pm 8.7$  yrs; body mass index [BMI] =  $32.8 \pm 4.1$  kg/m<sup>2</sup>; 89.5% female; 89.5% White) attended 75% of sessions and completed measures of weight, TV watching, PA, and diet at 0 and 8 weeks. Conditions received a dietary goal of 1,200-1,500 kcals/day (< 30% fat kcals). Objective measures of TV watching and PA were obtained via TV Allowance and Lifecorder EX, respectively. Dietary intake was assessed with 3-day food records. Results: Greater reductions in daily TV watching occurred in TV vs. PA ( $-3.1 \pm 3.2$  hrs/day vs.  $+0.5 \pm 1.3$  hrs/day,  $p < 0.05$ ). PA increased daily kcals from PA, while TV did not ( $+52.2 \pm 84.2$  kcals/day vs.  $-12.9 \pm 54.2$  kcals/day,  $p = 0.054$ ). Daily energy consumed while watching TV significantly ( $p < 0.01$ ) decreased across conditions, with a trend for TV having a greater reduction ( $-619.7 \pm 458.2$  kcals/day vs.  $-330.3 \pm 642.7$  kcals/day,  $p = 0.10$ ). Significant ( $p < 0.01$ ) weight loss occurred across conditions (TV =  $-12.1 \pm 4.7$  lbs; PA =  $-9.4 \pm 3.0$  lbs). Conclusion: TV watching can be reduced in obese adults and appears to influence dietary intake, not PA, during a behavioral obesity intervention.

**231-P****Dose-Dependent Reductions in Hunger By Specific Alginates in a Stable, Low Viscosity Drink Formulation**

Harry P. Peters, Remco Koppert, Hanny M. Boers, Sergey M. Melnikov, Ewoud A. Schuring, Anna Ström, Sheila A. Wiseman *Vlaardingen, Netherlands*

Background: Addition of specific types and amounts of alginates to protein-based drinks can reduce appetite, via formation of strong gels in the stomach in the presence of calcium. However, some recent studies do not find an effect of alginate on appetite, probably related to its physico-chemical properties. We tested a drink formulation that gels in the stomach but not in the product, and hypothesized that alginate in this format would dose-dependently decrease hunger responses at relatively low alginate levels. Methods: In a balanced order cross-over design, 24 volunteers consumed meal replacement drinks containing a low-calcium whey protein, a calcium source insoluble at product pH, and either 0 (control), 0.6 or 0.8% of a specific high-guluronate alginate. Appetite (six self-report scales) was measured for 5h post-consumption. Product viscosity and gel strength under simulated 'gastric' conditions were also measured. Results: Hunger was robustly reduced (20 to 30% lower area-under-the-curve) with 0.8% alginate ( $P < 0.001$ ), an effect consistent across all appetite scales. Effects were also significant with 0.6% alginate for most scales, and clear dose-response effect observed. Gastric gel strength was 1.7 and 3.7 N for the 0.6 and 0.8% alginate drinks, respectively, while viscosity was acceptable ( $< 0.5$  Pa·s at 10s<sup>-1</sup>). Conclusions: Strong gelling alginates (gastric gel strength at least 2N) at relatively low concentrations robustly reduce hunger when consumed in a stable, low viscosity protein-based drink formulation. Detailed specifications of study materials are clearly needed to replicate and compare effects of alginates and to better understand the underlying reasons for its potential efficacy or ineffectiveness.

**232-P****Metabolic Flexibility and Its Connection to Impaired Glucose Tolerance**

William Rumpler, Andrei Gribok *Beltsville, MD*; Loretta DiPietro *Washington, DC*; Reed Hoyt *Natick, MA*

The increased prevalence of obesity associated with the modern lifestyle accompanies a number of impairments in metabolic function. Resistance to insulin is one such dysregulation, and there is now growing interest in a consequence of insulin resistance termed metabolic inflexibility. Metabolic

inflexibility is characterized by a blunted fat oxidation during fasted conditions, and the impaired ability to shift from fat to carbohydrate oxidation in response to insulin, substrate availability, or to exercise. The development and recent availability of a continuous glucose monitoring system (CGMS) provides the opportunity for the first time to couple real-time glucose levels with 24 h calorimetry methodology to examine the relationship between blood glucose level and substrate oxidation to better understand metabolic flexibility. In this study the timing, frequency, and duration of exercise are varied while real-time measurements of blood glucose, substrate oxidation, heart rate, and physical activity are made continuously for 48-hour periods. Blood samples are collected to provide information on glucose, insulin, and free fatty acids as markers of metabolic status. All measurements are made in the USDA Beltsville Human Nutrition Research Center Energy Metabolism Unit room calorimeters while volunteers wear a CGMS and an ambulatory monitoring device. The collected data show different metabolic response as well as different glycaemic response for normoglycaemic and hyperglycaemic subjects. The Respiratory Exchange Ratio (RER) demonstrated more variability for the hyperglycaemic subject along with blunted glycaemic response. On the other hand, the normoglycaemic subject's glucose level responded acutely to the exercise, while the variability in RER was moderate.

**233-P**  
**Effect of a Combined Exercise Program on Body Fat Content and Distribution of Coronary Artery Disease Patients**

Nuno M. Pimenta, Helena Santa-Clara, Luis B. Sardinha *Lisbon, Portugal*; Bo Fernhall *Urbana, IL*

Purpose: To analyze effects of a one-year combined exercise program (CEP) on body fat (BF) content and distribution of coronary artery disease (CAD) patients. Methods: We followed, for about 12 months, two groups of CAD male patients. Group 1 consisted of 17 subjects (57+12yrs) who engaged in a CEP. Group 2 was a matched age control group of 10 subjects (58+11yrs). BF content and distribution was measured through Double Energy X-ray Densitometry (DXA) at baseline and follow-up. Results: We found no differences on body mass and body mass index (BMI) between baseline and end of follow-up in both groups, but group 1 showed significant decrease in mean values of total BF (21,600+5,996kg vs 20,324+5,890kg,  $p<0,01$ ), % total BF (27,83+5,48% vs 26,36+5,39%,  $p<0,05$ ), trunk fat (12,539+3,987kg vs 11,767+4,010kg,  $p<0,05$ ), % trunk fat (31,06+6,91% and 29,20+7,06%,  $p<0,05$ ), appendicular fat (8,217+2,084kg vs 7,718+2,0370kg,  $p<0,01$ ), % appendicular fat (25,72+4,93% and 24,48+4,92%,  $p<0,05$ ), abdominal fat (2,952+1,064kg vs 2,746+1,098kg,  $p<0,05$ ), % abdominal fat (34,19+7,61% vs 32,43+7,06%,  $p<0,05$ ), visceral fat (2,705+0,954kg vs 2,539+0,090kg,  $p<0,05$ ). Group 2 showed significant increase in appendicular fat (7,634+1,915kg vs 8,103+2,124kg,  $p<0,05$ ). Conclusion: These results confirm the positive effect of a CEP on body composition of CAD patients, despite no changes in body mass or BMI. In this study we observed no alterations on BF distribution meaning similar rate of fat loss in all analyzed BF depots. These results also alert for the limitations of BMI for tracking body composition changes.

**234-P**  
**Catechin Enriched Green Tea Beverage Induces Visceral Fat Loss in High Visceral Fat Adults**

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Purpose: To evaluate the influence of a catechin enriched green tea beverage on visceral fat in abdomen in Chinese adults with high visceral fat. Methods: Subjects, 73 females and 45males, whose visceral fat was above 95 cm<sup>2</sup> and estimated habitual intakes of catechins was under 100 mg/d, were randomly assigned to intake daily a beverage containing 609 mg catechins and 68.7 mg caffeine, or a control beverage containing 86 mg catechins and 40 mg caffeine for 12 weeks. All subjects were asked to not change habitual food intakes and physical activity levels. Abdominal fat areas (computed tomography), body weight and composition, and clinical laboratory tests were measured at week 0 and week 12. Food consumption and physical activity levels were recorded in a diary and surveyed at week 0, week 8 and week 12. Results: 104 subjects completed the trial. Their visceral fat

areas (152.4±42.5 vs 142.9±45.6 cm<sup>2</sup>,  $P<0.05$ ), body weight (83.2±11.6 vs 82.2±11.5 kg,  $P<0.05$ ) and fat (32.7±7.8 vs 32.0±7.9 cm<sup>2</sup>,  $P<0.05$ ) reduced significantly, in treatment but control group (156.4±43.9 vs 155.8±46.5 cm<sup>2</sup>, 83.1±12.5 vs 82.7±12.3 kg, 32.8±8.0 vs 32.6±8.6 kg,  $P>0.05$ ) with Per-protocol sets analysis. Multi-factor correlation analysis revealed no association of the visceral fat loss in catechin group with the changes of energy intakes ( $r = -0.002$ ,  $P=0.988$ ) or expenditures ( $r=0.227$ ,  $P=0.130$ ). Conclusion: Regularly consumption of the catechin enriched green tea beverage for 12 weeks induces visceral fat loss in Chinese adults with high visceral fat in abdomen and low habitual intakes of catechins.

**235-P**  
**Appetite Profile Ratings, 'Orexigenic' and 'Satiety' Hormone Concentrations and Energy Intake in Relation to Pre-Load Interventions**

Margriet S. Westerterp-Plantenga, Stijn Soenen *Maastricht, Netherlands*

Background: When studying the efficacy of a pre-load intervention, more often than not possible differences in subsequent variables such as appetite profiles or changes in 'orexigenic' and 'satiety' hormone and glucose concentrations or in energy intake do not seem to be related to each other. Methods: In order to test the sensitivity of the pre-load test-meal design with respect to these variables and possible interrelationships data were analysed from 600-1365 men and women (BMI 19-33 kg/m<sup>2</sup>; age 17-60 yrs), ingesting preloads of 2-3270 kJ or 0-20% of individual energy requirement. Results: Sensitivity was confirmed by 17-24% of explained variation in appetite AUC, 25-28% of explained variation in glucose- and insulin concentrations, 7-9% of glucagon-like-peptide-1 but not ghrelin concentrations, and 2% of explained variation in energy intake by energy content of the preload ( $p<0.001$ ). The higher percentages of the range in explained variation are due to taking subjects' individual energy requirement into account by administering amounts of preloads as a fixed percentage of energy requirement. Appetite profile ratings and GLP-1, insulin and glucose concentrations were correlated ( $r^2$  4-15;  $p<0.001$ ). Incidentally differences in energy intake due to iso-energetic treatment vs control preloads were related to differences in appetite ratings ( $r=-0.05$ ;  $p<0.01$ ). Conclusion: explained variations and correlations are small, but significant due to the number of subjects. Subject-specificity improves sensitivity. The sets of variables measure different aspects with appetite seemingly independent of body size, blood parameter excursions often depending on ingested nutrients, and energy intake also depending on remaining energy requirement.

**236-P**  
**Two-Year Results From a Multi-Site Randomized Trial of a Commercial Weight Loss Program**

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Commercial weight loss programs may contribute to efforts to reduce the prevalence of obesity, although evidence of efficacy and effects on metabolic and cardiovascular risk factors is critical in evaluating the likelihood of sustained benefits. The Jenny Craig (JC) program involves individualized diet and exercise counseling (provided either in-person at community-based sites or by telephone), prepackaged foods and a low-energy density diet. The aims of this study are (1) To test, in a multi-site randomized controlled trial, whether the JC Centre-based and/or JC Direct (telephone-based) interventions promote greater weight loss and maintenance of that loss in overweight or obese women over a 24-month period compared to usual care (UC) conditions; and (2) To describe the effect of the program (vs. UC conditions) on selected biochemical factors, cardiopulmonary fitness, quality of life (QOL) and eating attitudes and behaviors. At randomization, participants (n=442) were 44(10) (mean[SD]) yrs, with BMI 33.8(3.4) kg/m<sup>2</sup>, weight 92.1(10.7) kg, and waist circumference 108.6(9.6) cm. Two-year data are available for 91% of study participants (n=406), and weight loss is -8.1(8.6), -6.7(9.3), and -2.2(7.4) kg for the JC Centre-based, JC Direct, and UC groups, an average weight reduction of -8.7%, -7.3%, and -2.4% of initial weight, respectively. The proportion of women at highest risk (CRP>3 mg/L) in the JC arms decreased significantly from 53% at enrollment to 33% at two years, but was unchanged in the UC arm. Interim analysis also shows the JC intervention to promote favorable changes in lipid, leptin and carotenoid levels, and improved cardiopulmonary fitness.

## 237-P

**Patient Directed, Bariatrician Treated: A Comprehensive Physician Based Medical (Non-Surgical) Weight Loss Program**Robert Ziltzer, Craig Primack *Scottsdale, AZ*; Elena V. Rosca *Baltimore, MD*

There are 133.6 million overweight and obese American adults. The current recommendations are inconsistent in regard to the most effective treatment strategy for these individuals. This, unfortunately, is due to the modest weight loss provided by traditional diets. Diets such as Atkins, Ornish, Weight Watchers and Zone show an average weight loss of 2.1 to 3.3 kg at 1 year. These diets (as designed) are not individualized to the changing lives and medical conditions of the individual patient. In this study, we show that weight loss is maximized when patients are enrolled in a weight loss plan under the care of a Bariatrician with many different tools at his or her disposal. We present the results of a retrospective study of adult participants at Scottsdale Weight Loss Center, from 2006 to 2008 with BMI  $\geq 30$ . The patients were under full, partial and no meal replacement, with weight loss medications when appropriate and desired. 450 patients met the entry criteria; average initial weight was 104.76 kg (average BMI 35). Average weight loss compared to baseline was 10.24 $\pm$ 0.2 kg at 2 months, 16.5 $\pm$ 0.4 kg at 6 months and 17.05 $\pm$ 0.4 kg at 9 months. Average duration of treatment was 36 weeks. For those completing 12 months of treatment (n=80), average weight loss was 14.89 $\pm$ 0.45 kg. Men lost weight more rapidly in the first several months; however weight loss was similar at 1 year.

## 238-P

**Exercise Training Increases Sympathetic Reserve in Obese Individuals With Type 2 Diabetes**Tracy Baynard *Urbana, IL*; Styliani Gouloupoulou *Augusta, GA*; Ruth M. Franklin, Bo Fernhall *Urbana, IL*; Jill A. Kanaley *Columbia, MO*

Type 2 diabetes (T2D) is associated with altered blood pressure (BP) responses during sympathoexcitation, but whether exercise training affects this response is not fully elucidated. Purpose: To determine the effects of 4 mo of moderate endurance exercise training on BP in response to a single (cold pressor test (CPT)) and combined (CPT and glucose challenge) adrenergic stress in T2D versus an obese, non-T2D control group. Methods: Individuals with T2D (n=17, 48yrs) and obese, non-T2D individuals (n=33, 48yrs) completed a CPT for 2 min at 10 C, in fasted and glucose challenged state (75 g dextrose), pre/post training, with beat-to-beat BP measurements. Exercise training consisted of walking 4 d/wk at 65% of peak aerobic capacity (VO<sub>2</sub>peak) for 4 mo. Results: Training resulted in a modest reduction (p<0.05) in weight (1.1kg) and resting systolic BP (SBP: 130 vs. 126 mmHg) and an increase in VO<sub>2</sub>peak (23.2 vs. 24.8 mL/kg/min; p<0.05), with no group differences. The glucose challenge increased (p<0.05) baseline (125 vs. 132 mmHg) and CPT SBP values (151 vs. 157 mmHg), but these were not affected by training in either group. The peak SBP response to the CPT was attenuated only in the fasting condition within the T2D group after training (158 vs. 148 mmHg, p<0.05). Conclusions: Exercise training produced more 'sympathetic reserve' in peak SBP responsiveness during CPT in T2D, while the T2D and obese groups reacted similarly to the concomitant glucose and sympathetic challenge regardless of training status.

## 239-P

**Exercise Program Adherence Using a 5 Kilometer (5K) Event as an Achievable Goal: A Study in People With Schizophrenia**Kimberly R. Warren, M. Patricia Ball, Stephanie M. Feldman, Robert P. McMahon, Fang Liu, Deanna L. Kelly *Baltimore, MD*

Background: People with schizophrenia have a higher prevalence of obesity than the general population. Many people with this illness struggle with weight gain, due in part to their medications and other factors that act as obstacles to exercise and healthy eating including avolition (lack of motivation). Several studies have shown the benefits of behavioral weight loss programs targeting eating and/or exercise in people with schizophrenia. Fewer studies have used tangible goals for an exercise program (Pendlebury, Bushe, Wildgust, & Holt, 2007). Methods: This study tested the feasibility of using an exercise program in preparation for the completion of a 5 kilometer (5K) event in people with schizophrenia. The exercise program was a 10-week training program that consisted of three supervised walking/jogging sessions per week, and a weekly educational meeting on healthy behaviors. Results: Almost 65% (11/17) of the subjects participated in all of the training sessions. Eighty-two percent of the participants (14/17) who enrolled in the exercise program participated in the 5K event. Participants did not gain a significant amount of weight during

the exercise program (median weight change = 0.7 kg; 25<sup>th</sup> percentile 0.5, 75<sup>th</sup> percentile 3.9, p=0.10). Conclusions: These results suggest that a 5K event promotes adherence to an exercise program and is feasible in a population of people with chronic schizophrenia; and this method was successful in alleviating further weight gain in people with schizophrenia.

## 240-P

**Impact of Weight Control Intervention on Adolescents' Physical Activity and Sedentary Behavior**Amy F. Sato, Christina Tortolani, Elissa Jelalian, Chantelle Hart *Providence, RI*

Background: The goal of this study was to examine the key targets of physical activity (PA) and sedentary behavior (SB) in the context of an adolescent behavioral weight control intervention (BWC). Methods: Participants were 90 overweight or obese adolescents (Mean BMI=31.69; SD=3.54) randomized to one of two group-based BWCs (i.e., cognitive-behavioral therapy plus either supervised aerobic exercise or peer enhanced adventure therapy) who completed treatment and had activity data at baseline and end of treatment. Participants were 13-16 years old (M=14.32; SD=1.01), 66% female and 77% Caucasian. The Activity Gram was used to obtain self-reported activity (2 weekdays & 1 weekend day) at baseline and the end of the 16-week intervention. Variables of interest were minutes/day of moderate to vigorous physical activity (MVPA), and SB (i.e., television and computer time). Results: Reduction in adolescent BMI was observed pre- to post-treatment,  $F(1,83)=87.54$ ,  $p<.01$ , with no effect of treatment condition. No changes in MVPA were observed over time. A decrease in SB was observed over time,  $F(1,88)=6.66$ ,  $p<.05$ , with no effect of group (172.22 minutes/day [SD=97.54] at baseline vs. 144.67 minutes/day [SD=103.97] at follow-up). Decreases in SB were inversely associated with increases in MVPA ( $r = -0.36$ ,  $p<.01$ ). Changes in MVPA and SB were not associated with changes in adolescent BMI or weight over time. Conclusion: Adolescents participating in BWC demonstrated decreases in SB but no increases in MVPA. Findings speak to the need for additional research examining strategies to increase MVPA among overweight and obese adolescents participating in BWC.

## 241-P

**Weight and Adiposity Change Following Intentional Weight Loss in Obese African American Girls**Michelle Cardel, Jose R. Fernandez, Krista Casazza *Birmingham, AL*

Typically prescribed weight loss strategies produce short-term success; however, limited long term compliance often results in weight regain. The objective of this study was to quantify weight and body composition changes over an 8-week free-living phase following a 16 week dietary intervention in obese African American (AA) girls aged 9-14. Twenty-four AA girls participated in a twenty-four-week study of three phases: a five-week eucaloric diet in Phase 1, an eleven-week hypocaloric diet in Phase 2, and an eight-week period of free-living in Phase 3. Subjects were assigned to one of two diets: a reduced carbohydrate diet (redCHO: 42% CHO, 40% fat) or standard diet (STAN: 55% CHO, 27% fat). All meals were provided during Phase 1 and Phase 2. In Phase 3, the participants attended education sessions and received energy requirement recommendations in order to continue to lose weight. Body composition was assessed by DXA and participants were weighed to the nearest 0.1 pound. Mean weight loss and percent body fat loss at the end of Phase 2 did not differ between diet groups (redCHO: -11.83 lbs; -2.3% vs. STAN: -9.83 lbs; -3.19%). However, at the completion of phase 3, participants on the redCHO diet had regained significantly more weight and percent body fat (6.64 lbs; 1.53%) relative to the girls on the STAN diet (2.16 lbs; -0.16%) (p<.01). Our results suggest that macronutrient content during weight loss may affect weight maintenance outcomes in AA adolescents. The underlying determinants of weight regain deserve to be investigated further.

## 242-P

**Expansion of an Effective School-Based Wellness Intervention in Adolescents**Suzanne Lazoric *Greenville, NC*; George T. Hardison Jr *Williamston, NC*; Denise T. Esserman *Chapel Hill, NC*

Context: Few school interventions to curb childhood obesity have impacted Body Mass Index (BMI). Motivating Adolescents with Technology to Choose HEALTH (MATCH) is a 14-week, teacher-initiated, interdisciplinary, 7th grade wellness education program. Objective: To assess expansion

of MATCH to 3 schools and effect on BMI compared to control. Design/Methods: Within the school day, MATCH provides: wellness-themed education adapted to the NC Standard Course of Study, self-evaluation, goal setting for behavior change and physical activity. Pedometers, self-monitoring books, and age-appropriate incentives are given. In this cohort intervention study, we compared results from 3 schools compared to one control school. Outcome measures included pre- and post- BMI Z-score, BMI%ile for age/gender, and teacher survey responses. Descriptive and bivariate analyses yielded results. Results: Cohort characteristics (N=237; control N=67) across schools were similar for mean age, mean BMI, gender, ethnicity (African American 63-66%); baseline weight category: overweight (OW) 18-21%; obese (OB) 31-33%. Post-intervention for combined OW+OB, statistically significant ( $p \leq 0.004$ ) changes were demonstrated in the intervention group (BMI Z score change -0.04; BMI %ile -0.82) and no change was seen in the control group. In defining "success" rates for those with decreased Z-Score for OW+OB, success in intervention cohort was 64%. 11 teachers completed the 23-question survey and >90% reported MATCH lessons fit within the standard course and recommended MATCH continue and be expanded. Conclusions: The MATCH intervention is integrated within existing curriculum and incorporates skill-building for individualized behavior-change. 64% of MATCH program participants improved BMI post-intervention and teachers found MATCH feasible.

**243-P**  
**Nutritional Supplementation of Omega-3 Fish Oil In Children With High Body Mass Index Attending a Life-style Modification Program: Effects on the Anti-inflammatory Profile**

Gary A. Mayman *Las Vegas, NV*; Barry Sears *Danvers, MA*; William N. Evans, Anissa Gustafson *Las Vegas, NV*; Mary Dinehart-Perry *Danvers, MA*; Humberto Restrepo *Las Vegas, NV*

Background: Dietary supplementation with EPA and DOCA is associated with a reduced production of thromboxane and leucotriene with a shift to a more anti-inflammatory state and a decrease in the risk of cardiovascular events. Methods: We report data from the first 43 children with a body mass index  $\geq 95^{\text{th}}$  percentile enrolled in a double blind, placebo control, randomized clinical trial. All children participated in a 12-week weight management program with nutritional counseling and supervised exercise. Participants were randomized to group A (placebo) or B (Omega-3 fish oil supplementation). Omega-3 fish oil (OmegaRx™) was given at a dose of 6 grams/day/12weeks. Fasting blood samples for lipid profile and fatty acids were drawn at weeks 1 and 12 Results: Group A included 20 children and group B 23; at entry both groups were comparable by age, BMI Z-score, gender, serum lipid and fatty acid profiles, and race distribution (Hispanic: 65%, Caucasian: 25%, Others: 10%). By week 12, children in group B showed significant improvement in the fatty acid profile compared with children in group A. Group B reduced their Omega6/Omega3 ratio in 45% and Arac /Eicos acid ratio in 53%, while group A raised in 0.4% and 7% their ratios respectively. Both groups significantly lower their triglycerides (Group B: 9%, Group A: 6%). Conclusions: The group of children on nutritional supplementation with Omega-3 fish oil showed positive effects on the fatty acid profile than group who did not receive the supplementation.

**244-P**  
**Incremental Effects of a Nutrition and Strength Training Intervention on Insulin Sensitivity and Adiposity in Obese African American and Latino Adolescents**

Rebecca E. Hasson, Tanja C. Adam, Jaimie N. Davis *Los Angeles, CA*; Louise A. Kelly *Thousand Oaks, CA*; Emily E. Ventura *Los Angeles, CA*; Courtney E. Byrd-Williams *Austin, TX*; Christian Roberts, Christianne J. Lane, Stan Azen, Chih-Ping Chou, Marc J. Weigensberg *Los Angeles, CA*; Donna Spruijt-Metz *Alhambra, CA*; Kiros Berhane, Michael I. Goran *Los Angeles, CA*

Objective: The objective of this study was to examine ethnic differences in the metabolic responses to a 16-week intervention designed to improve insulin sensitivity (SI) and adiposity in obese African American and Latino adolescents. Methods: One hundred participants (African American: n=48, Latino: n=52; age: 15.4 $\pm$ 1.1 years, BMI: 35.0 $\pm$ 7.2 kg/m<sup>2</sup>) were randomly assigned to interventions: Control (n=30), Nutrition (n=39, 1x/week focused on decreasing sugar and increasing fiber intake), or Nutrition+Strength Training (n=31, 2x/week). The following were measured at pre- and

post-intervention: strength, dietary intake, body composition (DEXA/MRI) and glucose and insulin indices (OGTT/IVGTT). Results: Overall, the Nutrition group compared to Control and Nutrition+Strength Training groups reported significant improvements in SI (+16.5% vs. -32.3% vs. -6.9% respectively,  $p < 0.01$ ) and Disposition Index (DI: +15.5% vs. -14.2% vs. -13.7% respectively,  $p < 0.01$ ). The Nutrition+Strength Training group compared to Control and Nutrition groups reported significant reductions in hepatic fat fraction (HFF: -27.3% vs. -4.3% vs. 0% respectively,  $p < 0.01$ ). There were no intervention effects for all other measures of adiposity. Significant intervention by ethnicity interactions were found for African Americans in the Nutrition group who had significant increases in total fat mass (+6.4% vs. -1.1%,  $p = 0.03$ ), 2-hr glucose (+14.5% vs. -20.4%,  $p < 0.01$ ) and glucose IAUC (+7.1% vs. -14.5%,  $p = 0.02$ ), compared to Latinos. Conclusions: These interventions yielded different effects with the Nutrition group reporting favorable improvements in SI and DI and the Nutrition+Strength Training group reporting marked reductions in HFF. Both ethnic groups had significant improvements in metabolic health however some improvements were not seen in African Americans.

**245-P**  
**Exercise Training Improves Teacher Ratings of Executive Function**  
 Catherine L. Davis, Amanda McDougald *Augusta, GA*; Phillip D. Tomporowski *Athens, GA*

Background: Cross-sectional studies have established relations of children's fitness with achievement and executive function, however few exercise trials have been conducted. Methods: 23 overweight or obese children (87% Black, 70% female) were randomized to an after-school exercise program or an attention-control condition which were conducted every schoolday for approx. 8 mo. Attendance was 70%. Average heart rate in the exercise condition was 164 bpm. The Behavior Rating Inventory of Executive Function (BRIEF) Teacher Form was completed by classroom teachers at baseline and posttest. Body fatness was measured using dual-energy x-ray absorptiometry. ANCOVA tested the effect of exercise on BRIEF posttest scores, controlling for pretest score. Results: The children in the exercise group showed a trend toward lower scores (i.e., improvement) in 2 of 3 scales of the BRIEF, the Global Executive Composite and Metacognition Index, relative to controls. The adjusted group means (SD) on the GEC and MI scales were 69 (3.1), 70 (2.7) for the control group and 61 (3.0), 63 (2.5) for the exercise group, respectively,  $p < .10$ . No improvement was observed on the Behavioral Regulation Index. Conclusions: These preliminary data suggest that regular vigorous physical activity might improve classroom behavior in overweight children.

**246-P**  
**The Effects of Circuit-Training With and Without Motivational Interviewing on Ectopic Fat Stores in Obese Latino Adolescent Females**

Lauren E. Gyllenhammer, Amanda K. Vanni, Matthew R. Mejia, Sherry Esplana *Los Angeles, CA*; Donna Spruijt-Metz *Alhambra, CA*; Michael I. Goran, Jaimie N. Davis *Los Angeles, CA*

Objective: The objective of this study was to assess whether a 16-week circuit-training (CT; strength training + aerobic exercise) intervention can reduce ectopic fat, specifically liver fat in obese Latino adolescent females, and whether motivational interviewing would increase the efficacy of this exercise intervention. Method: Thirty-seven obese Latino female adolescents (15.5 $\pm$ 1.7 years) were randomized into one of 3 groups for a 16-week intervention: Control (delayed intervention; n=12), CT (n=13), or CT+ Motivational Interviewing (CT+MI; n=12). Both intervention groups received CT classes 2x/week and the CT+MI group received 8 individual and group MI sessions. Body composition was determined by DEXA and MRI before and after the intervention. Univariate analyses were used to assess change in adiposity parameters (i.e., total fat tissue, visceral adipose tissue (VAT), subcutaneous adipose tissue (SAT), and hepatic fat fraction (HFF)) across interventions. Results: There were no significant differences in change in adiposity measures between the CT and CT+MI; therefore these groups were combined for subsequent analysis. CT participants compared to control participants had significant decreases in: total body fat (-7% vs. +3%;  $p = 0.04$ ), SAT (-5% vs. +5%;  $p = 0.002$ ), VAT (0% vs. +7%;  $p = 0.04$ ), and HFF (-15% vs. -4%;  $p = 0.04$ ). Conclusions: MI did not

improve the efficacy of the exercise intervention. Twice per week CT led to significant reductions in adiposity, particularly VAT and liver fat. Given that CT only requires short bouts of cardiovascular and strength training (2-minute alternating intervals), this may be an optimal exercise for overweight Latino youth.

**247-P****Weight Management For Veterans: Examining Change in Weight Before and After MOVE!**

Jason R. Dahn, Stephanie L. Fitzpatrick, Maria M. Llabre *Miami, FL*; Greta Bujaker *Fort Lauderdale, FL*; Rebecca L. Helms, Marilyn Cugnetto, Johanna R. Klaus, Hermes Florez, Timothy Lawler *Miami, FL*

In the year 2000, 31% of women and 40% of men receiving outpatient care at VA medical facilities were considered overweight (BMI  $\geq 25$  and  $< 30$  kg/m<sup>2</sup>); 37.4% of women and 32.9% of men were considered obese (BMI  $\geq 30$  kg/m<sup>2</sup>). The purpose of the current study was to assess treatment effects of MOVE!® Weight Management Program for Veterans by comparing the trajectory of change in weight post-intervention (3, 6, and 12 months post enrollment) to a pre-intervention period (1, 3, and 5 years prior to enrollment). The sample consisted of 862 veterans participating in MOVE! at the Miami VA. All veterans participated in a two-hour Self-Management Support (SMS) session, which involved completion of the MOVE!23 questionnaire and a nutrition education group session. After completing SMS, veterans had the option of continuing with Supportive Group Sessions (SGS), which included 10-weekly group sessions led by a multidisciplinary team. Veterans served as their own control in the analyses. Veterans gained 2 kg per year before enrolling in MOVE!. There were similar increases in weight across sex, racial/ethnic groups, and treatment condition. Weight for participants in SMS stabilized after enrollment while participants in SGS had an average weight loss of 1.6 kg per year. The pre-intervention slope for weight was significantly different from the post-intervention slope, suggesting treatment effect. Findings from this study support the need for a lifestyle modification program such as MOVE! in primary care settings to assist overweight and obese patients in managing their weight.

**248-P**

*This abstract has been withdrawn.*

**249-P****Influence of Ileal Infusion of Long Chain Fatty Acid Receptor GPR120 Ligands on Hunger: A Pilot Study in Healthy Volunteers**

Jeroen P. Maljaars *Maastricht, Netherlands*; Harry P. Peters, Martin Foltz, Ewoud A. Schuring *Vlaardingen, Netherlands*; Ad A. Masclee *Maastricht, Netherlands*

Introduction: We have repeatedly shown that ileal infusions of long chain fatty acids (LCFA) can induce the ileal brake in humans, but underlying mechanisms are unknown. Recent findings in mice suggest the G-protein-coupled receptor GPR120 functions as an ileal sensor of LCFA, mediating GLP-1 and CCK secretion. We cloned human GPR120 and confirmed LCFA as potent receptor agonists. *In silico* prediction using a ligand-based structure activity model and *in vitro* hGPR120 activation revealed that the flavanoids quercetin-3-beta-glucoside (quercitrin) and epigallocatechin gallate (EGCG) were equipotent agonists. We hypothesized that ileal infusions of these GPR120-ligands, like LCFA, should decrease hunger relative to saline. Methods: Eight healthy volunteers were intubated with a naso-ileal tube. Following a 12 hour fast, each subject received 30 minutes ileal infusion on 4 consecutive days in balanced order: 400 mg quercitrin, 400 mg EGCG, 6g sunflower oil (positive control) or saline. Appetite parameters (6 line scales) were measured for 120 minutes. Results: Compared to saline, hunger area-under-the-curve (AUC) was 18% lower during and especially after the oil infusion, while responses to EGCG, quercitrin and saline were essentially identical (AUC 55, 66, 68 and 67 mm-min for oil, EGCG, quercitrin, and saline, respectively; SE=4). Results for other appetite parameters were largely similar. Conclusions: At these doses, there were no effects of ileal infusions of GPR120-ligands other than LCFA on self-reported appetite. Either GPR120 is not the primary mediator for human ileal brake, or the non-LCFA ligands tested here lack *in vivo* functionality for other reasons.

**250-P****Sex Differences in Epicardial Fat MicroRNAs in Patients With Coronary Artery Disease- West Virginia Appalachian Heart Study**

Kevin Johnson, Christopher Adams, Carla Cook, Todd Gress, Nepal Chowdhury, Paulette Wehner, Jia Fei, Nalini Santanam *Huntington, WV*

Background and Objective: Coronary Artery Disease (CAD) is a growing problem in the United States. Alterations in epicardial fat (EF), that covers the heart and coronaries have been correlated to CAD. This study proposes to identify unique microRNAs (miRNA) in the EF that are altered during CAD. MiRNAs are 18-25 nucleotides long and are master regulators of gene expression. Methods: We collected EF and subcutaneous fat (SF) from male and female (n=20/sex) patients undergoing the coronary artery bypass graft procedure. The human miRNA microarray was performed on the RNA isolated from EF and SF obtained from patients. The ratio of threshold values in EF to SF was used to compare miRNA expression in each patient. Results: Upon data analysis, we found sex differences in the expression of miRNAs in the EF. Pathway analysis using Ingenuity software identified 14 unique miRNAs in males and 4 miRNAs in females that were correlated to CAD. Only miR100 was equally altered between both sexes. Discussion and Conclusion: Further validation studies using real time PCR and comparison studies using EF from non-CAD patients is currently under way. Identification of unique sex specific miRNAs can have tremendous clinical implications. The authors acknowledge funding from NIH-NCRR P2ORR016477- 09S2, Drs. Mcunu and Setser for the samples and Dr. Mary Davis, WV-INBRE for help with the Pathway analysis.

**251-P****Veterans Who Participate in MOVE and Seasonal Effects on Weight Loss Outcomes**

Jen Rafacz, Susan Payvar *Chicago, IL*

The physical and psychological consequences of being overweight are well documented, emphasizing the need for successful weight loss programs. Research suggests that veterans in the VA system are more likely to be overweight when compared to general populations. Additionally, research suggests that African American men are becoming obese faster than Caucasian men. Seasonal changes in weight among individuals has been found in research. This study attempted to characterize the effectiveness of a particular VA program targeted at weight loss. Data was collected from participating veterans in an urban VA weight loss program. Veterans weights were taken at every session and upon program completion. This analysis explored what effect start season of the program had on several outcomes. This dataset consisted mainly of African American men leading us to consider ethnic differences. The analysis found significant differences between start season and number of classes attended, average class size, and start class size. When exploring ethnic differences, the analysis found that non-African Americans attended more classes than African Americans in the summer and spring seasons. Also, significant differences were found in weight loss between African American and non-African American while in the program during the summer and spring seasons, but no differences were found during the winter season. There were no differences in sustained weight loss. The data suggests that there are outside variables to consider when developing effective programs for weight loss. Specifically, it suggests we need to consider the seasonal factors and ethnicity when creating weight loss programs.

**252-P****24 Hour Core Temperature in Obese and Lean Men and Women**

Sarah M. Rodriguez, Mindy Hoffmann, Dinah Zeiss, Kelley Wachsberg, Robert Linsenmeier, Robert Kushner, Lewis Landsberg *Chicago, IL*

Maintenance of core temperature is a major component of 24-hour energy expenditure, and its dysregulation could contribute to the pathophysiology of obesity. The relationship among temperature, gender, and BMI, however, has not been fully elucidated in humans. This study investigated core temperature in obese and lean individuals at rest, during 20 min exercise on a bike ergometer, during sleep, and after food consumption. Twenty-four lean (18.5 -24.9 kg/m<sup>2</sup>) and obese (30.0 -39.9 kg/m<sup>2</sup>) healthy participants, ages 25 to 40 yrs old, were admitted overnight in a clinical research unit. Females were measured in the follicular menstrual phase. Core temperature was measured every minute for 24 hours using the CorTemp system, a



pill-sized sensor that measures core temperature while in the gastrointestinal tract and delivers the measurement via a radio signal to an external recorder. Core temperature did not differ significantly between the obese and lean individuals at rest, post-prandial, during exercise, or during sleep (all  $P$ 's > 0.5). Differences in core body temperature between men and women were statistically significant at rest ( $36.77^{\circ}\text{C} + 0.15$  vs.  $37.13 + 0.13$ ), post-prandial ( $37.06 + 0.22$  vs.  $37.38 + 0.20$ ), during exercise ( $37.28 + 0.24$  vs.  $37.60 + 0.32$ ), and during sleep ( $36.58 + 0.21$  vs.  $36.99 + 0.18$ ; all  $P$ 's < 0.05). These data indicate that obesity is not associated with a lower core temperature but that women have a higher core temperature than men at rest, during sleep, during exercise, and after meals.

**253-P**  
**The Effectiveness of tDCS in Decreasing Food Cravings**

Rachel L. Goldman, Jeffrey J. Borckardt, Heather A. Frohman, Patrick M. O'Neil, Alok Madan, Laura K. Campbell, Amanda Ray Budak, Mark S. George  
*Charleston, SC*

Previous studies suggest that the prefrontal cortex may be involved in inhibition of food cravings. Transcranial direct current stimulation (tDCS) is a minimally-invasive brain stimulation technique that is capable of selectively activating or inhibiting specific cortical areas. This study examined whether a single 20-minute session of active anode right/cathode left tDCS delivered during and immediately following exposure to food stimuli would reduce food cravings in healthy individuals who reported frequent food cravings. Nineteen participants viewed 24 computerized images of food and used computerized visual analogue scales to rate food cravings before, during, and after receiving either real or sham tDCS. This study employed a within-subject crossover design; each participant received both conditions in random order and was blind to the condition. Food cravings ratings were reduced in both conditions, however, the percent change in cravings from pre- to post- stimulation was significantly greater for real stimulation ( $M = -26.81\%$ ,  $SD = 26.11$ ) than for sham ( $M = -7.98\%$ ,  $SD = 41.82$ ;  $t(18) = -2.28$ ,  $p = .035$ ). Post hoc analyses suggest that active prefrontal tDCS acutely and significantly decreased food cravings ratings for sweet foods and carbohydrates more so than sham tDCS ( $t(18) = -2.34$ ,  $p = .031$  and  $t(18) = -2.44$ ,  $p = .025$ , respectively), but no significant effects were observed for high-fat food or fast-food images. These findings suggest that tDCS is able to temporarily modify food cravings in healthy subjects. Further studies are warranted to assess whether tDCS might be used to decrease food cravings to prevent and manage obesity.

**254-P**  
**The Effects of Consuming Frequent, Higher Protein Meals on Appetite and Satiety During Weight Loss in Overweight/Obese Men**

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The purpose of this study was to determine the effects of dietary protein and eating frequency on perceived appetite and satiety during weight loss. Twenty-seven overweight/obese men (age  $47 \pm 3$  y; BMI  $31.5 \pm 0.7$  kg/m<sup>2</sup>) were randomized to groups that consumed an energy restriction diet (i.e., -750 kcal/d below daily energy need) as either higher protein (HP, 25% of energy as protein) or normal protein (NP, 14% of energy as protein) for 12 weeks. Beginning on week 7, the participants consumed their respective diets as either 3 eating occasions/d (3-EO; every 5h) or 6 eating occasions/d (6-EO; every 2h), in randomized order, for 3 consecutive days. Indices of appetite and satiety were assessed every waking hour on the third day of each pattern. Daily, overall hunger, desire to eat, and preoccupation with thoughts of food were not different between groups. The HP group experienced greater fullness throughout the day vs. NP ( $51.1 \pm 5.6$  vs.  $24.3 \pm 5.4$  mm 15 h;  $p < 0.005$ ). When compared to NP, the HP group experienced lower late-night desire to eat ( $13 \pm 4$  vs.  $27 \pm 4$  mm,  $p < 0.01$ ) and preoccupation with thoughts of food ( $8 \pm 4$  vs.  $21 \pm 4$  mm;  $p < 0.01$ ). Within diet groups, the 3 vs. 6-EO patterns did not influence daily, overall hunger, fullness, desire to eat, or preoccupation with thoughts of food. The 3-EO pattern led to greater evening and late-night fullness vs. 6-EO but only within the HP group ( $p < 0.005$ ). Collectively, these data support the consumption of higher protein intake, but not greater eating frequency, for improved appetite control and satiety in overweight/obese men during energy-restriction-induced weight loss.

**255-P**  
**Effects of High and Low Palmitic Acid Diets on Whole Body, Tissue, and Serum Lipids**

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Palmitic acid (PA) and oleic acid (OA) have differential effects on muscle cells. We hypothesized that fat mass (FM), serum lipid concentrations, and fatty acid (FA) composition of muscle and adipose tissue lipids would be affected by diet PA versus OA. A double-blinded, cross-over trial was conducted in 18 non-obese, adults (9 females), who, after a 7-d, low fat baseline diet, ingested both experimental diets for 3 wks in random order: HI PA (Fat, 40.4% kcal; PA 16.0% kcal; OA, 16.2% kcal) or HI OA (40.1% kcal; 2.4% kcal; 28.8% kcal). We assessed FM and fat-free mass (FFM), serum lipid concentration, and muscle and adipose tissue FA composition. There was no diet effect on FM and FFM. LDL and total cholesterol (mg/dL) decreased from baseline during HI OA ( $P < 0.01$  vs. HI PA). In the fasting state, HI PA caused 73% and 83% increases in PA/OA ratio of diacylglycerol (DAG) and triacylglycerol (TAG) ( $P < 0.01$ ), respectively, and a 11% increase in fractional PA concentration of muscle phosphatidylcholine ( $P = 0.04$ ); similar diet effects were seen after meals ( $P < 0.01$ ). There was no effect of diet (either state) on muscle DAG or TAG concentration. In adipose tissue (collected in the fed state only), HI PA increased the PA/OA ratio of DAG (but not TAG) by 10% ( $P = 0.04$ ). Thus, changing the PA/OA ratio of the diet for 3 wks alters the FA composition of both muscle and adipose tissue and is associated with significant effects on serum lipids.

**256-P**  
**Preferred Snack Foods Are More Reinforcing Following a 24-Hour Complete Fast: Evidence That Energy Deprivation Alters Food Reward**

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Background: The relative reinforcing value (RRV) of food is assessed by the comparative reinforcing efficacy of 2 food stimuli. Acute food deprivation increases the RRV value of palatable snack foods, but the impact of prolonged deprivation on reinforcement and hedonics has to our knowledge not been evaluated. Our objective was to examine the association between a 24-hour complete fast and the RRV of food and food hedonics. Methods: Results presented herein are from an ongoing randomized repeated measures crossover study of men ( $n=4$ ) and women ( $n=2$ ) (age= $26.8 \pm 8.8$ ) undergoing two testing sessions, one in the fed state and the other fasted. RRV was measured by computerized progressive ratio schedules of reinforcement and hedonics were measured by visual analogue scales. Also measured were body weight (BW), body mass index (BMI), resting energy expenditure (REE), and eating behaviour (Three Factor Eating Questionnaire). Results: There were no significant changes in BW ( $77.5 \pm 22.9$  vs.  $76.8 \pm 23.1$  kg), BMI ( $25.7 \pm 5.0$  vs.  $25.4 \pm 5.0$  kg/m<sup>2</sup>), or REE ( $1703 \pm 369.8$  vs.  $1708 \pm 340.9$  kcal/day); all results herein are presented fed and fasted, respectively. For the fast-ing condition subjects responded significantly more ( $p < 0.05$ ) for the snack food vs. fruit ( $299 \pm 122.5$  vs.  $526.2 \pm 393.9$  snack responses) when controlling for disinhibition. Also, a non-significant trend ( $p=0.1$ ) was found for snack points earned ( $15.6 \pm 9.0$  vs.  $20.5 \pm 11.7$ ). The snack reinforcer was rated significantly ( $p < 0.05$ ) more palatable after fasting ( $130.5 \pm 10.0$  vs.  $142 \pm 5.1$ ). Conclusions: The RRV and hedonic evaluation of preferred foods were significantly increased following a 24-hour fast, suggesting palatable foods become more rewarding with prolonged food deprivation.

**257-P**  
**The Effects of an 8-Month Maintenance Nutrition and Strength Training Intervention on Type 2 Diabetes Risk Factors in Overweight Latino and African American Adolescents**

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Objective: To test the effects of an 8 month maintenance program to extend an intensive 4-month nutrition and strength training intervention to reduce risk of type 2 diabetes in high-risk overweight minority adolescents. Methods: After an initial 4-month intervention (1/wk nutrition education or

nutrition plus 2/wk strength training), 53 overweight Latinos and African American adolescents (15.4±1.1 yrs, 53% Latino) were randomized into one of 2 maintenance groups for 8 months: Control (C; n=23; monthly newsletters) or Group Classes (GC; n=30; monthly classes + 4 motivational interview sessions by phone). The dietary goals were to reduce added sugar and increase fiber intake. The following were measured at baseline, and at months 4 and 12: height and weight, body composition by BodPod™, glucose/Insulin indices by fasting blood and insulin-modified intravenous glucose tolerance test. Results: Changes over time in all health outcomes were not significantly different between the 2 maintenance groups. From baseline to month 12, total and insoluble dietary fiber increased in both groups by 24% and 30% (p=0.03) while added sugar intake decreased by 18% (p=0.02). There were significant changes from month 4 to 12 in the following outcomes for both groups: fasting insulin and acute insulin response decreased by 27% and 16% (p<0.02); while insulin sensitivity and glucose effectiveness improved by 16% and 13% (p=0.02). Conclusions: Both maintenance strategies were equally effective in improving dietary intake and metabolic outcomes resulting in improving long-term insulin action, thus reducing type 2 diabetes risk factors in overweight minority adolescents.

**258-P****Impact of a Snacking Intervention for Overweight Mexican American Children**

Jennette L. Palcic, Craig A. Johnston, Abeer A. El-Mubasher, Sandra Stansberry, John Foreyt *Houston, TX*

Eating patterns have changed dramatically over the last 30 years. Our previous study found a lifestyle intervention to be effective in reducing zBMI in children. This study examined the impact of the snacking component of the intervention. A total of 497 students were randomized to the instructor led intervention (ILI, n=273) or a self-help (SH, n=224) condition. Change in total snacks consumed was examined from baseline to 6 months. A significant interaction was observed (F=8.9, p<.01) with the ILI decreasing and SH increasing snacks consumed. Examination of changes in hunger revealed that children in both conditions increased their hunger ratings over time (F=26.9, p<.001). However, the hunger ratings of the SH children increased more than ILI (F=5.0, p<.05). The ILI demonstrated a greater decrease in BMI and zBMI at 6 months than children in SH (F=8.0, p<.01; F=5.7, p<.05, respectively). The ILI showed significantly greater decreases in calories compared to the SH (F=4.5, p<.05). Correlations were calculated for total snacks, hunger ratings, caloric intake, and change in zBMI. Total snacks was positively correlated with hunger and caloric intake, but not zBMI change. The results suggest the snacking intervention was effective in changing snacking behavior of children in the ILI.

**259-P****Two-Year Follow Up of a Behavioral Adolescent Weight Control Intervention**

Elissa Jelalian, Amy F. Sato, Chantelle Hart *Providence, RI*; Elizabeth Lloyd Richardson *Dartmouth, MA*; Robyn Mehlenbeck *Providence, RI*

Background: Few studies report long-term outcomes of behavioral weight control interventions (BWC) with adolescents. The goals of the current study were to: 1) examine 24 month follow-up data from a randomized controlled trial and 2) determine the contribution of treatment related improvements in self-efficacy and self-concept to BMI change. Methods: One hundred eighteen obese adolescents (Mean BMI=31.41; SD=3.33) ages 13-16 years (M=14.33; SD=1.02) were randomized to one of two 16-week group-based BWC that differed only in the exercise component. One hundred adolescents (85%) completed the 16-week intervention and 89 participants (75% retention) were available for 24-month evaluation. The 24 month completers were 76% Caucasian, 13% African American, 7% Latino, and 70% female. Height and weight were obtained at baseline, at the end of the intervention, 12- and 24-month follow-up. The Self-Perception Profile for Adolescents, Physical Self-Efficacy Questionnaire and Weight Efficacy Life-Style Questionnaire were completed at baseline and at the end of intervention. Results: Mixed factor ANOVA indicated a significant effect for time on BMI, F(3,82) = 35.32, p<.001, with no effect of group. Post-hoc comparisons showed a significant decrease in BMI

at 4 months, maintained at 12 months, with return to baseline levels by 24-month follow-up. Negative correlations were observed between BMI reduction at 24 months and treatment related improvements in physical activity related self-efficacy, r = -.23, p<.05, physical appearance related self-concept, r = -.38, p<.01, and global self-concept, r = -.34, p<.01. Conclusion: BMI reductions observed through 12-months were not maintained at 24-months. Improvements in self-concept and physical activity self-efficacy observed during treatment were important for long-term BMI reduction.

**260-P****Vegetable and Fruit Consumption During Weight Loss Is Positively Correlated With Weight and Fat Loss**

Leah D. Whigham *Grand Forks, ND*; Ashley R. Valentine, Zhumin Zhang *Madison, WI*; Richard L. Atkinson *Richmond, VA*; Sherry A. Tanumihardjo *Madison, WI*

Background: Recommendations to increase vegetable and fruit consumption often accompany guidelines for weight loss. A previous study indicated that people who were instructed to count calories lost more weight than those simply instructed to increase vegetable and fruit intake. Objective: The objective was to determine if actual vegetable and fruit intake based on serum carotenoid concentrations was correlated to weight loss and body composition changes. Design: 60 obese (BMI 30-40 kg/m<sup>2</sup>) volunteers were enrolled in a weight-loss intervention. Subjects were randomly assigned to one of two groups: calorie reduction group was instructed to restrict total intake by 500 kcal and limit fat to 25% and high vegetable group was instructed to increase vegetable intake to 8 servings/d and fruit to 2-3 servings/d. For the first 3 mo, subjects were provided breakfast and lunch 5 d/wk and taught basic nutrition principles to assist them in meeting dietary goals. As a transition, subjects received breakfast and lunch 2 d/wk during the 4<sup>th</sup> month and regular phone calls of decreasing frequency for the remainder of the year. Results: Vegetable and fruit intake and most serum carotenoid concentrations increased from baseline to 3 mo and remained elevated at 12 mo. Total serum carotenoid concentrations correlated positively with self-reported vegetable intake and combined fruit and vegetable intake. Weight, fat, and %fat were negatively correlated with serum carotenoid concentrations. Conclusions: Increased vegetable consumption is an appropriate strategy for weight loss. However, increased vegetable consumption must still happen within the context of reducing total caloric intake.

**261-P****Prevention of Obesity in Preschool Children**

Julie A. Lanigan, Sarah L. Low, Kerry M. Lanigan-Coyte, Heidi A. Tang, Toni Birbara, Maria Kokoreli, Atul Singhal *London, United Kingdom*

Background: Obesity in young children is a growing problem with an estimated 22 million children aged less than 5 years being currently classified as overweight or obese worldwide. Studies suggest that most excess weight is gained prior to starting school and therefore prevention of obesity should begin early in childhood. However, there are few lifestyle interventions targeted at preschool children. Here, we report the results of a community based, lifestyle intervention designed to reduce obesity risk in children aged 1-5 years ('Trim Tots' Healthy Lifestyle Programme). Methods: Children (mean age 2.5: years, n=88), attending family centers (part of the UK government's 'Sure Start' programme), with BMI above the 91st centile or upward crossing in centiles for weight were randomly assigned to either intervention or waiting list control groups. The intervention, delivered twice-weekly for 3 months and then weekly for 3 months, included nutrition education, physical activity, and behavior change components with an emphasis on family involvement and learning through art and play. Results: BMI and BMI z-score were lower in children completing the 6 month intervention than controls (mean difference for BMI z-score: -0.9 z scores; 95% CI: -1.4 to -0.4; p=0.001) and this difference remained after adjustment for age and sex (p=0.002). Discussion: The 'Trim Tots' intervention was acceptable to both families and center staff and resulted in a significant reduction in obesity risk. Although longer term data are required, these findings suggest that the programme is a feasible intervention for prevention of obesity in preschool children.

**262-P**

**Outcomes of a Multi-Disciplinary 20-Week Fitness and Nutrition Program**

Sharon A. Martino, Peter J. Morelli, Sue A. Sisto, Eric M. Lamberg *Stony Brook, NY*

Background: Childhood obesity studies have traditionally used body mass index (BMI) as the primary outcome measure. The percentage of lean tissue and body fat along with fitness may be more accurate indicators of program effectiveness. Purpose: To evaluate the effect of a multi-disciplinary exercise and nutrition intervention administered to overweight and obese children, ages 8-17, by examining body composition using dual-energy x-ray absorptiometry (DXA), fitness levels, and BMI. Methods: The influence of a twenty week (2 times per week) exercise and nutrition intervention was examined in 48 children (12.1 ±2.5 years; BMI range 27-69). Assessments of body composition and fitness measures were made at baseline, following 10 weeks of the intervention and after an additional 10 weeks of a home program. Results: There was no change in BMI. Body composition improved with significant changes in % body fat (-2.1%) and % lean tissue (+1.9%) noted between baseline and twenty weeks ( $p < .05$ ). Fitness measures improved and changes were maintained or increased during the home program phase. Conclusion: Upon completion of the program BMI remained stable and body composition and fitness improved in overweight/obese children. The use of body composition methods and fitness measures may be better indicators of program effectiveness.

**263-P**

**Factors Associated With 12-Month Weight Change in a Physical Activity Trial**

Melissa Napolitano, Sharon Hayes *Philadelphia, PA*

Background: Examining factors that relate to weight stability and change over a 1-year period are of public health importance. Methods: Data were examined from a physical activity (PA) intervention trial for women ( $n=274$ ; mean age =47.2±10.8; mean BMI=28.7±5.2). By 12 months, all groups reached public health guidelines for PA (150 min/week), with no group differences. Women were categorized by weight status change from baseline to month 12: *No change* (BMI within + 1 unit;  $n=154$ ; 56.2%); *Increase* (BMI change > 1 unit;  $n=31$ ; 11.3%); *Decrease* (BMI change < 1 unit;  $n=89$ ; 32.5%). Analyses: Discriminant function analyses were conducted to examine the effect of change (from baseline to month 12) in PA, mood and stress on group classification. Results: Tests of dimensionality indicate that both of the dimensions were statistically significant. Dimension 1 [F (6, 470)= 3.31;  $p < 0.01$ ] had a canonical correlation of 0.23 between the response variables and weight status classification, while the canonical correlation for Dimension 2 [F (2, 236) =3.39;  $p < 0.05$ ] was lower at 0.17. Standardized canonical coefficients for both dimensions were examined with the first dimension negatively weighted by mood (-1.25) and positively weighted by stress (0.87) and PA (0.46). The second discriminant dimension was more weighted to activity (.69) compared with mood (.34) and stress (.53). The first dimension reflects a mood/negative affect dimension while the second is a physical activity dimension. Conclusions: Psychosocial factors, in particular mood and stress, should be considered in the context of both weight loss and PA intervention trials, as they appear to impact one's weight outcome.

**264-P**

**Clinical Effects of Combining a Liquid Dietary Supplement Containing a Combination of Indigestible Soluble Fiber, Phenylalanine, N-Acetyl-L-Tyrosine, Tea Extract With Polyphenols and Caffeine and Lycium Barbarum (TAIslim), Glucomannan Fiber-Containing Chew (TAIslim SKINNY) and Meal Replacement Shake (TAIslim Shake) on Appetite and Gastrointestinal Parameters: A Randomized, Placebo-Controlled, Blinded Human Clinical Study**

Harunobu Amagase, Richard Handel *Phoenix, AZ*

Background: TAIslim® (Product A) reduced appetite and anthropometric parameters when used with exercise and diet restriction. We examined glucomannan fiber-containing products with Product A on appetite and gastrointestinal parameters during a weight loss program. Methods: Combination of Product A with chewable confection (TAIslim® SKINNY=Product B)

and/or meal replacement shake (TAIslim® Shake=Product C) was studied in a randomized, placebo-controlled, blinded manner. Fiber content in Product A, B, or C was 5, 1, or 5 g, respectively. A total of 58 male and female adults (age=37.5 y; BMI=30.8 kg/m<sup>2</sup>) were randomized into 3 groups (All placebos, Product A+B+placebo C, Product A+B+C). Intake procedures were; Product A, 60 ml (20 kcal) t.i.d. immediately before meal; Product B, 1 chew (20 kcal) t.i.d. between meals and after dinner; Product C, 40.5 g (158 kcal) mixed with water as breakfast. A calorie-restricted diet (1,200-1,800 kcal/d) with multi-vitamin supplement and daily exercise was required. Visual analogue scales for appetite and ranked scale questionnaire (0-10) for gastrointestinal conditions were assessed after 12 h fast at baseline and during the first 3 days. Results: Appetite was significantly reduced by 21.2±5.3% and 38.6±6.5% (mean±SEM) compared to the baseline level by Product A+B and Product A+B+C, respectively, and better than placebo ( $P < 0.05$ ). No significant changes were found in placebo group. Gastrointestinal side effects were not detected. Conclusions: Based on previous TAIslim study and these results, it is suggested that combining these products may be useful as a weight loss program, as additive effects are expected on appetite and other parameters.

**265-P**

**A Mediterranean Diet Intervention in Lactating Women: Change in Body Weight and Body Composition**

Nicole Stendell-Hollis, Patricia Thompson, Monica Lauder milk, Joy Winzerling, Michael Daines, Cynthia Thomson *Tucson, AZ*

Retention of body weight and body fat during the postpartum period is common. Evidence suggests lactation may be associated with weight control, although not consistently. We hypothesized that women adhering to a Mediterranean-style diet (MED) during lactation will show significant reductions in body weight and body fat compared to women randomized to a control diet. To date, 92 lactating women have been enrolled in a randomized, controlled dietary intervention trial designed to compare change in body weight and body composition in relation to adopting a MED with walnuts to the USDA's MyPyramid diet for Pregnancy and Breastfeeding. Anthropometric measurements were obtained at baseline, 2 months, and 4 months. Women were mostly Caucasian (83.3%), average age was 29.6 years, BMI averaged 27.7 kg/m<sup>2</sup>, waist:hip ratio 0.84 cm (SD: 0.06), and body fat averaged 40.1%. Over 80% were primarily exclusively breastfeeding upon study entry, a mean 15.6 weeks post-partum. To date, 53 women have completed 2 months and 28 women have completed 4 months of the diet intervention. Regardless of diet group assignment women have demonstrated reductions in body weight at 2 and 4 months, with a larger decrease exhibited in the control group at 4 months (-2.9 kg compared to -0.3 kg). Women in the intervention group illustrated a significant decrease in waist:hip ratio (-0.04 cm;  $P=0.05$ ) in the same 4 month time period, a change that was not discerned in the control group. Further follow up and increased sample size is needed before the apriori hypotheses can be fully tested.

**266-P**

**Breakfast Consumption (BC) Is Associated With Higher Self-Reported and Objectively Measured Moderate to Vigorous Physical Activity (MVPA) in 8-17 Year Old Latina and African American Females**

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Background: Eating breakfast and engaging in regular physical activity (PA) may help children maintain a healthful weight; however, both behaviors decline in adolescence. Few studies examine BC and MVPA and their relationship in youth, and none have used objectively measured PA (OMPA) in minority females. Objective: To investigate the associations between BC and MVPA in minority female youth. Methods: Cross-sectional data from three related pediatric obesity studies is presented. Measures included: BC by 3-day food records, MVPA by accelerometry (data for ≥4days; 10hr/day) and 3-day PA recall (3DPA), and body composition by BodPod™. Participants were divided into three breakfast categories; those who: never ate breakfast ['skippers'; 25(20.8%)], ate breakfast one or two days ['occasional eaters'; 61(50.8%)], or ate breakfast all three days ['regular eaters'; 34(28.3%)]. Differences in PA across groups were tested using ANCOVA

with Bonferroni adjustments. Covariates were age, ethnicity, total fat and total lean mass. Results: Participants were 120 females [ $M_{\text{age}}=13.3(\pm 3.1)$ ; 68.3% Latina]. Breakfast skippers were older than occasional and regular eaters [ $M_{\text{age}}=14.6(\pm 2.4)$  vs.  $M_{\text{age}}=13.1(\pm 3.3)$  vs.  $M_{\text{age}}=12.7(\pm 2.9)$ ;  $p=0.01$ ]. BC was related to higher MVPA by both OMPA ( $p<0.001$ ) and 3DPA ( $p=0.01$ ). Regular eaters recorded higher mins/day of MVPA by accelerometry compared to skippers [ $31.6(\pm 30.5)$  vs.  $14.9(\pm 14.6)$ ;  $p=0.05$ ]. Regular eaters also reported higher mins/day of MVPA by 3DPA compared to skippers [ $109.3(\pm 87.7)$  vs.  $78.9(\pm 69.6)$ ;  $p=0.05$ ]. Conclusions: Regular breakfast eaters spent more time in MVPA, regardless of PA assessment method and independent of age and body composition. Promoting BC may be a viable approach to improving PA in minority female youth.

**267-P****A Catechin-Rich Beverage With No Caffeine Lowered Abdominal Fat in Japanese Overweight/Obese Adults**

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Background: Obesity, a major risk factor for cardiovascular disease (CVD), is epidemic in Asian countries as well as Western countries. Accumulating human evidence indicates that tea, especially green tea extract (GTE) that is rich in catechins and caffeine, improves fat metabolism. The potential health benefits of catechins per se, however, have yet to be elucidated. We assessed whether daily consumption of decaffeinated GTE affects body fat in an Asian population in a large clinical study. Methods: The study was a multicenter, randomized, double-blind, placebo-controlled, parallel study. After a 4-week run-in period, 172 Japanese overweight and obese men and women (mean BMI:  $27.6 \text{ kg/m}^2$ ) were divided into two groups that consumed a 500-mL bottle of tea containing either 538 mg of catechins without caffeine ( $n=86$ ) or placebo without catechins and caffeine ( $n=86$ ) per day for 12 weeks. Data on all patients were analyzed on an intention to treat basis. Results: At the end of the study, body weight ( $-2.0 \text{ kg}$ ,  $p<0.001$ ), waist circumference ( $-2.1 \text{ cm}$ ,  $p<0.001$ ), visceral fat area (VFA) measured by CT scans ( $-10.0 \text{ cm}^2$ ,  $p<0.001$ ) were lowered significantly more in the catechin group than the placebo group. The visceral fat-lowering effect was also observed when the subjects were stratified by gender, in men ( $n=89$ ) and women ( $n=83$ ). Furthermore, mild reductions in systolic and diastolic blood pressures and serum reactive oxygen species were observed in only the catechin group. Conclusion: Daily consumption of a catechin-rich beverage, even with no caffeine, may be useful for managing central obesity linked to CVD.

**268-P****Factors That Predict Weight Loss: Results of a Meta-Analysis of Weight Loss Studies**

Elissa Finkler *New York, NY*; Steven Heymsfield *Rahway, NJ*; Marie-Pierre St-Onge *New York, NY*

Although dietary weight loss counseling usually employs a 500-1000 kcal/d energy deficit to induce weight loss of 1-2 lbs/wk, this rate of weight loss is rarely achieved in research settings. To examine factors that influence the rate of weight loss obtained in clinical studies, we identified 37 weight loss studies published between 1995-2009 that used dietary counseling to induce weight loss in healthy subjects. Studies were included if they had a duration of at least six weeks, used a strategy to counsel subjects to reduce free-living energy intakes, and reported weight loss data based on a completers analysis. Using linear regression analysis, we examined which variables were associated with the rate of weight loss among age, gender (% female subjects), initial body weight, standard deviation of weight loss, frequency of dietary counseling, placebo use, exercise level, study length, and prescribed energy deficit. Study length was negatively related to the rate of weight loss ( $P<0.0001$ ) whereas subject age ( $P=0.0064$ ), initial body weight ( $P<0.0001$ ), frequency of dietary counseling ( $P=0.0006$ ), and prescribed energy deficit ( $P=0.0003$ ) were positively related to the rate of weight loss observed. These findings provide a tool for investigators and clinical dietitians to predict the rate of weight loss that can be expected within a population given the age, initial body weight, frequency of dietary counseling, and energy deficit prescription. Our data suggest that older and heavier subjects lose more weight and that higher contact frequency and caloric restriction also increase the rate at which individuals lose weight.

**Physical Activity and Obesity****269-P****Insulin Resistance and Impaired Substrate Utilization During Fasted, Hyperinsulinemic and Exercise Conditions in Non-Alcoholic Fatty Liver Disease**

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Non-alcoholic fatty liver disease (NAFLD) is associated with insulin resistance (IR). The capacity to utilize lipids and glucose in response to conditions of metabolic stress, such as hyperinsulinemia and exercise, may provide insight into the mechanisms of disease. Patients with NAFLD ( $n=14$ , BMI  $33.5\pm 6.6 \text{ kg/m}^2$ ) and healthy controls ( $n=14$ , BMI  $22.9\pm 2.6 \text{ kg/m}^2$ ) underwent indirect calorimetry to assess lipid (LIPox) and glucose (GLUox) oxidation rates in 3 conditions: 1) Resting and fasted 2) Hyperinsulinemia: euglycemic hyperinsulinemic clamp, 3) Exercise: cycling at the intensity eliciting maximal LIPox (MLO). IR was determined as total glucose disposal rate (GDR), glycogen storage capacity as non-oxidative GDR, cardiorespiratory fitness as  $VO_{2\text{max}}$ , fat mass (FM) by DEXA and physical activity by accelerometry. At rest, NAFLD patients displayed lower LIPox than controls ( $0.75\pm 0.27$  vs  $1.13\pm 0.35 \text{ mg/kg/min}$ ,  $p<0.01$ ). In hyperinsulinemia, NAFLD patients were severely IR and metabolically inflexible. They had lower total and non-oxidative GDR ( $p<0.001$ ), reduced suppression of LIPox ( $p<0.01$ ), and lower GLUox ( $p<0.05$ ). During exercise, NAFLD had a reduced ability to increase LIPox from resting conditions and reached a lower MLO than controls ( $1.96\pm 0.89$  vs  $4.67\pm 3.70 \text{ mg/kg/min}$ ,  $p<0.05$ ). NAFLD patients who exercised  $\geq 30 \text{ min/d}$  ( $n=5$ ) had lower total body and trunk %FM, higher non-oxidative GDR and higher  $VO_{2\text{max}}$  ( $p<0.05$ ). Patients with NAFLD are severely IR predominantly due to reduced glycogen storage capacity. Reduced LIPox at rest and metabolic inflexibility during conditions of metabolic stress may contribute to IR and ectopic accumulation of fat in the liver. Therapies such as exercise training, which can promote LIPox, warrant further investigation.

**270-P****More Pronounced Effect of Acute Exercise-Induced Increase in Circulating Inflammatory Markers in Obese Compared to Lean Subjects**

Tore Christiansen, Soeren Paulsen, Jens Meldgaard Bruun, Jens Olholm, Steen Pedersen, Bjorn Richelsen *Aarhus, Denmark*

Objective: Exercise modulates the immune system and in young males acute exercise has been found associated with increased systemic level of inflammatory markers such as IL-6 and IL-8. In this study we investigated the impact of obesity on the exercise induced release of inflammatory markers in circulation, and on gene expression on these inflammatory marker in skeletal muscle (SM) and adipose tissue (AT) biopsies. Material and Methods: 15 lean males and females (BMI  $22.4\pm 2 \text{ kg/m}^2$ ) and 16 obese males and females (BMI  $31.6\pm 3 \text{ kg/m}^2$ ) exercised for 120 minutes by ergometer bicycling at moderate intensity (55-60% of maximal heart rate). Blood samples were obtained at baseline (T0), after 60 minutes of bicycling (T=60), after 120 minutes of bicycling (T=120), whereas biopsies from AT and SM were obtained at T0 and T120. Results: Divided into weight-status, plasma levels of IL-8 and TNF $\alpha$  were at T=120 significantly increased in the obese group ( $p<0.01$ ) and not in the lean group. Moreover, at T=120 the increase in IL-6 was significantly higher in the obese as compared to the lean (all  $p<0.01$ ). In SM, a significant increase in mRNA expression of IL-6, TNF $\alpha$  and IL-10 was observed ( $p<0.05$  -  $p<0.01$ ). In AT, only the expression of IL-6 was increased significantly ( $p<0.01$ ). Conclusion: These findings show that acute exercise is associated with an increase in circulating level of inflammatory markers. Moreover, the findings suggest that the systemic inflammatory response to acute exercise is different in lean and obese subjects.

**271-P****Fear-Avoidance Beliefs and Exercise Among Overweight and Obese Adults**

Brooks C. Wingo, Jany D. Ard, Monica L. Baskin, Retta R. Evans, Diane M. Grimley, Jane Roy, Scott Snyder *Birmingham, AL*

Background: Pain is a common barrier to exercise in obese adults. Obese adults may avoid exercise due to high fear-avoidance beliefs resulting from increased cardio-respiratory responses to exercise. The purpose of this study was to assess the relationships between BMI, exercise level and

fear-avoidance beliefs among a sample of overweight and obese adults. Methods: Participants (n=125; BMI=25-60 kg/m<sup>2</sup>) completed the Exercise Fear-Avoidance Scale (EFAS), a newly developed 11-item scale that measures fear related to exercise in 2 domains: weight-specific fears (e.g. 'I need to lose weight before I can exercise safely'), and cardio-respiratory fears (e.g. 'When I exercise, I often worry I may have a heart attack'). Exercise was measured using the Behavioral Risk Factor Surveillance System and categorized into 4 groups: inactive (no activity above base-line), low (up to 149 minutes/week), medium (150-300 minutes/week), and high (>300 minutes/week). The relationship between BMI and EFAS responses was examined using regression analyses. ANOVA was used to assess differences in EFAS scores based on exercise level. Results: Participants (74.4% female) had a mean age of 48.7 years and BMI of 37.2 kg/m<sup>2</sup>. A higher BMI was a significant predictor of higher weight-specific fears (p=.001), but not cardio-respiratory fears. The inactive group had significantly higher cardio-respiratory fears than the medium (p=.02) and high activity groups (p=.02). Conclusion: The results of this study suggest that there may be a relationship between weight and fear-avoidance beliefs. Future research should examine how tailoring exercise prescriptions to address high fear-avoidance beliefs may increase adherence in obese adults.

**272-P**  
**Nylon Fiber Undergarment Effectively Augments the Energy Cost of Uphill Walking and Stair Climbing in Women**

Corey Rynders, Cate McLean, Frank Katch, Arthur Weltman *Charlottesville, VA*

Background: ShāToBu is a nylon fiber undergarment with resistance bands designed to gently resist hip flexion and may result in increased energy expenditure (EE) during activities such as walking and stair climbing. Methods: Fifteen women aged 22 to 57 years were tested on 3 occasions: Visit 1) two continuous 15-min treadmill walks separated by 15-min rest. Initial treadmill % grade was 5% and was increased by 5% every 5-min. Visit 2) two 15-min stair climb tests separated by 15-min of recovery, at a Borg-RPE of 10 and 16, respectively. Visit 3) stair climbing identical to visit 2. Women were randomly assigned to the undergarment (G) or their usual clothing (C). During visit 1 they wore G or C during the first 15 min and then crossed over during the second 15 min. During visits 2 and 3 they wore either G or C. For statistical analysis, women were divided into responders and non-responders. Results: Eighty percent of women responded to G while walking uphill at 5% (G= 5.6±0.9; C= 5.3±0.9; kcal/min, P<0.001) and 10% grade (G= 7.4±1.5; C= 6.8±1.6; kcal/min, P<0.001). Stair climbing at RPE 10 while wearing G increased EE in 67% of women (G= 8.4±1.6; C= 7.7±1.2; kcal/min, P=0.007). The undergarment did not impact EE at the highest exercise intensities (15% grade, stair climbing at RPE 16). Conclusions: Our results suggest that in most women, ShāToBu increases the energy cost of everyday activities such as walking uphill and climbing stairs at a moderate intensity.

**273-P**  
**The Effects of Exercise on Acute Energy Compensation**

Emily Jokisch, Hollie Raynor *Knoxville, TN*

Objective: Physical activity may aid with energy regulation. This investigation examined acute energy compensation in habitually active (HA) and sedentary (S), normal-weight, unrestrained males. Energy intake (EI) in a laboratory meal following an Exercise as compared to a Control activity assessed compensation. Methods: Participants were 10 HA (moderate-intense physical activity = 438.2 + 151.9 minutes/week; age = 21.4 + 2.1 yrs; body mass index [BMI] = 23.9 + 1.5 kg/m<sup>2</sup>) and 10 S (moderate-intense physical activity = 31.5 + 42.5 minutes/week; age = 20.9 + 1.9 yrs; BMI = 23.0 + 1.9 kg/m<sup>2</sup>) males. Participants completed two activity sessions followed 1-hr later by a meal: 1) 45 minutes of rest (Control); and 2) 45 minutes of riding an ergometer (Exercise). Acute compensation = [(EI Exercise - EI Control)/energy expenditure during exercise] x 100. Positive values indicate compensation (greater intake in Exercise relative to Control). Results: No group difference in expenditure occurred in Exercise (HA = 455.8 + 8.9 kcals; S = 451.3 + 11.6 kcals). S consumed less energy in Exercise as compared to Control (934.8 + 222.0 kcals vs. 1073.9 + 470.3 kcals, p < 0.03), with no session difference in intake for HA (1016.8 + 396.7 kcal [Control] vs. 1105.6 + 389.2 kcal [Exercise]). A difference in

acute energy compensation occurred; HA compensated more than S (19.6+ 45.3% vs. -30.6 + 69.9%, p < 0.05). Conclusion: Although complete acute compensation did not occur, HA acutely compensated intake more so than S, demonstrating better energy regulation ability.

**274-P**  
**Physical Activity and Long-Term Weight Maintenance After Gastric Bypass Surgery**

Lance Davidson *Salt Lake City, UT*; Michael LaMonte *Buffalo, NY*; Ted D. Adams, Richard E. Gress, Steve Hunt *Salt Lake City, UT*

Background: Few prospective studies have examined the effect of physical activity (PA) on weight regain after extreme weight loss induced by gastric bypass surgery (GBP), and none has evaluated whether adherence to U.S. activity guidelines (~150 min, or 7.5 MET hours/week) can predict successful weight maintenance. Methods: This study examined PA and weight change prospectively in GBP patients (83% female, predominantly Caucasian) before surgery (exam1) and after surgery at 2.3 years (exam2) and 5.6 years (exam3). No formal dietary or exercise intervention was issued other than post-operative recommendations. A total of 135 patients (mean±SD; pre-op BMI 45.8±6.9 kg/m<sup>2</sup>, weight 130.7±25.4 kg, age 46.2±11.2 years) who successfully lost >20% of initial body weight at exam2 were included in the study. Intensity/duration of regular PA was assessed by questionnaire, and weight was measured clinically. Results: Using a general linear model adjusted for baseline age, weight, PA, and changes in weight and PA from surgery to exam2, adherence to U.S. PA recommendations at exam2 (27% achieved 7.5 MET hours/wk) did not predict avoiding weight regain of more than 10% of initial body weight at exam3 (P>0.37). However, patients who maintained or decreased PA after exam2 had a 3-fold greater likelihood of a 10% weight regain (OR=3.2, 95% CI 1.4-7.5) compared to those who increased PA. Conclusions: While adhering to federally-recommended activity guidelines during the first 2 years after GBP does not appear to prevent subsequent weight regain, becoming more physically active during years 3-6 may increase the likelihood of maintaining weight loss.

**275-P**  
**Factors Associated With Physical Activity Among Two-to-Five-Year Old Children**

Diana H. Dolinsky, Rebecca N. Brouwer *Durham, NC*; Kelly Evenson *Chapel Hill, NC*; Truls Østbye *Durham, NC*

Few studies have examined factors related to physical activity level, a risk factor for weight gain, as measured by accelerometry in young children. We evaluated factors associated with moderate to vigorous physical activity (MVPA) as measured by accelerometry in two to five year olds. We obtained baseline measurements of physical activity by accelerometry (Actical) recording in 15-second epochs among 337 two to five year olds and their mothers participating in the Kan-Do trial. MVPA was defined using a cutoff of 715 and 1782 counts per minute for children and mothers, respectively, and they needed at least 3 valid days (at least 6 hours) of wear. Other potential correlates were self-reported by the mother. Bivariate and multivariable linear regression analyses were used to determine correlates of children's MVPA. Children had an average of 14.9 minutes/day of MVPA. In multivariable analysis, boys had 3.3 more minutes/day of MVPA (p<0.01), and children had 4.4 more minutes/day per increasing year of age (p<0.01). Children whose mothers had less than 1 hour/day of computer time had 2.6 more minutes/day of MVPA as compared to at least 1 hour/day (p<0.01), and children with married mothers had 5 minutes/day more as compared to those whose mothers lived with a partner (p=0.04). For each additional minute/day of maternal MVPA, the child had 0.1 more minutes/day of MVPA (p=0.03). Some factors associated with preschooler physical activity levels are modifiable, including maternal physical activity, marital status, and computer time.

**276-P**  
**Game Type and Player Weight Affect Energy Expenditure and Motivation During Video Game Play in Young Adults**

Elizabeth J. Lyons, Deborah F. Tate, Dianne S. Ward *Chapel Hill, NC*

Active video game play may be a way to increase physical activity, but variability of activity level across game type and sustainability of play are concerns. Also, these games may be less intrinsically motivating (i.e., fun) than more traditional games. Young adults (N=100, 50F, 55 overweight, mean age

and BMI  $23.76 \pm 3.96$  years old,  $27.12 \pm 6.52$  kg/m<sup>2</sup>) were measured during four types of video game play: shooter (traditional controller), band simulation (guitar and drum controller), dance simulation (dance mat controller), and fitness (balance board controller). Energy expenditure (EE) was measured using indirect calorimetry, and intrinsic motivation was self-reported. Fitness and dance games increased EE by 322% ( $3.10 \pm 0.89$  METs) and 298% ( $2.91 \pm 0.87$  METs) over rest. EE produced by these games was greater than that produced by band simulation (73%,  $1.28 \pm 0.28$  METs) and shooter games (23%,  $0.91 \pm 0.16$  METs). Motivation was higher in overweight compared to normal weight participants ( $p=.032$ ), and in band simulation games compared to the other types ( $p<.001$ ). Activity in overweight participants was not of moderate intensity ( $\geq 3$  METs) in any game; MET level in overweight participants was significantly lower than in normal weight participants during the dance and fitness games. Play of video games may represent a more active alternative to sedentary screen time, but the more active games were less motivating, which may influence play over time. Further research that measures physiological and psychological reactions is needed to determine the sustainability of physical activity promotion through video games.

## Behavioral and Psychosocial Aspects

### 277-P

#### Self-Monitoring During the Screening Period In Relation to Outcomes in Look AHEAD

Anthony N. Fabricatore *Philadelphia, PA*; Adam Gildea *Denver, CO*; Thomas A. Wadden, Allison J. Higginbotham *Philadelphia, PA*; Andrea Anderson *Winston-Salem, NC*; John Foreyt *Houston, TX*; James O. Hill *Aurora, CO*; Robert Jeffery *Minneapolis, MN*; Marci E. Gluck *Phoenix, AZ*; Edward Lipkin *Seattle, WA*; Brent Van Dorsten *Aurora, CO*

Efforts to predict which participants will achieve favorable outcomes in weight loss programs have yielded inconsistent results. A behavioral “run-in” allows investigators to observe candidates’ performance of study-related tasks (e.g., self-monitoring) before randomization. Look AHEAD – a trial of intensive lifestyle intervention (ILI) for weight loss vs. usual care in adults with type 2 diabetes – required candidates to record all food, drink, and physical activity for >12 of 14 screening days. The quality of record-keeping varied widely among randomized participants. We hypothesized that the volume of recording during screening (defined as the number of words and numbers contained in participants’ records) would be related to weight loss (>5% reduction) and physical activity (>175 min/wk) after 1 year of ILI. A random subsample of ILI participants at 4 sites was selected ( $n=103$ , 50% female, 65% white, mean age = 59+6 years). Two raters counted the words and numbers that each participant recorded, and days on which any physical activity was recorded, during the 14-day run-in. Interclass correlations (>.97) indicated excellent inter-rater reliability. Those who lost >5% of initial weight at 1 year recorded more words ( $426+169$  vs.  $347+158$ ,  $p=.03$ ) and numbers ( $100+92$  vs.  $64+53$ ,  $p=.05$ ), and recorded activity on more days ( $7+4$  vs.  $4+4$ ,  $p=.01$ ) during the run-in than those who lost <5%. Participants who met the activity goal reported exercising on more days ( $9+4$  vs.  $5+4$ ,  $p=.001$ ) during the run-in. Results suggest that self-monitoring behavior during screening can be quantified and may predict 1-year outcomes in a comprehensive lifestyle modification program.

### 278-P

#### Social Contacts and Social Norms Affect Weight Loss Intentions in Young Adults

Tricia M. Leahey, Jessica Gokee LaRose, Rena R. Wing *Providence, RI*

Background: Christakis has shown that smoking cessation clusters in social networks and suggests that shared norms may account for the clustering. This study examined whether having more social contacts trying to lose weight is associated with greater intention to lose weight among overweight/obese young adults and whether social norms for weight control are associated with weight loss intentions. Methods: Participants ( $N=137$ ; 64% female; 83% Caucasian; age= $21.8 \pm 2.2$ ; BMI= $30.1 \pm 4.7$ ) completed an online survey. Number of social contacts trying to lose weight was assessed by having participants indicate how many of their overweight contacts are presently attempting to lose weight (Nobody=0; All=4). To measure social norms for weight control, participants indicated how frequently social contacts encourage them to lose weight (“Never”=0; “Often”=4), offer

weight loss information or tools (“Never”=0; “Often”=4), and the extent to which close contacts would approve of their weight loss (“Strongly disapprove”=0; “Strongly approve”=4). Participants also reported how likely they were to try to lose weight within the next 3-months (“Very unlikely”=0; “Very likely”=4). Results: Having more social contacts trying to lose weight was associated with greater intention to lose weight among OW/OB young adults ( $p=.02$ ). Weight control social norms were also associated with weight loss intention; more social contacts encouraging weight loss, offering weight loss information, and approving of weight loss were all associated with intention to lose weight (all  $p$ 's < .004). Conclusion: These results are consistent with and extend Christakis’ smoking cessation findings to weight loss in young adults.

### 279-P

#### Factors Associated With Attendance in Weight Loss Treatment For Obesity Among Self-Identified Non-Hispanic Black and Non-Hispanic White Women

Sapna D. Doshi, Michael R. Lowe, Meghan L. Butryn *Philadelphia, PA*

Research has found that non-Hispanic black (black) participants have higher attrition rates than non-Hispanic white (white) participants in behavioral weight loss programs. Exploratory predictor variables among two samples of black and white obese females ages 19 to 71 (Study 1:  $n=100$  and Study 2:  $n=174$ ) were entered into linear regressions with race/ethnicity and an interaction term to determine if there were differential factors between racial/ethnic groups related to number of sessions attended. Both studies used meal replacements for weight loss followed by randomization to different weight loss maintenance conditions. Study 1 involved in-person group treatment, and Study 2 involved individual, telephone-based treatment. In Study 1, black participants ( $n=37$ ) attended significantly fewer sessions than white participants ( $n=63$ ); in Study 2 there was no significant difference between black ( $n=139$ ) and white participants ( $n=35$ ) in sessions attended. In Study 1, smaller early weight losses, higher BMI, and lower physical functioning and sex quality of life were related to lower attendance among black participants. These variables were weaker or non-significant predictors of attendance among white participants. In Study 2, higher work quality of life and greater self-efficacy in the ability to resist eating when feeling physically uncomfortable were related to lower attendance among white participants. These variables were weaker or non-significant predictors of attendance among black participants. These preliminary data provide insights into racial/ethnic differences in factors associated with attendance and can guide future research to identify factors to address initially to promote attendance in black and white participants in treatments using different formats.

### 280-P

#### Preventing Weight Gain in Young Men: An Uphill Battle

Jessica Gokee LaRose *Providence, RI*; Amy Gorin, Megan M. Clarke *Storrs, CT*; Rena R. Wing *Providence, RI*

Young adulthood is a high-risk time for weight gain but limited data exist as to how best to intervene, particularly with young men. A total of 1347 incoming freshman (45% male; 80% non-Hispanic White;  $18.6 \pm 1.7$  yrs; BMI =  $23.3 \pm 2.3$  kg/m<sup>2</sup>) at a state university in the Northeast completed a survey designed to: 1) determine if weight gain is a concern among men in this age group, 2) gauge level of interest in weight control programs, and 3) determine the most acceptable setting for an intervention. Perceptions regarding freshman weight gain were consistent across gender, with participants reporting the average student gains 13.6+13lbs. Men were less concerned than women about weight gain ( $3.2 \pm 2.2$  vs.  $5.4 \pm 2.1$  on 8-pt scale,  $p < .001$ ) and reported they would have to gain 13.7+9.3lbs before becoming concerned compared to 6.9+3.8lbs among women ( $p < .001$ ). Further, 29% of men were overweight based on their BMI, but only 13.3% perceived themselves as overweight. Fewer men reported they would join a program to prevent weight gain (17% men vs. 40% women,  $p < .001$ ). When asked about preferences for programs, easy access appeared important – 46.2% of men reported a willingness to attend classes on a local college campus, compared to 34.8% online, 32.3% at a community center or YMCA, and 20.5% at a hospital or research center; a similar pattern emerged for women. Findings highlight the challenges of weight gain prevention among young men and are discussed in terms of implications for improving recruitment efforts and intervention development with this high-risk group.

**281-P**

**Improvements in Weight and Mood in Obese Individuals With Clinical Depression at Risk For Cardiovascular Disease**

Lucy F. Faulconbridge, Thomas A. Wadden, Robert I. Berkowitz, Melissa Pulcini, Tracey Dobson *Philadelphia, PA*

Obese individuals with clinical depression are at high risk for incident cardiovascular disease (CVD), but are routinely screened out of weight loss trials due to concern that weight reduction will lead to adverse psychiatric outcomes. These concerns, however, are not based on empirical evidence. No treatments exist for obese individuals with clinical depression. This ongoing prospective pilot study was designed to test whether obese, depressed individuals can lose clinically significant amounts of weight, and achieve improvements in mood and CVD risk factors. Twelve obese patients diagnosed with clinical depression who had at least 1 additional risk factor for CVD (mean age= 45.5yr, BMI=34.6kg/m<sup>2</sup>; Framingham risk score 4.2%) participated in a 16-week lifestyle modification program combined with group cognitive behavioral therapy for depression. Changes in weight and mood (as measured by the Beck Depression Inventory-II, BDI-II) were assessed weekly. Changes in CVD risk factors will be assessed (via Framingham Risk scores) at week 16. Mean baseline BDI-II score was 29.9±10.4, indicating severe depression. At week 12, patients lost 8.8±3.6% of initial weight (p<0.001) and reported a mean decline of 12.0±8.9 points on the BDI-II (p<0.001; i.e., a significant improvement in mood). Decrease in BDI-II score was not correlated with percent weight loss at 12 weeks (r=0.1). These data show that obese, depressed individuals can lose clinically significant amounts of weight and achieve improvements in their symptoms of depression in a combined treatment program that targets depression and obesity simultaneously.

**282-P**

**Effects of Laboratory Stressor on Desire to Eat in Obese Individuals**

Tatiana Ungredda, Susan Carnell, Nandini Mehta, Benjamin Wagner, Michal Kollnesher, Elizabeth Sharp, Allan Geliebter *New York, NY*

Obesity has been associated with heightened stress responsivity and greater desire to eat in response to palatable food cues. Increased desire to eat in response to stress could partially explain excessive intake in the overweight. This study tested the effects of a combined social and physiological stressor on self-reported appetite in lean and obese groups. Participants were 25 lean (4 males: BMI 23.5±0.3 SD, age=29.3±4.3; 5 females: BMI 21.0±2.1SD, age 24.8±3.6 SD) and obese (9 males: BMI 33.3±6.8, age=36.3±6.3; 7 females: BMI 40.0±4.0, age=36.5±10.7) individuals. On two testing days, participants underwent a socially-evaluated cold pressor test (SECPT) and desire to eat, fullness and hunger ratings were reported on a 0-100 scale before (-10, 0 min), during (1 min), and afterwards (2, 15, & 30 min). On one day the test occurred in the morning (c.11:00 am) and on another day the test occurred in the evening (c.6:00 pm), (conditions counter-balanced). Repeated measures ANOVA revealed a significant interaction between obesity status and change in desire to eat for the morning condition only (F=2.36, df=5, 65, p=.05). Desire to eat immediately following the stressor (2 min) decreased more for the lean group and was markedly lower (Lean: 32.8±24.4, obese: 40.0±25.5). These preliminary analyses suggest that obese participants may fail to demonstrate the suppression of desire to eat in response to stress that is exhibited by lean individuals. Stronger drive to eat in the presence of stress may help explain the development and maintenance of obesity and may be a useful intervention target.

**283-P**

**Social Comparisons Among Members of a Behavioral Weight Loss Program Are Associated With Weight Loss Outcomes**

Tricia M. Leahey, Jessica Gokee LaRose, John G. Thomas, Rena R. Wing *Providence, RI*

Background: Social influence among members in behavioral weight loss groups has largely gone unstudied. Given findings in other health domains (e.g., smoking cessation), we hypothesized that participants who compare themselves with other group members who are doing better at weight loss will achieve better weight loss outcomes. Methods: Every 5-weeks, participants (N=62; 88% female; 93% Caucasian; age=50.6±10.0; BMI=34.1±4.4) in a 6-month group behavioral weight loss program were weighed and

completed a social comparison questionnaire. The questionnaire asked participants to indicate the name of the group member with whom they've compared their weight loss most often over the past 5-weeks and whether they believed that person was doing "better" (upward comparison), "the same" (lateral comparison), or "worse" (downward comparison) at weight loss. This self-reported comparison information was used to assess subjective comparison direction. To obtain objective comparison direction, we compared participants' weight loss to their targets' actual weight loss and coded whether they were engaging in upward, lateral, or downward comparisons. Results: At all 5 time points, subjective upward social comparisons were associated with less weight loss than lateral or downward social comparisons (all r's=.31-.53, all p's<.05). The direction of the relationship between objective social comparison and weight loss was the same, but the correlations were even stronger (e.g., at Week 20, r=.65). Conclusions: Contrary to our hypothesis, upward social comparisons among members of a behavioral weight loss group may undermine weight loss success.

**284-P**

**Demand Cognitions and Parental Feeding Styles Among Families Seeking Treatment For Early Childhood Obesity**

Myles S. Faith, Lisa K. Diewald, LeeAnn M. Tanaka, Karen Hoffer, Ryan Davies, Shawn N. Katterman *Philadelphia, PA*

Certain parental feeding styles may promote overconsumption and poorer weight control by children. Cognitions that are associated with, and potentially influence, parents' feeding practices have not been identified. We addressed this issue in 50 parent-child dyads seeking intervention for pediatric obesity. Children were 4-8 years old. Mean (SD) child age= 6.70 (1.15) yrs; child BMIz= 2.29 (0.57) SD. Parents completed the Child Feeding Questionnaire (CFQ; Birch et al, 2001), which assesses three feeding styles: restriction; pressure-to-eating, and monitoring. They also completed the Feeding Demands Questionnaire (FEEDS; Faith et al, 2008), which assesses three "demand cognitions:" (1) Food Amount Demandingness, (2) Food Type Demandingness, and (3) Anger/Frustration. Children's 24-hr dietary intake was assessed over 3 days by food records, from which we calculated daily intake of "red light," "yellow light," and "green light" foods (i.e., "Stop Light Diet,"SLD). We tested correlations among the FEEDS and the CFQ subscales, and among FEEDS and SLD categories. Greater restrictive feeding was associated with greater food type demandingness (p=0.02), while pressure-to-eat was associated with greater food type (p=0.04) and food amount (p=0.01) demandingness. Greater daily green light food consumption by children was associated with reduced parent anger/frustration (p=0.02), and greater "yellow light" food intake was associated with reduced food type (p=0.02) and food amount (p=0.007) demand cognitions. Increased "red light" food consumption by children was associated with greater food type demandingness (p=0.04). In summary, demand cognitions were associated with parental feeding practices and children's dietary intake. These cognitions may be intervention targets, pending further research.

**285-P**

**Obesity Clusters in Young Adults But Social Norms For Obesity Do Not Differ Between Normal Weight and Overweight/Obese Young Adults**

Tricia M. Leahey, Jessica Gokee LaRose, Rena R. Wing *Providence, RI*

Background: Christakis showed that weight status clusters within social networks and suggested that shared social norms may account for the clustering. In the present study, these phenomena were examined in a sample of young adults. We assessed whether overweight/obese young adults have more overweight social contacts than normal weight young adults and whether social norms for obesity differ between the two groups. Methods: Overweight/obese (OW/OB; N=137) and normal weight (NW; N=151) young adults (64% Female; 83% Caucasian; age=21.8±2.2) completed an online survey. To assess number of obese social contacts, participants indicated whether their best friend and romantic partner are overweight (Yes/No) and number of friends, relatives, and colleagues/classmates who are overweight on a 5-point scale ("Nobody"=0; "All"=4). Social norms for obesity were measured by asking participants how socially acceptable it is to be overweight, eat unhealthy foods, and be inactive ("Very unacceptable"=0; "Very acceptable"=5). Results:

Compared to NW, OW/OB young adults were more likely to have overweight best friends (24% vs.14%,  $p < .05$ ) and romantic partners (25% vs.14%,  $p = .05$ ) and reported more casual friends, relatives, and colleagues/classmates who were overweight (all  $p < .05$ ). However, the two groups did not differ in ratings of how socially acceptable it was to be overweight (OW/OB=1.4; NW=1.3), eat unhealthy foods (OW/OB=2.5; NW=2.4), or be inactive (OW/OB=2.1; NW=2.0). Conclusion: These findings extend Christakis' work and suggest that weight status not only clusters among adults, but also young adults. In addition, these findings indicate that norms regarding the social acceptability of obesity do *not* differ between obese and normal weight individuals.

**286-P  
Practitioner Advice and Perceptions of Ideal and Expected Pregnancy Weight Gain Among Normal Weight and Overweight Women**

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The purpose of this study was to investigate receipt of gestational weight gain advice in prenatal care and perceptions of "ideal" vs. expected gestational weight gain for normal weight (NW; N = 240) and overweight/obese (OW/OB; N = 161) women early in pregnancy (mean = 13 weeks gestation). Pregravid weight and "excessive" gestational weight gain were based on the 1990 Institute of Medicine (IOM) guidelines because these data were collected before the 2009 revisions. Less than half of participants (41.9%) reported receiving weight gain advice from a practitioner. In multivariable models, pregravid weight status was not significantly related to receiving advice. However, women with lower income (OR = .33 [.13-.83]  $p = .02$ ), younger age (OR = .92 [.86-.98]  $p = .009$ ), and multiparity (OR = .24 [.12-.45]  $p = .0001$ ) were least likely to report receiving advice. Among those receiving advice, 85% reported accurate advice, however, the following significant differences were observed: Compared to NW, OW/OB were more likely to report advice to over-gain (24.3% vs 3.1%;  $p < .0001$ ), and to report "ideal" (OR= 21.1 [5.5-80.5]  $p < .0001$ ) and expected (OR = 8.9 [4.7-17.2];  $p < .0001$ ) pregnancy weight gains above IOM guidelines. Further, a consistent relationship was observed between higher ideal and expected weight gains and greater first trimester weight gain ( $ps < .02$ ). Clinicians should be encouraged to provide timely and accurate advice to women on weight gain. Interventions to promote healthy gestational weight gain may benefit from targeting women's beliefs about ideal and expected gestational weight gain.

**287-P  
Patient-Physician Race Concordance and Weight-Related Counseling Among Obese Patients**

Sara N. Bleich *Baltimore, MD*; Alan E. Simon *Hyattsville, MD*; Lisa A. Cooper *Baltimore, MD*

**Introduction:** The purpose of this study was to assess the impact of patient-provider race concordance on weight-related counseling among obese patients. We hypothesized that race concordance would be positively associated with weight-related counseling. **Methods:** We used clinical encounter data obtained from the 2005-2007 National Ambulatory Medical Care Surveys. The sample size included 2,231 visits of Black and White obese individuals (ages 18 and older) to their Black and White physicians from the specialties of general/family practice and general internal medicine. Three outcome measures of weight-related counseling were explored: weight reduction, diet/nutrition, and exercise. Logistic regression was used to model the outcome variables of interest. Wald tests were used to statistically compare the coefficients of the Black concordant vs. Black non-concordant groups and White concordant vs. White non-concordant groups. **Results:** Contrary to our hypothesis, we did not observe a positive association between patient-physician race concordance and weight-related counseling. Black patients seeing White doctors had a lower odds of receiving exercise counseling as compared to White patients seeing White doctors (OR = 0.54; 95% CI: 0.31, 0.95). Post-estimation tests indicated that obese patients in non-concordant White pairs were significantly more likely to receive weight related counseling as compared to obese patients in concordant Black pairs ( $p = 0.03$ ). Other significant predictors of weight-related counseling

included: patient age, co-morbidity risk status, visit type, and length of visit. **Conclusion:** Black obese patients are less likely than White obese patients to receive some aspects of obesity care, regardless of the race of physician being seen.

**288-P  
Insulin Area Under the Curve During an Oral Glucose Tolerance Test Is Associated With Measures of Stress and Anhedonia**

Marci E. Gluck, Colleen A. Venti, Cindy Ziker, Jianying He, Adela Penesova, Susanne B. Votruba, Jonathan Krakoff *Phoenix, AZ*

**Background:** Depressive symptoms are associated with insulin action and prevalence of diabetes is increased 2-4 fold in persons with mood disorders. Therefore, we examined the relationship between psychological factors related to depression and insulin and glucose levels in a convenience sample of volunteers participating in an inpatient study. **Methods:** Fifty-six non-diabetic volunteers (41m/15f; BMI (mean  $\pm$  SD)  $32 \pm 7$  kg/m<sup>2</sup>; age  $40 \pm 9$  y) were admitted to our inpatient unit. On admission, volunteers were placed on a weight maintaining diet and completed questionnaires measuring depressive symptoms, perceived stress, and anhedonia (loss of pleasure). After 3 days, a 75g oral glucose tolerance test (OGTT) was administered for measurement of insulin and glucose concentrations at multiple time points. Incremental area under the curve (iAUC) for insulin and glucose was calculated. **Results:** Fasting insulin and glucose concentrations, insulin and glucose iAUC and scores on the psychological scales did not differ between men and women. Insulin iAUC, but not glucose iAUC, was significantly associated with perceived stress ( $r=0.35$ ,  $p = .02$ ) and anhedonia ( $r=0.33$ ,  $p = .02$ ), but not with depressive symptoms. In a general linear model, the association with anhedonia was still significant after adjustment for age, race, sex and %fat ( $\beta=0.03$ ,  $p = 0.04$ ) but the association with perceived stress scores was not ( $\beta=0.02$ ,  $p = 0.21$ ). Psychological measures were not correlated with BMI, %fat or waist circumference. **Conclusions:** Anhedonia and perceived stress scores are associated with insulin iAUC during an OGTT, indicating a link between depressive symptoms and hyperinsulinemia.

**289-P  
Validity of the SF-36 in Patients With Morbid Obesity**

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**Objectives:** The Medical Outcome Study 36-Item Short Form Health Survey (SF-36) is a generic quality of life instrument that has been utilized in > 1,000 studies, also in current obesity research. The validity of the instrument in patients with morbid obesity is not established. **Methods:** Patients with BMI  $\geq 35$  kg/m<sup>2</sup> (N=475, mean (SD) BMI 42 (6.2) kg/m<sup>2</sup>, 68% females) referred to a rehabilitation center for obesity treatment were mailed the SF-36 form for completion prior to their initial clinic appointment. Two principal component analyses with oblique rotations were performed to examine the underlying component structure of the questionnaire. **Results:** Our first analysis examining the subscales resulted in a six-component structure instead of the expected eight-component structure. Of eight hypothesized subscales, only the "vitality" subscale items loaded on a single component supporting a valid measurement of subjective well-being associated with "energy and fatigue" as intended by the scale authors. When applying a two-component solution in the second analysis, the "physically oriented" items clustered in one component and the "mentally oriented" items in another. This clustering was in accordance with the expected two-dimensional structure of the SF-36. **Conclusion:** The SF-36 has satisfactory validity in patients with morbid obesity but the subscale results should be interpreted with care. The main component scores seem to be valid suggesting that the questionnaire can be used to assess quality of life in morbidly obese patients initiating treatment.

**290-P  
Convergent Validity Between the Night Eating Questionnaire and Night Eating Diagnostic Questionnaire**

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Despite some empirical support, measures of Night Eating Syndrome (NES) require further validation. This study assessed convergent validity between two measures of NES: the Night Eating Questionnaire (NEQ) and the Night Eating Diagnostic Questionnaire (NEDQ). The study included



18 overweight outpatients (12 females, BMI = 41.2±7.6 SD, age = 40.5; 6 males, BMI = 44.5±10.5, age = 55.9) entering a weight loss program. Participants completed the NEQ and NEDQ. They were then bifurcated as either night-eaters (NE, 14 participants) or normal (N, 4 participants) using the NEQ (NE ≥14) and NEDQ (NE assessed via endorsement of at least (1) and/or (2) of the following revised criteria): (1) consumed ≥ 25% of intake after the evening meal, (2) had nocturnal awakenings with ingestions ≥ 2/week, (3) endorsement of 3-5 of: morning anorexia, strong desire to eat between dinner and sleep initiation and/or upon awakening at night, sleep onset and/or sleep maintenance insomnia are present, a belief that one must eat in order to initiate or return to sleep, mood being frequently depressed and/or worsening in the evening. Convergent validity was confirmed with a significant correlation between the NEQ and NEDQ for participants designated as NE ( $r = .553, p = .017$ ). Results helped validate NEQ, NEDQ, and the revised NES criteria. Further, the use of a less stringent limen to assess participants as NE (14 as opposed to 30) was supported.

**291-P**  
**Early Results From a Phone- and Web-Based Weight Management Program Offered Through Worksites**

Jennifer C. Lovejoy, Jenny Hapgood-LeBank, Tim McAfee, Marie Gahler, Steve Tutty, Sandi Kaplan *Seattle, WA*

Worksite-based programs offer many advantages for treating obesity in adult populations. We developed a phone- and web-based worksite weight loss program based on Social Cognitive Theory and pilot tested it with a large retail employer. The program teaches participants to follow a reduced calorie eating plan based on the DASH diet, get 180 min/wk of exercise or 10,000 steps/day, and engage in regular stress management. An interactive website provided the program curriculum, weight and activity trackers, and an online support community. Telephone coaching was provided by registered dietitians and health coaches trained in cognitive-behavioral strategies. Telephone surveys were completed every 3 months to assess self-reported changes in weight and health behaviors. Of 325 participants eligible for 6-month follow-up, data were obtained from 104. At 6 months, 83% (N=86) of respondents reported losing weight and 39% had lost 5-10% of initial body weight. The number of participants who ate ≥4 servings of fruits and vegetables per day was 59% at 6 months (vs 33% at baseline) and the number who ate breakfast every day was 84% at 6 months vs 58% at baseline. Participants who engaged in >4 days/wk of physical activity increased from 33% to 46%, with 18% reporting daily activity at 6 mo. Although these results are preliminary, they suggest that a phone- and web-based program offered through worksites can produce clinically meaningful changes in weight, nutrition and exercise behavior. A randomized trial is planned to further test the efficacy of this program.

**292-P**  
**Distress Tolerance in a Bariatric Surgery Seeking Sample: Implications For Post-Surgical Treatment For Patients at High Risk of Relapse**

Susan Himes, Karen Grothe, Matthew Clark, Donald McAlpine, Karen Graszler, Kristi Luenzmann, James Swain, Michael D. Jensen, Maria Collazo-Clavell, Michael Sarr *Rochester, MN*

Background: Limited ability to tolerate distress may contribute to poor bariatric surgical outcomes. Distress intolerance is characterized by a low threshold for negative emotional experiences and lack of emotional regulation with unhealthy coping behaviors. The purpose of this study is to measure distress tolerance in obese patients with a history of eating disturbance and substance abuse and assess its relationship to BMI. Methods: Patients undergoing psychological evaluation for obesity/bariatric surgery completed the Distress Tolerance Scale and were assessed with Axis I DSM-IV criteria. Medical records were retrospectively reviewed to extract data. Results: The sample (n=248) consisted of patients with a BMI ≥ 35 (89% Caucasian, 75% female, mean age=49.) Rates of current eating disordered behaviors (binge eating episodes 28%, BED 4%, night eating 15%, BN <1%) were less than lifetime prevalence (binge eating episodes 38%, BED 8%, night eating 25%, BN 4%). Low levels of current substance abuse (5%), and greater levels of historical substance abuse (19%), were endorsed. BMI was not correlated with distress tolerance ( $r = -.115, p = .08$ ). One-way ANOVAs revealed lower levels of distress tolerance ( $F(1,229) = 9.3, p = .003$ )

in patients with a history of disordered eating. There were non-significant lower mean levels of distress tolerance ( $F(1, 216) = 2.0, p = .135$ ) for patients with substance history. Conclusion: Low distress tolerance may help explain unhealthy coping strategies (eating disturbance, substance use) that contribute to failure or relapse in bariatric surgery patients, and the application of existing treatments (Dialectical Behavior Therapy) may improve patient outcomes.

**293-P**  
**Eating Behaviours Do Not Predict Changes in Weight and Body Composition in Women During the Menopausal Transition - Preliminary Data From a MONET Study**

Marie-Eve Riou *Ottawa, Canada*; Irene Strychar *Montreal, Canada*; Simone Lemieux *Quebec, Canada*; Karine Duval, Denis Prud'homme *Ottawa, Canada*; Martin Brochu *Sherbrooke, Canada*; Remi Rabasa-lhoret *Montreal, Canada*; Eric Doucet *Ottawa, Canada*

Background: Eating behaviours have been associated to long term changes and maintenance of weight and body composition. We aimed to investigate whether this was the case across the menopause transition. Methods: In this five-year prospective study, eating behaviours (dietary restraint, disinhibition and hunger) were measured at baseline with the Three-factor Eating Questionnaire. Weight and body composition (DXA) as well as physical activity (accelerometry) were measured yearly in 64 women (50.1±2.0 y; 23.2±2.2 kg/m<sup>2</sup>) going through the menopausal transition. These variables were then compared between groups divided on the basis of the median of baseline dietary restraint, disinhibition and hunger (TFEQ scores). Results: Dietary restraint (low=7.3±1.5; high=12.5±1.2,  $p < 0.001$ ), disinhibition (low=2.2±0.9; high=6.0±2.1,  $p < 0.001$ ) and hunger (low=2.1±0.8; high=6.4±2.5,  $p < 0.001$ ) were significantly different between groups as designed. When comparing the pre- and post-menopausal states, significant changes were found for percent fat (33.7±6.5 to 34.2±7.3,  $p < 0.001$ ), fat mass (10.2±18.6%,  $p < 0.001$ ) and fat-free mass (-1.7±8.6%,  $p < 0.01$ ) for the whole sample. However, no significant differences were noted between groups characterized by baseline low or high-dietary restraint, disinhibition or hunger in regard to changes in weight and body composition during the menopause transition. Conclusion: Even if some studies have demonstrated that eating behaviours are associated with better long-term weight maintenance, our results suggest that this may not be the case for women experiencing the menopausal transition.

**294-P**  
**Older Bariatric Candidates: Is There Greater Psychological Risk?**

Leslie J. Heinberg, Kathleen Ashton, Amy Windover, Julie Merrell *Cleveland, OH*

Although severe clinical obesity is dramatically increasing in older adults, many bariatric programs utilize age cut-offs due to concerns about greater perioperative morbidity and mortality risks. More recently, surgical outcomes have been reported in older adults. However, there is a paucity of data on the psychological risks of older adult bariatric candidates. Older and mid-life patients (N=266) who underwent weight loss surgery (75% female; 74% Caucasian; Mean BMI=53.73 kg/m<sup>2</sup>) completed a psychiatric diagnostic interview and the SCL-90-R prior to surgery and were followed for 6 months post-surgery. A series of t-tests and Chi-square analyses examined differences in baseline psychosocial variables and post-operative weight loss at 1, 3, and 6 months comparing older patients (age > 65) to those at mid-life (age 40-55). Older adults (n=26) were more likely to be Caucasian (85% vs. 69%;  $X^2 = 13.39, p = .01$ ) and had lower BMI's (47.93 kg/m<sup>2</sup> vs. 52.99 kg/m<sup>2</sup>;  $t = 3.32, p < .01$ ) than those at mid-life (n=240). Groups did not differ on psychopathology as measured by the SCL-90-R. However, there was a trend for younger patients to be more likely to be taking psychotropic medication and have a history of mental health treatment ( $p$ 's < .08). No differences were found for follow-up adherence or BMI change at 1-, 3- and 6-months after controlling for baseline weight. Although medical risk factors may cause concern, the findings indicate that older adults do not demonstrate any increased psychological risk factors over middle-aged surgical candidates. Future research should examine psychosocial and weight loss outcomes in the years following bariatric surgery.

## 295-P

**Screening For Bipolar Disorder in Patients Seeking Bariatric Surgery**

Karen Grothe, Susan Himes, Matthew Clark, Mark Frye, James Rundell, Sarah Kalsy, Kristin Somers, James Swain, Michael D. Jensen *Rochester, MN*

This study examined the lifetime prevalence of mania (i.e. euphoria, increased energy, grandiosity) in patients seeking obesity treatment, primarily bariatric surgery. **Methods:** We reviewed medical records from 238 adult outpatients with BMI > 35 who underwent psychological evaluation, which included the Mood Disorder Questionnaire (MDQ), a self report screen for bipolar disorder. A positive screen is the endorsement of at least 7/13 items with concurrence and > moderate disability. Soft spectrum was defined as < 7 items with concurrence or > 7 items without concurrence and > moderate disability. **Results:** Patients were 89% Caucasian, 76% female, average age was 49 + 13 and average BMI was 46.4 + 8.4, range 35.2 to 77.2. Fourteen (6%) patients were MDQ + and 34 (14%) screened positive for soft bipolar spectrum. A bipolar clinical diagnosis was present prior to evaluation in 5%. The most frequently endorsed symptoms were: irritability (41%), difficulty concentrating (37%), increased confidence (34%), and racing thoughts (31%). The average number of symptoms endorsed was 7.6 + 2.5 for those who screened positive. Total symptoms endorsed was not correlated with baseline BMI ( $r_s = .05$ , ns) or weight ( $r_s = .05$ , ns), however weight was significantly higher for patients screening positive than those who screened negative ( $F(3,234) = 2.58$ ,  $p = .05$ ). **Conclusion:** Patients seeking bariatric surgery have higher screening rates for bipolar disorder and softer spectrum illness than the general population. This psychiatric comorbidity needs to be further studied with a focus on overall surgical success and mental health outcome.

## 296-P

**The Relationship Between Social Anxiety, Emotional Eating, and Binge Eating: Could Social Anxiety Be a Barrier to Healthy Weight in Overweight and Obese Individuals?**

Natania D. Wright, Carmen R. Isasi, Judith Wylie-Rosett *Bronx, NY*

**Background:** While eating disorders have been associated with social anxiety, few studies have examined binge eating disorder and social anxiety. Individuals with high levels of social anxiety may binge as a way to regulate affect. This study evaluated binge eating, emotional eating, and social anxiety in an overweight population. **Methods:** Using an internet-based survey, overweight and obese men and women (BMI > 25 kg/m<sup>2</sup>,  $N = 231$ ) completed self-report measures including: social anxiety (Social Phobia Inventory), emotional eating (Emotional Eating Survey), and binge eating (Questionnaire on Eating and Weight Patterns). The relationship between social anxiety, emotional eating, and binge eating were examined using Pearson's correlations, regression equations, and ANOVAs. **Results:** Social anxiety was significantly correlated with emotional eating ( $r = .46$ ,  $p < .01$ ) and binge eating ( $r = .36$ ,  $p < .01$ ). This association remained significant after controlling for confounders ( $\beta = 0.36$ ,  $p < .01$ ;  $OR = 1.06$ ,  $CI = 1.02 - 1.10$ ). Individuals with binge eating disorder ( $N = 52$ , 23%) reported significantly higher levels of social anxiety than other participants ( $F(2, 214) = 19.36$ ,  $p < .01$ ). BMI was correlated with binge eating ( $r = .45$ ,  $p < .01$ ), but was not correlated with emotional eating or social anxiety. **Conclusion:** In this study, social anxiety was associated with emotional eating and binge eating. Future research should examine this relationship through longitudinal studies. A clinical trial would be useful to see if weight loss interventions addressing social anxiety are more effective than standard weight loss treatment.

## 297-P

**Lower Scores on Cognitive Performance Tests Are Related to Obesity and Depression**

Cindy Ziker, Colleen A. Venti, Brian Grice, Reiner Jumpertz, Marie Thearle, Susanne B. Votruba, Jonathan Krakoff, Marci E. Gluck *Phoenix, AZ*

**Background:** Depression, adiposity and decreased executive functioning are thought to be associated. As a preliminary investigation, we examined the relationship between measures of executive functioning, depressive symptoms and adiposity in a convenience sample from three clinical studies. **Methods:** Volunteers without diabetes ( $n=32$ ; 22m/10f; BMI 37 ± 8 (mean ± SD); 37 ± 10 y) were admitted to our inpatient unit,

and completed the Inventory for Depressive Symptoms and computerized versions of the Wisconsin Card Sorting Task (WCST) and Iowa Gambling Test (IGT). Percent body fat was measured by DXA. **Results:** Presence of depressive symptoms was higher in obese (BMI > 30 kg/m<sup>2</sup>) compared to overweight or normal weight volunteers ( $c^2 = 3.7$ ,  $p = 0.05$ ) but depression score was not associated with %fat or waist circumference. Depression score was significantly negatively correlated with WCST score (higher scores indicate poorer performance;  $r = -0.38$ ,  $p = 0.05$ ) but not with IGT score. Based on established cutoffs, we categorized individuals into impaired vs. not impaired groups for each test. There were no differences in BMI or %fat between groups on the WCST or IGT but those in the impaired IGT group had a greater waist circumference (51 cm ± 7 vs. 43 cm ± 7,  $p = 0.03$ ). There was no association between scores on either test and BMI, %fat or waist circumference. **Conclusions:** Our preliminary findings indicate that depressive symptoms and measures of adiposity are associated with lower scores on cognitive performance tests. The direction of causality remains to be established.

## 298-P

**The Effects of Overweight BMI on Adaptive Motor Patterns**

Simone V. Gill, Shannon E. Hauff *Boston, MA*

Overweight adults are at risk for using maladaptive gait patterns. Difficulty adapting to change poses safety risks and has implications for physical activity levels; however, the literature on how overweight affects adults' motor adaptation is sparse. We aimed to examine how overweight affects motor adaptation. Preliminary data included 7 adults ( $n=4$  normal BMI,  $n=3$  overweight BMI). They walked at slow, normal, and fast metronome frequencies. Kinematics were collected using a mechanized gait carpet (Gaitrite Inc., Clifton, NJ). Participants walked for 86 trials in 5 blocks; 1: 10 baseline trials. 2-4: 10 trials at counterbalanced metronome frequencies, 2 minutes of practice at the same frequency, and 10 trials at the same frequency followed by 2 baseline trials. 5: 10 baseline trials. We observed differences in adaptation at the fastest and slowest frequencies. At the fastest frequency, participants with overweight BMIs took smaller ( $M = 62.3$  cm), faster ( $M = 364.6$  ms) steps than adults with normal BMIs ( $M = 67.2$  cm and  $M = 365.6$  ms). At the slowest frequency, participants with overweight BMIs took shorter ( $M = 65.4$  cm), faster ( $M = 593.5$  ms) steps than adults with normal BMIs ( $M = 69.9$  cm and  $M = 606.9$  ms). **Results suggest** that people with overweight and normal BMIs adapt differently to change. Taking short, fast steps could have minimized falling risks for participants with overweight BMIs and may reflect decreased strength and balance needed to adapt with longer, slower steps. Findings have implications for minimizing safety risks to overweight adults.

## 299-P

**Body Mass Index and Quality of Life in Women**

Tiffany L. Cox, Jamy D. Ard, Mark Beasley, Jose R. Fernandez, Virginia Howard *Birmingham, AL*; Ronette L. Kolotkin *Durham, NC*; Ross D. Crosby *Fargo, ND*; Olivia Affuso *Birmingham, AL*

**Background:** There is emerging interest in weight-related quality of life (QOL) due to the high prevalence of obesity in the United States. **Objective:** To examine the association between body mass index (BMI) and QOL in African American (AA) and Caucasian women and test for effect modification by race/ethnicity. **Methods:** A cross-sectional community sample of 176 AA and 175 Caucasian women with BMI ≥ 25 kg/m<sup>2</sup> completed all assessments, including the Impact of Weight on Quality of Life – Lite (IWQOL-Lite), a self-reported measure of weight-related QOL which provides scores on 5 domains (physical function, self-esteem, sexual life, public distress, work) and a total score. Scores range from 0 (worst) to 100 (best). BMI was calculated from measured height and weight. Data were analyzed using linear regression. **Results:** Mean age and BMI was 40.5 ± 11.2 years and 35.4 ± 7.8 kg/m<sup>2</sup>, respectively. The mean total QOL score was 74.6 ± 20.1. BMI was inversely associated with total QOL score in both AA and Caucasian women ( $p < 0.001$ ). Further tests for BMI by race interaction revealed the gradient of decrease was significantly greater in Caucasian than in AA women. Although AAs had higher mean total and domain specific QOL scores than Caucasians at all BMIs, physical function scores of the 2 groups were the most similar of the 5 domains. **Discussion:** AA and Caucasian women reported lower weight-related QOL as BMI increased. The degree

of impairment was greater in Caucasians than in AAs, particularly in psychosocial domains, which may be driven by cultural norms; however, physical functioning appeared to be similarly affected by higher BMI regardless of race/ethnic identity.

**300-P**  
**Do Dietary Intake and Physical Activity Mediate of the Relationship Between Psychosocial Variables and Weight Loss Maintenance?**

Melanie Warziski Turk, Susan M. Sereika, Kyeongra Yang, Marilyn Hravnak, Linda J. Ewing, Lora E. Burke *Pittsburgh, PA*

Background: Certain process variables might be responsible for or mediate the effect of psychosocial factors on weight loss maintenance. Objective: To explore the roles of dietary intake and physical activity as mediators of the relationship between weight maintenance and 6 psychosocial variables at 18 months after a behavioral weight loss trial. Methods: We weighed participants in light clothing without shoes and used the following instruments to measure psychosocial variables: Barriers to Healthy Eating (BHE), Experiences Following a Low-Fat Diet (ELF), Weight Efficacy Lifestyle (WEL), and Self-Efficacy for Exercise. We measured social support with a composite variable of two subscales from the ELF and BHE and measured stress from four survey items. Dietary intake was assessed using two 24-dietary recalls; physical activity was measured by the Paffenbarger Activity Questionnaire. Linear regression models analyzed both the direct effect of each psychosocial variable on percent weight change and its indirect effect through dietary intake and physical activity. Results: The sample ( $N = 116$ ) was 85% female and middle-aged ( $45.9 \pm 7.5$  years). Dietary intake and physical activity did not mediate the relationship between any psychosocial variables and weight maintenance; however, the BHE, ELF, WEL and the effect of a stressful life event on eating predicted weight gain,  $ps < .03$ . Increases in the BHE also predicted increased fat gram intake,  $p = .048$ . Conclusions: Dietary intake and physical activity were not mediators of weight change after a behavioral weight loss trial, but these results identify several target areas for future directions in weight maintenance interventions.

**301-P**  
**Bariatric Surgery and Female Caregivers: Differences in Dietary Practices, Child Feeding Practices, and Household Food Purchases**

Sara E. Walters-Bugbee, Kelly S. McClure, Tanja V.E. Kral, Simon M. Moon, David B. Sarwer *Philadelphia, PA*

Bariatric surgery is the most effective treatment for extreme obesity and its popularity has grown exponentially. To date, research has emphasized the psychosocial and behavioral changes that occur postoperatively. Little study is available on how bariatric surgery affects other family members and, in particular children, with respect to child feeding practices and household food purchases. This exploratory study examined the home food environment of 71 women with children between the ages of 2 and 16. Forty-seven women were candidates for bariatric surgery and assessed preoperatively. Twenty-four women had previously undergone surgery. Groups were compared on the caregivers' own eating behavior, child feeding practices, and the availability of encouraged/discouraged foods within the home. Participants completed the Child Feeding Questionnaire, Child Feeding Practices Questionnaire, Three Factor Eating Questionnaire, Fat Preference Questionnaire, and a Shelf Inventory. Women who had undergone surgery showed significantly higher cognitive restraint, lower dietary disinhibition, and indicated they consumed high-fat foods less often than those awaiting surgery ( $p \leq 0.05$ ). Postoperative caregivers also reported modeling healthy eating behaviors ( $p = 0.003$ ) and teaching about nutrition ( $p = 0.009$ ) with greater frequency as compared to surgery candidates. Women who had undergone surgery reported fewer discouraged foods in the Dairy, Breads/Pasta/Rice, Meat/Sausage, Dressings/Sauces/ Condiments, and Soups/Legumes food sets as compared to those awaiting surgery. This cross-sectional study suggests there are differences in the home food environments and maternal feeding behaviors of women awaiting bariatric surgery and those who have undergone surgery. Future longitudinal studies are needed to further investigate these associations.

**302-P**  
**Maternal Perception of Child Weight Status: Associations With Child, Maternal, and Family Factors and Maternal Endorsement of Child Behaviors**

Anna E. Schierberl Scherr, Amy Gorin Storrs, CT; Deanna Calvert, Sara Martel, Michelle M. Cloutier *Hartford, CT*

Background: Accurate parental perception of child weight is assumed to be a key element for successful obesity prevention programs; however, little research has examined if there are differences in the actions of parents when they accurately or inaccurately perceive their child's weight status. This study elucidated child, parent, and family characteristics associated with maternal misperception and explored the link between misperception and behavior. Methods: Mothers ( $n=78$ ) of Latino and non-Latino Black overweight children aged 2-4 years (56% male) were drawn from a sample of caregivers surveyed in an urban pediatric clinic. Child weight and height were obtained from medical charts and mothers provided information on demographics, weight, and child diet and activity behaviors. Mothers were categorized as accurately/inaccurately perceiving their child's weight status and child behaviors (e.g., milk consumption, TV viewing) were dichotomized as obesogenic/non-obesogenic according to recommendations from the American Academy of Pediatrics. Results: Child BMI was the only demographic factor that differed between the two groups; accurate mothers had heavier children than inaccurate mothers (BMI%=97.9 vs. 94.1, respectively;  $P=0.003$ ). There were no differences between accurate and inaccurate mothers for endorsement of child behaviors. Child age moderated the relationship between maternal classification and total obesogenic behaviors endorsed; accurate mothers were more likely to endorse more obesogenic behaviors for their older children than inaccurate mothers ( $P=0.05$ ). Conclusion: In this diverse sample of low-income families, few differences emerged between accurate and inaccurate mothers suggesting that further research is necessary to clarify the role of parental perception in childhood obesity programs.

**303-P**  
**Sleep in Early Infancy Predicts Weight-For-Length Percentiles at One Year**

Stephanie Anzman-Frasca *University Park, PA*; Ian M. Paul *Hershey, PA*; Leann L. Birch *University Park, PA*

Background: Short sleep duration has been associated with increased obesity risk for children and adults. Objective: We tested whether sleep and weight status are inversely associated in infancy and investigated whether sleep precedes weight status. Methods: Participants were 110 mother-infant dyads who completed a one-year study. Most mothers were White (91%) and were college graduates (73%). Mothers completed 4-day diary cards at infant ages 3, 4, 8, and 16 weeks, indicating every 15 minutes whether the infant was sleeping, feeding, fussing/crying, or awake/calm. We calculated average daily sleep during a 24-hour period at each week. Weight-for-length percentiles were calculated from infant weight and length, measured by nurses at birth, 3 weeks, and 1 year. Results: There was moderate stability in sleep patterns throughout early infancy, such that the inter-correlations between total sleep at adjacent time points were all greater than .40 ( $p < .0001$ ). Shorter sleep time at 4 weeks predicted greater weight-for-length percentiles at one year,  $\beta = -.21, p < .05$ . This relation remained significant when adjusting for maternal education and pre-pregnancy BMI, infant fussing/crying at 4 weeks, and feeding mode (breast- vs. formula-feeding). Sleep at 4 weeks also remained a significant predictor of weight status at 1 year when adjusting for birth-weight-for-gestational-age and weight-for-length percentiles at 3 weeks. Conclusions: These data provide evidence that shorter sleep precedes increased weight status in infancy. Sleep patterns in early infancy were stable, suggesting that early sleep could set the stage for both sleep patterns and weight trajectories later in development.

**304-P**  
**Impact of Physical Activity on Mood for Obese Girls: An Ecological Momentary Assessment Study**

Dana L. Rofey, Ronette G. Blake, Jennifer S. Silk, Mary Jo Loughran, Neal Ryan, Ronald E. Dahl *Pittsburgh, PA*

Objective: Research has shown a compelling link between physical activity and depression. The majority of work has focused on self-reported, retrospective indices limited by memory bias. This study utilized Ecological Momentary Assessment (EMA), an innovative methodology that samples

adolescents in their environments, collecting data on mood, activity, and behavior. The main aim of this study is to incorporate EMA to better understand the temporal relationships among weight, mood, and sleep in adolescents. Methods: Thirty-two obese female adolescents with Major Depressive Disorder (MDD) and 31 control, non-depressed female youth (mean age=14, BMI=30, 81% Caucasian) reported on physical activity and positive affect in their natural environment. EMA consisted of 14 phone calls from Thursday to Monday evening. Results: Despite being clinically diagnosed with MDD, no differences were found on positive affect for the MDD/obese group versus the non-MDD group ( $t=-.29$ ,  $p=ns$ ). While overall BMI differences were found between groups, there was no main effect of BMI on positive affect for either group. MDD, obese youth reported more positive affect after engaging in physical activity relative to control children, ( $F_{(1,112)} = 6.17$ ;  $p < .05$ ). Conclusions: Findings suggest that adolescents who are obese and depressed do not differ significantly in mood from control, non-depressed children. Physical activity may have a protective factor for obese, depressed youth as it significantly affects positive mood. Further research on mood and activity—particularly a better understanding of the type, duration, and frequency of physical activity that increases positive affect—could inform intervention strategies to improve adolescent health.

**305-P**

**Maternal Psychosocial and Lifestyle Factors Associated With Accelerated Baby Weight Gain the First Two Months of Life: P-POD Study Preliminary Results**

Deborah Young-Hyman, Marlo Vernon, Jane Mikell, Yonisha Wimberly Augusta, GA

Rate of weight gain during the first 6mos of life predicts overweight later in childhood. We evaluate modifiable psychosocial/lifestyle factors contributing to accelerated rate of weight gain during this critical period. Accelerated rate of weight gain is defined as increasing sex-specific percentile birth to 2mos (%WtΔ). 55 first time healthy mothers (Age 23±4.7, 56%Black) and full term babies were studied. Pre-pregnancy BMI, pregnancy weight gain, breast feeding, maternal lifestyle (routine exercise, EX), and parenting stress (Parenting Stress Index, PSI) at 2mos were assessed to ascertain associations with %WtΔ. Baby weights were obtained via medical record and converted to sex-specific percentiles. Mothers' pre-pregnancy weight and pregnancy weight gain were self-reported. Regression was used to predict %WtΔ. Mean birth weight percentile (BW%) was lower than the mean at 2mos ( $t = -2.936$ ,  $p<.005$ ). 94% baby weights were between 5 - 85<sup>th</sup> both assessments. Mothers' pre-pregnancy BMI ranged 18.3 - 47.7 ( $X = 27.8±7.0$ ). Pregnancy wt gain ranged -21lbs - 80 lbs ( $X = 32.2±18.8$ lbs). 79% mothers attempted to breastfeed. 34% reported any breast feeding at 2mos. 48% mothers reported EX at 2mos. 39% of the variance in %WtΔ was explained ( $F = 4.17$ ,  $p<.001$ ). BW% ( $p<.003$ ), EX ( $p<.01$ ) and PSI Life Stress scale ( $p<.05$ ) made independent contributions to %WtΔ. Results suggest that maternal lifestyle/stresses are associated with early accelerated rate of baby weight gain. Results need to be confirmed in a larger sample powered to examine age, race and education based differences in lifestyle and stress to inform an effective early childhood intervention to prevent obesity.

**306-P**

**Psychosocial Factors Related to Enrollment, Attrition, and Retention in a Pediatric Weight Management Program**

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Background: Factors related to enrollment, attrition, and retention in weight management programs are not well understood. Objective: To examine 1) demographic and psychosocial factors that may be associated with enrollment, attrition, and retention in a 6-month multidisciplinary weight management program, and 2) how psychosocial functioning changes over the course of the program. Design/Methods: A retrospective analysis of the Child Behavior Checklist, Youth Self-Report, Self-Perception Profile for Adolescents, Schwartz Peer Victimization Scale, and McMaster Family Assessment Device completed by 122 obese adolescents, 12- to 17-years and their parent at the initial consultation, and after 3- and 6-months of participation. Analysis: Groups were classified according to program participation status: a) did not join, b) discontinued treatment, and c) completed program. ANOVA was used to calculate group differences at the initial consultation. Paired t-tests were used to examine changes in psychosocial functioning at the 3 time points. Results: Enrollment was associated

with fewer parent reported difficulties with family behavioral control at the initial consultation. Youth who discontinued treatment after 3 months demonstrated no change in psychosocial functioning at the 3-month assessment, whereas completers improved in behavioral conduct and family communication. At 6-months, completers demonstrated improvements in self-esteem related to athletic and job competence, and family behavioral control. Completers' parents rated improvements in youth Internalizing, Externalizing, and Total Problems, plus improved family communication. Conclusion: These results suggest such programs can improve psychosocial functioning and they highlight the need for further research to better understand engagement and retention of participants in weight management programs.

**307-P**

**Have You Ever Been Told Your Child is Overweight? National Trends in Reports of Health Care Provider Notification of Weight Status, 1999-2008**

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Background: Parents with overweight children often do not recognize their children as overweight, perhaps because physicians do not diagnose or communicate children's weight status to parents. Increased recent national attention to pediatric obesity may have improved physician diagnosis and communication of weight status. Objective: To examine time trends over the last decade in reports of health care provider (HCP) notification of childhood overweight to parents or patients. Methods: Using the National Health and Nutrition Examination Survey, 1999-2008, we examined 6282 children ages 2-17 years with BMIs ≥85<sup>th</sup> percentile, based on measured height and weight. Chi-squared tests examined the effect of multiple factors on endorsing the following statement: "Has a doctor or health professional ever told you that your child/you are overweight?" Parents responded for children ages 2-15 years, 16 and 17 year olds responded for themselves. Results: Overall, 23% of parents of children or adolescents with a BMI ≥85<sup>th</sup> percentile reported having been told by a HCP they were overweight. This was greater among minorities and poorer children. Rates between 1999-2006 increased from 19.3% to 24.2%, but accelerated in 2007-2008 (to 30.6%). This time trend was most prominent among children with BMIs 85<sup>th</sup>-95<sup>th</sup> percentile (7.2% in 1999-2000 vs. 17.0% in 2007-2008), white children (17.0% vs. 29.2%), those aged 9-11 (18.1% vs. 34.0%), and females (18.8% vs. 33.6%). Conclusions: A small percentage of overweight children and their parents report having been told they were overweight by a HCP. The recent increase may be due to changed and clearer definitions, increased concern about mild overweight, and/or improved recall.

**308-P**

**To Spend or Save? Delayed Gratification and Body Mass Index in Preadolescence**

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Background: Delay of gratification tasks require an individual to forego an immediate reward and wait for a more desirable delayed reward. Obese adults are less able to delay gratification than healthy weight individuals. Few studies have examined this phenomenon in children, however. This study used an ecologically valid measure of delayed gratification to test the hypothesis that preadolescents with higher body mass index (BMI) would be less likely to delay gratification. Methods: Healthy Hawks is a 12-week educational/behavioral weight loss program at the University of Kansas Medical Center. Each week, children earn a point if they complete their goals worksheet. They can spend that point immediately on a small toy prize or save points to use on a larger prize. We calculated the percentage of points saved over the 12 weeks for 59 children (28 females) ages 8-12 years old (mean = 10.29, SD 1.39). Results: Spearman correlation revealed that higher BMI percentile was associated with reduced point savings ( $r = .33$ ,  $p = .01$ ). Similarly, obese preadolescents saved significantly fewer points than healthy weight and overweight preadolescents ( $t(57) = 3.14$ ,  $p < .01$ ). Conclusion: Results from our ecologically valid measure support the theory that obese children are less likely to delay gratification than healthy weight children. Even for nonfood rewards, preadolescent children with higher BMIs prefer the immediate reward over a delayed, larger reward. This has implications for developing specific strategies within obesity treatments aimed at improving delayed gratification.

**309-P**

**Teasing, Social Rejection, Psychological Well-Being and Academic Competencies Among Obese Children Referred For Family-Based Behavioral Treatment**

Thrudur Gunnarsdottir, Urdur Njardvik, Anna Sigridur Olafsdottir *Reykjavik, Iceland*; Linda Craighead *Atlanta, GA*; Ragnar Bjarnason *Reykjavik, Iceland*

**Background:** Childhood obesity has been associated with higher levels of psychological maladjustment and lower levels of academic competencies. Factors such as child degree of overweight, parental psychopathology, socioeconomic status, children's physical activity, and teasing/social rejection have all been implicated as contributing factors. **Objective:** To determine the prevalence of teasing and social rejection, psychological maladjustment, and low academic competencies in obese Icelandic children referred for family-based behavioral treatment at the Children's Medical Center. A further objective was to determine the degree to which teasing and social rejection, children's academic competencies, physical activity, parental and demographic factors correlate with and contribute to children's psychological well-being and their academic competencies. **Methods:** Obese children (mean BMI-SDS = 3.11, range 2.14 - 4.59, mean age 11.0, range 7.5 - 13.6 years) were referred by school nurses after routine screening at public schools. Eighty-four children completed measurements. Height and weight, demographics and measures of children's psychological adjustment, academic competencies, teasing and social rejection and physical activity were collected from children, parents, and teachers. Parental depression was self-reported. **Results:** Teasing and social rejection emerged as the strongest predictor of both child psychological adjustment and academic competencies in multivariate regression modeling. Also, psychological adjustment correlated negatively with academic competencies ( $r = -.342$ ,  $p < 0.05$ ). **Conclusions:** The results indicate that the degree of self-reported teasing and social rejection is associated with poorer psychological adjustment as well as lower academic competencies among obese children. These findings have implications for clinical practice as well as for public health interventions.

**310-P**

**The Effect of Simulated Ostracism on Physical Activity Behavior in Children**

Jacob E. Barkley *Kent, OH*; Sarah-Jeanne Salvy, James N. Roemmich *Buffalo, NY*

**Background:** Several studies have outlined the emotional and psychological effects of ostracism on children, but few have tested whether ostracism may contribute to overweight in children by altering physical activity behavior. **Methods:** Nineteen (N=11 males, 8 females) children (11.7±1.3 years old) completed two different experimental conditions at two laboratory visits. During each visit children played the virtual ball-toss computer game; Cyberball, and were told they were playing with two other children over the internet. In reality, the other characters were computer generated confederates programmed to include children in play in one condition and ostracize them by not throwing the ball to the targeted child during the other condition. The order of conditions was counterbalanced. After playing Cyberball, children completed a validated Aversive Impact Index to assess positive and negative affective states and were taken to a gymnasium where they had free-choice access to physical and sedentary activities for a period of 30-minutes. Children could participate in these activities, in any pattern they chose, for the entire period. Physical activity during the free-choice period was assessed via accelerometry. **Results:** Children had 97±20% greater ( $P < 0.001$ ) scores for the negative items and 26±6% lower ( $P < 0.001$ ) scores for the positive items on the Aversive Impact Index and accumulated 22±7% fewer ( $P < 0.01$ ) accelerometer counts in the ostracized condition. There were no effects of sex ( $P \geq 0.3$ ). **Conclusions:** Simulated ostracism elicits a negative emotional state and decreases physical activity participation in children. Ostracism may be a contributing factor to the development of obesity in children.

**311-P**

**Translation and Validation of a Parent-Proxy, Obesity-Specific Quality of Life Measure for the Spanish-Speaking Population: Sizing Them Up**

Erin E. Anderson *Lawrence, KS*; Ann M. Davis *Kansas City, KS*; Meredith L. Dreyer *Kansas City, MO*

**Objective:** The purpose of the current study was to translate and validate a Spanish version of Sizing Them Up, a parent-proxy, obesity-specific quality-of-life measure originally published by Modi & Zeller (2008) for use in obesity intervention programs for primarily Spanish-speaking parents

of overweight or obese youth. This project is in response to research that indicates that children of Hispanic ethnicity may be at a greater risk for being overweight or obese than children with other ethnic backgrounds. **Procedures:** Participants included 79 Spanish-speaking parents of children who were overweight or obese (BMI > 85th percentile) enrolled in obesity intervention programs at two hospitals in a large, Midwestern city. Parents were primarily of Mexican descent. Internal consistency, test-retest, and factor analyses were conducted. **Results:** The measure demonstrated good internal consistency (Cronbach's  $\alpha = .658$ ) and test-retest reliability (Cronbach's  $\alpha = .609$ ). Exploratory factor analyses using a 6 factor structure revealed factors with different items loading than on the original measure. **Conclusion:** Further research and revision of the measure is recommended with special attention paid to questions addressing emotional functioning of overweight or obese Hispanic children.

**312-P**

**Effects of Entree Unit Size on Children's Self-Served Portions**

Kevin C. Mathias *Philadelphia, PA*; Leann L. Birch *University Park, PA*; Jennifer O. Fisher *Philadelphia, PA*

Although adults self-serve larger amounts when the size of individual pieces or unit size (US) of a snack food is increased, investigations of US effects on children's eating behaviors have not been conducted. This research tested the hypothesis that increasing the US of an entrée would increase children's self-serve portions at a meal. Participants were 41 ethnically diverse 4- to 6-year-old children (BMI-for-age=69± 26%tile; 14 overweight/obese), who ate dinner in groups of 2-4 1x/wk in a laboratory setting. Over 4 weeks, each child was served 4 fixed portions of pizza (204g) in counterbalanced order, which differed in US: US = 25.5 g/piece (8 pieces), US = 34 g/piece (6 pieces), US = 51 g/piece (4 pieces), and US = 102 g/piece (2 pieces). Fixed portions of corn, applesauce, milk, and cookies were also provided. Anthropometric, demographic, and weighed self-serve data were collected. The amounts children self-served across conditions of increasing US was: 148 ±9 g, 148 ±10 g, 160 ±9 g, and 161 ±7 g, respectively. Children served themselves significantly greater amounts of pizza in the two larger US conditions than in the two smaller US conditions ( $p < 0.05$ ). The effect of larger food units to promote self-served portions was seen in 19 of 41 children. Seven of 41 children showed the opposite effect, and 14 of 41 served themselves the entire amount available in each condition. In conclusion, the findings of this research support the hypothesis that children serve themselves more of an entrée when US is increased. Support provided by USDA NRI 2006-55215-05938.

**313-P**

**In Their Own Words: The Day-To-Day Challenges Of Severely Obese Mexican-American Female Adolescents**

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**Purpose:** To identify themes that capture the adolescent's personal daily struggle with obesity and describe, in their own words, the compounding factors that impede their weight loss attempts. **Methods:** As part of a larger qualitative study that identified barriers and facilitators to Mexican-American females adopting a modified low glycemic index diet, interviews with 20 adolescents weighing >150% estimated ideal body weight and their families were conducted in English (n=12) or Spanish (n=8) by trained interviewers. Participants were 12-19 year old females without endogenous or iatrogenic causes of obesity, interviewed with family and in private. Open-ended questions explored eating patterns; ways family/friends act as barriers or supports to weight loss; prior weight loss experience; and weight-related health beliefs. Transcribed and verified interviews were coded using a framework approach in which 7 independent, multi-disciplinary coders identified themes related to the participant's life experiences. **Results:** Seven emergent themes revealed complex and pervasive struggles with weight and with family and peer relationships. Internal themes illustrated thoughts and behaviors that act as barriers to treatment, such as Self-Isolation (e.g., skipping lunch to avoid perceived scrutiny by peers). External themes highlighted struggles unique to their environment, such as Physical Limitations (e.g. unable to fit on roller coaster) and Conflicting Messages about their weight from family/friends and professionals. These challenges are magnified by normal adolescent development.

Conclusions: Knowledge of the unique day-to-day challenges experienced by obese adolescents and their families can help develop culturally competent, individualized medical, dietary and psychological/behavioral interventions.

**314-P****Self- and Parent-Reported Psychosocial Symptoms in Overweight Children**

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Obesity in adults is associated with higher internalizing symptoms (i.e., depression and anxiety). These symptoms in youth may also be associated with higher weight status, as well as social functioning deficits (e.g., teasing and stigmatization). Our previous data suggest that overweight children's parent-reported psychosocial impairments impede long-term weight control treatment response. Further specification of overweight children's internalizing symptoms and psychosocial deficits, as assessed by self- and parent-reports, is needed to improve treatment. We are conducting a multi-site randomized controlled trial evaluating weight maintenance treatments in overweight children (BMI >85<sup>th</sup> percentile) aged 7-11y. This program utilizes a multi-level approach that focuses on social facilitation of healthy weight control behaviors and promotes long-term weight control. Measures being collected to assess psychosocial functioning of 240 overweight children include: Mood and Feelings Questionnaire (child-report); Screen for Child Anxiety and Related Emotional Disorders (child-report); Coping with Teasing Scale (child-report); Pediatric Quality of Life Inventory (child- and parent-report); and Child Behavior Checklist (parent-report). To date, half of the sample has been assessed. This maintenance study is the first to examine treatment-seeking overweight children's internalizing symptoms from both self- and parent-reports. Findings will provide unique insight into the psychosocial contexts of youth struggling with overweight, including their own experience of their symptoms, as well as direction for the assessment and treatment of overweight children. Results from correlational analyses between the following measures and constructs will be presented: 1) child- and parent-reports; and 2) severity of internalizing symptoms and psychosocial deficits, initial weight status, and quality of life.

**315-P****Stress Levels in Parents of Overweight Children**

KristiLynn R. Volkenant, Nicole P. Quinlan, Margaret Rukstalis *Danville, PA*

Clinical experience with overweight youth suggests their parents are often highly stressed (Zeller, et al., 2004). Compared to parents of children seen in mental health setting, it is not known whether those of overweight children experience higher levels of parenting stress due to concern about significant physical and psychological problems including diabetes, depression, and oppositionality that impair parents' ability to assist with behavior change goals (Eremis et al, 2004). Methods: Using the Parenting Stress Index-Short Form, this study compared the parenting-related stress levels of parents in two groups of parents: 1) N= 29 Parents in an obesity prevention program for children ages 4 to 8 year olds with Body Mass Index (BMI) >85<sup>th</sup> % for age, sex 2) N= 29 parents in treatment program for children ages 4-8 for externalizing and internalizing symptoms. Results: Parenting-related stress levels in both groups were high. Results for Child Behavior Checklist and parent depression (Beck Depression Index) were also analyzed. Rates of mental health problems, and relationships between scores on the global scales of internalizing and externalizing problems and parenting stress are discussed.

**316-P****Hormonal and Metabolic Factors in Obesogenic Depression**

Dana L. Rofey, Hala Tfayli, Jennifer E. Phillips, Silva Arslanian *Pittsburgh, PA*

Objective: Polycystic Ovary Syndrome (PCOS) is the most common endocrinopathy in the reproductive group and is one of the most common obesogenic syndromes characterized by chronic anovulation, hyperandrogenism, hirsutism, infertility, and acne. In addition to having an adverse influence on physical health, increasing evidence reveals possible psychological correlates of PCOS. There are two current hypotheses about pathophysiologically-driven

psychopathology: (1) hyperandrogenemia or (2) insulin resistance. Methods: The aim of the current investigation is to examine the impact of hormonal (free testosterone, androstenedione) and metabolic (insulin sensitivity) parameters on depressive symptomatology at baseline in 40 obese, 10-20 year-old females with PCOS (mean age = 16 years, BMI = 38 kg/m<sup>2</sup>, 53% Caucasian). Laboratory values were collected as part of a larger investigation to examine the impact of insulin sensitizers versus oral contraceptive pills in adolescents with PCOS. Fasting testosterone and androstenedione were collected and homeostatic model assessment (HOMA-IR) was used as an index of insulin resistance. Results: Despite high rates of overall depression in adolescents with PCOS (45%) compared to BMI-matched controls, there was no relationship between depressive symptoms and free testosterone, rho=-.02, p=.46, insulin resistance, rho=-.06, p=.37, or androstenedione, rho=-.26, p=.21. Discussion: Further studies are needed to compare adolescent girls with PCOS to BMI-matched, non-PCOS controls to assess the relationships among BMI, hyperandrogenism, and depression. These results may have implications for identification, prevention and intervention to reduce both obesity and depression in adolescents diagnosed with obesogenic syndromes.

**317-P****Disrupting Eating Through Technology-Based Multitasking**

Erin Thole, Randal Foster, Laura Kimm, Maren Vik, Lorraine Lanningham-Foster *Ames, IA*

Background: Obesity is a multifactorial disease and one factor that has been associated with rising rates of obesity in adults and children is screen time. Objective: The aim of this study was to determine if eating during screen time could be disrupted through technology-based multitasking. Methods: Twenty-six healthy fasted participants, 19-32 years old, were asked to watch two 90 minute movies on two different days within a single week. During their first visit study participants completed consent forms, anthropometric measurements, and a questionnaire. Study participants consumed a standardized meal at the beginning of each study period. On the control day participants were instructed to watch a movie without disruptions. On the experimental day participants multitasked by watching a movie while continuously chatting (instant messaging). For each study day snack foods of various types (chips, cookies, popcorn, and snack crackers) were provided to participants ad libitum and the net amounts consumed were measured. Results: Men consumed significantly less chips while multitasking during the movie watching (30.8 ± 23.6) than while watching a movie without multitasking (46.8 ± 17.6 g, p < .05). Men consumed more cookies (70.6 ± 20.9 g) than women (37.5 ± 20.9 g p < 0.01) when not multitasking. This difference disappeared while multitasking (men = 59.6±35.3, women = 49.4 ± 34.7, p = NS). Conclusion: Men consumed fewer chips while multitasking vs. movie watching alone. Men consumed more cookies than women while not multitasking. Multitasking appears to affect eating behavior in men.

**318-P****Trait Anxiety, But Not Trait Anger, Predisposes Obese Individuals to Emotional Eating**

Kristin L. Schneider *Worcester, MA*; Bradley M. Appelhans *Chicago, IL*; Matthew C. Whited, Jessica Oleski, Sherry Pagoto *Worcester, MA*

The influence of negative emotions on food intake is complex and not completely understood. While initial research suggests that general negative affective traits are associated with vulnerability to emotional eating in obese individuals, specific types of trait negative affective have not been examined. The present study examined whether trait anxiety and trait anger are associated with vulnerability to emotional eating, particularly among obese individuals. Lean (n=37) and obese (n=24) participants completed a laboratory study where they completed measures of trait anxiety and trait anger at screening and then completed 3 counterbalanced experimental sessions involving different mood inductions (neutral, anxiety, anger). Following each mood induction, participants were provided with snack foods in a sham palatability test. Multiple regression analysis was used to examine whether BMI group (lean, obese) moderated the relationship between trait anxiety or trait anger and caloric intake. Models predicting snack intake revealed a significant trait anxiety x BMI group interaction (t=2.77, p=.008, R<sup>2</sup>Δ=.04), such that high trait anxiety was positively associated with food intake for obese individuals (t=2.65, p=.02, R<sup>2</sup>Δ=.13), but not their lean counterparts (t=0.03, p=.98). Contrary to the hypothesis, trait anger was

not associated with food intake ( $t=-0.56, p=.58$ ). Results suggest that trait anxiety may be a risk factor for emotional eating among obese individuals. Training in the use of coping strategies that address anxious mood states, like relaxation or mindfulness, could assist obese individuals with high trait anxiety in reducing emotional eating.

**319-P**  
**Awareness of Weight Status and Desire For Weight Change Among Patients With Severe Mental Illness**

Otto Kausch, Richard McCormick *Cleveland, OH*; Nikona Thomas, Douglas Smith, Michael DeDonno *Northfield, OH*

**Background:** Obesity among the mentally ill is coming under increasing scrutiny. There have been few studies examining the perspectives of patients themselves on their weight status and desire for change. **Methods:** Dietary Staff asked patients' perceptions of their weight status, their concern about their weight, their level of desire to lose weight, as well as documenting their stages of change for weight loss, and the patient's most recent BMI. Psychotic patients were compared with non-psychotic patients. **Results:** Among 89 psychotic patients, 23.3% of were normal weight, 30.1% were overweight, and 46.1% were obese. Among 177 psychotic patients, 58.2% were in the pre-contemplation stage, 7.3% were in the contemplation stage and 35.4% were in the action/maintenance stage. Among 82 obese psychotic patients, there was no significant difference in the stages of change for weight loss. Among 89 psychotic obese individuals, 7.9% believed they were below their ideal weight, 16.9% believed they were at their ideal weight, 60.7% believed they were above their ideal weight and 14.6% were unsure. Among 89 psychotic obese patients, 52.8% were not concerned about their weight, 22.5% were a little concerned, 15.7% were concerned and 9.0% were very concerned. Among 87 psychotic obese, patients 43.7% wanted to lose weight, 31.0% did not want to lose weight, and 25.3% were unsure. **Discussion:** Our research demonstrates that patients with psychotic illness have significant problems with overweight and obesity, and that their perceptions about their weight status vary considerably. These perception disparities may be an important limiting factor when developing interventions to reduce obesity.

**320-P**  
**Parent and Child Dietary Change During a Family-Based Behavioral Childhood Obesity Intervention**

Jessica Bachman, Hollie Raynor *Knoxville, TN*

**Objective:** The relationship between parent and child dietary change (fruits [F], vegetables [V], low-fat dairy [LFD], snack foods [SF], and sweetened beverages [SB]) during a 6-month, family-based behavioral childhood obesity intervention was examined. **Methods:** Secondary data analysis based on parent-child pairs ( $n = 68$ , Parent: age =  $38.6 \pm 4.8$  years, body mass index [BMI] =  $32.1 \pm 8.1$ , 92.6% female, 92.6% white; Child: age =  $7.25 \pm 1.7$  years, zBMI =  $2.23 \pm 0.6$ , 63.2% female, 91.2% white) with complete dietary data was conducted. Participants were randomized to one of three conditions: newsletter; decrease intake of SF and SB; or increase intake of F, V, and LFD. Three-day food diaries (one weekend day, two weekdays) collected at 0 and 6 months were analyzed using NDS-R software. Hierarchical regression analyses determined the relationship between parent and child dietary change for each dietary variable (F, V, LFD, SF, and SB), with demographics, intervention group, and baseline dietary intake controlled. **Results:** In the full model, relationships between parent and child change from 0 - 6 months in LFD and SF intake were significant (LFD:  $r^2 = 0.37, p < 0.05$ ; SF:  $r^2 = 0.64, p < 0.001$ ). Parent dietary change in LFD and SF made a significant contribution to each model of child dietary change (LFD:  $\beta = 0.34, p < 0.05$ ; SF:  $\beta = 0.42, p < 0.01$ ). No other relationships were found. **Conclusion:** Parent dietary change is related to child dietary change during a family-based behavioral childhood obesity intervention.

**321-P**  
**The Relationship of Dieting and Levels of Restraint to Caloric Intake in College Women**

Stephanie P. Goldstein, Shawn N. Katterman, Michael R. Lowe *Philadelphia, PA*

To solve the current obesity crisis, many dieting and weight loss strategies have been explored. However, evidence indicates that young women who describe themselves as restrained eaters do not eat any less than unrestrained eaters in the natural environment. Some studies have shown

that self reported eating restrictions are simply a reflection of weight concern in young women (Field, Wolf, Herzog, & Cheung, 1993). To study this phenomenon further, secondary analyses were performed on data from an ongoing weight gain prevention study. Participants included 293 freshman females that completed the Three-Factor Eating Questionnaire (TFEQ), three 24-hour food recalls and answered questions about current dieting status. Participants were divided into four groups (those dieting to lose weight, those dieting to prevent weight gain, restrained eaters, and unrestrained eaters) based on self-reported restraint levels and dieting status. It was predicted that there would be a significant difference in nutritional intake among the four groups, suggesting a relationship between dieting status or restraint levels and nutritional intake. The results were in the expected direction, but were not statistically significant ( $F(3,253)=1.41, p=.241$ ). Participants who were dieting to lose weight reported the lowest caloric intake ( $M=1530.25, SD=417.98$ ). Participants dieting to prevent weight gain followed ( $M=1590.93, SD=552.60$ ), then restrained eaters ( $M=1666.20, SD=462.22$ ), and unrestrained eaters ( $M=1686.75, SD=430.34$ ). Results add to literature investigating whether self-report measures of restrained eating or dieting are related to actual energy intake.

**322-P**  
**The Relationship of Impulsivity to BMI in African-American and European-American Women**

Kathryn A. Kaiser *Birmingham, AL*; Susan F. Franks *Fort Worth, TX*

The reasons for disproportionate obesity rates in African Americans (AA) over European Americans (EA) have not been elucidated. Personality traits related to behavioral control have been implicated in obesity vulnerability, but results may be impacted by self-report. Obesity-promoting eating patterns, conceptualized within the domain of addiction, point to a possible role for impulsivity (IM). This study investigates the relationship between IM and obesity in AA and EA women, controlling for social desirability (SD). EA ( $n=122$ ) and AA women ( $n=101$ ) of all weight categories were recruited from a metropolitan area in the southwestern U.S. Participants were pre-screened for eating disorders and medical conditions strongly influencing weight. Average age was 35.3 years (24-52), and average BMI was 29.1 (17-55). The IM and SD sections of the Zuckerman-Kuhlman Personality Questionnaire (ZKPQ) were administered. Relationships were examined using t-tests and correlations. EA and AA did not differ in BMI, age, or IM. SD was significantly higher for AA than EA ( $t= 3.48, p=.001$ ). For EA, BMI and IM were significantly correlated ( $r=.27, p=.003$ ) and remained so when controlling for SD ( $r=.26, p=.004$ ). For AA, SD was negatively correlated with IM ( $r= -.30, p=.003$ ) but did not alter the non-significant relationship between BMI and IM ( $r=.02, p=.826$ ). Results suggest that impulsivity may play an important role in obesity risk for EA but does not appear to hold the same relevance for AA. Other factors may increase risk for obesity in AA women to a greater degree than personality traits and should be further investigated.

**323-P**  
**Novel Type of Depression in Overweight Youth**

Dana L. Rofey *Pittsburgh, PA*; Jessica Black *Cincinnati, OH*; KayLoni L. Olson, Eva Szigethy *Pittsburgh, PA*

**Objective:** While research on the relationship between youth depression and weight is mixed, there is support that youth seeking treatment for weight management are more likely to experience higher rates of depression. The aim of the current investigation was to explore differences in depression for treatment-seeking, obese youth as compared to a non-obese, treatment-seeking, normative sample. **Methods:** The Children's Depression Inventory (CDI; Kovacs, 1996) is a commonly used measure across various settings to assess childhood depressive symptomatology on five standard factors: Negative Mood, Interpersonal Problems, Ineffectiveness, Anhedonia, and Negative Self-Esteem. The current study compares results from a Maximum Likelihood Factor Analysis with an oblique rotation to investigate the similarities and differences in depressive symptoms for 195 overweight youth (mean age=15 years, mean BMI=34 kg/m<sup>2</sup>, 86% female, 65% Caucasian) seeking weight management services. **Results:** Results revealed four components with Eigenvalues exceeding 1 and accounting for 58.7% of the cumulative variance.

An evaluation of individual CDI items suggests that overweight youth endorse items differently than non-overweight youth (e.g., for obese children, negative school experience loads as its own scale and self-blame and deprecation load with sadness). *Discussion:* These results can inform depression diagnoses in an overweight youth population which may improve current treatment and inform preventive efforts. Clinical implications reveal a possible variant of Major Depressive Disorder for adolescents who are obese.

**324-P****The Impact of Parental Education on Offspring BMI: Evidence From a College Cohort**

Aydin Nazmi, Soma Roy, Heather S. Smith, Kris Z. Jankovitz, Ann Yelmokas McDermott *San Luis Obispo, CA*

**Background:** Socioeconomic status (SES) is inversely associated with body mass index (BMI) but data on the differential impact of maternal and paternal education on offspring BMI is limited. **Methods:** We used cross-sectional data from the Cal Poly FLASH Longitudinal College Study to assess associations between parental education and BMI in freshman at a California public university. **Results:** A total of 1341 (34%) individuals (54% female, 65% white) had complete data. Mean (SD) BMI (kg/m<sup>2</sup>) in men and women was 22.9 (3.4) and 21.9 (3.0), respectively. Inverse dose-response patterns were observed in overweight/obesity (BMI > 25.0) prevalence from lowest to highest maternal (p=0.004) and paternal education (p=0.005). Patterns were stronger by maternal education (p=0.006 for both sexes) compared to paternal education (p=0.05 men, p=0.01 women). In linear regression models, when adjusted for race/ethnicity; family income; and physical activity, beta coefficients (95% CI) for the association between BMI and maternal education in young men and women were -0.37 (-0.66,-0.09) and -0.35 (-0.60,-0.11), respectively. For paternal education, corresponding values were -0.27 (-0.55,-0.01) and -0.21 (-0.43,0.00). **Conclusion:** Maternal education is more strongly associated with young adult offspring BMI than paternal education but effect sizes are similar in men and women. Macro-level policies impacting educational attainment may have important lifecourse and inter-generational effects on key health indicators.

**325-P****The Prevalence of Night Eating Syndrome Among Children and Parents at Risk for Cardiovascular Disease and Type 2 Diabetes**

Jennifer D. Lundgren *Kansas City, MO*; Vicky Drapeau *Quebec, Canada*; Kelly C. Allison *Philadelphia, PA*; Angelo Tremblay *Quebec, Canada*; Marie Lambert *Montreal, Canada*; Simone Lemieux *Quebec, Canada*; Albert J. Stunkard *Philadelphia, PA*

**Background:** Night eating syndrome (NES) is characterized as a disorder of circadian-delayed food intake manifested by evening hyperphagia (EH) and nocturnal ingestions of food (NI). Research diagnostic criteria recently have been proposed (Allison et al., 2010), including EH and/or NI, awareness of eating behavior, presence of at least three additional hunger, sleep, or mood symptoms, and distress/impairment in functioning. This study estimated the prevalence of NES in children and parents enrolled in the Canadian Familial Study on the Prevention of Cardiovascular Disease and Type 2 Diabetes in Children and Adolescents using these new diagnostic criteria. **Methods:** Families (N = 395; children aged 8-10 years, mean BMI = 19.5 kg/m<sup>2</sup>; mother mean age = 40.3 years, mother mean BMI = 29.2 kg/m<sup>2</sup>; father mean age = 42.5 years, father mean BMI = 30.5 kg/m<sup>2</sup>) were assessed with the Night Eating Questionnaire (parent and child versions). **Results:** Based on child report, only 2 children (0.5%) reported evening hyperphagia or nocturnal ingestions of food. None were classified as NES positive based on full diagnostic criteria. Based on parent report of child behavior, only 6 children (1.5%) reported evening hyperphagia or nocturnal ingestions of food and none were classified as NES positive based on full diagnostic criteria. Only 2 mothers (0.5%) and 1 father (0.3%) met full NES diagnostic criteria, although evening hyperphagia and/or nocturnal ingestions of food were reported more frequently (mothers = 2.0%; fathers = 4.3%). **Conclusions:** Full threshold NES in this sample is rare.

**326-P****Family Determinants of Sedentarism in Portuguese Children Aged 3 to 10 Years Old**

Cristina Padez *Coimbra, Portugal*; Vitor Marques *Lisboa, Portugal*; Augusta Gama *Lisbon, Portugal*; Isabel Mouro *Vila Real, Portugal*

**Background:** Sedentary activities such as television, electronic games and computer use are associated with childhood obesity. **Purpose:** To investigate the influence of family, child and environmental characteristic, is the time that children watched television, used computer and played electronic games and, to analyze the effect of these sedentary activities in the prevalence of obesity. **Methods:** A cross-sectional of children 3 to 10 years was performed, Weight, height, triceps and subscapular skinfolds were measured as well as abdominal circumference. Parents filled out a questionnaire about family characteristics. BMI was calculated and IOTF cut-offs were used to classify obesity levels. **Results:** The prevalence of obesity is lowest among children watching 0-2 hours a day and highest among those watching 3 or more hours a day (p<0.001). Use of electronic games was significantly associated with the prevalence of obesity. Children who had greatest physical activity spent less time watching television, but more time using electronic games. Concerning parents, an highest educational level was associated with: less time watching television and playing electronic games and more time using the computer. **Conclusions:** The results suggest that any intervention strategies to prevent and reduce childhood obesity must involve all the family.

**327-P****Suicidal Ideation and Its Associations With Body Mass Index, Waist Circumference, and Waist-to-Height Ratio Among U.S. Adult Men and Women**

Guixiang Zhao, Earl S. Ford, Chaoyang Li, James Tsai, Lina S. Balluz *Atlanta, GA*

Obesity is associated with an increased risk of mental disorders. This study examined the associations of suicidal ideation with anthropometric measures of obesity including body mass index (BMI), waist circumference (WC) and waist-to-height ratio (WHR) among U.S. adult men and women. A cross-sectional, nationally representative sample including 7,605 (3,860 men and 3,745 nonpregnant women) noninstitutionalized U.S. adults aged ≥20 years from the 2005-2008 National Health and Nutrition Examination Survey was used. Suicidal ideation was assessed based on the question from the Patient Health Questionnaire-9 about having contemplated suicide. The regression coefficients (β) with standard errors (SE) were estimated using logistic regression analyses. Overall, the age-adjusted prevalence of suicidal ideation was 2.6±0.3% in men and 3.0±0.3% in women; the prevalence increased significantly with increasing quintiles of WC (P<0.001 for a linear trend) and WHR (P<0.001) in women but tended to decrease across quintiles of WC (P=0.052) and WHR (P=0.100) in men. After multivariate adjustment for demographics, lifestyle factors, and multiple chronic conditions, the significant and positive associations of BMI (β=0.023 [SE: 0.011], P=0.034), WC (β=0.012 [SE: 0.005], P=0.015) and WHR (β=2.178 [SE: 0.840], P=0.014) with suicidal ideation persisted in women. In contrast, WC (β=-0.016 [SE: 0.009], P=0.085) and WHR (β=-2.938 [SE: 1.525], P=0.063) were marginally and inversely associated with suicidal ideation in men after multivariate adjustment. In conclusion, among U.S. adults, anthropometric measures of obesity were significantly associated with suicidal ideation; the associations varied significantly by sex. Future studies are warranted to further explore the underlying mechanisms on the sex-specific associations.

**328-P****Energy Balance Understanding Does Not Predict Measures of Wellness**

Stephanie R. Fishel-Brown, Jenna L. Scisco, Adam W. Hoover, Eric R. Muth *Clemson, SC*

**Background:** Much emphasis on the fight against obesity is placed on education and food labeling, yet very little comprehensive research has been conducted to measure understanding of energy balance and its relationship with measures of wellness (e.g., BMI). **Method:** Normal weight (N = 181), overweight (N = 66) and obese (N = 15) college students completed a 38-item energy balance questionnaire in a controlled laboratory setting without access to external resources or cues. Height, weight, percent body fat, waist circumference, hip circumference, and blood pressure were measured. **Results:** Energy balance understanding (M = 28.35; SD = 4.06) did not predict body



mass index ( $R^2 = .009$ ,  $F(6,255) = .37$ ,  $p = .90$ ), percent body fat ( $R^2 = .004$ ,  $F(6,254) = .18$ ,  $p = .98$ ), waist to hip ratio ( $R^2 = .02$ ,  $F(6,255) = .92$ ,  $p = .48$ ), waist circumference ( $R^2 = .03$ ,  $F(6,255) = 1.18$ ,  $p = .32$ ), or blood pressure (systolic:  $R^2 = .02$ ,  $F(6,254) = .47$ ,  $p = .98$ ; diastolic:  $R^2 = .004$ ,  $F(6,254) = .12$ ,  $p = .99$ ). Conclusion: This was the first study to examine performance on energy balance questions comprehensively in relation to measures of wellness. Given the emphasis placed on education in the current fight against obesity, the key finding is eye opening: it appears knowledge alone does not relate to ideal measures of wellness. Assumptions regarding education and its role in the treatment, reduction, and prevention of obesity should be reexamined.

**329-P**

**Health Correlates of Night Eating in Families at Risk For Cardiovascular Disease and Type 2 Diabetes**

Jennifer D. Lundgren *Kansas City, MO*; Vicky Drapeau *Quebec, Canada*; Kelly C. Allison *Philadelphia, PA*; Angelo Tremblay *Quebec, Canada*; Marie Lambert *Montreal, Canada*; Simone Lemieux *Quebec, Canada*; Albert J. Stunkard *Philadelphia, PA*

Background: Night eating syndrome (NES) is characterized as a disorder of circadian-delayed food intake manifested by evening hyperphagia (EH) and nocturnal ingestions of food (NI). NES has been associated with obesity (Andersen et al., 2004) and diabetic complications (Moorse et al., 2006). This study examined the relationship between night eating behavior, obesity, and metabolic syndrome in children and parents enrolled in the Canadian Familial Study on the Prevention of Cardiovascular Disease and Type 2 Diabetes in Children and Adolescents. Methods: Families ( $N = 395$ ; children aged 8-10 years, mean BMI = 19.5 kg/m<sup>2</sup>; mother mean age = 40.3 years, mother mean BMI = 29.2 kg/m<sup>2</sup>; father mean age = 42.5 years, father mean BMI = 30.5 kg/m<sup>2</sup>) were assessed with the Night Eating Questionnaire (NEQ); anthropometric and metabolic variables were assessed. Results: Child NEQ scores were not significantly correlated with child BMI. Mothers' and fathers' NEQ scores were significantly correlated with their respective BMIs (mother  $r = 0.28$ ,  $p < 0.01$ ; father  $r = 0.14$ ,  $p < 0.01$ ). Only adults were classified as positive or negative for Metabolic Syndrome (MS). Mothers, but not fathers, meeting criteria for MS had statistically significantly higher NEQ scores (MS positive [ $N = 77$ ] = 11.8 points, MS negative [ $N = 232$ ] = 10.5 points;  $p < 0.05$ ). Conclusions: Night eating is associated with heavier body mass in adults and metabolic syndrome diagnosis in mothers. Research is necessary to determine if night eating behavior leads to the development of excess weight and MS as children age.

**330-P**

**Depressive Mood and Suicidality Among Overweight High School Students**

Moonseong Heo, Natania D. Wright, Judith Wylie-Rosett *Bronx, NY*; Myles S. Faith *Philadelphia, PA*

Experience of depressive mood and suicidality may be associated with weight status, actual or perceived, among high school students. To examine such potential associations, we analyzed a nationally representative sample of  $N=6945$  boys and  $N=7005$  girls in grades 9 to 12 from the year 2007 Youth Risk Behavior Survey data conducted by the CDC. Actual overweight (BMI  $\geq 85$ ) was based on self-report height and weight and perceived overweight was defined as slightly or very overweight to describe own weight. Depressive mood was based on feeling sad or hopeless more than two consecutive weeks in the past year. Suicidality items included suicidal ideation, suicidal plan, and suicidal attempt in the past year. Survey sampling strata and weightings were incorporated in all analyses. Overweight prevalence was higher in boys (32.8% vs. 24.7%,  $p < .0001$ ) but the perceived overweight prevalence was higher in girls (24.2% vs. 34.5%,  $p < .0001$ ). Prevalence of depressive mood and suicidality was significantly higher for girls. Although none of the depressive mood and suicidality items were significantly associated with the self-report actual weight status in boys, all of them were significantly associated in girls. All of the depressive mood and suicidality items were significantly associated with perception of being overweight in both boys and girls. These results show that the association between mood and weight status differs by sex and how students perceive their weights. This finding suggests that psychological interventions, which may differ by sex, are needed for adolescent weight management intervention.

**330.5-P**

**Relationship Between BMI, Hormones, Neuropeptides and Eating Disorders in Adolescents**

Mara C. Lofrano-Prado *São Paulo, Brazil*; Wagner L. Prado Recife, *Brazil*; Aline de Piano, Lian Tock, Danielle A. Caranti, June Carnier, Claudia Maria O. do Nascimento, Lila M. Oyama, Sergio Tufik, Marco Túlio de Mello, Ana R. Dâmaso *São Paulo, Brazil*

Background: There is considerable evidence showing that eating disorders and obesity rates are increasing. The obesity, mainly in the adolescence, affects the self-esteem and satisfaction with the appearance, factors that increase the risk of developing eating disorders. And a number of bioactive substances (cytokines, hormones and neuropeptides) could be the link between obesity and eating disorders. Objective: The aim of this study was to verify the relationship between BMI, hormones, neuropeptides and eating disorders symptoms in adolescents. Methods: The sample size was composed by 32 adolescents from both genders (41% obese [BMI=36.64±5.67] and 59% normal weight [BMI=22.17±3.11]), aged between 14 to 19 years old. Body composition was assessed by pletismography. Leptin, ghrelin, insulin, TNF- $\alpha$ , AGRP, adiponectin, NPY,  $\alpha$ -MSH, MCH was determinate by Elisa (Phoenix peptide). Body image dissatisfaction was assessed by Body Shape Questionnaire (BSQ); for binge eating symptoms was used the Binge Eating Scale (BES); Bulimic Investigatory Test Edinburgh (BITE) to assay the presence of purging. Results: A positive correlation was found between: leptin and BES ( $r=.724$ ), BSQ ( $r=.705$ ) and BITE ( $r=.696$ ); BMI and BES ( $r=.663$ ), BSQ ( $r=.525$ ) and BITE ( $r=.732$ ); the same pattern was observed to insulin and TNF- $\alpha$ . A negative correlation was found to  $\alpha$ -MSH and AGRP with BES, BSQ and BITE. Related to other variables no association was verified. Conclusion: The blood levels of hormones and neuropeptides could be the link between obesity and eating disorders in adolescents. However, it is not clear what is cause what consequence.

**Behavioral and Psychosocial Factors**

**331-P**

**Risky Business: Adolescents With Extreme Obesity and the Risk Taking Behaviors They Engage In**

Megan B. Ratcliff, Todd M. Jenkins, Jennifer Reiter-Purtill, Meg H. Zeller *Cincinnati, OH*

Adolescence is associated with increased engagement in risky, harmful, or antisocial behaviors. Little is known regarding these behaviors in adolescents with extreme obesity (AEO; BMI  $> 99^{\text{th}}$  percentile), a subpopulation increasing in prevalence and at considerable medical and psychosocial risk. Data from the 2007 Youth Risk Behavior Survey were used to calculate prevalence estimates and odds ratios for risk-taking behaviors. AEO were similar to healthy weight adolescents (HWA, BMI: 5-84<sup>th</sup> percentile) in prevalence of most behaviors related to peer violence, suicide, alcohol/drug use, and sexual activities, with the following exceptions: Relative to HWA, both male and female AEO more frequently reported ever trying cigarettes [female: 61% vs. 46%, OR: 2.0(1.3-3.2), male: 62% vs. 50%, OR: 1.5(1.2-2.0)] and feeling unsafe at school [female: 12% vs. 5%, OR: 2.5(1.1-5.6), male: 9% vs. 5%, OR: 1.9(1.0-3.6)]. Compared to female HWA, female AEO had lower odds of ever having sex [32% vs. 46%, OR: 0.5(0.3-0.9)], but greater odds of reporting drinking alcohol before their last sexual encounter [42% vs. 17%, OR: 4.6 (1.2-17.6)], current smoking [26% vs. 18%, OR: 2.3 (1.2-4.4)] and suicidal ideation [27% vs. 18%, OR: 1.7(1.0-2.9)]. Compared to male HWA, male AEO had greater odds of carrying a weapon [42% vs. 27%, OR: 2.0 (1.5-2.7)] and smoking before age 13 [20% vs. 16%, OR: 1.4(1.0-2.0)]. In general, AEO were similar to HWA for the majority of risk-taking behaviors, with most differences being gender-specific. In addition to medical and psychosocial risks, extreme obesity may be associated with behavioral health risks for adolescents.

**332-P**

**Maternal and Daughter Weight Predict Change in Daughters' Perceived Parental Restriction: A Latent Transition Model**

Jennifer Savage, Brandi Y. Rollins, Leann L. Birch *University Park, PA*

Background: Restrictive feeding practices impact children's food intake, but little is known about multidimensional patterns of snack food restriction over time. Methods: This study examined longitudinal patterns of snack food restriction from age 7 to 9 among non-Hispanic white girls ( $n = 180$ ),

and how daughter and maternal characteristics predict changes in restriction. Daughters' perceived restricted access to 10 snack foods was assessed at 7 and 9y; mother and daughter BMI were calculated from height and weight; psychosocial measures included weight concerns, dietary restraint and disinhibition. Results: Latent transition analyses (LTA) revealed 3 distinct patterns of restricted access to snack foods: *Free Access*, *Snack Time Only Access*, and *Special Occasion Access*. Between 7 and 9y, daughters of non-overweight mothers were more likely to remain or transition to *Snack Time Only Access*, whereas daughters of overweight mothers were more likely to transition to higher levels of restricted access. Daughters of non-overweight mothers were more likely to transition to higher restricted access if they stayed overweight between 7 and 9y, reported greater disinhibited eating at 7y, and had mothers who gained weight. Daughters of overweight mothers were more likely to transition to higher restricted access if they became overweight at 9y, and were less likely to transition to lower restricted access if they had higher BMIs, disinhibited eating, and mothers reporting greater concern for daughter weight. Conclusion: Girls' perceived snack food restriction is a multidimensional construct, and both increases and decreases in restriction were predicted by change in maternal and daughter weight

**333-P****Perceived Body Image for Optimal Health: Analysis of Racial Differences**

Harold E. Bays *Louisville, KY*; Kathleen M. Fox *Monkton, MD*; Susan Grandy *Wilmington, DE*

The 2007 US Study to Help Improve Early evaluation and management of risk factors Leading to Diabetes (SHIELD) survey received responses from 4,094 (26%) African American (Black) and 9,717 (61%) Caucasian (White) participants with or at risk for diabetes mellitus. Respondents chose the "body type that you feel best resembles the ideal body type for optimal health" on the gender-specific Stunkard Figure Rating Scale (FRS) with #1 being the thinnest body type and #9 being the most obese type for men, and #10 to #18 respectively for women. The majority of Black and White men indicated that body images #3 (21% Black vs. 16% White), #4 (37% Black vs. 36% White), and #5 (25% Black vs. 36% White) were optimal for health. These perceptions among men did not differ based upon education level or age. Generally, Black men chose an image for optimal health that was thinner than White men. Most Black and White women chose images #12 (32% Black and White) and #13 (37% Black vs. 38% White) as being ideal for optimal health, with no differences based upon race, education level, or age. Both Black and White women tended to choose images that were thinner than those chosen by Black and White men; but Black and White women did not substantially differ in their image choices they perceived as ideal for health. This survey does not support racial differences in body weight as being due to differences in perceived ideal body image for optimal health.

**334-P****Assessment of Body Image Dissatisfaction in a Multi-Ethnic Cohort**

Scott A. Lear *Vancouver, Canada*

Background: Much attention has been directed to ethnic differences in body fat distribution but relatively little on body image dissatisfaction (BID). The purpose of this investigation was to identify determinants of BID in a multi-ethnic cohort. Methods: 569 participants of Aboriginal (n=85), Chinese (n=163), European (n=177) and South Asian (n=144) origin from the Multi-cultural Community Health Assessment Trial identified Stunkard scale silhouettes that most closely corresponded to their current and desired shapes. BID was calculated as the difference between the participants' choices for desired and current shape. Participants were also assessed for demographics, body mass index (BMI) and waist circumference (WC). T-test, ANOVA and linear regression were conducted to identify determinants of BID. Interactions of either ethnicity or sex with either BMI or WC were tested. Results: South Asians identified a lower desired body shape ( $3.4 \pm 0.9$ ) than Aboriginal ( $3.8 \pm 1.1$ ,  $p=0.005$ ) and European ( $3.8 \pm 0.8$ ,  $p=0.001$ ) participants. BID was greater in South Asians ( $1.8 \pm 1.3$ ) than Chinese ( $1.4 \pm 1.1$ ,  $p=0.007$ ) and Europeans ( $1.4 \pm 1.2$ ,  $p=0.015$ ). There were significant ethnicity by WC, sex by BMI and sex by WC interactions

after adjusting for age, sex and ethnicity. The final model for BID included age, sex, ethnicity, BMI, WC and sex by WC as determinants. In this model, Chinese and South Asians participants had a BID that was greater by 0.3 and 0.4, respectively ( $p<0.01$ ), than Europeans. Conclusions: Perception of body image was dependent on ethnic background such that Chinese and South Asians had greater dissatisfaction than Europeans.

**335-P****Family Functioning and Psychosocial Outcomes in Obese Adolescents**

Monica D. Meyer *San Diego, CA*; Lindsay K. Boyce, Kerri Boutelle *La Jolla, CA*

Recent estimates show that over one third of American children and adolescents are overweight. Considering the importance of family in an adolescent's development and weight, the purpose of this study is to determine how family functioning affects psychosocial functioning specifically among overweight and obese adolescents. Surveys were completed by 108 overweight and obese adolescents (mean BMI percentile = 96.2; gender = 64.2% female; mean age = 15.2 years) and analyzed using multiple regression. Family functioning was measured by the FACES II; Depression by the Center for Epidemiological Studies Depression Scale for Children (CES-DC); Anxiety by the Spielberger Trait Anxiety Inventory; Anger by the Spielberger Trait Anger Scale; Self-esteem using the Rosenberg Self Esteem scale; and Body Satisfaction by a modified version of the Body Shape Satisfaction Scale. Gender and socioeconomic status were entered as covariates. Results indicate psychosocial variables were significantly associated with both family adaptability ( $F = 2.94$ ,  $p = .008$ ) and cohesion ( $F = 3.11$ ,  $p = .005$ ). Specifically, adolescent reports of anger were negatively associated with both adaptability ( $t = -2.55$ ,  $p = .012$ ) and cohesion ( $t = -3.33$ ,  $p = .001$ ). Results suggest family functioning is related to overweight and obese adolescent reports of anger, which has been previously associated with increased risk of cardiovascular disease (CVD). This is important for adolescents who may already be at increased risk for CVD due to weight status. Future intervention studies should target family functioning which could also potentially decrease the risk of CVD in overweight youth.

**336-P****Assessing the Effects of the Holiday Season on Body Weight, Body Fat Percentage and Blood Pressure**

Meagan A. Stoner, Zeynep Goktas, Robert D. Sawyer, Mallory Boylan, Jamie A. Cooper *Lubbock, TX*

Background: Longitudinal studies among U.S. adults show that average weight gain is 1kg per year. The purpose of this study was to assess the effects of the Holiday Season (Thanksgiving to New Years Day) on changes in body weight, body fat percentage (BF%), and blood pressure (BP) in adults. Methods: 148 subjects (age 18-65y) were evaluated in November (baseline) and January (follow-up). Data collected at each visit included height, weight, BF%, BP, and resting heart rate (HR). In both visits, subjects were evaluated at the same time of day wearing a hospital gown, were instructed to refrain from vigorous exercise for 12 hours, and fasted for 4 hours prior to testing. BF% was measured using bioelectrical impedance analysis. Statistical significance was set at  $p < 0.05$ . Results: From baseline to follow up visits there were significant increases in body weight ( $0.78 \pm 1.28$ kg), BF% ( $0.52 \pm 2.27\%$ ), systolic and diastolic BP ( $1.84 \pm 10.10$ mmHg and  $2.32 \pm 14.20$ mmHg, respectively), and HR ( $2.32 \pm 11.52$ bpm). When analyzed by BMI category, obese subjects showed a significantly greater increase in BF% from November to January compared to normal weight subjects ( $p < 0.02$ ) and trended for a difference compared to overweight subjects ( $P < 0.09$ ). Conclusions: Adult subjects showed an average increase in body weight of 0.78Kg between baseline and follow-up visits. If these subjects gain the national average of 1kg per year, up to 78% of annual weight gain could be attributed to the holiday season. Additionally, obese subjects may be most at risk as they showed the greatest increases in BF%.

**337-P**

**Gender and BMI Differences in Perception of Unhealthy Weight in Paris Metropolitan Area, France, 2009**

Judith Martin, Emmanuelle Cadot, Pierre Chauvin *Paris, France*

Background: Figural drawing scales are commonly used to measure issues of body image. We used Stunkard's figural drawing scales to explore the perception of unhealthy silhouettes in Paris in 2009. Methods: This study is based on a population based, representative, cohort study in Paris metropolitan area. Perceptions of the 3000 participants were asked about 9 silhouettes of men and 9 silhouettes of women classified by ascending weight. This work focuses on questions about unhealthy weight ("Which silhouettes correspond to an unhealthy weight?"), asked systematically both on female and male silhouettes. Participants BMI was estimated using self-reported height and weight and computed in a dichotomous variable (BMI<25 vs BMI ≥25). Results: Globally, participants identified the first silhouette and the last one (of their own gender) were unhealthy but with different proportion: first silhouette was cited by 37.2% (p<0.001) of the total sample and the last one by 96.9% (p<0.001). Differences between men and women existed about perception of unhealthy weight. Men answered more frequently than women that first silhouettes (1,2,3) of both gender were unhealthy when women cited more often than men that the last ones (7,8,9) were unhealthy. Moreover, differences exist between BMI groups: both men and women with a BMI<25 had a lower threshold regarding unhealthy overweight female silhouettes. Conclusion: This work shows that the perception of unhealthy weight is linked to BMI and gender. Knowing this perception bias is important for further works on weight issues and prevention programs.

**338-P**

**Parental Alcoholism Can Cause Obesity and Unspecific Eating Disorders, Based on Structural Equation Modeling**

Sandra C. Salas *Puerto Ordaz, Venezuela*; Juan C. Lopez-Alvarenga *Mexico City, Mexico*

Eating disorders have been associated with anxiety and familial alcohol abuse. It is not clear whether addictive behavior of parental alcoholism can influence addiction for food and obesity in their children. We analyzed if parental family history of alcoholism is associated with anxiety, ED and obesity. We included 141 patients (115 women) aged 40 ± 13 years and BMI of 30.5 ± 6. They filled: HADS (Hospital Anxiety and Depression Scale), EAT-26 (Eating Attitudes Test) and the Michigan Alcoholism Screening Test for Father (F-MAST) and mother (M-MAST). Height and weight were recorded. Odds ratio (OR) and multiple linear regression were used to explain the score of ED (adjusted by age and sex). Structural equation modeling (SEM) was performed to test causal models. Total score of EAT-26 was associated with alcoholism from both parents (β= 1.6±0.2, p<0.05). The EAT-26 dieting subscale (representing dietary behavior) was associated with BMI (β= 15.3±6.9, p=0.003); the subscale bulimia (binge eating detected) was associated with alcoholic father (β= 0.60±0.18, p<0.044). The risk of anxiety disorder was OR 4.75 (95% CI: 1.6,13.9) in patients with alcoholic mother. SEM showed alcoholism had effect on BMI, independently of TAC, and these variables had effect on anxiety [p<0.001]. The SEM suggests that parental alcoholism may have negative effects on unspecific ED and obesity. The SEM models suggest that anxiety is a consequence of ED and obesity. Longitudinal studies are needed to clarify the timing of these events.

**339-P**

**The Relationship Between Source of Self-Esteem and Body Composition in College Women**

Breckann F. Moncur, Bruce W. Bailey, Annette Bailey, Trevor Batty, Pam Borup *Provo, UT*

Purpose: The purpose of the study was to determine the relationship between achievement self-esteem, self acceptance self-esteem and body composition in college women. Methods: One-hundred and thirty seven college women were recruited to participate in the study. Participants were healthy, between the age of 18 and 25, not taking medication that would alter metabolism, and able to participate in physical activity without restriction. As part of the study the participants filled out the Worth Index, which measured level of self-acceptance and achievement self-esteem. The questionnaire also broke these constructs into four subscales that included:

basic human worth, performance, personal security and appearance. Body composition was assessed using the BOD POD. Results: Participants in the study were 19.9±1.7 yrs, had a BMI of 22.5±3.2 and a percent body fat of 26.4±6.4. Source of self-esteem was primarily self-acceptance self-esteem with participants on average scoring 65±11 out of 84 (high moderate) compared to an achievement self-esteem score of 35±10 out of 84 (low moderate). When evaluating the subscales a similar trend appears with the exception of the performance factor, which was more normally distributed. Both the performance factor and appearance subscales were significantly related to percent body fat (p<0.05). Global self-esteem was not related to percent body fat in this population. Conclusion: College women whose physical appearance was based more on achievement self-esteem tended to have a higher percent body fat than women whose appearance was less based on achievement self-esteem. This was also true of performance.

**340-P**

**Betel Nut Chewing Is Associated With Central Obesity in Taiwanese men**

Wen-Yuan Lin, Hsu-Hua Shui, Cheng-Chieh Lin, Chih-Yang Huang *Taichung, Taiwan*; Kuo-Chin Huang *Taipei, Taiwan*

Background: Betel nut chewing had been reported to increase cardiovascular disease and all-cause mortality. We aim to assess the association between betel nut chewing and central obesity in Taiwanese adult men. Methods: A total of 56,114 adult male, aged 20 and above, were recruited from four nationwide health screening centers in Taiwan from 1998 to 1999. The anthropometric index and laboratory biomarkers were measured. Questionnaire including smoking, alcohol, betel nut chewing, physical activity, income, and educational level were recorded. Central obesity was defined as waist circumference > 90 cm. Results: A total of 10,157 (18.1%) of participants were central obesity. The prevalence of current and former betel nut chewing were 10.7% and 9.9%. After adjustment for age, diabetes, hypertension, smoking, alcohol drink, physical activity, income, educational level, total cholesterol, high-density-lipoprotein cholesterol, and triglycerides, the adjusted odds ratios of having central obesity are significantly increased among current and former betel nut chewers than never chewers. Compared with never chewers, the adjusted odds ratios were 1.38 (95% CI:1.19,1.59), 1.20 (1.09,1.32), and 1.25 (1.15,1.35) among current chewers (>7times/week and < 7times/week) and former chewers, respectively. Furthermore, increased betel nut chewing frequency was associated with increased prevalence of central obesity. The prevalence of central obesity increases by age. Conclusion: This study found that betel nut chewing is closely associated with central obesity in Taiwanese adult men. The possible mechanism between betel nut chewing and cardiovascular disease mortality could be due to central obesity.

**341-P**

**Parent Perceptions of Child's Weight: Associations With Ethnicity, Gender, BMI and Education**

Noe C. Crespo, Guadalupe X. Ayala, John P. Elder *San Diego, CA*

Parents of obese children may not realize their child's weight is unhealthy and therefore may not be receptive to obesity prevention strategies. This study examined factors associated with parent accuracy of their own and their child's weight status. Data are from baseline surveys of 541 participants in a childhood obesity prevention intervention. Parent and child body mass index (BMI) were measured. Parents classified their own and their child's weight into one of four categories (underweight, normal weight, overweight, obese). Parent accuracy of own and child's weight was assessed by agreement to measured BMI (four categories). Bivariate and multivariate associations of parental accuracy and various factors were tested using Chi-square and logistic regression. Parents were 93.5% female, 41% Latino and 61.7% were overweight or obese. Children were 6.7±0.7 years old, 55.1% female and 32.6% overweight or obese. Among parents who were inaccurate of own weight, 45% were also inaccurate of child's weight (p<0.01). Latino parents showed greater underestimation of own weight (47.5%) and child's weight (44.6%) compared to non-Latinos (25.7% and 28.0%, respectively). Parental Latino ethnicity (OR=0.48; CI:0.33, 0.71), female gender (OR=0.21; CI:0.10, 0.47) and BMI (OR=0.89; CI:0.86, 0.93) were associated with lower odds of accurately classifying own weight. Parent Latino ethnicity (OR=0.60; CI:0.41, 0.88) and BMI (OR=0.93; CI:0.92, 0.96) were

associated with lower odds of accurately classifying child's weight. After adjusting for parent education, parent BMI remained a negative correlate of parental accuracy in all analyses. Interventions should include targeted strategies to educate parents regarding healthy weight ranges for children.

**342-P****Parental Perceptions, Role Modeling and Media-Related Resources Within the Home Are Associated With Screen Time Behavior in American Indian Children**

Daheia J. Barr-Anderson, Jayne A. Fulkerson, Mary Smyth, John H. Himes, Peter Hannan, Mary Story *Minneapolis, MN*

**Background:** American Indian children have high rates of overweight/obesity compared to children of other racial/ethnic groups. Young children's sedentary behavior is heavily influenced by their parent's behavior and the environment in which they live. This research explores if parental perceptions and role modeling, and media-related resources available within the home, are related to screen time (i.e., television, video game, and computer use) among American Indian youth residing on a Northern Plains reservation. **Methods:** This study used baseline data from 431 parents and 454 American Indian kindergarteners who participated in *Bright Start*, a randomized-controlled, school-based trial to reduce excess weight gain. Controlling for demographics, stepwise, linear regression analyses assessed the associations between child's screen time and parental television time; parental perceptions of screen time, limiting behaviors, child's television behavior, and household resources; and presence of television in child's bedroom. **Results:** The most parsimonious yet explanatory model for children's screen time did not include the presence of a television in child's bedroom; the statistically significant factors were child's gender, parental body mass index, parental television time, parental perception that child spent too much time playing video games and how often they limit their child's television time, and the ownership of DCD/VCR player and video game player in the home ( $F_{(7,367)}=14.67$ ;  $p<0.0001$ ; adjusted  $R^2=0.38$ ). **Conclusions:** Results suggest that changes in parent's behaviors, parent's control over child's behavior and the availability of certain household goods merit further investigation as a means to decrease screen time and subsequently overweight and obesity in American Indian children.

**343-P****TV Viewing and Adolescent Overweight Association Controlling For Age, Sex, Lifestyle Variables and Health Status**

Moonseong Heo, Judith Wylie-Rosett *Bronx, NY*; Myles S. Faith *Philadelphia, PA*

Television (TV) viewing is associated with overweight in youth. However, this association may be a product of confounding factors such as age, sex, unhealthy diet, physical activities and poor health status. To examine association between TV viewing and overweight after controlling for those confounding factors, we analyzed a nationally representative sample of  $N=13198$  youths who were 14-18 years old from the 2007 Youth Risk Behavior Survey data. Overweight status (BMI  $\geq 85$ ) was derived from self-report height and weight measures. TV viewing was based on 3+ hours/day and soda drinking based on soda intake 1+ times day in the past week. Physical activities included: played on 1+ sports teams in the past year, active 1+ hours on 5+ days in past 7 days, and moderate exercise in past 7 days. Poor health status was defined as fair or poor rather than excellent or good to describe own health. We applied logistic regression models incorporating survey strata and sampling weighting. Viewing TV 3+ hours/day compared to <3 hours/day was significantly associated with overweight in a bivariate analysis ( $p<0.0001$ ), as were all confounding factors at  $p<0.05$ . The unadjusted odds-ratio (OR) of TV watching was 1.6 (95%CI=1.4-1.7,  $p<0.0001$ ). Even after controlling for all confounding factors in a multivariate logistic model, the association was little affected yielding OR=1.4 (95%CI=1.3-1.6,  $p<0.0001$ ). These results show that TV viewing itself is a strong correlate of overweight in youth, and suggest that replacement of TV viewing with health promoting alternatives are needed.

**344-P****BMI and Unhealthy Weight Control Behaviors in Adolescents: The Role of Emotional Adjustment and Family**

Jillon S. Vander Wal *Saint Louis, MO*

Among adolescents, increasing BMI classification is associated with increased use of unhealthy weight loss methods, such as fasting or vomiting. This association however is imperfect, suggesting that the association may be stronger for some adolescents than for others. It was hypothesized that increasing BMI classification and lower indices of emotional functioning and family support would predict greater use of unhealthy weight loss methods and that the association between BMI classification and unhealthy weight loss methods would be stronger among adolescents with lower emotional functioning and levels of family support. Data were drawn from the 2001-2002 Health Behavior in School-Aged Children collaborative survey in which questions pertaining to weight loss methods were administered to a nationally representative sample of adolescents in the 9<sup>th</sup> and 10<sup>th</sup> grades. Participants included 4555 adolescents who met criteria for average weight ( $n=3189$ ), at-risk for overweight ( $n=797$ ), or overweight ( $n=569$ ). Results showed that BMI classification (OR=3.83), emotional functioning (OR=4.47), life satisfaction (OR=3.30), and parental school support (OR=1.26) predicted use of unhealthy weight loss methods for overweight girls and that BMI classification (OR=3.54), emotional functioning (OR=2.68), life satisfaction (OR=3.12), parental communication (OR=1.32), parental school support (OR=1.63), and extra-curricular participation (OR=1.35) predicted use of unhealthy weight loss methods for overweight boys ( $p's<.01$ ). Surprisingly, the association between BMI classification and use of unhealthy weight loss practices was stronger among adolescents who endorsed higher levels of emotional functioning and life satisfaction ( $p's<.01$ ). Results suggest that weight issues may be more salient among adolescents with higher emotional functioning.

**345-P****Evaluating Brief Psychosocial Measures Related To Diet Behaviors**

Jordan A. Carlson *San Diego, CA*; Gregory J. Norman *La Jolla, CA*; James F. Sallis *San Diego, CA*; Karen J. Calfas, Kevin Patrick *La Jolla, CA*

Psychosocial construct measures are required to assess dietary interventions. We evaluated 13 brief psychosocial scales related to 4 dietary behaviors (consumption of fat, fiber/whole grains, fruits, and vegetables). The psychosocial constructs included pros, cons, self-efficacy, change strategies, social support, environment, and enjoyment. Study 1 assessed 2-week reliability in 49 university students (67% female; age  $M=20.4$ ). Study 2 assessed construct validity on 441 men (age  $M=43.9$ ; BMI  $M=34.2$ ; 29% non-white) and 401 women (age  $M=41.2$ ; BMI  $M=32.4$ ; 39% non-white) enrolled in weight loss studies. Cronbach's alpha and intra-class correlations (ICCs) assessed reliability. Correlations of the scales to the corresponding dietary behaviors measured with a validated food frequency survey determined construct validity. In study 1, test-retest ICCs ranged from .63-.79. Alphas ranged from .61-.91. Each of the cons scales was related to the corresponding dietary outcome measure ( $|r|'s = .17-.27$ ;  $p<.001$ ), while the pros scales were not related to the outcomes ( $|r|'s=.02-.15$ ). Each of the self-efficacy scales was related to the corresponding outcome measures ( $r's=.24-.30$ ;  $p<.001$ ) except for dietary fat self-efficacy ( $r=-.07$  &  $-.08$ ). However, the self-efficacy scales did not discriminate as well between outcomes as expected. The change strategies ( $|r|'s=.14-.31$ ;  $p<.001$ ) and enjoyment ( $|r|'s=.18-.37$ ;  $p<.001$ ) scales were the consistently strongest correlates of dietary outcomes. General social support ( $|r|'s=.10-.26$ ) was related to each of the dietary outcomes, while general healthy eating environment ( $r's=.13-.19$ ) was related to consumption of fiber, fruit, and vegetables. These results indicate that brief psychosocial measures related to dietary behaviors demonstrated adequate reliability and, in most cases, validity.

## 346-P

**Differences in Nutrition- and Health- Related Psychosocial Factors Across Ethnicity and Socioeconomic Status (SES) Among US Adults and Their Associations With Diet, Physical Activity, and Obesity**Youfa Wang, Xiaoli Chen *Baltimore, MD*

**Background:** Large ethnic-, SES- disparities regarding health conditions including obesity exist in the US. Eliminating health disparities is a national priority. **Objectives:** To study: (1) differences in nutrition/health related psychosocial factors (eg, nutrition knowledge and beliefs, NKB) across US ethnic and SES groups; (2) associations between these factors and diet, physical activity (PA), obesity; (3) how much of ethnic, SES disparities in diet, PA, obesity could be explained by differences in their psychosocial factors. **Methods:** Nationally representative data from 4,356 US adults in the 1994-96 Continuing Survey of Food Intakes by Individuals (CSFII) and 1998 Diet and Health Knowledge Survey (DHKS) were used. Only these, but not other datasets including recent NHANES provided all needed measures. NKB was assessed using 11 questions. Subjects were asked about factors affecting food purchase ('food choice considerations', FCC). Diet was assessed using two 24-hour recalls. **Results:** Sex-, ethnic-, and SES-differences in NKB and FCC existed (most  $p < 0.05$ ). Women, whites, and higher SES groups had better ones. Those with better NKB ( $\geq 80^{\text{th}}$  percentile) had better dietary intakes, eg, higher USDA Healthy Eating Index score (56 vs 51), lower energy (1913 vs 2130 kcal/day), and cholesterol (250 vs 282 mg/day), more fruits and vegetables (5.2 vs 4.9 servings/day). NKB and FCC explained some (eg, 3-12%) of ethnic- SES- variations in diet, PA, obesity. **Conclusions:** NKB and FCC varied by ethnic and SES groups; seemed affecting Americans' dietary intakes; explained some of ethnic- SES- variations in dietary intakes, PA, obesity.

## 347-P

**Discordance Between Belief, Expectation, and Reality Amongst Obese Patients Seeking Weight Loss**Scott Doyle, Andrew Lloyd *Oxford, United Kingdom*; Brad Curtis, Julie Birt, Kecia Godbey *Indianapolis, IN*; Shehzad Ali *York, United Kingdom*

**Background:** Weight loss interventions are considered clinically effective by regulators and physicians if they reduce body mass index (BMI) by  $\sim 10\%$ . However, overweight individuals have been shown to have unrealistic expectations regarding degree of weight loss (Foster 1997). This study was designed to understand drivers of patient choice in the context of health behaviour. **Methods:** Obese individuals actively attempting weight loss in the United States (N=251) and United Kingdom (N=251) were surveyed. Importance of different aspects of pharmacotherapy (weight loss, side effects, administration mode, health risk reduction, time to weight loss, need for lifestyle modification) was captured using a discrete choice experiment. Questions also assessed expectations regarding weight loss, treatment history, and weight loss experience. Regression models were used to analyse data. **Results:** Unrealistic expectations of patients regarding weight loss were confirmed (acceptable weight loss = 23.5% of body weight). Also reported were long histories of weight loss attempts (mean length 12.9 months  $\pm$  23.1). Overall weight loss was the most important factor for patients, odds ratio (OR)=11.40 per 10% bodyweight change,  $p < 0.001$ ) and reduction in health risk was much less important (OR=10.10 per 10% risk reduction,  $p < 0.001$ ). Participants also highly valued therapies that avoided any need to modify lifestyle by diet or exercise (OR=0.86,  $p < 0.001$ ). **Conclusion:** The inherent health benefits of weight reduction were not highly valued by participants. Results suggest that people with obesity may place greater value on cosmetic aspects of weight loss rather than health benefits and this may be a stronger driver of behaviour.

## 348-P

**Social Context Explains Race Disparities in Obesity Among Women**Sara N. Bleich, Roland J. Thorpe *Baltimore, MD*; Hamidah S. Sharif-Harris *Owings Mills, MD*; Ruth Fesahazion, Thomas A. LaVeist *Baltimore, MD*

**Introduction:** The goal of this study was to investigate whether race disparities in obesity among women persist in a community of Blacks and Whites living in the same social context with similar income. **Methods:** We examined race disparities in obesity among Black and White women living in the same

social context with similar income, using the data from the Exploring Health Disparities in Integrated Communities-SWB (EHDIC-SWB) study, and compared these estimates to national data (National Health Interview Survey) to determine if race disparities in obesity were attenuated among women in EHDIC-SWB. These analyses included 771 non-pregnant Black and White women from the EHDIC-SWB sample and 16,219 non-pregnant Black and White women from the NHIS sample. Obesity was based on participants' self-reported height and body weight. Using chi-square and t-tests, we evaluated the mean and proportional differences between Black and White women for the demographic and the health-related factors in each sample. Logistic regression was used to examine the association between race and obesity. **Results:** In the national sample, Black women exhibited greater odds of being obese (OR=1.99, 95%CI: 1.71-2.32) than White women after controlling for covariates. In the EHDIC-SWB sample, Black women had similar odds of being obese (OR=1.25, 95%CI: 0.90-1.75) as compared to White women, after adjusting for covariates. **Conclusion:** We observed no race disparities in obesity among poor, urban women sharing the same social context. Developing policies which focus on modifying social aspects of the environment may reduce disparities in obesity among low-income women living in urban communities.

## 349-P

**The Relationship Between Body Image and Adiposity in Postpartum Women**James LeCheminant, Katherine Pratt, Tiffany Hinman, Nathan Earl, Rosemary Thackeray, Ben LeCheminant *Provo, UT*

**Objective:** To determine the relationship between body image and adiposity in primarily lactating, postpartum women. **Methods:** Sixty women (26.4 $\pm$ 4.7 y, 72.7 $\pm$ 12.2 kg, 26.6 $\pm$ 3.9 kg/m<sup>2</sup>) were included in this study. Participants were 6-weeks to 8-months postpartum (mean=3.8 $\pm$ 1.7 months), 97% were breastfeeding, and average weight retention above pre-pregnancy weight was 6.5 $\pm$ 0.5 kg. All women were measured cross-sectionally for BMI (kg/m<sup>2</sup>) using a digital weigh scale and height stadiometer, body composition via dual-energy x-ray absorptiometry, and waist/hip circumference using a spring-loaded tape measure. Body image and related variables were determined using The Multidimensional Body-Self Relations Questionnaire-Appearance Scales (Cash, 2000; Brown et al, 1990). **Results:** Participants body areas satisfaction and appearance evaluation were 4% and 11% lower than female reference norms, respectively. Both body area satisfaction and appearance evaluation were inversely related to several measures of adiposity (body weight, BMI, waist and hip, and body fat) ( $r = -0.39$  to  $-0.55$ ;  $P < 0.05$ ). Additionally, both were inversely related to overweight preoccupation and postpartum weight retention ( $P < 0.05$ ). When analyzed by BMI category, the obese women had poorer body image and higher preoccupation with being overweight ( $P < 0.05$ ). Additionally, the obese women had twice the weight retention than the overweight or normal-weight women ( $P = 0.0004$ ). **Conclusions:** Postpartum women may have poorer body image than a reference population. Body image and satisfaction appears to be partially accounted for by adiposity. Due to these associations, the postpartum period may represent an opportune time for interventions that decrease adiposity and improve body image.

## 350-P

**African American Adolescent Girls: What Are the Environmental Factors That Influence Their Risk For Overweight?**Daheia J. Barr-Anderson, Alexis Adams, J. Michael Oakes, Mary Story *Minneapolis, MN*

**Background:** Underlying causes for overweight/obesity are a complex interplay of individual, behavioral, social, and environmental factors related to physical activity (PA) and diet, though less research has been conducted on environmental dynamics. As African-American girls experience high rates of overweight than other youth and more likely live in environments that may inhibit healthy lifestyles, there is an urgent need to understand what roles different environments play in the obesity paradigm for this population. **Methods:** Social factors within the home, neighborhood and school environments that influence African-American girls' PA and food choices were explored in six focus groups with 34 girls and four with 25 of the girls' mothers. Food, PA, and media inventories were completed to assess the availability of physical resources in 19 homes. **Results:** Major themes about the home environment that surfaced were

mothers' negative discussion about their daughter's and their own weight and inconsistent family rules regarding eating meals while watching television or eating in bedrooms. Girls expressed concern about being active outdoors in their neighborhoods (i.e., traffic, gangs); however, the visibility of peers increased their use of available neighborhood resources (e.g., parks, walking trails). Being the minority in predominantly white schools affected some girls' decisions to be on a sports team. Hair was deemed not an excuse for physical inactivity. Most homes had limited PA equipment, but many media-related resources (e.g., cable, internet). Conclusions: Learning more about the PA and food environments is just the first step in creating innovative, environmental strategies to address the high rates of overweight/obesity in African-American girls.

**351-P**

*This abstract has been withdrawn.*

**352-P**

**Perceived Weight Discrimination, Adiposity, and Glycemic Control: Adding Insult to Injury**

Vera Tsenkova, Dale A. Schoeller *Madison, WI*; Deborah Carr *New Brunswick, NJ*; Carol Ryff *Madison, WI*

Background: The rapid increase of obesity and type 2 diabetes has necessitated an integrated approach to preclinical glycemic control that draws on advances in medicine, public health, and psychology. *Purpose.* We investigated whether the well-established effects of obesity and central adiposity on nondiabetic glycemic control (indexed by HbA<sub>1c</sub>) were exacerbated by a psychosocial stressor: perceived weight discrimination. Methods: Data came the nondiabetic subsample (n=966) of the Midlife in the United States (MIDUS) survey. Results: BMI, waist-to-hip ratio (WHR), and waist circumference (WC) were significantly linked to higher HbA<sub>1c</sub> ( $p < .001$ ). Multivariate-adjusted models showed that weight discrimination exacerbated the effects of WHR on HbA<sub>1c</sub> ( $p < .05$ ): the difference in HbA<sub>1c</sub> approached 1% at higher WHR levels, which is a clinically significant difference previously linked to higher morbidity and mortality. Conclusions: Understanding how biological and psychosocial factors interact at *nondiabetic* levels to increase vulnerability could have important implications for design of prevention strategies.

**353-P**

**Antifat Attitudes on College Campus: Sex, Race, and Social Affiliation**

Alice K. Lindeman *Bloomington, IN*

With obesity increasing in the US, more young adults attending college overweight/obese. College is a time that stresses appearance, attractiveness, and social norms. Antifat attitude studies with college students have noted less tolerance of obesity. This study was designed to reveal demographic factors contributing to obesity attitudes in college students. Methodology: Surveys were distributed to 301 (37.2%M, 62.8%F) undergraduate students in business, science and sociology classes. Demographics were gathered along with the Antifat Attitude Test (AFAT with subscales social/character disparagement [SOC]; physical/romantic unattractiveness [PHYS]; weight control/blame [WT]). Results: AFAT and subscale scores varied by race, sex, class rank and social affiliation. When controlled for race, differences in scores by sex remained for white students (84.9%); white males consistently displayed greater antifat attitudes than white females (AFAT, SOC, PHYS, WT;  $p < .001$ ). The only non white observation was Asian (9.1%) males with lower SOC acceptance ( $p = 0.027$ ) than Asian females. No differences were seen among blacks (7.0%) by sex. Freshmen showed more tolerance for PHYS than other classes ( $F = 3.065$ ,  $p = 0.028$ ). More telling was social affiliation. Fraternity/sorority affiliated students showed lower acceptance in AFAT ( $F = 5.795$ ,  $p = 0.003$ ), PHYS ( $F = 6.398$ ,  $p = 0.002$ ) and SOC ( $F = 3.12$ ,  $p = 0.0041$ ) than students from dorms or apartments. Future careers as health care professionals did not affect AFAT or subscale scores. Conclusions: Among undergraduate university students, white males have the greatest antifat attitudes. Environments that promote physical and social standards including fraternity/sorority may foster negative attitudes toward the obese. Of question, How to stop before they enter the workplace?

**354-P**

**Parental Level of Education: Factor of Influence in Children BMI**

Mariabella Herrera, Jesus A. Velasquez, Mariela Berrisbeitia, Priscila Quintero, Yajaira Zambrano, Nora De la Fuente *Caracas, Venezuela*

Background: Childhood obesity has been increasing during the past in developed countries and several studies show a similar tendency in countries in Nutrition Transition. For developing efficient strategies for prevention of obesity it is important to know if the significant association reported in previous studies between children BMI and parental level of education can be found in developing countries. The aim of this study is to determine if parental level of education is related to BMI in Venezuelan children. Methods: A simple random sample of 166 school children was obtained between 7 and 12 years old. Weight and height were recorded by standardized personnel to determine BMI and subsequently categorize it in percentiles. Evaluation of parental level of education was obtained using Graffar method modified by Mendez Castellano. Descriptive statistic analysis and bivariate Spearman correlation were obtained to check possible associations between variables. Results: From 166 children, 91 were boys and 75 were girls. Average age, weight, height and BMI were: 9 years  $\pm 1.7$ ; 36 Kg  $\pm 12.5$ ; 1.35 mt  $\pm 0.1$ ; 19.10 kg/mt<sup>2</sup>  $\pm 4.2$  and median was: 9 years; 31 Kg; 1mt and 18 kg/mt<sup>2</sup> respectively. When Spearman correlation was applied an increase of 0.685 for both parents level of education a diminution in children BMI of -0.75 ( $p < 0.01$ ) was observed. No significant associations between level of education of mother or father independently were identified. Conclusions: Higher level of education of both parents together significantly and positively affects BMI in their children, but either parent separately does not.

**355-P**

**Childhood Obesity: Affluence Factor**

Tania Bulbul *Dhaka, Bangladesh*

Background: The prevalence of obesity is increasing particularly in affluent populations in larger cities. Obesity is at least three times more common in cities than in rural areas. Method: This comparative cross-sectional study on exploring the present status of obesity among Bangla and English medium high school children in Dhaka city was carried out among randomly selected 684 high school students (11 to 14 years of age) from two types of schools. Then categorized them into affluent group (English medium students) and non-affluent group (Bangla medium students) based on their monthly school fees. We shall determine the BMI in order to group them as obese or non-obese according to the cut off value standardized for age and sex recommended by WHO. Result: This study revealed that 21.2% children were overweight and 11% were obese. Significant difference ( $p < 0.001$ ) in obesity was observed between two groups of students showing a prevalence of 24.4% in affluent group against 5.7% in non-affluent group. This study also showed significant positive relationship between monthly family income and obesity in both the affluent (OR=2.079; 95% CI= 1.05-4.12) and non-affluent (OR=3.657; 95% CI = 1.76-7.58) groups. It revealed significant relationship between frequencies of junk food taking and obesity among both affluent (OR=2.2127; 95% CI=1.59-2.84) and non affluent (OR=2.239; 95% CI=1.55-3.24) high school children. Conclusion: Higher socioeconomic status is related to obesity and the study revealed direct relationship between factors contributing to sedentary life style and obesity.

**356-P**

**Examination of Primary Care Physicians' Beliefs and Attitudes About Reducing Weight in Obese Patients at Piedmont Hospital**

Michelle N. Humphreys *Marietta, GA*

Obesity is an increasing health concern in the United States and globally. Obesity contributes to other health conditions and has a negative impact on medical expenditures. Physicians are on the front line in treating obese patients. However, research shows that some physicians do not feel qualified to treat the obese patient and some feel that treating these patients is futile. The ultimate goal of this program proposal was to use data gathered through this study to create an effective and efficient weight reduction program at Piedmont Hospital. In order to gather relevant information on how to develop such a program, all primary care physicians within the Piedmont Hospital organization were emailed a survey. The survey examined the beliefs and

attitudes on treating the obese patient. Approximately 47% of the physicians surveyed did not think they were successful in treating the obese patient, and 22% did not feel confident in treating these patients. The majority, 71.9%, disagreed that treating the obese patient was futile and 94% thought that treating obese patients was important. Only 62.5% of physicians think they were qualified to treat the obese patient. The majority, 68%, think that obesity is caused by behavioral factors and 33% think obesity is primarily caused by environmental factors. The majority of physicians were aware of the nutrition classes and health and fitness center. This study aimed to understand the causes for a lack of success among primary care physicians in treating obesity and methods for improving both success and confidence of achieving success.

**357-P**  
**Does Weight Counseling Complement or Substitute Patients' Perceptions of Excess Weight Risks?**

Eleonora S. Tan, Christine C. Ferguson, Avi Dor *Washington, DC*

**Background:** The main objective of this study is to examine the associations between weight counseling and enabling factors, including patients' knowledge of the effect of weight on health and considering it a physicians' responsibility to tell a patient whether their weight is a problem. We use the 2009 George Washington University – Weight in America Patient Survey (n=1,002), which sheds light on our understanding of patient perceptions regarding care. We apply multivariate logistic regression to understand associations between enabling factors and weight counseling after controlling for demographics, health behavior, patient needs and access to care. Two questions capture the incidence of weight counseling: 1) "Have you discussed ways to achieve a healthy weight with your physician" and 2) "Has your physician told you that you are obese?" **Results:** Unadjusted odds ratios suggest a positive relationship between patient knowledge and discussion (OR: 1.22) as well as physician responsibility and discussion (OR: 1.10). Having been told that you are obese is positively associated with knowledge (OR: 1.23) while negatively associated with physician responsibility (0.81). The latter implies that people diagnosed by their physician as obese are less likely to think that it is the physician's responsibility to tell them that their weight is a problem. **Conclusion:** This research examines the relationship between weight counseling and patients' knowledge and views on physician responsibility, and stresses the importance of informing the patient of the health consequences of weight. Findings also suggest that patients may react negatively to being told they are obese.

**358-P**  
**Factors Associated With Low-Income Mothers Accuracy and Satisfaction With Their Toddlers' Body Size**

Erin Hager, Kristen Hurley, Laura Latta, Margo Candelaria, Yan Wang, Elizabeth Kim, Maureen M. Black *Baltimore, MD*

**Background:** Maternal perceptions of toddler body size may influence feeding/activity behaviors. **Purpose:** To examine maternal accuracy/satisfaction with toddler body size. **Methods:** A newly developed/validated 7-image toddler silhouette scale was administered to 172 low-income mothers of toddlers 12-32 months-of-age. Mothers identified the image that resembled their child and their ideal image. Toddlers' weight/length were measured in triplicate. Weight-for-length percentiles (w-1%tile) were calculated. Accuracy was +/-1 silhouette of true w-1%tile. Satisfaction was the same image for both questions. Accuracy/satisfaction were examined with bivariate analyses and logistic regressions, adjusting for covariates. **Results:** Toddlers were 56% male, 18.6%>85<sup>th</sup>tile w-1 (overweight), and 17.0%<15<sup>th</sup>tile w-1 (underweight). Mothers were average 27.7 years, 38.4% married, % white, 54.1% black, mean BMI 31.7kg/m<sup>2</sup>, and 73.3% overweight/obese. Rates of accuracy/satisfaction were 43.0%/72.7%. Accuracy/satisfaction were not associated with demographics. Maternal BMI (t=2.28,p=0.023) and toddler's w-1%tile (t=8.46,p<0.001) were higher among accurate mothers than inaccurate mothers. Toddler w-1%tile was lower among satisfied mothers than dissatisfied mothers (t=3.30,p=0.001). Among overweight toddlers, inaccuracy exceeded 87% (c<sup>2</sup>=14.94,p<0.001) and satisfaction exceeded 81% (c<sup>2</sup>=13.43,p<0.001). Among underweight toddlers, satisfaction was 44.8%. In logistic regressions, compared to normal weight toddlers, mothers of overweight toddlers were 17.05 times (p=0.005) more likely to be inaccurate. **Conclusions:** Low-income mothers of toddlers were inaccurate when assessing their toddler's body size. Although inaccurate,

parents of overweight toddlers were satisfied. Low satisfaction among parents of underweight toddlers may reflect providers' focus on growth faltering. Increasing parental awareness of toddler body size and strategies to maintain healthy weight are important yet understudied areas of research/practice.

**359-P**  
**Girls' Perception of Positive Parent Relationships at Age 9 May Reduce Their Risk of Obesity at Age 11**

Kaigang Li, Kirsten K. Davison *Rensselaer, NY*

**Purpose:** This study examined the association between girls' perceived relationship with their parents at age 9 and their body mass index (BMI) and weight status at age 11. **Methods:** Data were collected from 183 non-Hispanic, white girls at ages 9 and 11 years. The Autonomy Granting Scale was used to measure girls' perceived relationship with their parents at age 9. Measured height and weight were used to quantify girls' BMI and weight status (non obese, obese) at age 11. **Results:** Results from logistic regression models indicated that the girls who perceived higher parental monitoring (adjusted OR = 0.38, CI = 0.17 - 0.87) and more positive relationships with their parents (adjusted OR = 0.28, CI = 0.10 - 0.76) at age 9 were less likely to be obese at age 11. Whereas, girls who perceived higher parental control (adjusted OR = 2.53, CI = 1.36 - 4.71) at age 9 were more likely to be obese at age 11. Results from the multiple regression models predicting BMI at age 11 showed similar results. All findings were independent of family demographic variables. **Conclusion:** Results from this study support the positive influence of supportive family relationships on reducing early adolescent girls' risk of obesity. Understanding the role of parent-child relationships may help health practitioners to more effectively tailor obesity prevention messages to address the entire familial context.

**360-P**  
**Children's Daily Fruit and Vegetable Intake: Associations With Maternal Intake and Child Weight Status**

Tanja V. Kral *Philadelphia, PA*; Paige Miller *University Park, PA*; Renee H. Moore *Philadelphia, PA*

The early home food environment plays a crucial role in shaping young children's food selections and preferences. With mothers serving as important role models, children may learn to imitate maternal consumption patterns for healthy foods, such as fruits and vegetables (F&V). The aims of this study were to examine the relationship between children's and their mothers' daily intake of F&V and to determine if child F&V intake was related to weight status. Mothers of 5- to 6-year-old children (19 boys, 20 girls) completed a subsection of the Diet History Questionnaire to estimate intake of 13 fruits and 21 vegetables over the past 12 months. Dietary data were reported separately for mothers and children. There was a significant positive association between children's and their mothers' daily intake of F&V (r = 0.85, p < 0.001). Overweight/obese children, compared to normal-weight children, consumed significantly fewer F&V (4.0 ± 0.5 vs. 7.2 ± 1.1 servings/day; p = 0.02). The odds of being overweight/obese were 7.3 times greater (p = 0.08) for children who did not meet the MyPyramid recommendations for F&V compared to those who met the recommendations. Young children's consumption of F&V was positively associated with their mothers' intake of F&V and inversely related to children's weight status. Efforts to promote increased F&V consumption not only in children, but also in their mothers and possibly other family members, may be a promising strategy to help children achieve the recommended daily intake for F&V, which in turn may positively influence their weight development.

**Obesity Interventions**

**361-P**  
**Interventions to Reduce Children's Screen-Time: A Meta-Analysis**

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Children's screen time, especially television viewing, and weight status are related. Although several interventions have been developed to modify children's screen time, to date, no systematic review of these interventions exists. This work describes a systematic review and meta-analysis

of interventions aimed at modifying children's screen time. Published and unpublished documents describing interventions that modify children's (ages 0-18 years) screen time were identified. A random effects model was used to calculate effect sizes and associated 95% confidence intervals. Heterogeneity tests, moderator analyses, assessments of bias, and sensitivity analyses were also conducted. Reliability was assessed with Cohen's Kappa. The systematic search identified 3002 documents; 33 were eligible for inclusion and 29 were included in the analyses. Most reported pre- and post-intervention data from two groups and were published in peer-reviewed journals. The overall Hedges  $g$  (-0.144 (CI -0.217, -0.072)) and Standard Mean Difference (-0.148 (-0.224, -0.071)) indicated that the interventions were associated with small but significant reductions in children's screen time. Although heterogeneity was present in the sample, no significant moderators (e.g., age, race, gender, country) were identified. The results were robust; the funnel plot and trim-and-fill methods identified few missing studies, the inclusion of which would not alter the overall conclusion. Results from this meta-analysis support the effectiveness of interventions to modify children's screen time. The absence of significant moderators may be due to the limited number of studies including subgroup analyses. Follow-up meta-analyses will be necessary as more interventions are developed and effect modifiers can be appropriately assessed.

**362-P****Household Obesity Prevention: Take Action- A Group-Randomized Trial**

Simone A. French, Anne Gerlach, Nathan Mitchell, Peter Hannan, Ericka Welsh  
*Minneapolis, MN*

**Objectives:** To evaluate an intervention to prevent weight gain among households in the community. The study was unique in targeting entire households for prevention activities and focusing on both the home environment and individual behavior changes. **Methods:** Ninety households were randomized to intervention or control group for one year. Intervention consisted of six face-to-face group sessions, placement of a television locking device on all home televisions, and home-based intervention activities. Measures were collected in person at baseline and one year. Weight, height, eating behaviors, physical activity and television viewing were measured among household members ages > 12 yrs. **Results:** Follow-up rate at one year was 97%. No significant intervention effects were observed for change in household BMI-z score. Intervention households significantly reduced television viewing (hrs/day -0.37;  $p < .02$ ), snacks/sweets intake (portions/day -0.25;  $p < .03$ ), and dollars per person/week spent eating out (-3.90;  $p < .02$ ), and increased (adults only) physical activity (mins/day +29.63;  $p < .02$ ) and self-weighing frequency (% weekly +32.46;  $p < .0001$ ) compared with control households. **Conclusions:** A one-year obesity prevention intervention targeting entire households was effective in reducing television viewing, snack/sweets intake and eating out purchases. Innovative methods are needed to strengthen the home food environment intervention component. Longer intervention durations also need to be evaluated.

**363-P****Weight Management in Spanish-Speaking Women and Prevention of Excessive Weight Gain in Their Children**

Diane C. Berry, Melida Colindres, Lizette Sanchez-Lugo, Maria Sanchez, Madeline Neal, Darcy Lear, Cherie Smith-Miller, Lacava Gina, Amy Lane  
*Chapel Hill, NC*

Hispanic women and their children are at high risk for overweight, increasing their risk for developing type 2 diabetes and cardiovascular disease later in life. The purpose of this pilot study was to work within an existing community-based partnership to test an adapted and translated nutrition and exercise education and coping skills training weight management program with 56 overweight Spanish-speaking mothers and their 2- to 4-year old children ( $n=56$ ). The study used a two-group repeated measures experimental design. The intervention classes met once a week for 3 months (Phase I) and then once a month for 3 months (Phase II). From Time 1 to Time 4 the experimental children's BMI percentile stabilized as they grew taller and their weight stayed stable ( $p < .04$ ). The mother's in the experimental group decreased BMI ( $p=.06$ ), decreased waist circumference ( $p=.07$ ), triceps

skin folds ( $p < .05$ ) and subscapular skinfolds ( $p < .01$ ). The mother's in the experimental group demonstrated a significant decrease in fasting blood glucose ( $p < .04$ ) and trends in the appropriate direction for HgbA1c ( $p = .3$ ), mean glucose ( $p = .3$ ), insulin ( $p = .3$ ), total cholesterol ( $p = .1$ ), triglycerides ( $p = .3$ ), HDL ( $p = .3$ ), and LDL ( $p = .08$ ). In addition, the mothers in the experimental group showed improved exercise self-efficacy ( $p < .04$ ), eating self-efficacy socially acceptable eating scale ( $p < .01$ ) and negative affective scale ( $p < .02$ ), nutrition knowledge ( $p < .008$ ), physical activity education ( $p < .02$ ), health responsibility ( $p < .03$ ), and stress ( $p = .1$ ). A community-based nutrition and exercise education and coping skills training and physical activity program taught in Spanish improved both mothers and their young children's outcomes.

**364-P****Common Ground: A Pilot Study to Improve the Obesogenic Environment of an Afterschool Program For Girls**

Olivia Affuso, Erica R. Johnson, Monica L. Baskin  
*Birmingham, AL*

**Background:** Childhood obesity continues to be a significant public health issue especially among African American girls. **Objective:** To examine the impact of the implementation of wellness policy and environmental changes on the weight status of girls attending an afterschool program. **Methods:** A 12-month quasi-experimental pilot study of 74 girls was conducted at two afterschool programs in the metropolitan Birmingham, Alabama area. Policies limiting the number of snack items and instituting 10 minutes of physical activity each day were implemented. Environmental changes included the sale of healthy snacks at prices lower than snacks available from the on-site vending machines and access to fresh fruits and vegetables. Paired  $t$ -tests were used to examine changes in the BMI percentiles and  $z$ -scores from measured height and weight pre and post-intervention. **Results:** Mean age, BMI percentile, and BMI  $z$ -score were 9.0 + 2.0 years, 73.3 + 28.7 %tile, 0.91 + 1.3 units, respectively at baseline. There were self-reported improvements in dietary behavior ( $p = 0.03$ ). However, there was no significant change in the prevalence of overweight (BMI > 85%tile) pre-post intervention (50.0% to 48.0%;  $p > 0.05$ ). There was also no significant difference in BMI  $z$ -score from baseline (-0.18 + 1.7 units;  $p > 0.05$ ). **Discussion:** The findings of this study suggest that policy and environment changes targeting dietary intake and physical activity opportunities may alter dietary behavior and slow the trajectory of BMI change in girls attending an afterschool program. However, the lack of a randomized controlled design limits the conclusions of these results.

**365-P****Worksite Environment Intervention to Prevent Obesity in Metropolitan Transit Workers**

Simone A. French, Lisa Harnack, Peter Hannan, Nathan Mitchell, Anne Gerlach, Traci Toomey  
*Minneapolis, MN*

**Objective:** The results of an 18-month worksite intervention to prevent obesity among metropolitan transit workers are reported. This study was one of several funded simultaneously by NIH/NHLBI to examine worksite environment interventions for obesity prevention. **Methods:** Four garages in a major metropolitan area were randomized to intervention or control groups. Data were collected during the fall of 2005 prior to the start of the intervention and during the fall of 2007, after the intervention ended. Intervention program components at the garage included enhancement of the physical activity facilities, increased availability of and lower prices on healthy vending machine choices, a peer mentoring program, and group behavioral programs for walking and regular self-weighing. Mixed model estimates from cross-sectional and cohort samples were pooled, with weights inverse to the variance of their respective estimates of the intervention effects. **Results:** Measurement participation rates were 78% at baseline and 74% at follow-up. The intervention effect on garage mean BMI change was not significant (-0.14 kg/m<sup>2</sup>). Energy intake decreased significantly (-407 kcal/day; 95% CI = -778, -36) and fruit and vegetable intake increased significantly (+0.25 svg/day; 95% CI = 0.01, 0.49) in intervention garages compared to control garages. Physical activity change was not significant. **Conclusion:** Worksite environmental interventions for nutrition and physical activity behavior change may have limited impact on



BMI among transit workers who spend most of their workday outside the worksite. Obesity prevention strategies that target transit workers may need to focus on policy changes that address infrastructure issues including work schedules and break policies.

**366-P****A Dietary Intervention to Improve Metabolic Outcomes and Decrease Adiposity in Overweight Peri-Pubertal African American Girls: Does Macronutrient Profile Matter?**

Krista Casazza, Michelle Cardel, Lynae J. Hanks, Akilah Dulin-Keita, Stephenie Wallace, Barbara A. Gower, Jose R. Fernandez *Birmingham, AL*

Obesity prevalence among African American girls (AA) is higher than that of other groups. As typical calorie restriction obesity treatment strategies have met with limited success, alterations in macronutrient composition might effectively improve metabolic outcomes and impact future body composition trajectories in this population. The study objective was to examine the effectiveness of a 16-week dietary intervention to improve metabolic profile and promote weight-loss in 24 overweight AA aged 9-14y. Girls were assigned to either a reduced-carbohydrate diet (SPEC: 42% CHO, 40% fat; n=10) or a standard diet (STAN: 55% CHO, 27% fat; n=14). The study included two phases: eucaloric (5-week) and hypocaloric (11-week; 1000kcal deficit). Energy requirements were determined by indirect calorimetry and all meals were provided accordingly. Meal tests were performed for metabolic analyses and DXA was used for body composition assessment. Girls on the SPEC diet had significantly lower triglycerides ( $p < 0.001$ ) and marginally decreased leptin ( $p = 0.10$ ). Girls on both diets had marginally decreased LDL cholesterol ( $p = 0.07$ ) and increased adiponectin ( $p = 0.06$ ). Although the meal test indicated improved glucose/insulin homeostasis, girls on the SPEC diet also had higher fasting insulin ( $p = 0.02$ ). SPEC resulted in marginal reduction in lean mass during the eucaloric phase ( $p = 0.11$ ), that rebounded during the hypocaloric phase. Overall, both groups had reductions in weight and adiposity although there were no group-differences in weight/body composition at the end of the intervention. Carbohydrate reduction influences metabolic parameters but may elicit a compensatory change in fuel utilization in AA. Future research is needed to determine long-term effectiveness on weight/fat-loss and metabolism.

**367-P****Elementary School-Based Obesity Prevention Intervention Effect on Waist Circumference Among Multiethnic 6-13 Year Olds**

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Background: Childhood onset obesity and related health consequences continue to be major clinical and public health issues in the U.S. Schools provide an opportunity to implement obesity prevention strategies to large and diverse pediatric audiences. Healthier Options for Public Schoolchildren (HOPS) was a school-based obesity prevention intervention with both nutrition and physical activity components implemented in the elementary school setting targeting 6-13 year olds. Methods: HOPS was a quasi-experimental elementary school-based obesity prevention intervention targeting ethnically diverse 6-13-year-olds (Kindergarten-6<sup>th</sup>). Over two school years (August 2004-June 2006), six elementary schools (four intervention; one control, N=3,183, 48% Hispanic) in Osceola County, Florida participated in the study. Waist circumference (WC) data was reported in the Fall of 2005 and Spring of 2006 only and these one year results are reported here. Results: Among boys, the mean incremental change in WC (measured in centimeters [cm]) increase was significantly less in the intervention (1.35 cm +/- 0.88 [SD]) versus control schools (3.83 cm +/- 0.94) ( $P < 0.0001$ ). Among girls the mean incremental change in WC increase was significantly less in the intervention (1.20 cm +/- 0.84) versus control schools (4.17 cm +/- 0.89) ( $P < 0.0001$ ). Similarly, waist-to-height ratio results showed that the intervention group mean incremental change was significantly less versus the control group for boys ( $P = 0.0002$ ) and girls ( $P < 0.0001$ ). Conclusions: Elevated WC is strongly correlated with cardiometabolic disease risk factors and should be monitored in young children as such. School-based obesity prevention interventions show promise in improving weight and potentially cardiometabolic health in elementary-school aged children.

**368-P****Variability in Middle Schools' Implementation of a Multi-Component Obesity Prevention Program Linked With Three-Year Changes in Behaviors and Weight Status**

Karen E. Peterson *Ann Arbor, MI*; Jennifer Spadano-Gasbarro, Mary Greaney, Henry A. Feldman, Tracy Richmond, Solomon Mezgebu *Boston, MA*; Anne T. Hunt *Logan, UT*; Emily Blood, Stavroula Osganian, Christine M. Horan, Maria Bettencourt, S. Bryn Austin *Boston, MA*

Successful dissemination of multi-component interventions shown to improve youth dietary, physical activity (PA) and sedentary behaviors requires new data on effects of specific program activities and intervention dose in different school settings. The Massachusetts Healthy Choices (HC) evaluation documented three-year changes in school-level behaviors among approximately 20,000 adolescents in 45 middle schools and body mass index (BMI) in 7<sup>th</sup> graders in 35 schools, adjusting for school % free/reduced price lunch, % white, % female and mean age. Intervention dose was estimated by summing types of activities (curriculum, promotions, before/after school programming, environmental and policy change, HC implementation team) supporting HC 5-2-1 daily behavioral goals: > 5 fruit and vegetables (FV), < 2 hours TV viewing, 1 hour PA. Principal components analysis yielded three factors each related to the 5, 2, 1 components and four global implementation factors. From Fall 2005 to Spring 2008, the adjusted mean school percent of students achieving HC behavioral goals increased from 16.4 to 19.4% for FV ( $p = 0.0001$ ), from 53.4 to 58.2% for TV ( $p = 0.0003$ ) and from 37.1 to 39.9% for PA ( $p = 0.02$ ). Mean school prevalence of BMI  $\geq 95^{\text{th}}$  percentile fell from 22.4 to 20.0% ( $p = 0.045$ ). Change in mean BMI percentile was inversely associated with higher factor scores for implementation of PA lessons ( $p = 0.01$ ), school reach (number 5-2-1 promotions, number teachers trained) ( $p = 0.07$ ), but positively related to TV lessons ( $p = 0.002$ ). Findings suggest interventions by school personnel can foster healthier behaviors and reduce high BMI through substantial organizational commitment to curricular and other school-wide activities.

**369-P****Two-Year School-Based Obesity Prevention Program in Chilean Children: Differential Effect According to Baseline Nutritional Status and Gender**

Juliana Kain, Barbara Leyton, Fernando Concha, Gabriela Salazar, Luz Lobos, Fernando Vio *Santiago, Chile*

Objective: to determine the effect of an obesity prevention program implemented for 2 years on 4 and 5y olds and 1<sup>st</sup> to 3<sup>rd</sup> grade schoolchildren, according to baseline nutritional status and gender. Methodology: in 2007 and 2008, we implemented this program in all public schools from one district of Santiago (741 low SES children in 7 schools). Non-randomized, no-control study (not possible otherwise) including nutrition education and increased PE classes. Weight and height were measured. BMI, BMI Z and nutritional status (low weight, normal, overweight and obese) were determined using WHO 2006/2007. The effect of the intervention was determined by comparing a) BMI Z change in OW (overweight + obese) and N (low + normal weight) by gender using Wilcoxon test and b) change in % obesity by gender (Mc Nemar test). Results: at baseline, BMI Z for OW was 2.1 and 1.9 for boys and girls respectively; for N it was 0.16 for both genders; 21.5% boys and 18.8% girls were obese. At follow-up, BMI Z for OW was 1.85 and 1.7 and for N, 0.11 and 0.19; 21% of boys and 15.4% girls were obese. A significant difference was found in BMI Z for N boys, OW boys and OW girls ( $p = 0.02$ ,  $< 0.0001$ ,  $< 0.0001$  respectively). The % change in obesity was significant only in girls ( $p = 0.01$ ) Conclusion: this intervention was effective in reducing BMI Z in overweight children, more so in girls. BMI Z also decreased in N boys but remained within normal range.

**370-P****Effect of One-Year Randomized Controlled Family Based Lifestyle Intervention (FBI) on Total and High Molecular Weight Adiponectin and Their Ratio in Obese Children**

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It has been suggested that high molecular weight (HMW) adiponectin is important for vascular protection. Although we and others have shown beneficial effects of physical activity-based lifestyle intervention on total (T) adiponectin in adolescents, the long-term effects on T and HMW

adiponectin are not well documented. Therefore, this study was designed to determine the long-term effects of a Family Based-lifestyle Intervention (FBI) program on T and HMW adiponectin in obese children. Methods: Overweight children (N=149), with an age-adjusted BMI 85%tile were recruited for a 1-year randomized controlled outpatient FBI-program that included enhanced physical activity and dietary counseling and behavior modifications. Anthropometry, OGTT, T and HMW adiponectin were measured at baseline, 6 and 12-months of intervention. Results: Results from 51 subjects (age:10.1±1.1 years; BMI%tile: 97.7±2.3), who completed all the studies (baseline, 6 and 12-months) are included. Significant increases in the concentration of HMW adiponectin (P=0.05 and 0.08 at 6 & 12 m respectively) in the intervention group, but a steady decrease in the controls was observed. Although the T-adiponectin did not change, the ratio of HMW to T adiponectin showed significant and sustained increases (P<0.05). Conclusions: One-year FBI-program appears to be durable with beneficial changes in the concentration of HMW adiponectin and the ratio of HMW to T-adiponectin. It is encouraging that the beneficial changes are sustained for at least a year. Further the results suggest that HMW adiponectin and/or the ratio of HMW to T-adiponectin may better represent the changes in response to intervention in obese children.

**371-P**

**A Web-Based Intervention For Weight Loss: Disseminating Effective Habits of Successful Weight Losers (Positive Deviants)**

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Background: In our prior work, we identified 36 habits that were consistently used by individuals who successfully lost weight (“positive deviants”). We conducted a randomized controlled trial to evaluate if promoting use of these habits in an interactive Internet-based program would produce weight loss among overweight adults. Methods: Participants (n = 100) were randomized to the 12-week Internet-based weight-loss intervention or a wait-list control group. Computer algorithms were used to identify two positive deviants as role models who were most similar to the intervention participant based on age, gender, education, weight, and weight goal. A list of behavioral habits used by their role models for successful weight loss was provided to the participants. Participants were able to view Internet videos of their role models using the weight loss habits and set goals to use similar habits. Intervention participants were also encouraged to email other participants seeking to adopt similar weight loss habits. The primary outcome was weight change, measured at baseline and 12-weeks. Secondary outcomes included weight loss habits, physical activity, diet, and weight-related quality of life. Results: Participants had a mean age of 50.3 years, a BMI of 33.2, and were 70% female. Internet-based intervention participants lost significantly more weight than control participants (-1.36 kg vs. 0.56 kg, p<0.003). An increase in self-reported habit use was correlated with weight loss (r =0.42, p<0.001). Conclusions: An Internet-based weight-loss program using a positive deviance approach increased weight loss habit use and helped participants lose weight.

**372-P**

**The Perceptions of Overweight and Obese Individuals Participating in a Phone-Based Weight Management Program: What Are the Benefits and Barriers?**

Susan P. Harvey, Cheryl A. Gibson *Kansas City, KS*; Renee J. Sol, Joseph E. Donnelly *Lawrence, KS*

Clinic-based weight management programs can be time-consuming, expensive, and present barriers for participation. Programs that remove barriers for participation are needed. In an effort to reduce barriers, we are conducting a large equivalence trial where obese adults are randomized to an 18-month weight management program delivered by a group conference call (GCC) or by traditional face-to-face clinics (FCG). As part of this study, we want to determine the acceptability of the phone-based group. GCC individuals with BMIs between 25 and 40 kg/m<sup>2</sup> took part in structured interviews and focus group discussions to assess their perceptions of the phone-based program. Presently, 4 cohort groups have completed the program. Of those groups, 28 individuals (M=7, F=21) participated in focus groups. Average baseline BMI was 34.2±4.6 kg/m<sup>2</sup> and at 18-months was self-reported as 32.5±5.1 kg/m<sup>2</sup>. GCC participants shared

several benefits, including amount of weight loss, ease and helpfulness of the call, and the convenience to participate from any location. Challenges included not being able see other group members to gauge how well others were doing, and the common struggles associated with maintaining weight loss. Structured interviews results paralleled comments from focus group participants. Additionally, prior to randomization, participants specified preference to FCG or GCC. Twelve participants (43%) indicated preference for FCG. At the conclusion of the program, however, almost all participants were happy to be being randomly assigned to GCC. Overall, participants were pleased with phone-based counseling, allowing for an alternative mode for weight management programs and addressing barriers related to time and cost.

**373-P**

**Efficient 10-Week Walking Program Among Female Students: Results of a Randomized Controlled Trial**

Carine Platat, Hosam Habib, Amjad Jarrar *AL AIN, United Arab Emirates*

Introduction: Recent works revealed a worrying increase of obesity in both adults and children in Gulf countries, more than 35% of adult women being obese in the United Arab Emirates (UAE). Physical activity, a strong environmental contributor to this multifactorial disease, remains insufficiently practiced although recognized health benefits. Hence, real-world interventions promoting physical activity are needed in these countries. Methodology: 10-week pedometer-based culturally-adapted randomized controlled trial including a walking program, among 42 Female students (18-35 years old) at Al Ain, UAE, in Spring 2009. An individual daily step goal was defined (baseline daily steps' number plus 3 000 steps). Physical activity (IPAQ, pedometer), anthropometry and some laboratory parameters were assessed before and after the intervention. Results: Intervention and control group were similar at baseline with a mean daily steps count of 8146.22 ± 3457.89. After 10 weeks, intervention group increased significantly its daily steps' number (p=10<sup>-3</sup>) of more than 3 000 steps whereas no change was observed in controls. The difference in daily steps' number changes across groups was significant (p=0.02), even after adjustment for confounding factors. Regarding health outcomes, the difference of the changes from baseline between groups of all of them was not significant. Discussion: This pedometer-based, culturally-adapted walking program was effective in promoting physical activity among female students even though no significant change of health outcomes was observed. Nevertheless, certainly, these results encourage policy makers to consider walking for public health purpose as an easy and simple tool to improve physical activity level and prevent obesity.

**374-P**

**Interventions on Reduced Screen Time, Not the Best Bang For Your Buck in Barbados: Findings From a Pilot Study Among Pre-Adolescent Barbadian Children**

Pamela S. Gaskin *Bridgetown, Barbados*; Pamela Lai, Devon Guy *Montreal, Canada*; Anders L. Nielsen *Bridgetown, Barbados*

Introduction: Developed country research has heightened interest in reduced screen time as an intervention for pre-adolescent over-weight in Barbados. However there is no focus on parental modelling of preferred dietary and activity behaviours, known to be important in development. In addition there are no local studies on over-weight risk factors in this age group. Methods: We conducted a pilot study among 62, 9-11 year old children to develop hypotheses about the local drivers of the epidemic, to test ability to report dietary intakes and to gather information on physical activity (PA) and access to play spaces. Weight, height, waist and BIA were measured. Three 24hr dietary recalls and reported PA were recorded. Results: Sugar sweetened beverages represented 21 % of foods most frequently consumed. A PCA derived factor representing energy and macronutrients explained 14% of variance in BMI when controlled for age and sex in regression. Screen time accounted for 39% of self-selected activities. Homework and chores were 15% and 12% of all activities respectively (60% of adult guided activities). Most children had limited room for play at home. Conclusions: These findings suggest that children 9-11 years in Barbados can reliably report food intake. Sugar intake from beverages is high. Adults tend to promote sedentary rather than active behaviours at home. Interventions should focus scarce resources on parental involvement in enhanced PA, opportunities for play, and on factors, such as acquired tastes for excess sugar, rather than on copying programmes for which there is little local evidence.

**375-P**

**ACTYBOSS. Activity, Behavioral Therapy in Young Subjects. After-School Intervention Pilot Project on Obesity Prevention**

Bartolome Burguera, Antoni Colom, Maria Caimari, Juan Tur, Antoni Aguilo, Antoni Burguera, Aina Yanez, Marta Couce, Marga Frontera, Elena Cabeza *Palma de Mallorca, Spain*

Context: Childhood obesity is becoming a major public health problem in Spain, where 13.9% of children are obese. Objective: To test the feasibility of a school-based intervention, which combines an incentive-driven exercise program with life-style lectures, whether it improves children's metabolic parameters. Design, Participants: and Setting: We conducted a six-month, pilot intervention in two High Schools in Mallorca, Spain. A total of 90 children participated. Intervention: A program involving free supervised exercise sessions and nutritional lectures, where children received credit points, as a reward for the hours they spent exercising and also for their attendance to these lectures. The credits-earned points obtained were exchanged for gifts. We developed personalized cards and a web application for the participants to check the gifts they were eligible for (<http://www.actyboss.com>). Main Outcome Measures: Percentage body fat, percentage of muscle mass and body mass index. Secondary measures included fitness parameters blood pressure and blood lipids levels. Results: 90 children signed the consent form and 56 completed the program until the end-point. Our results showed a beneficial effect on body composition, fitness parameters and systolic blood pressure in children who participated in ACTY-BOSS compared to children who did not start the intervention. Conclusion: We describe here the first incentive-driven, school intervention program, to promote a healthy life style. The program was well accepted and had a positive effect on anthropometric measurements. A larger incentive-driven healthy life-style program is now ongoing in an effort to reduce adiposity and improve fitness in our children.

**376-P**

**The Public's Understanding of Daily Caloric Recommendations and Their Perceptions of Calorie Posting in Chain Restaurants**

Sara N. Bleich, Keshia M. Pollack *Baltimore, MD*

Introduction: The goal of this study was to assess consumer understanding of overall daily caloric requirements and perceived effectiveness of calorie posting in chain restaurants. Methods: We fielded a survey from May 1, 2009 through May 17, 2009 among a nationally-representative sample of U.S. adults. These analyses included 663 adults aged 18 and older, including an oversample of Blacks and Hispanics. All together, 119 Blacks and 103 Hispanics were interviewed. Chi-squared tests were used to examine differences by race and ethnicity (White, Black, and Hispanic) and gender. Results: We found that most Americans were knowledgeable about caloric requirements for moderately active men (78%) and women (69%), but underestimated caloric requirements for inactive adults (60%). Whites had higher caloric literacy and confidence about their caloric knowledge than Blacks and Hispanics ( $p < 0.05$ ). Blacks and Hispanics reported a higher likelihood of eating at a chain restaurant than Whites ( $p < 0.05$ ) and selecting lower calorie foods where caloric information was posted ( $p < 0.05$ ). Most Americans favored the government requiring chain restaurants to post calorie information on menus at the point of purchase (68%). Support for government mandated calorie posting in chain restaurants was higher among Blacks (83%) and Hispanics (75%) as compared to Whites ( $p < 0.05$ ). Conclusion: Americans are knowledgeable about caloric requirements for moderately active men and women, but tend to underestimate caloric requirements for inactive adults. Mandating calorie posting in chain restaurants may be an effective policy tool for promoting energy balance, particularly among Blacks and Hispanics.

**377-P**

**Design and Rationale of a Child Obesity Prevention Intervention Integrating Parenting Style and Healthy Weight Practices: Parenting SOS**

Amber Vaughn, Deborah Jones, Laura McKee, Josephine Emunah, Dianne S. Ward *Chapel Hill, NC*

Obesity levels in child are high, even among young children. The social and physical environment of the home provided by parents influences the weight-related behaviors (diet and physical activity) that children adopt. Parent involvement is critical in establishing healthy behaviors, but often it is not

recognized as a priority for the family. Interventions to engage parents must attract their interest. Methods: Parenting SOS is a randomized controlled trial testing the efficacy of a behavioral intervention targeting parents with preschool-age children and integrating general parenting styles and specific food- and activity-related parenting practices. A total of 280 families will be randomized into (a) a children's book club (control arm) or (b) the Parenting SOS program in which parents attend 12 group meetings and receive 11 tailored phone calls across 8-months. The SOS program addresses topics such as stress management and families routines, and applies these to weight-related parenting practices. Results: To date, 73 families have been enrolled in, and completed, the intervention. This group is 54% White, 33% African American, and 32% has a household income below \$50,000. At baseline, average child age was 42 months, percent body fat 10.6%, and 24.3% had a BMI at or above the 85<sup>th</sup> percentile. Additional measures included parent height and weight, parenting style, and weight-related parenting practices. Conclusion: This study will provide knowledge about mediating and moderating relationships between general parenting style and specific food and activity-related practices and child weight, and the efficacy of this integrated approach to obesity prevention. Funding: NHLBI (1R01HL091093-01A1)

**Physical Activity**

**378-P**

**How Might the Built Environment Influence Obesity? Assessment of Mediation By Physical Activity and Sedentary Behavior**

Janne Boone-Heinonen, Penny Gordon-Larsen *Chapel Hill, NC*

Background: While many studies estimate direct effects of built environment features (e.g., recreation centers, parks) on obesity, mediation by physical activity or sedentary behavior has not been formally assessed. Methods: Using data from the National Longitudinal Study of Adolescent Health and a spatially and temporally linked geographic information system, we investigated (1) the relationship between residential built environment features during adolescence (Wave I, 1994-95) and incident obesity in young adulthood (Wave III, 2001-02;  $n=10,865$ ) and (2) mediation by: (a) moderate to vigorous physical activity (MVPA; bouts/week); (b) specific MVPA types (wheel-based activities, sports, exercise); and (c) screen time (hours/week) during adolescence in sex-stratified multivariable logistic models controlled for individual and neighborhood-level sociodemographics. Results: Risk of incident obesity in young adulthood was lower in females whose neighborhood in adolescence had greater density of for-pay physical activity facilities (per 10,000 population) and less greenspace (percent of total landcover) [OR (95% CI) for 1% change in environment measure: 0.78 (0.68, 0.89) and 1.69 (1.04, 2.74), respectively], and was unrelated to street connectivity. In males, obesity risk was marginally lower with greater density of for-pay facilities and street connectivity [OR (95% CI): 0.87 (1.74, 1.02), 0.55 (0.29, 1.01), respectively] and unrelated to greenspace. Associations were unchanged after controlling for MVPA or screen time variables. Conclusions: We found no evidence for mediation by MVPA or sedentary behavior in the relationship between built environment features and obesity, suggesting that other mechanisms and analytical approaches should be investigated.

**379-P**

**Quantity and Intensity of Physical Activity Are Related to Volume and Location of Adipose Tissue**

Helen A. Smith, Kristi L. Storti, Andrea M. Kriska, Kim S. Tyrrell, Kazanna C. Hames, Molly B. Conroy *Pittsburgh, PA*

Background: Accelerometers objectively measure quantity and intensity of physical activity (PA). Little published data describes the relationship between accelerometer-measured PA and regional adiposity. Methods: Analysis was performed on baseline data from 245 participants of the Slow Adverse Vascular Effects study, a behavioral weight loss study of men and women aged 20-45 and with BMI 25-40 kg/m<sup>2</sup>. PA was expressed as total daily minutes and daily minutes of light (100-1951) and moderate-vigorous (MVPA;  $\geq 1952$  counts) intensities. Single-slice CT scans measured subcutaneous (SCAT) and visceral (VAT) abdominal adipose tissue (AT), as well as thigh AT. Spearman's Rho test assessed associations among PA, BMI, and regional adiposity. Results: Mean (SD) age was 38.1 (5.9) years and BMI was 32.6 (3.9) kg/m<sup>2</sup>; 194 (79%) were women. Median (IQR) total PA was 329.0 (127.2) minutes, with 309.9 (122.1) light and 22.8 (24.2)

MVPA minutes. Higher total and light PA levels were associated with lower BMI ( $-0.16$ ;  $p=0.02$  and  $-0.12$ ;  $p=0.06$ , respectively) and less VAT ( $-0.18$ ;  $p=0.005$  and  $-0.17$ ;  $p=0.009$ ), but not associated with thigh AT. Higher MVPA levels were associated with less SCAT ( $-0.14$ ;  $p=0.04$ ) and less thigh AT ( $-0.24$ ;  $p=0.0002$ ), but not associated with BMI or VAT. Conclusions: While greater accumulation of total daily physical activity minutes was associated with lower BMI and less VAT, more MVPA was related to less SCAT and thigh AT. This unique data prompts further investigation into how both volume and intensity of PA may influence regional adiposity.

**380-P****Do the Associations Between Physical Activity, Diet, and Obesity Differ According to Health Status?**

Mariane L. Heroux, Ian Janssen *Kingston, Canada*; Duck-chul Lee, Xuemei Sui, Steven N. Blair *Columbia, SC*

Background: Limited research has considered whether the associations between physical activity (PA), diet, and obesity differ according to health status. Purpose: To determine whether the influence of PA and diet on obesity differs in individuals with and without chronic disease. Methods: Participants were 13,621 adults (aged 20-84) from the Aerobics Center Longitudinal Study. Groups of relatively healthy participants and participants with chronic disease (history of diabetes, cancer, stroke, or myocardial infarction) were created. Based on 3-day diet records, an established index (Héroux et al, *Int J Epid*, 2010) was used to classify participants as having unhealthy, moderately unhealthy, or healthy diets. A leisure-time PA questionnaire was used to classify participants as inactive, somewhat active, or active. Percent fat was measured by hydrostatic weighing or skinfolds. Obesity was determined using age- and sex-specific body fat thresholds. Associations were examined using logistic regression. Results: PA and diet were independently associated with obesity within the healthy and chronic disease groups. PA was a stronger predictor of obesity than was diet within both groups. There were no significant interactions between PA and health status or diet and health status, indicating that associations were similar in the healthy and chronic disease groups. By comparison to active participants with healthy diets, the odds ratios (95% confidence intervals) for obesity in inactive participants with unhealthy diets were 8.8 (6.3-12.3) in the healthy group and 6.3 (3.0-12.9) in the chronic disease group. Conclusion: Physical inactivity and unhealthy eating are strong determinants of obesity irrespective of chronic disease status.

**381-P****Physical Activity and Sedentary Behaviors Associated With Sugar-Sweetened Beverage (SSB) Consumption Among 8th Grade Middle School Students**

Courtney E. Byrd-Williams, Deanna M. Hoelscher, Andrew Springer, Nalini Ranjit, Steven Kelder *Austin, TX*

Purpose: Sugar-sweetened beverages have been cited as problematic dietary behaviors that may contribute to the current pediatric obesity epidemic. Identifying adolescents' concomitant physical activity and sedentary behaviors will aid in developing effective intervention strategies. The purpose of this study is to identify how physical activity and sedentary behaviors are associated with the consumption of SSB among a sample of multi-ethnic 8<sup>th</sup> grade students. Methods: This is a cross-sectional assessment of 1721 8<sup>th</sup> grade students (mean age: 13.9y) from 30 middle schools in central Texas, USA. Physical activity and sedentary behaviors and SSB intake were assessed via validated self-report questionnaire. SSB intake included usual weekday consumption of regular soft drinks, punch, sports drinks, and fruit-flavored drinks. Activity and sedentary items included days with > 60 mins of MVPA, sports team participation, and hours of TV watching during normal weekday. Multi-level regression analyses adjusting for school, gender, ethnicity, and perceived socio-economic status were conducted, and standardized coefficients are reported. Results: Three-fourths of students reported consuming > one SSB per school day. Students who consumed more SSB reported watching more hours of TV during a normal school day ( $\beta=0.57$ ,  $p<0.001$ ). Students who consumed more SSB reported currently participating in more sports teams ( $\beta=0.14$ ,  $p<0.05$ ) and participated in more sports teams during the last year ( $\beta=0.22$ ,  $p<0.001$ ). Conclusions: High consumption of SSB is

associated with more TV watching among a multi-ethnic sample of 8<sup>th</sup> grade students. Additionally, SSB is positively associated with participation in sports. Future research should investigate why sports participation is associated with SSB consumption.

**382-P****Changes in Cardiorespiratory Fitness Predicts Changes on Body Fatness From Childhood to Adolescence: An 8 Year Longitudinal Study**

Rui T. Ornelas *Funchal, Portugal*; Analiza M. Silva, Luis B. Sardinha *Lisbon, Portugal*

Background: Several body composition variables, such as waist circumference and trunk skinfolds, are indicators of body fatness. Interest exists in evaluating the effect of cardiorespiratory fitness (CRF) measures on changes of those markers, from childhood to adolescence. Purpose: The aim of this study is to examine CRF as a potential predictor of changes in body fatness over an 8-year follow-up in a paediatric population. Methods: A cohort study of 140 children (76 girls, 64 boys) at age 9 ( $9.8\pm 0.3$ ) who participated in the Portuguese arm of the European Youth Heart Study in 2000, completed a follow-up evaluation in 2008, at age 17 ( $17.0\pm 0.4$ ). CRF, expressed as  $VO_{2max}$  ( $ml\cdot kg^{-1}\cdot min^{-1}$ ), was assessed during an incremental multistage bicycle test to exhaustion. Body fatness was assessed by fat mass (FM) using anthropometric models, sum of trunk skinfolds (TS), and waist circumference (WC). Changes are expressed as a percentage of the baseline value (% $\Delta$ ). Comparison of means and linear regression analysis were used for data analysis. Results: For both genders, CRF significantly decreased whereas body fatness markers increased ( $p<0.01$ ). Alone, CRF explained 36%, 28%, and 23% of the total variance in WC, FM, and TS, respectively ( $p<0.01$ ). Adjusting for gender and maturation changes, CRF remained a significant predictor of WC ( $\beta=-0.268$ ,  $P<0.01$ ), FM ( $\beta=-1.795$ ,  $P<0.01$ ), and TS ( $\beta=-1.311$ ,  $P<0.01$ ). Conclusions: CRF is a good predictor of body fatness, from childhood to adolescence. These findings highlight the importance of school-based interventions for physical activity promotion throughout adolescence. Keywords: cardiorespiratory fitness, body fatness, childhood, adolescence.

**383-P****Physical Activity Evaluated By Triaxial Accelerometer and Weight Status in Japanese Preschool Children**

Chiaki Tanaka *Machida, Japan*; Shigeho Tanaka *Tokyo, Japan*

Background: Childhood obesity is a health problem and a social problem in many countries, including Japan. Although decreased physical activity (PA) is likely a major contributor to obesity in young children, the data for preschoolers with objectively measured PA are limited. On the other hand, thinness is also a social problem in Japan. Purpose: The purpose of this study was to examine the association between participation in PA and body mass index (BMI) among Japanese preschool children. Methods: PA was assessed with a triaxial accelerometer (ActivTracer, GMS) for 6 consecutive days, including weekdays and weekends. Subjects were 295 four- to six-year-old Japanese girls and boys attending kindergartens or nursery schools. Weight status was classified as normal weight, overweight or thinness, based on Cole's international cut-off points for BMI (2000, 2007). Results: PA in overweight children was comparable with that in normal-weight children, after controlling for age and gender. On the other hand, thin children had significantly shorter times spent in light intensity ( $2 \leq$  physical activity ratio  $< 3$ ) and higher-intensity activities (physical activity ratio  $\geq 4$ ) than normal-weight children. No significant difference was observed between groups for moderate-to-vigorous activity (physical activity ratio  $\geq 3$ ). Conclusions: This study suggests that thinness, not excess weight, is associated with decreased PA in Japanese preschool children. However, these findings require corroboration in a longitudinal study. This work was supported by a Grant-in-Aid for Young Scientists (B) of the Japan Society for the Promotion of Science (to C. Tanaka).

**384-P**

**The Availability of Active Space and Equipment at Home: Associations With Physical Activity and Body Mass Index in Children and Parents**

Genevieve Dunton *Alhambra, CA*; Michael Jerrett, Jennifer Wolch *Berkeley, CA*; Donna Spruijt-Metz, Mary Ann Pentz *Alhambra, CA*

**Background:** Features of the home environment may influence obesity risk by cueing physical activity and/or providing space where active behavior can occur. This study determined whether the availability of active space and equipment at home is associated with physical activity and Body Mass Index (BMI) in children and their parents. **Methods:** Participants consisted of 376 low-to-middle income, ethnically-diverse children (ages 8-15 years; 52% male) and their parents (85% female). The home environment was assessed using a self-report inventory completed by the parents. Availability of active equipment (e.g., bicycle, in-line skates, swing set) and active space (e.g., playroom, workout room, yard) was calculated by summing the number of items or active rooms present in the home. Items also measured availability of TV's and video games. A GT2M Actigraph measured average minutes/day of moderate-to-vigorous physical activity (MVPA) in children and parents using age-specific cut-offs. BMI (for parents) and BMI percentile (for children) were calculated using height and weight assessed by research staff. **Results:** After adjusting for sex, age, and household income and size; MVPA in children was marginally positively associated with the availability of active equipment ( $\beta = .086, p = .089$ ) and negatively associated with the availability of video games for boys only ( $\beta = -.158, p = .026$ ). Parents' BMI was negatively associated with the availability of active space ( $\beta = -.118, p = .038$ ). **Conclusion:** The home environment may play a role in obesity risk, but the types of relevant features may differ for children as compared to adults.

**385-P**

**How Do Mood and Motivational Factors Shape Concurrent Physical Activity Levels in Children? An Ecological Momentary Assessment Study**

Yue Liao *Alhambra, CA*; Stephen Intille *Cambridge, MA*; Mary Ann Pentz, Genevieve Dunton *Alhambra, CA*

**Purpose:** Research linking mood and motivational factors with physical activity has been limited by the use of recall-based instruments or exercise sessions in laboratory settings. The present study utilized Ecological Momentary Assessment with mobile phones to investigate the association of mood, enjoyment, energy level and motivations with concurrent physical activity levels during the course of everyday life for children. **Methods:** Data were collected for 121 children (ages 9-13 years, 51% male, 38% overweight/at risk for overweight) from Friday to Monday during their non-school time. Children simultaneously wore an Actigraph GT2M accelerometer. Electronic surveys were prompted through the mobile phone 3-7 times per day (up to 20 times total) assessing children's moods, tiredness, energy level, and enjoyment and motivations for the current activity. Each survey response was time-matched to steps and minutes of moderate-to-vigorous physical activity (MVPA) ( $\geq 1,952$  counts/min.) in its surrounding  $\pm 15$  minutes. **Results:** Current energy level and motivation from friends were positively related (and tiredness was negatively related) to total steps ( $ps < .05$ ). Energy level, enjoyment, internal motivation, and motivation from friends were positively associated with MVPA ( $ps < .05$ ). Positive moods (happy and joyful), negative moods (stressed, mad, nervous, and sad), and motivations from parents and teachers had no significant relationships with total steps and MVPA. **Conclusion:** Energy level during and enjoyment of behaviors may have stronger immediate effects on children's physical activity levels than moods. Self-motivation and motivation from friends to engage in behaviors also appear to shape the intensity and duration those activities.

**386-P**

**Relation of Daily Physical Activities to Obesity in Free-Living Japanese Adults**

Jonghoon Park, Kazuko Ishikawa-Takata, Shigeho Tanaka *Tokyo, Japan*; Yuki Hikiyama *Narashino, Japan*; Kazunori Ohkawara, Shaw Watanabe, Motohiko Miyachi, Akemi Morita, Naomi Aiba, Izumi Tabata *Tokyo, Japan*

**Objective:** The aim of this cross-sectional study was to investigate the relation of the physical activity level (PAL), step counts, and time spent on physical activity of low, moderate, or vigorous intensity to obesity

in free-living Japanese adults. **Methods:** 86 men and 106 women, aged 30-69, subjects volunteered for the present study. Total energy expenditure (TEE) was estimated over the 14-day study period using doubly labeled water (DLW) method. Resting metabolic rate (RMR) was measured using Douglas bag. PAL was estimated by dividing TEE by RMR. Subjects were instructed to wear an accelerometer for the same period with DLW experiment. A logistic model was used to quantify the effect of physical activities on being overweight (BMI  $> 25$  kg/m<sup>2</sup>) and having excess body fat (% body fat  $> 25\%$  and  $> 35\%$  for men and women, respectively). **Results:** 1 SD increase for PAL reduced the risk of being overweight for women (OR = 0.61; 95% CI, 0.38-0.99) but not for men, moreover, it decreased the risk of excess body fat for both men (OR = 0.38; 95% CI, 0.22-0.68) and women (OR = 0.56; 95% CI, 0.36-0.86). Additionally, only for women, increase of step counts or time spent on vigorous intensity of physical activity was associated with the reduced risk of being excess body fat. **Conclusions:** PAL is related with a reduced risk of over 25 kg/m<sup>2</sup> of BMI in women but not in men. On the other hand, PAL is negatively associated with excess body fat in both sexes.

**387-P**

**ACSM Physical Activity Guidelines and Body Fat Percentage in Midlife Women**

Larry Tucker *Provo, UT*; Travis Peterson *Colorado Springs, CO*

**Background:** ACSM guidelines recommend that adults perform 150+ minutes of moderate intensity activity (PAmo) each week or 60+ minutes of vigorous activity (PAvig) per week. This study was conducted to determine if body fat percentage (BF%) differed in women who met the guidelines compared to their counterparts. **Methods:** BF% was measured in 259 women using the Hologic 4500W DEXA system. PA intensity was assessed using Actigraph accelerometers worn for 7 consecutive days. **Results:** Minutes of sedentary-light PA (PAsed) per week was directly related to BF% ( $F=26.0, p<0.0001$ ), with BF% increasing 0.25 percentage point for every 10 minute increase per week in PAsed. PAmo was not associated with BF% ( $F=2.0, p=0.1619$ ). Minutes engaged in PAvig were inversely related to BF% ( $F=37.1, p<0.0001$ ), with BF% decreasing 0.40 percentage point for every 10 minute increase per week. Women who engaged in 150+ minutes per week of PAmo and PAvig combined (BF%:  $29.4 \pm 7.8$ ) had significantly lower BF% than women (BF%:  $32.9 \pm 7.0$ ) who did not meet the ACSM guidelines ( $F=9.1, p=0.0028$ ). Women who performed 60+ minutes per week of vigorous PA (BF%:  $28.0 \pm 7.2$ ) had significantly lower BF% than women (BF%:  $33.3 \pm 6.9$ ) who had fewer minutes of PAvig ( $F=22.9, p<0.0001$ ). Adjusting for differences in potential confounders had little effect on the results. **Conclusions:** Women with 150+ minutes of PAmo per week were not leaner than their counterparts, but women who met the ACSM guidelines for PAvig were significantly leaner than their counterparts, as were women who performed 150+ minutes per week of PAmo+PAvig combined.

**388-P**

**Strength Training and Body Composition in Middle-Aged Women**

Jared M. Tucker *Fargo, ND*; Larry Tucker *Provo, UT*

**Background:** Research has shown mixed results regarding the relationship between strength training (ST) and body composition. The purpose of this study was to assess the association between minutes of ST per week and body fat percentage (BF%), fat mass (FM), and fat free mass (FFM) in 218 middle-aged women. **Methods:** Self-reported ST (min/wk) was compared to body composition as measured by DEXA (Hologic 4500W). Potential confounding variables included body weight, measured using a digital scale, aerobic physical activity measured using 7-d accelerometry, energy intake measured using 7-d weighed food records, and age. **Results:** ST for 60 min/wk was associated with 3.1 percentage points lower BF% when compared to no ST ( $F=26.24, p<0.0001$ ). The ST and BF% relationship remained significant after controlling for aerobic physical activity, energy intake, and age ( $F=9.69, p=0.0021$ ), though controlling for aerobic activity weakened the relationship by 48%. After adjusting for body weight, 60 min/wk of ST was associated with 1.1 kg lower FM ( $F=15.43, p=0.0001$ ) and 1.2 kg greater FFM ( $F=16.87, p<0.0001$ ) when compared to no ST. After adjusting for aerobic activity, energy intake, age, and body weight, the relationships

between ST and FM ( $F=7.53$ ,  $p=0.0066$ ) and FFM ( $F=8.28$ ,  $p=0.0044$ ) remained significant. Conclusions: There is a significant, inverse relationship between time spent ST per week and BF%. This relationship appears to occur due to both a decrease in FM and an increase in FFM.

**389-P****Are Parent Perceptions of the Neighborhood Environment Associated With Children's Physical Activity?**

Casey P. Durand, Genevieve Dunton *Alhambra, CA*; Jennifer Wolch *Berkeley, CA*; Mary Ann Pentz *Alhambra, CA*

Background: Previous research has found that neighborhood perceptions are important drivers of physical activity in adults. However, given the influence parents can exert on the types and locations of their child's activities, it is important to understand whether a parent's perception of the neighborhood built environment is associated with their child's physical activity. Methods: The Neighborhood Environment Walkability Scale was completed at baseline by parents as part of a four-year, group randomized trial of families living in urban and suburban areas of San Bernardino County, California. It consists of fourteen subscales which assess factors such as residential density, land use mix, traffic hazards, street connectivity, walking facilities, aesthetics, and crime. Outcome data consisted of child accelerometry and child self-reported mode of travel to school. Results: The sample consisted of 362 parent-child pairs. Lack of cul-de-sacs was positively associated with achieving 60 minutes per day of moderate-to-vigorous physical activity (OR=1.4, 95% CI=1.02-1.91). Aesthetics (OR=1.83, 95% CI= 1.19-2.83), lack of parking (OR=1.52, 95% CI= 1.16-2.0) and social interactions (OR=1.75 95% CI= 1.26-2.42) were positively associated with non-motorized transport to school (i.e. walking, biking or skating), while land use mix diversity was negatively associated (OR=0.74, 95% CI=0.56-0.98). All other associations were non-significant. Conclusions: Findings suggest that parent perceptions of the neighborhood are associated with physical activity which specifically takes place in the neighborhood (i.e., non-motorized transport to school). Parent perceptions of non-structural features of the neighborhood, such as aesthetics and social interactions, may be more important in children's active commuting to school than structural features such as sidewalks and housing density.

**390-P****Cardiorespiratory Fitness and Moderate-to-Vigorous Objectively Measured Physical Activity Are Independently Associated Odds Ratio For Abdominal Obesity**

Diana A. Santos, Analiza M. Silva, Fatima Baptista *Lisbon, Portugal*; Jorge Mota *Porto, Portugal*; Luis B. Sardinha *Lisbon, Portugal*

Background: Waist circumference (WC) is an important predictor of cardiovascular risk. However, it is unclear the independent impact of physical activity (PA) dimensions and cardiorespiratory fitness (CRF) in abdominal obesity in elderly. Our purpose was to examine the relationship between CRF and objectively measured PA dimensions with odds ratio for abdominal obesity. Methods: A national survey with a cross sectional sample of noninstitutionalized elderly Portuguese was used. The sample consisted in 112 males and 185 females, 65-103 years. PA was assessed using objective data with accelerometers (*Actigraph*, model *GT1M*). WC was measured according to NIH procedures and dichotomized into normal or increased risk (females: >88 cm; males: >102 cm). Results from six-minute walk test were used as a CRF marker. Binary logistic regression was used. Results: Mean WC was  $97.2 \pm 10.7$  cm for males and  $94.0 \pm 11.1$  cm for females. Prevalence of abdominal obesity was 29.5% and 68.1% for males and females respectively. Logistic regression showed that, adjusting for gender and age, CRF and moderate-to-vigorous PA (MVPA) were the only significant variables in predicting odds ratio for abdominal adiposity. Each unit (minute) of MVPA decreased abdominal obesity odds ratio in 1.3% ( $p=0.043$ ). Independently, each unit (meter) of walking distance in CRF test was associated with a 0.4% reduction in abdominal obesity ( $p=0.001$ ). Neither sedentary time nor light PA were associated with WC odds ratio. Conclusion: Higher CRF and MVPA are independently associated with a lower risk for an increased WC highlighting the importance of physical activity promotion for abdominal obesity prevention in an elderly population.

**391-P****Is Increased Physical Activity Associated With Decreased Fat and Alcohol Consumption Among Overweight and Obese African American and Hispanic-Latina Women?**

Ygnacio Lopez III, Scherezade K. Mama, Ashley V. Medina, Rebecca E. Lee *Houston, TX*

Background: African American and Hispanic or Latina women are highly vulnerable to obesity and related conditions. Consuming foods with high fat content and alcohol consumption contributes greatly to obesity. Increasing physical activity (PA) may influence positive dietary habits. The purpose of this study was to determine whether increased PA was associated with decreased fat and alcohol consumption among African American and Hispanic-Latina women. Methods: One hundred fifty-eight overweight or obese women (102 African American, 56 Hispanic-Latina;  $M=46.3$  years,  $M$  BMI=34.8 kg/m<sup>2</sup>) completed interviewer administered questionnaires including days drinking in the past 30 days, the NCI Fat Screener, and demographics, and measured BMI and PA (accelerometry). Women reported consuming a relatively high fat diet ( $M=31.6\%$ ) and lower rates of physical activity ( $M=19.9$  min.). Drinks over the last 30 days ( $M=0.61$ ) was dichotomized into no drinks vs. any drinks. Results: Fat consumption was significantly correlated with PA ( $r=.177$ ) and alcohol consumption ( $r=0.168$ ,  $p<.05$ ). Simultaneous linear regressions found increased PA was associated with increased fat consumption ( $R^2=0.123$ ,  $\text{Beta}=0.046$ ,  $p=0.013$ ) after adjusting for ethnicity, age, BMI, education and income. Physical activity was not related to alcohol consumption. Conclusions: No differences by ethnicity were found, suggesting that women who are more physically active tend to eat more calories from fat, regardless of ethnicity. Perhaps low rates of alcohol consumption in this sample explain the lack of relationship between PA and alcohol consumption. Future studies should investigate the longitudinal association between PA and dietary habits, to aid in more effective weight control. Funded by NIH CA109403.

**392-P****Validity of the IPAQ Among Mexican Adults With Type 2 Diabetes**

Nuria Yohana Caravali-Meza, Montserrat Bacardi-Gascon, Ana Lilia Armendariz-Anguiano, Arturo Jimenez-Cruz *Tijuana, Mexico*

Introduction: We found no reports of validation of the IPAQ among Mexican people with diabetes. Objective: The purpose of this study was to validate the short and long version of the IPAQ in adults with diabetes living in Tijuana. Methods: 31 subjects with type 2 diabetes participated in the study. Direct interview of the short (IPAQ-S) and long (IPAQ-L) version was applied twice over a period of five days. The participants wore an Actigraph accelerometer (AA) model GTM1 during seven days. Data from the accelerometer was processed using Actilife v 4.4.1 and Meterplus v 4.0 software. The test-retest reliability and the validity of the questionnaires were assessed using the Spearman's correlation coefficient. Results: The mean age of the participants was 51.5 years old and BMI was 30.8 Kg/m<sup>2</sup>. The test-retest results for the IPAQ-S and IPAQ-L for vigorous PA were 0.89 ( $p=0.0001$ ) and 0.74 ( $p=0.0001$ ); for light PA they were 0.74 ( $p=0.001$ ) and 0.70 ( $p=0.01$ ) respectively. For IPAQ-L a moderate PA was 0.69 ( $p=0.02$ ). The correlation coefficients between AA counts/min/d with moderate PA from IPAQ-S and IPAQ-L were 0.37 ( $p=0.04$ ) and 0.39 ( $p=0.03$ ) respectively. Correlations between light PA from AA and min. of moderate PA from IPAQ-S and IPAQ-L were 0.49 ( $p=0.01$ ) and 0.65 ( $p=0.0001$ ) respectively. Vigorous PA from AA was correlated with min. of walking from the IPAQ-S (0.54,  $p=0.002$ ). Conclusions: A good reproducibility was shown along with modest and significant correlations between the direct measures of PA and the questionnaires for moderate and light PA.

**393-P****Validity of the International Physical Activity Questionnaire Among Mexican Adults**

Ivonne Murillo-Rabago, Ana Lilia Armendariz-Anguiano, Arturo Jimenez-Cruz, Montserrat Bacardi-Gascon *Tijuana, Mexico*

Introduction: We found no reports of validation of the IPAQ among healthy, Mexican people. Objective: The purpose of this study was to validate the short and long versions of the IPAQ in healthy adults in Tijuana. Methods: Forty-three healthy subjects participated in the study. Direct interview of the

short version (IPAQ-S) and long (IPAQ-L) version was applied twice over a period of five days. The participants wore an Actigraph accelerometer (AA) model GTM1 during seven days. Data from the accelerometer was processed using Actilife v4.4.1 and Meterplus v4.0 software. The test-retest reliability and the validity of the questionnaires were assessed using the Spearman's correlation coefficient. Results: The mean age was 30 years old and BMI was 25.6 Kg/m<sup>2</sup>; 56% were women. The test-retest results for the IPAQ-S and IPAQ-L were 0.67 (p<0.001) and 0.57 (p=0.05) for moderate PA; for light PA they were 0.91 (p<0.001) and 0.78 (p=0.003); and for sitting time they were 0.73 (p<0.001) and 0.881 (p<0.001) respectively. For IPAQ-S, vigorous PA was 0.73 (p<0.0001). Correlations between sedentary activity from AA and sitting time from IPAQ-S and IPAQ-L were 0.30 (p=0.05) and 0.33 (p<0.03) respectively. No correlations were observed between light, moderate and vigorous PA with the IPAQ-S and IPAQ-L with AA; however, Light PA from AA was correlated with moderate PA from the IPAQ-L (0.31, p=0.04). Conclusions: Although a good reproducibility was shown with the IPAQ-S and IPAQ-L, the lack of correlations between AA and light, moderate and vigorous PA with both questionnaires limits the use of IPAQ on this population.

**394-P**  
**Validation of the Gruve Triaxial Accelerometer System For Measuring Physical Activity**

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Background: Increased physical activity along with behavioral change can bring about healthy and sustainable weight loss. We validated an accelerometer based physical activity monitoring device called 'Gruve'; which also gives positive reinforcement through an intuitive web interface thus aiding sustainable weight loss and brings overall wellness to the individual. Methods: 22 subjects wore the 'Gruve' device along with the validated Physical Activity Monitoring System (PAMS) with different body postures and during graded walking at 7 velocities. Energy expenditure was measured using indirect calorimetry. Results: The 22 subjects laboratory validation test showed the 'Gruve' device distinguished sedentary and walking activity reliably with 1/2 mph walking speed increments. It was accurate and precise compared to the PAMS, with an intra-class correlation coefficient (r<sup>2</sup> > 0.98). The 'Gruve' device showed excellent sequential increases with increased walking velocity and energy expenditure (r<sup>2</sup> > 0.9). Conclusions: The 'Gruve' device was shown to be accurate and reliable in measuring and quantifying physical activity in the laboratory setting. A comprehensive integrated physical activity promoting and weight loss platform using 'Gruve' holds promise in the free living society.

**395-P**  
**Promoting Physical Activity in Preschoolers to Prevent Obesity: A Review of the Literature**

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Purpose: To identify factors that impact physical activity (PA) levels in preschoolers and summarize clinical recommendations for PA in this population. Methods: Literature from November 2004 through June 2009 was searched through PubMed using the following key terms: *physical activity, preschoolers, obesity, overweight, prevention, and childcare*. Seventy-two articles were reviewed. Four independent reviewers met to discuss studies, interpret findings, and discuss recommendations. Thirteen studies met inclusion criteria. Results: Several themes were associated with PA levels in preschool children. These included parental perceptions, childcare settings, and the home environment. Parental Perceptions: PA barriers included the child's personality traits and activity preferences and busy or unconcerned parents. PA facilitators include parental role modeling, enjoyable and/or self-initiated play, increased outdoor space and time, and play equipment variety. Childcare Setting/Home Environment: PA barriers included increasing home media equipment. PA facilitators in both settings included more than one piece of play/playground equipment, more portable playground equipment, larger outdoor play areas, and, in the home, increased levels of parental PA. Clinical Implications: PA levels in preschoolers are influenced by parental perceptions, the childcare setting, and the home environment. Barriers to increasing PA included inconsistency in both the definition of and recommendations for PA in preschoolers, PA measurement challenges,

and little research conducted with minority children. Additional research is needed to evaluate levels of PA in preschoolers and determine how PA can be increased to either prevent or decrease overweight and/or obesity in this age group.

**396-P**  
**The Relation of Physical Activity to Body Composition in Elementary School Children**

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Objective: Moderate-to-vigorous physical activity (MVPA) of 60 minutes has been recommended for prevention of obesity and lifestyle-related disease for children. However, this criterion is not necessarily based on sufficient evidence. We investigated the relation of physical activity to body composition in Japanese elementary school children using a novel method to differentiate locomotive activity from nonlocomotive activity. Method: The subjects were 114 Japanese elementary school boys (age: 10 ± 2 yrs, height: 141.4 ± 11.3 cm, weight: 35.1 ± 10.1 kg, %BF: 22.5 ± 7.1). We assessed the time engaged in sedentary, light, moderate and vigorous activity for a period of 10 days using tri-axial accelerometer with gravity removal physical activity classification algorithm (Active style Pro HJA-350IT, Omron Healthcare Co., Ltd., Kyoto, Japan). Body composition was measured by Dual energy X-ray absorptiometry (Hologic QDR-Delphia DXA scanner, Hologic Inc. Waltham, MA, USA). Results: There were significant correlations between %BF and physical activity times with controlled age, in particular vigorous activity (partial r = -0.22, P = 0.023). Two groups classified according to the level of obesity (25 %BF) were significantly different in time spent in MVPA (normal: 70 ± 19 min vs. obesity: 59 ± 22 min) with adjusted age as covariate. Conclusion: Reduced MVPA may be associated with higher adiposity in elementary school children.

**397-P**  
**Plasma Leptin Levels Are Associated With Objectively Measured Moderate to Vigorous Physical Activity (MVPA) Independent of Adiposity in 8-11 Year Old Latina and African American (AA) Females**

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Background: Leptin, an adipose-derived hormone that regulates hunger, has been linked to MVPA. However this relationship is unclear in youth. Objective: To investigate the association between leptin and MVPA, and test whether this association is moderated by Tanner pubertal stage (TS). Methods: Cross-sectional data is presented. Measures were plasma leptin (ng/ml), TS, subcutaneous abdominal adipose tissue (SAAT; L), intra-abdominal visceral adipose tissue (VAT; L), insulin sensitivity (SI), and MVPA by accelerometry (data for ≥4days; 10hr/day). Partial correlations tested associations between covariates and MVPA, controlling for ethnicity and age. T-tests assessed differences in leptin between TS1/TS2. Multivariable regressions investigated relationships between MVPA, TS, and leptin. Covariates were ethnicity, age, SI, SAAT, and VAT. Results: Participants were 50 minority girls [mean age=9.4(±0.9); 78% Latina; 38% ≥95<sup>th</sup> BMI percentile]. MVPA correlated with SI (r=0.38, p=0.008), SAAT (r=-0.35, p=0.013), and leptin (r=-0.54, p<0.001). Leptin correlated with SI (r=-0.67, p<0.001), SAAT (r=0.66, p<0.001), and VAT (r=0.50, p<0.001). Mean leptin values were higher in TS2 than TS1 [19.4(±10.9) vs. 11.4(±7.6); p=0.004]. MVPA was related to leptin (β=-0.03, p=0.013), ethnicity (β=-0.39, p=0.025), and age (β=-0.21, p=0.008; model R-squared=0.47). The leptin-TS interaction was not significant. Conclusions: Higher leptin was related to lower MVPA independent of central adiposity and SI. TS did not influence the relationship between leptin and MVPA behavior in this sample. High leptin may indicate leptin resistance, which might be related to low MVPA and central adiposity. MVPA could help prevent leptin resistance and energy imbalance, particularly in overweight youth.

## 398-P

**Validation of INTA Physical Activity Questionnaire Among School Children in Tijuana**

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**Introduction:** The Institute of Nutrition and Food Technology (INTA) from Chile has developed and validated a self-report physical activity questionnaire for 8-13 year old children. However, there has not been a reported validation elsewhere. **Objective:** To validate the INTA physical activity (PA) questionnaire among 7 to 9 year old children in two primary schools in Tijuana. **Methods:** Students were selected from 3rd and 4th grade from two private schools in Tijuana (n=45). Weight, height and waist circumference were assessed. To assess reproducibility a test-retest was conducted a week later. The questionnaire was applied to all children and they wore the Actigraph accelerometer (AA) GTM1 during seven consecutive days. Data from AA was processed using the Actilife v4.4.1 and Meterplus v4.0 software. The test-retest and the validity of the questionnaire with the accelerometer were assessed by the Spearman's correlation coefficient. **Results:** The mean age was 8.5 (7-9) years and BMI was 18 (15-23) kg/m<sup>2</sup>. The test-retest showed correlations above 0.8 on four constructs and above 0.5 on three (p<0.05). The only two significant correlations between the activities from the questionnaire and the accelerometer were between the time spent playing outdoors and hard PA from AA (Rho=0.44, p=0.003), and time spent sitting in the classroom and light PA from AA (Rho=0.30, p=0.05). **Conclusions:** Although a good reproducibility was shown, there was only a modest correlation between sitting in the classroom, playing outdoors and hard and light physical activity recorded from the accelerometer respectively.

## 399-P

**Physical Activity Overestimation in Youngsters With High Waist Circumference**

Jose Ribeiro, Gustavo Silva, Norton Oliveira, Maria P. Santos, Jose Oliveira, Jorge Mota *Porto, Portugal*

Physical inactivity is pointed as responsible factor for the increased levels of obesity in children, and accelerometers (ACL) have been used widely in studies for evaluation of physical activity (PA). Usually ACLs are used around the waist, and since obese youngsters have higher waist circumferences (HWC), it's possible that there's an overestimation of the levels of PA due to oscillation of subcutaneous adipose tissue around the waist. **Purpose:** The aim was to compare the number of counts, in different speeds, between youngsters with normal and HWCs. **Methods:** 38 boys and girls were evaluated. They completed the 20 meters Shuttle Run Test (20MSRT), using the ACL (GT1M, Actigraphs, LLC) and oxygen consumption (VO<sub>2</sub>; METs, etc) was measured using a portable metabolic system (Cosmed k4b2), to assess the intensity of exercise in order to compare it with the ACLs data. 20MSRT starts at 8.5 km/h and increases 0.5 km/min. Normal and HWC was divided in accordance with Taylor et al (2000). **Results:** Our results reveal that there's a difference in the number of counts, for the same speeds and METs, between normal and HWC, with an overestimation of the number of counts in youngsters with HWC but with only a significant difference in girls (1120 counts/min.; p<0.05) but not in boys. **Conclusions:** It's possible that there's an overestimation of the number of counts in girls with HWCs, leading to overestimation of the levels of PA in obese girls, namely in those with HWCs. MCTES/FCT: PTDC/DES/099018/2008

## 400-P

**Physical Activity Relates to HbA1c in the Longitudinal DIALBEST Trial**

Jyoti Chhabra *Hartford, CT*; Sonia Vega-Lopez *Mesa, AZ*; Sofia Segura-Perez *Hartford, CT*; Rafael Perez-Escamilla *New Haven, CT*

**Objective:** To examine the relationship of Physical Activity (PA) with HbA1c among Latinos with type 2 diabetes (T2D). **Methods:** Obtained demographic and PA information from 211 (73.5% women) primarily Spanish speaking participants at baseline, 3-, 6-, 12-, and 18-mo, ≥21y (mean=56.4±11.8y), having T2D, and HbA1c≥7%. Height and weight were measured and BMI calculated as kg/m<sup>2</sup>. PA was assessed by whether one exercised for >30mins/d, >5d/wk (Y=1/N=0). HbA1c was measured from capillary blood using an A1cNow

INView' device. N<sub>3mths</sub>=179, N<sub>6mths</sub>=169, N<sub>12mths</sub>=135, N<sub>18mths</sub>=106. Data collection for 12- and 18-mos is ongoing. Means: BMI<sub>Baseline</sub>=34.5±8.2 kg/m<sup>2</sup>, BMI<sub>3mths</sub>=35.1±9.2 kg/m<sup>2</sup>, BMI<sub>6mths</sub>=34.6±8.3 kg/m<sup>2</sup>, BMI<sub>12mths</sub>=36.5±10.8 kg/m<sup>2</sup>, BMI<sub>18mths</sub>=34.4±7.8 kg/m<sup>2</sup>. Mean HbA1c<sub>Baseline</sub>=9.6±1.8%, HbA1c<sub>3mths</sub>=8.8±1.7%, HbA1c<sub>6mths</sub>=8.8±1.7%, HbA1c<sub>12mths</sub>=8.9±1.9%, and HbA1c<sub>18mths</sub>=8.6±1.9%. 75% of the participants had < high school education and 63% had < \$500 per-capita monthly household income. 45%, 50%, 61% 64% and 57% of participants reported performing PA at baseline, 3-, 6-, 12-, and 18-mo respectively. **Results:** PA<sub>Baseline</sub> was negatively related to BMI<sub>Baseline</sub> (r=-0.16), BMI<sub>3mths</sub> (r=-0.19) and BMI<sub>6mths</sub> (r=-0.19) (all p<0.02). PA<sub>3mths</sub> was marginally negatively related to BMI<sub>3mths</sub> (r=-0.14, p=0.06) and PA<sub>18mths</sub> was marginally negatively related to BMI<sub>18mths</sub> (r=-0.24, p=.06). PA<sub>Baseline</sub> was not related to HbA1c<sub>Baseline</sub>. PA<sub>Baseline</sub> (R<sup>2</sup>=0.06, β=-0.25, p<0.001) and PA<sub>3mths</sub> (R<sup>2</sup>=0.02, β=-0.15, p<0.04) independently predicted HbA1c<sub>3mths</sub>. PA<sub>Baseline</sub> predicted HbA1c<sub>6mths</sub> (R<sup>2</sup>=0.05, β=-0.22, p<0.004). PA<sub>3mths</sub> and PA<sub>6mths</sub> were not related to HbA1c<sub>6mths</sub> significantly. **Conclusion:** The greater the PA<sub>Baseline</sub>, the lower the HbA1c<sub>3mths</sub> and HbA1c<sub>6mths</sub>. This relationship is independent of BMI. Funded by CT NIH Export Center of Excellence for Eliminating Health Disparities among Latinos (NIH-NCMHD grant # P20MD001765).

## 401-P

**Use of Parks or Playgrounds and Access to Drinking Water Fountains**

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**Background:** Promoting water intake is one potential strategy to prevent obesity and one tactic for promoting this strategy is to make potable drinking widely accessible in public facilities. **Objective:** As a first step to examine public accessibility, we examined access to drinking water fountains in parks or playgrounds. **Method:** A cross-sectional analysis was conducted on a convenience sample of 4,163 US adults (≥18 years) using the 2009 HealthStyles Survey data. The outcome measure was reported access to drinking water fountains in parks/playgrounds (response options: yes, no, or do not use parks/playgrounds). Among those who reported using parks/playgrounds, chi-square tests were used to examine differences within categories, and multivariable logistic regression was used to examine the associations between demographic variables and access to water fountains. **Results:** Only 55% of participants used parks/playgrounds. Among those, only 55.0% reported access to drinking water fountains. In chi-square tests, park/playground users reporting access were more likely to be male, Hispanic, and unmarried (P<0.05). In multivariable logistic regression, significant variables associated with access to water fountains were middle age (45–64 years vs. ≥65 years; odds ratio (OR)=0.73, 95% CI 0.54–0.98), male (OR=1.45, 95% CI 1.22–1.72), and Hispanics (vs. non-Hispanic White; OR=1.35, 95% CI 1.06–1.72). **Conclusions:** Almost half of respondents reported not using parks/playgrounds. Among adults who reported using parks/playgrounds, half of respondents had access to drinking water fountains. Reported access to water fountains was significantly different by demographic characteristics. These findings can be used to develop interventions to increase access to drinking water in public facilities.

## 402-P

**Park-Based Social Capital and Physical Activity**

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**Objectives:** We examined whether social capital is a collective feature of the park environment and whether it influences park use and park-based physical activity. **Methods:** We surveyed 234 adult park users in 28 neighborhood parks in New Orleans, LA in July–August 2008 and conducted direct observations to count the numbers and activity levels of all park users (adults and children) in these parks on weekdays during the hours of 4:00–7:00 pm. Multilevel linear regression models were used to calculate the intraclass correlation (ICC), which measures the variation in perceived social capital attributable to differences between parks, and to test whether park use and physical activity outcomes differed between parks with high versus low levels of social capital. **Results:** In our parks, 26% of perceived social capital was attributable to differences between parks (ICC=0.26). Parks with higher levels of social capital had higher daily numbers of observed park users (38.1 vs. 13.4; p=0.0183) and showed higher volumes of park-level energy expenditure (2824.3 vs. 859.2 MET-minutes; p=0.0339). Although not significant, there was a tendency



for parks with higher levels of social capital to have lower mean park-user energy expenditure levels (2.9 vs. 3.3 METs;  $p=0.0927$ ), although mean park-user energy expenditure levels were light to low-moderate for both high and low social capital parks. Conclusions: Interventions that target the park social environment may help to increase physical activity levels in communities.

**403-P****Physical Activity and Smoking Among Lebanese University Students: Is There a Link?**

Najat Yahia *Mt. Pleasant, MI*; Alice Ashkar, Sandra Rizk *Beirut, Lebanon*

**Background:** Physical inactivity and cigarette smoking are major public health problems among college students. We aim to examine the association between levels of physical activity (high, moderate, low) and smoking habits (non-smoker, ex-smoker, current smoker) among a sample of Lebanese University students. Understanding factors that affect smoking is an essential step towards developing health promotion programs targeting college students. **Methods:** A cross-sectional survey was conducted among 220 students from the Lebanese American University campus. Students filled out questionnaires related to their physical activity levels (International Physical Activity Questionnaire) and smoking habits. **Results:** Results showed there was a negative relationship between levels of physical activity and smoking habits across both genders. 75% of students who reported high level of physical activity were ex-smokers compared to 42% who are current smokers and 33% who have never smoked. Students who reported low level of physical activity were distributed as follows: 12.5% were ex-smokers, 25% were current-smokers and 32% have never smoked. Overall, smoking was not common among students but the percentage of students who reported current smoking was higher among males than among females. **Conclusion:** Our study indicated that physical activity is negatively correlated to students' smoking habits. Thus, promoting physical activity among students, as a preventive measure against smoking, is recommended.

**404-P****Effect Size of Physical Activity and BMI**

Lida Tabatabaian, Erin R. Hager, Soren Snitker *Baltimore, MD*

**Purpose:** Many previous studies have found an increased risk of overweight or obesity in those who are the least physically active. However, these studies generally do not provide an estimate of the effect size, or beta-coefficient, of the relation between physical activity (PA) and BMI or body weight. It is important to know the effect size because it is informative about the extent to which one can expect BMI or body weight to change in response to a given increase in PA. **Methods:** We determined the relationship between PA and body composition in the 2003-04 cycle of NHANES, where physical activity was measured objectively in with accelerometers in 4867 participants aged 6 years and above. **Results:** We found that, as in other studies, all measures of fatness (age- and sex-standardized BMI, body weight, etc.) were negatively related to physical activity, especially moderate-to-vigorous PA. The effect size (beta-coefficient) of this relationship is provided for each age group and gender. **Discussion:** Because the inverse relationship between PA and fatness may be bi-directional, our calculated effect sizes provide optimistic estimates of the weight loss benefit of PA. However, as such, they provide an upper limit for the impact on fatness one can realistically expect from increasing PA in adults and children to be consistent with current recommendations.

**405-P****Physical Activity Dosage Required to Reduce Adiposity Indicators in Overweight Minority Girls**

Stephanie Kellam, Norma Olvera, Jian Liu, Dennis Smith, Patrick Leung *Houston, TX*

Physical inactivity is considered a major factor contributing to the energy imbalance that leads to an excess of adiposity. There is a dearth of research regarding the exercise dosage required to meet physical activity recommendations and reduce adiposity indicators. The purpose of this study was to determine the exercise dosage required to reach at least 60-minutes of MVPA and to reduce adiposity indicators. Sixty-two overweight (BMI > 85<sup>th</sup> percentile) Hispanic and African American girls (ages ranging from 8-14, mean = 11.2 + 1.5 years) participated in either a three-week (2580 minutes of physical activity exposure) or four-week (3600 minutes of physical activity exposure) BOUNCE healthy lifestyle summer intervention. Participants wore accelerometers to assess the frequency and intensity of their physical activity levels each day of the BOUNCE intervention. Adiposity indicators (BMI, weight, body fat, and waist circumference) were taken pre- and post-intervention. Differences in daily minutes of MVPA over time were measured using a repeated measures analysis of variance. Differences between interventions were measured using repeated measures multivariate analysis of variance. The BOUNCE intervention significantly increased MVPA levels ( $p = 0.020$ ) over time. The four-week intervention had a significantly greater decrease in adiposity indicators ( $p = 0.006$ ) over time as compared to the three-week intervention. Waist circumference displayed the most significant decrease ( $p = 0.001$ ) with an observed power of 0.951. Thus, both BOUNCE interventions were found to be effective in promoting physical activity and reducing abdominal obesity for minority girls.

**406-P****Association of Bouts of Physical Activity and Body Fat in Pre-School Children**

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**Background:** Whether bouts of different physical activity (PA) intensities are associated with body fat in preschool children is not known. The aim of this study was to analyze the association of different intensity bouts of PA with body fat in Portuguese children aged 3-6 years ( $n=310$ ) during weekdays and weekend. **Methods:** Body fat was assessed by skinfold thickness (SKF) measured at triceps and subscapular. Each skinfold was adjusted for age and sex, and children were assigned to the non-overweight group if they had 2 SKF below the 85<sup>th</sup> age and sex specific percentile, to the overweight group if they had 1 SKF above the 85<sup>th</sup>, and to the obese group if they had 2 SKF above the 85<sup>th</sup>. PA was assessed by accelerometers during at least 4 days (at least 1 weekend). Average weekly number of 1 min bouts of light, moderate and vigorous PA was calculated, and was analysis and grouped by tertiles. **Results:** We observed no statistically significant differences between categories of SKF and all intensities of bouts during weekdays (all  $p>0.05$ ). Likewise, no statistically significant differences were found between categories of skinfolds and bouts of light and moderate PA ( $p>0.05$ ) during weekends. In contrast, we observed an association between bouts of vigorous PA and body fat during weekends ( $p=0.009$ ). 84.6% of the children in the lowest third of bouts of vigorous PA were obese. **Conclusion:** The findings suggest that bouts of vigorous PA during weekends are associated with body fat already at pre-school age.