PEDIATRIC PHYSICAL ACTIVITY AND ENDOTHELIAL FUNCTION

THE RELATIONSHIP BETWEEN OBJECTIVELY MEASURED HABITUAL PHYSICAL ACTIVITY IN PRESCHOOLERS AND PERIPHERAL ARTERY ENDOTHELIAL FUNCTION IN SCHOOL-AGED CHILDREN

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LAY ABSTRACT

It is clear that preliminary signs of atherosclerosis begin during the early years of childhood, and typically precede the development of future cardiovascular disease. Engaging in habitual physical activity at higher intensities, has been shown to positively influence cardiovascular health, specifically in central and peripheral arteries. This study sought to investigate the trends in vascular heath over time in children and examine the effect of moderate-to-vigorous physical activity engagement during the preschool years on vascular health during the school-age years. Our results suggest that as children age, their arteries get bigger in size and that school-aged girls have elevated vascular function when compared to boys. Children who engage in greater amounts of moderate-to-vigorous physical activity during their school-age years does not influence measures of vascular health. Additionally, engagement in habitual moderate to vigorous physical activity during the preschool years, does not impact these vascular health relationships during the school-age years.

ABSTRACT

The development of atherosclerotic lesions and endothelial cell damage can originate during early childhood. Endothelial cells produce and release vasodilatory chemicals, which dictate the artery's ability to vasodilate or vasoconstrict. Brachial artery FMD is a non-invasive, reproducible and a sensitive technique used to detect changes in arterial diameter and is correlated with coronary artery endothelial function. Cross-sectional studies have indicated increases in arterial diameter in children between the ages of 6-18 years however, a longitudinal, observational design study has not been conducted to understand how arterial diameters and FMD change over time in children, with considerations for the influences of physical activity and sex. The purpose of this study was to understand the impact of age and sex on arterial diameter and FMD and investigate the effects of habitual moderate-to-vigorous physical activity (MVPA) during both the school-age and preschool years on endothelial function trajectories during the school-age years. Over three years, 418 children between 3-5 years old participated in the HOPP study annually, and 279 of these children attended the lab when they were between 6-12 years old for an additional 3 annual visits in the SKIP study. Habitual MVPA was measured for 7 days in both the HOPP and SKIP studies each year, and FMD was measured each year during SKIP. Linear mixed-effects modeling was implemented to study the trend in FMD and the influence of chronological and biological age, sex and MVPA on arterial function; effects are reported as unstandardized estimates (Est). Boys had larger baseline and peak brachial artery diameters compared to girls ($p<0.001$). Girls had larger brachial artery FMD compared to boys (6.82±3.39 vs. 6.23±3.50 %, $p<0.001$).

There was an effect of MVPA in the SKIP study on allometrically scaled FMD (Est. -0.017, p=0.03), but not on relative FMD (Est. -0.01, p=0.17). MVPA in the preschool years did not predict school aged scaled FMD (Est. 0.11, p=0.24) or FMD (Est. -0.003, p=0.64). The observed trends in brachial artery diameter and FMD are in-line with expected changes in growth and maturation in children. Children who engaged in more habitual MVPA during the childhood years, but not the preschool years, demonstrated changes endothelial function during the school-age years.

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ANCOVA	Analysis of covariance
APHV	Age of peak height velocity
β	Beta
BF	Blood flow
BMI	Body Mass Index
Ca^{2+}	Calcium
cGMP	Cyclic guanosine monophosphate
cIMT	Carotid intima media thickness
CSEP	Canadian Society for Exercise Physiology
CVD	Cardiovascular disease
DO	Direct observation
ED	End-diastolic diameter
DLW	Doubly labelled water
EE	Energy expenditure
eNOS	Endothelial nitric oxide synthase
FMD	Flow-mediated dilation
FMD%	Relative flow-mediated dilation
GC	Guanylate cyclase
GTP	Guanosine triphosphate
HOPP	Health Outcomes and Physical activity in Preschoolers study
HR	Heart rate

KD	Kawasaki disease
LPA	Light physical activity
MVPA	Moderate-to-vigorous physical activity
MVPA-H	Moderate-to-vigorous physical activity in HOPP
MVPA-S	Moderate-to-vigorous physical activity in SKIP
NO	Nitric oxide
PA	Physical activity
RH	Reactive Hyperemia
ROI	Region of interest
PWV	Pulse wave velocity
SBP	Systolic blood pressure
SKIP	School-age Kids' health from early Investment in Physical activity study
SR	Shear rate
SS	Shear stress
TIDM	Type l Diabetes Mellitus
TPA	Total physical activity
V	Blood velocity
YPHV	Years to peak height velocity

CHAPTER 1

Literature Review

1.1. Introduction

For the better part of the last two decades, cardiovascular disease (CVD) has been the global leading cause of morbidity and mortality, contributing to one third of all deaths worldwide (1). CVD is the overarching term used to describe disease states of the heart and blood vessels and is associated with a multitude of spontaneously occurring acute cardiovascular events such as myocardial infarction, sudden cardiac death, cerebral infarction and unstable angina (2,3). Risk factors for disease states are conditions or behaviours that are thought to be associated with the development of a disease and are used in the prediction and prevention of disease states (4). Risk factors commonly associated with CVD are high low-density lipoprotein, low high-density lipoprotein, smoking, obesity and physical inactivity. In contrast, risk markers are behaviours or conditions that are not causally related to the development of a disease, but rather are frequently a measure of the disease itself or the by-products of the disease process (4,5). Despite the known influence of traditional risk factors such as hypertension, obesity, elevated low-density lipoprotein, smoking and diabetes, which are often used to determine risk for CVD via the Framingham Risk Score (6), non-traditional, or novel risk markers such as measures of vascular function, like carotid-intima media thickness, pulse-wave velocity (PWV), and endothelial function (7–12) have become increasingly popular when trying to understand CVD risk and atherosclerotic development. Among these novel measures, endothelial function measured via the flow-mediated dilation

(FMD) test, detects the ability of blood vessels to respond to changes in blood flow-induced shear stress (SS) (9,10). Brachial artery FMD is non-invasive, both reproducible and sensitive, to blood-flow mediated arterial diameter responses, and has been shown to be correlated with central coronary artery endothelial function (9,13–15). As a research tool, FMD has become an increasingly popular technique used to provide additional information to CVD risk assessments in a variety of both healthy and chronic disease populations. Notably, the assessment of endothelial function in children has garnered more attention in recent decades (9,16–19), as an important identifier of CVD risk and marker of CVD progression at very early ages.

1.2. Arterial anatomy and endothelial function

Arteries are the main blood vessels responsible for carrying blood away from the heart to the rest of the body and are made up of three distinct layers (**Figure 1**). The outermost layer, the tunica adventitia, is the most superficial and is comprised of collagen, elastin, nerves and vasa vasorum (51). The middle layer, the tunica media, is comprised of smooth muscle cells and elastic connective tissue; and the deepest layer, the tunica intima, is made up of a monocellular sheet of endothelial cells, known as the endothelium (51). The endothelium of blood vessels is continuous with the endocardial lining of the heart and is physically supported against the internal elastic lamina and tunica media via a collagen fiber network known as the basement membrane (51).

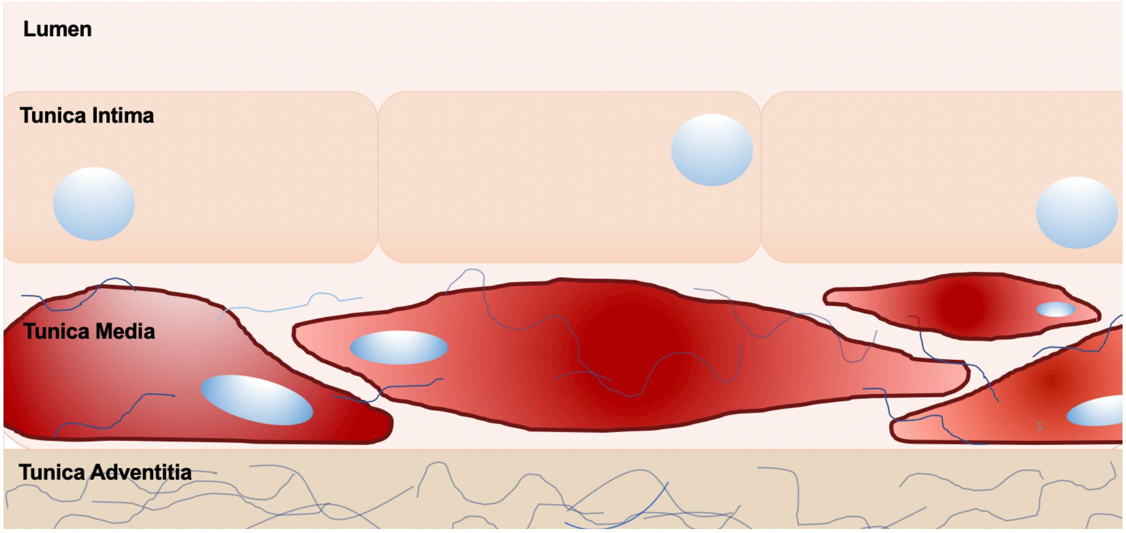

Figure 1. Arterial wall layers. Outer layer: tunica adventitia. Middle layer: tunica media. Deep layer: tunica intima. Lumen: space through which blood flows through the artery.

Changes to the structure and function of blood vessels are stimulated by the collective effects of a variety of stimuli including blood-flow mediated alterations in SS caused by changes in blood flow through the arterial lumen (20,21). The tunica intima, once thought to provide a selectively permeable barrier solely to water and electrolytes, is now known to be important for maintaining vascular structure and function through the release of various chemical factors (22). In 1980, Furchgott and Zawadzki discovered that an intact endothelium was critical to endothelial-dependent arterial dilation (23). Endothelial cells work like paracrine organs to facilitate adjustments to arterial luminal diameter, such that through mechano-transduction, the tangential force – SS along the endothelial cells, signals an influx of calcium (Ca^{2+}) into the cells, which binds to endothelial nitric oxide synthase (eNOS) (24). eNOS then catalyzes the synthesis of nitric oxide (NO) from the amino acid L-arginine (24). Upon eNOS activation, the newly formed NO diffuses into the underlying arterial smooth muscle layer, where it activates guanylate cyclase (GC)

(**Figure 2**). GC converts guanosine triphosphate (GTP) into cyclic guanosine monophosphate (cGMP), which then induces smooth muscle relaxation and arterial dilation. There are other mechanisms that can promote arterial vasodilation, namely through endothelium-derived hyperpolarizing factor and endothelial-derived prostaglandins (25). Nevertheless, NO is considered the primary regulator of endothelium-dependent vasodilation (26). The chemical pathways described above are controlled by mechanisms that regulate changes in blood flow, such as those seen with exercise (27), while damage to the endothelium or reductions in endothelial function are associated with CVD risk factors, such as physical inactivity, resulting in the reduced bioavailability of NO, which is seen as the hallmark of endothelial dysfunction (28).

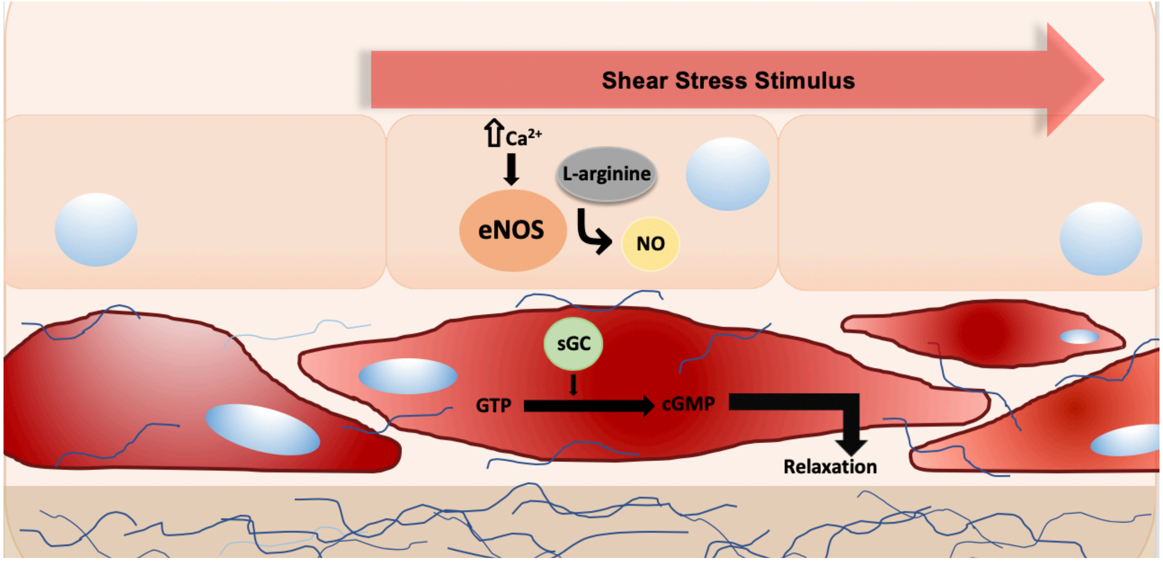

Figure 2. Endothelial-dependent dilation. The tangential shear stress stimulus of blood flowing through the arterial lumen activates eNOS through Ca^{2+} channels on the surface of the endothelium. Activated eNOS stimulates the production of the potent vasodilator, NO in the endothelial cell, which diffuses into the smooth muscle cells and activates a G-protein signaling cascade. Smooth muscle relaxation and arterial dilation occurs (eNOS, endothelial nitric oxide synthase; Ca^{2+}, calcium; NO, nitric oxide; GC, guanylate cyclase; GTP, guanosine triphosphate; cGMP, cyclic guanosine monophosphate).

1.3. Flow-mediated dilation as an assessment of endothelial function

Endothelial function can be measured both invasively and non-invasively. Cardiac catheterization is considered a standard technique for assessing coronary artery endothelial function (29). This technique involves the intra-arterial administration of acetylcholine – a vasodilatory substance, while measuring changes in blood flow by Doppler flow wire and blood vessel diameter by coronary angiography (29,30). A very common non-invasive, standardized method used to measure arterial endothelial function, the FMD technique, is based on the premise of inducing a vasodilatory response at the brachial artery caused by blood flow-induced SS. In 1992, Celermajer *et al* published the foundational paper conceptualizing the measurement of endothelial function using the FMD technique. Since its inception, FMD has become a validated and popular method used to measure vascular arterial responses to altered blood flow states (31–33). Brachial artery FMD assesses artery endothelial function at the upper limb and has been shown to be closely associated with central coronary artery endothelial function (13,30,34), such that there is a high correlation between brachial artery FMD and coronary artery endothelial function, when assessed using catheterization (13). Additionally, in a study of 435 participants and another study of 618 healthy, middle-aged subjects with low clinical risk and absent of known cardiovascular events, FMD independently predicted cardiovascular events over and above traditional risk factors, when followed-up, on average, between 2.7 and 4.6 years (14,15).

Using brightness mode ultrasonography, the FMD test measures endothelial-dependent dilatory capacity, whereby brachial arterial diameter proximal to the antecubital fossa is measured at rest to assess baseline arterial diameter. A pneumonic cuff is placed on the forearm distal to the olecranon process and inflated to supra-systolic pressures, inducing an ischemic state for 5 minutes. Upon cuff deflation, increased blood flow rapidly elevates SS forces through the brachial artery, along the tunica intima and a brief state of reactive hyperemic (RH) ensues, causing the release of NO from the endothelial cells and a vasodilatory response is captured post-occlusion. (**Figure 3**). According to standard protocol, arterial diameter is then typically quantified using edge-detection software (10). Absolute (mm) and relative (%) change in diameter is expressed using the peak and resting arterial diameters. Larger FMD responses suggest increased endothelial function, while smaller FMD responses indicate endothelial impairment or dysfunction. Not only is brachial artery FMD related to coronary endothelial function (13,34), but the test is also an independent predictor for CVD (35,36). A meta-analysis conducted in 2010, involving 14 cohort studies, made up of 5547 adult participants determined that a 1% decrease in FMD is associated with 8-13% increase in future CVD risk, (37).

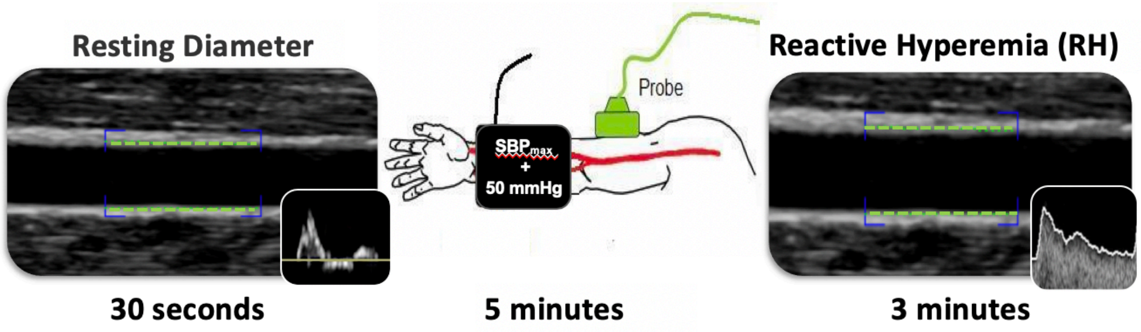

Figure 3. Flow-mediated dilation technique. Thirty seconds of resting arterial diameter is captured at the brachial artery, proximal to the antecubital fossa prior to the induction of a 5-minute ischemic stimulus at the forearm. Three minutes of RH is recorded following the deflation of the pneumonic cuff.

1.4. Risk factors preceding endothelial cell damage

Damage to endothelial cells, otherwise known as endothelial cell injury, typically precedes the development of atherosclerosis, which is defined as the accumulation of cholesterol deposits in the intimal layer of blood vessels (38,39). These initial insults to the endothelial cells typically have their origins in childhood, with the presence of fatty streaks, otherwise known as minimal sudanophilic intimal deposits identified in the abdominal aorta of children as young as 3 years of age (40,41). A post-mortem autopsy study conducted in 93 subjects between age 2 to 39 years, identified those with 3 or 4 traditional risk factors including high body mass index (BMI), elevated systolic blood pressure (SBP), serum triglyceride concentration and serum LDL concentrations had fatty lesions and fibrous-plaque lesions in the coronary arteries 8.5 and 12 times as great compared to those with less than 3 risk factors, respectively (42).

According to Voller and Strong's multifactorial hypothesis, various risk factors may act together in numerous ways, at specific time points to cause endothelial cell injury (39). The accumulation of multiple risk factors beginning during childhood, is thought to accelerate atherosclerotic lesion development, increasing the risk for CVD later in life. Exposure to risk factors associated with endothelial cell damage may result in failure to regulate changes in blood flow, and SS chronically, which may then lead to the series of steps promoting the development of intimal lesions (43). The first evidence of the multifactorial process is the presence of non-elevated fatty intimal lesions comprised of connective tissue, lipid material and other substances with no significant underlying vascular damage (39,41). Eventually as the disease progresses, these intimal lesions are converted into fibrous plaques with lipid deposits remaining in the core (39,41). Over time, the fibrous plaques may become larger and progressively cause stenosis in the lumen of the vessel, especially if another plaque is forming on the opposite side (41). A fibrous plaque can continue to become sufficiently larger through the accrual of additional lipid to its surface, making the area for blood to flow through the lumen significantly smaller (41). This inflammatory response continues through a positive feedback loop, resulting in substances such as fibrin, platelets and blood cells to collect in the mesh of arterial connective tissue (39,41). Similar to a cancerous tumour, the fibrous mass may become vascularized, increasing the risk for thrombosis, ulceration, hemorrhage and even full vessel occlusion (41). Some of the earliest work conducted to assess CVD risk factors in children was done in the 1970s through the Bogulusa study in the USA. Children between birth and 26-years of age were assessed three times over a five-year period for CVD risk factors which included measuring metabolic markers, such as serum lipid and lipoprotein levels (44). Upon repeated measures, they determined high levels of serum lipids and β-lipoprotein cholesterol, may increase risk for CVD later in life (44,45).

1.5.Vascular function in children

1.5.1. Vascular function impairments in children with chronic conditions

Children with chronic health conditions are more likely to develop risk factors related to CVD mortality risk when compared to those without disease. Like adults, children with chronic kidney disease are more likely to develop higher rates of CVD-related risk factors such as development of atherosclerotic heart disease, congestive heart failure and myocardial infarctions (46). The 2017 annual report out of the US Renal Data System indicated that children and adolescents under the age of 21 years with end-stage renal disease on dialysis treatment were expected to live 42 to 53 years less compared to the general population (47). Similarly, those with Type 1 Diabetes Mellites (T1DM) demonstrate between a two- and ten-fold increase risk of death from CVD compared to the healthy population. A recent study determined that 52 children aged 4.5 years on average, living with T1DM had significantly lower FMD compared to age and gender-matched controls by 65%, increasing their risk for future CVD risk (48). In another study investigating children with T1DM, 45 subjects with T1DM were compared to 35 healthy controls between 7 and 14 years of age, and reported healthy children had 50% higher FMD compared to those with diabetes, indicating healthy children have better endothelial function compared to those with T1DM (49,50). Kawasaki disease (KD) is another chronic disease inflicting pediatric populations, and has garnered attention as a risk factor for CVD (51,52). In 2005, Kadono *et al* investigated the effect of FMD in pediatric populations of T1DM, KD and controls, between 3 and 23 years of age and determined that both disease states displayed impairments in endothelial function compared to controls (53). While understanding the trends in FMD in populations of children with chronic diseases, it is equally important to consider trends in arterial function in healthy children to better understand endothelial function in a system not compromised by factors associated with chronic diseases.

1.5.2. Trends in endothelial function with age and sex in children

Throughout the early years and during adolescence, children experience more rapid physical changes compared to any other period throughout the lifespan in accordance with growth and maturation. These changes include increases in the size of peripheral arteries such as the brachial artery. Between the ages of 6-18 years, healthy boys typically demonstrate a larger resting arterial diameter compared to age-matched girls (16). Additionally, with age, peripheral artery size increases, regardless of observed gender differences (16,18,53,54). Endothelial function also demonstrates progressive changes during this critical period of growth and development in both males and females, however no standardized, normative FMD values have been determined in the current FMD literature.

While there is a considerable amount of previous work outlining endothelial function in children with chronic health conditions, Hopkins *et al* (2015) (16) stress the importance of understanding trends in FMD in healthy populations. When assessed cross-sectionally, endothelial function in post-pubertal males decreased, while endothelial function plateaued in females at age 12 years in a group 978 healthy children between 6 and 18 years of age, with females having larger FMD's compared to males (16). Another study also reported females had larger FMD values compared to males between ages 10-17 years (18).

While normative values for endothelial function have not yet been validated in pediatric populations a technique known as allometric scaling is a controversial, yet available method to standardize FMD with respect to differences in arterial diameters between sexes, populations and age groups. Upon allometrically scaling FMD to account for differences in baseline diameters between girls and boys, Hopkins *et al* (2015) (16) found sex differences were attenuated between the ages of 6-18 yrs, suggesting that because boys have larger arterial diameters than age-matched girls therefore, the capacity for the male artery to dilate is diminished.

1.6. Physical activity in children

1.6.1. Physical activity guidelines for children

It is well known that engaging in regular physical activity (PA) promotes health by decreasing the risk of noncommunicable diseases associated with age, such as osteoporosis, obesity and other metabolic and CVD across all ethnicities, genders and socioeconomic statuses (55,56). Of the modifiable risk factors suggested by Voller and Strong (1981), PA continues to be highlighted as a non-medicinal therapy shown to improve vascular heath and prevent CVD for all ages (57–59). In June 2016, the Canadian Society for Exercise Physiology (CSEP) released the Canadian 24-hour movement guidelines for the school-aged years (5-17 years). These guidelines highlight four specific elements instrumental to healthy active living behaviours, which include sweat, step, sleep and sit (60). The guidelines suggest that children during their school-aged years should: *"accumulate at least 60 minutes per day of moderate to vigorous physical activity involving a variety of aerobic activities. Vigorous physical activities and muscle and bone strengthening activities should each be incorporated at least 3 days per week* (60)*."* In November 2017, the Canadian 24-hour movement guidelines for the early years (0-4 years) were established (61). CSEP (2016) proposes that the benefits of following the PA guidelines counteracts any possible PA-related health detriment. The 2017 guidelines for the early years suggest preschool children, aged 3-4 years, should: *"accumulate at least 180 minutes per day in a variety of physical activities, of which at least 60 minutes is energetic play – more is better. Not being restrained for more than 1 hour at a time or sitting for extended periods. Sedentary screen time should be no more than 1 hour; less is better. And when sedentary, engaging in pursuits such as reading and storytelling with a caregiver is encouraged* (61)*."*

1.6.2. Early physical activity engagement improves cardiovascular health in children

Physical activity exerts a positive effect on arterial function (53,57,62). Other novel, yet popular measures of vascular health are whole body-pulse wave velocity (PWV), β-stiffness index and carotid intima media thickness (cIMT). PWV is a measure of the speed of the arterial pressure wave propagation and is an index of arterial wall stiffness, whereby increases in stiffness are associated with increased risk for a host of CVD, such as stroke, and coronary artery disease (11,63–65). β-stiffness index measures the mechanical properties of the arterial wall and elevations in carotid and aortic artery stiffness indices are related to the severity of coronary atherosclerosis (66). cIMT is a reliable measure of lumen-intima interface to the media-adventitia interface taken using ultrasonography at 1-2cm proximal to the carotid bifurcation (67).

Recently, a prospective, observational cohort study of 418, 3- to 5-year-olds, assessed annually over a 3-year period demonstrated that those who engaged in higher levels of MVPA had improved age associated trajectories of whole-body PWV and carotid artery β-stiffness index (57). This investigation also measured total physical activity (TPA), and showed that the relationship with PWV was consistent over time (57), however, the rate of change in PWV differed with levels of MVPA, with higher levels of MVPA being associated with a slower increase in PWV (57). This relationship with MVPA was mirrored for carotid β-stiffness, while this relationship was not observed for TPA (57). Taken together these results suggest that children who engaged in greater amounts of MVPA, but not TPA, attenuated their expected age-related increase in arterial stiffness. While these results suggest the beneficial effects of MVPA on novel measures of vascular health, there remains a paucity of literature examining the possible relationships between MVPA and FMD, using cohort-based longitudinal analysis.

Through cross-sectional study designs, it is well established that PA has an impact on vascular endothelial function in young children between the age of 5-17 years. In a study of 45 children between the age of 5-10 years, physical activity, expressed as a ratio between total energy expenditure and resting metabolic rate in both males and females was correlated with FMD, and remained correlated after adjusting for age, and age and sex (62). A randomized study of 483 healthy adolescents at age 13 years assessed PA using questionnaires, to capture subjective information about each child’s participation in, and frequency, duration and intensity of PA (68). In this study vascular endothelial function, assessed at the brachial artery using the FMD test was positively correlated with higher levels of PA in the boys, however the girls showed no association, which was credited to less engagement in physical activity compared to their male counterparts (68).

The differences observed in endothelial function between males and females was quantified upon normalizing FMD to shear rate as was suggested in the technical guidelines at the time (19,69), however, the most recent standards for analyzing FMD suggest scaling the relative change in arterial diameter to baseline diameters which is seen as an advanced scaling method to account for inter-participant diameter variability (70). In another study, investigating the relationship between PA and vascular function in a sample of 129 children aged 10-11 years old, highlighted those who participated in greater amounts of intense PA demonstrated enhanced FMD, especially those that were stratified to the lowest FMD tertials; while this relationship was not observed in those in the highest PA tertials (19). It has been suggested that children who participate in greater amounts of high intensity PA, may receive the most benefit in terms of future CVD risk through improving endothelial function rather than enhancing their cardiorespiratory fitness *per se* (19).

1.6.3. Definition of physical activity in children

Physical activity is defined as any bodily movement, conducted via skeletal muscle, that results in energy expenditure (71). Importantly, physical activity differs from exercise and physical fitness, in that exercise is widely considered a sub-category of physical activity, whereby movement is planned, purposive and structured (71). Additionally, physical fitness is defined as a set of attributes that people have, or achieve, which can be measured using health-related, or athletic ability, components. Such health-related components include cardiorespiratory and muscular endurance, body composition and flexibility (71). Trost and Neil, 2013 describe physical activity as a complex health behaviour that can be categorized into dimensions and domains (72). Dimensions of physical activity include frequency, intensity, type and time, which are described as objective measures used to overcome reporting biases common with subjective methods of physical activity assessment (72). Domains of physical activity are described as the specific capacity in which PA is attained, including occupational, leisure time and activity associated with transportation (72).

According to the most recent ParticipACTION report card released on June 19, 2018, only 39% of Canadian children between 5-17-years-old meet the age-recommended PA guidelines, resulting in a score of D+ (73). This is a perceived improvement in rating compared to the D- awarded in the 2016 report card, however, the grade change reflects a new approach to assessing PA in each age group, so children have not improved nor declined in meeting the guidelines since 2016. More specifically, there have been no changes in the amount of moderate-to-vigorous physical activity (MVPA) in Canadian children and youth between 2007 and 2015 (74). Much of the report focuses on the cognitive, mental and emotional wellbeing associated with engaging in MVPA; however, it does not specifically address the issue of physical activity intensity and associated impacts on vascular endothelial function. It is perceived that through active play, defined as *"a form of gross motor or total body movement in which young children exert energy in a freely chosen, fun, and unstructured manner* (75)*,"* children will be more likely to partake in PA as there is less pressure on physical results, or measurable achievement. Through unstructured play, children are not only refining their physical abilities related to coordination, muscle strength and adaptability, but it also fosters social development, creativity and self-concept (76,77), making it a feasible and reasonable choice to measure physical activity patterns in children.

1.6.4. Measurement and assessment of physical activity

Physical activity assessment in children continues to be a controversial topic in pediatric exercise literature. Measures of physical activity must be valid, reliable, practical and non-reactive to be used in research and for evaluative purposes (78). There are 3 types of measures that are typically used to assess PA: primary, secondary and subjective (79). Primary measures are typically known to be the criterion standards to assess PA and include the doubly labelled water technique (DLW), indirect calorimetry and direct observation (79). DLW and indirect calorimetry are widely used for field assessments of energy expenditure (EE) and assesses total caloric expenditure by estimating carbon dioxide production through isotope dilution over a 3 day period (79). EE is a physiological result of PA and has been shown to have a relationship with disease prevention and health. However, studies using DLW or indirect calorimetry to assess PA-related EE in children have not shown consistent and reliable results, making direct observation (DO) a more practical alternative (79). DO of movement is seen to be the most appropriate standard for PA assessment and measurement in children because of the ability for observers to capture short term patterns and sudden changes in PA typical with activity patterns seen in children (79,80). However, this technique has limitations, including a high experimenter burden, potential participant reactivity and it is unclear what the total time of observation should be to obtain acceptable day-to-day repeatability stability (79,81).

Secondary instruments such as heart rate (HR) monitors, pedometers and accelerometers have become widely popular tools for objectively measuring PA. HR monitors used to measure EE rely on the linear relationship between HR and oxygen consumption (VO_2) in adults and youth. However, during sedentary or light intensity PA, the linear relationship is not as robust, as an individual's HR can be influenced by other facts other than body movement (82). Medications, caffeine, environmental and physiological stress can all affect HR at the low end of the PA intensity spectrum can influence HR, independent of someone's PA-related EE. Pedometers are another secondary measure used in research to measure PA, using a small, electronic device used to determine the number of steps taken over a period of time. Pedometers are simple to use, inexpensive, objective, re-usable and non-reactive; however, they are limited in their ability to capture any other information about PA patterns other than total step counts or steps taken in a discrete time interval (79).

Unlike other secondary instruments used to measure physical activity, such as heart rate monitors or pedometers, accelerometers are more complex electronic devices that detect and measure accelerations produced by body movements (79). According to Sirard *et al*. (2001), accelerometers are considered a secondary measurement instrument that provide an objective, nonreactive and re-usable tool for assessing physical activity. As a secondary measure, accelerometers have been validated against indirect calorimetry, known as a primary or criterion measure for physical activity-induced EE (79,83).

Piezoelectric technology works via the movement of a suspended seismic mass at the end of a piezoelectric element upon the detection of acceleration (84). The ActiGraph accelerometer is a tri-axial accelerometer activity monitor, meaning it is designed to capture accelerations in the longitudinal (up and down movements), anteroposterior axis (forwards and backwards movement) and mediolateral axis (side to side movement). However, vertical accelerations as a result of trunk movement produce the greatest amount of activity-related EE; thus, the vertical axis is typically assessed to quantify movement (85,86).

The Actigraph accelerometer has the capacity to be programed to capture different lengths of sampling intervals or windows, known as epochs (86). Within each epoch, raw accelerometer outputs, known as counts, are converted from an analog to digital signal (A/D conversion) after being filtered and amplified at a prefixed frequency by the device (86). An algorithm is used to determine the maximum value within a specified epoch to represent the count for that particular window of time (86). The duration of each epoch is a highly debated topic in the area of accelerometry-based PA monitoring (87–91). A common duration of 1-minute epochs is commonly used in adults; however, longer epochs risk underestimating exercise intensity, if a mixture of activity intensities is captured in that window of time (86). If high intensity physical activity is short in duration, but captured in a longer epoch, the average physical activity count will be lower than the actual PA intensity in that epoch. Children commonly perform physical activity in short bouts, such that capturing movement in short epochs, like 3-seconds, can yield a more accurate representation of true physical activity intensity (86). It is important to consider epoch length, especially when measuring PA in young children to accurately capture the PA intensities they perform their physical activities in.

1.7. Purpose and Hypothesis

Evidently, robust longitudinal cohort studies are needed to better understand the impact that early investment in physical activity has on endothelial function as an emerging CVD predictive test for vascular function during later stages of childhood. Trends in endothelial function measured throughout a discrete time period during the school-aged years have not been investigated via longitudinal, cohort-based investigations. Additionally, recent evidence suggests that children who engage in higher amounts of PA, specifically MVPA during the early years of life, demonstrate better cardiovascular health trajectories specifically in whole body pulse-wave velocity and β-arterial stiffness index in the carotid artery (57). Children, both during the preschool years and throughout youth, into adolescents are encouraged to engage in daily energetic play as outlined in the most recent edition of the Canadian Physical Activity Guidelines (60,92).

Therefore, the purposes of this study were:

(1) Understand the relationship between chronological age and biological age, measured as maturity offset and brachial artery endothelial function during the school-age years, in the SKIP study;

(2) Assess the changes in brachial artery endothelial function over a three-year period in school-age children;

(3) Understand the impact of habitual PA on brachial artery endothelial function during the school-age years;

(4) Assess the relationship between the early engagement in habitual PA (during the preschool-ages of 3-5-years) on brachial artery endothelial function, during the school-age years.

Based on previous cross-sectional analysis of classifications of arterial diameter sizes and FMD differences between boys and girls (16,53), we hypothesized that;

(1) Relative brachial artery FMD would not differ over a span of three years or between sexes, when scaled for baseline diameter in our cohort of pre-pubertal children;

(2) Brachial artery diameter will increase with age in both sexes; however, we predict males will have larger diameters compared to their female counterparts;

(3) Based on recent findings, indicating that active preschoolers demonstrate reduced PWV and β-arterial stiffness index (57), we hypothesized that children who participate in greater amounts of MVPA (mins/d) during their school-age years, would have improved longitudinal trajectories of FMD when compared to children who engage in less MVPA in this cohort; and

(4) Since it is well established that the development of CVD risk factors begin in very early childhood, much attention is being steered towards understanding what preventative measures can be established early in life to delay CVD manifestation (40). Therefore, the final (4) hypothesis of this investigation was that there will be a positive relationship between the amount of time preschoolers spend engaging in habitual MVPA and their endothelial function later on in childhood, their school-age years.

1.8.References

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CHAPTER 2:

The Impact of Objectively Measured Physical Activity in Preschoolers on Endothelial Function During the School-Aged Years

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Ms Bacauanu collected, analyzed and interpreted FMD vascular data and drafted this thesis; Ms Proudfoot, coordinated the HOPP study, collected physical activity data for the HOPP study, assisted with SKIP vascular data collection and contributed to statistical advice; Dr Currie assisted with data collection for the SKIP study; Ms Di Cristofaro coordinated the SKIP study, collected and analyzed the physical activity data; Ms Caldwell collected and analyzed physical activity data; Drs Timmons and MacDonald conceptualized and designed the study, obtained funding for the data, supervised the study and interpreted the data; Dr MacDonald provided the techniques for the vascular assessments and critically reviewed and revised this thesis.

2.1. Introduction

The development of atherosclerotic lesions and the initiation of endothelial cell damage originate during early childhood, with the presence of fatty streaks and subsequent risk for future cardiovascular disease (CVD) present in the coronary arteries during the adolescent years (42,93–96). One cross-sectional study evaluating vascular health in healthy children aged 6-18 years, showed that flow mediated dilation (FMD), a measure of vascular health decreased in males up to age 18 years and plateaued in females by age 12 years (16). However, Kadono *et al* (2005), observed no differences in FMD between males and females with increasing age. Both studies described a consistent trend in arterial diameters between boys and girls with age, with both sexes demonstrating an increase in peripheral artery diameter between the ages of 3-23-years-old. Additionally, boys tend to have larger resting and peak arterial diameters at every age compared to girls (16,53). Physical activity (PA) in children has been shown to be associated with improvements in vascular endothelial function using the FMD test, which measures arterial vasodilatory capacity – an indication of endothelial-dependent function (19,62,68,97,98). In cross-sectional studies, higher intensity PA, such as moderate-to-vigorous PA (MVPA) tends to have a greater effects on endothelial function, as demonstrated with higher FMD compared to sedentary behaviours, or light physical activities (LPA) (62,97,98). The mechanism underlying the increases in endothelial function associated with higher intensity PA (e.g. running, cycling) is thought to be due to the increases in blood-flow mediated shear stress (SS), which cause an augmentation in the release of the pro-dilatory substances such as nitric oxide (NO) (21,26,27,99). It has become apparent that the prevention of endothelial damage and the promotion of preventative techniques to delay the onset of atherosclerosis are important in order to avoid or delay CVD risk at very early ages. With the release of the Canadian Physical Activity Guidelines, suggesting children, both during the preschool years and throughout youth, into adolescence should engage in daily energetic play (60,92); the purposes of this study were to:

(1) understand the relationships between biological and chronological age and endothelial function during the school-age years;

(2) assess the changes in endothelial function over a three-year period in school-age children;

(3) understand the impact of habitual PA on the trends in endothelial function during the school-age years; and

(4) assess the relationship between the early engagement in habitual PA on endothelial function, specifically during the preschool-ages of 3-5-years-old and the impact on the trends in endothelial function observed during the school-age years.

We hypothesized that:

(1) relative brachial artery FMD would not differ over time or between sexes in our cohort of pre-pubertal children;

(2) brachial artery diameter, will increase with age in both sexes, and that males will have larger diameters compared to their female counterparts

(3) children who participate in greater amounts of MVPA (mins/day) during their school-age years, will have improved longitudinal trajectories of FMD when compared to children who engage in less MVPA in this cohort; and

(4) that early investment in MVPA in the preschool years will result in improved longitudinal trajectories of FMD during the school-age years.

2.2. Methods

2.2.1. Participants

Participants and their families attended the laboratory for 2 visits each year, annually, for 3 years. Each year, a host of vascular health assessments were conducted during one visit and a series of physical activity, fitness and motor proficiencies took place during the other visit. Initially, 418 children were recruited to participate in the Health Outcomes and Physical activity in Preschoolers (HOPP) study, initially aged 3, 4 and 5 years old, of whom 42 withdrew or were lost to follow-up by the final year of the study (5% attrition per year). For the HOPP study, recruitment took place from August 2010 to August 2012 in south-central Ontario, Canada, including the city of Hamilton through local schoolboards, community events, preschools, early child-care centres/day-cares and word of mouth. Exclusion criteria included children with a physical disability, known motor delay, or a diagnosed medical condition (e.g. cystic fibrosis, asthma, arthritis, diabetes, inflammatory conditions). Children completed a series of assessments over 2 visits separated by an average of 19±14 days. Participants and their families followed the same annual procedure for each assessment conducted at McMaster University in the Vascular Dynamics Lab and the Child Health and Exercise Medicine Program. In this investigation, we were interested in utilizing each participant's earliest measure of MVPA (mins/d) as an indicator of habitual PA performed in children at the youngest age possible. The average age for the children from the HOPP study included in this analysis was 4.6±.89 years old, with the earliest measure of PA obtained from 78 three-year-old's, 106 four-year-old's, 93 five-year-old's, 1 six-year-old and 1 seven-year-old.

The School-age Kids' health from early Investment in Physical activity (SKIP) study is the sequel to the HOPP study. Participants enrolled in the original HOPP study were invited to return to participate in the SKIP study in the Vascular Dynamics Lab and the Child Health and Exercise Medicine Program at McMaster University over an additional 3-year period. Participants and their families were contacted though email and telephone if they had already consented to be contacted during the HOPP study. Initially, 279 participants age 8.83±1.04 years were enrolled in the SKIP study in year one. By the final year, 245 children age 10.69±1.07 years completed the study (6% attrition rate per year). Exclusion criteria included children with a physical disability, known motor delay, or a diagnosed medical condition (e.g. cystic fibrosis, asthma, arthritis, diabetes, inflammatory conditions). As with the HOPP study participants and their families followed the same annual procedure for each assessment conducted at McMaster University in the Vascular Dynamics Lab and the Child Health and Exercise Medicine Program.

2.2.2. *Study design and protocol*

2.2.2.1. *Independent variable: MVPA*

The HOPP study was a prospective cohort study designed to assess the relationship between PA and health outcomes in preschool-age children (100). Data collection occurred over 2 study visits with an additional 7 days of habitual PA monitoring. Parents and children visited the laboratory where the study was explained in detail and questions were answered by study examiners. Written informed consent was obtained from the parents and the Hamilton Health Sciences/Faculty of Health Sciences Research Ethics Board provided ethical approval for the study. Parents provided demographic information and completed questionnaires, while the rest of the first visit was used to assess motor skills, short-term muscle power, aerobic fitness and body composition. At the end of the first visit an accelerometer was provided to the child and they, along with their parents, were given detailed instructions for its use over the next 7 days (100). For the second visit, parents and participants returned to the lab for measurements of indices of vascular structure and function and the accelerometer was returned or mailed back.

The SKIP study continued to employ a longitudinal, within-subject, observational design to study the associations between physical activity engagement during the early years and health outcomes in the school-aged years. Annual assessments followed the same timeline as originally proposed in the HOPP study and were measured once per year, for 3 years, as close as possible to the date of the previous year’s testing. During the first visit, parents provided demographic information, including a questionnaire with parental beliefs/support about their child's PA as well as their own. The remainder of the visit involved assessments of indices of vascular structure and function followed by assessments of anaerobic and aerobic fitness, body composition, assessments of motor skill proficiency and questionnaires related to parental and peer support, health-related quality of life and self-efficacy. Prior to leaving the laboratory, children were fitted with an accelerometer on their hip to monitor habitual PA and provided with a detailed instruction booklet with tracking logs for use for the next 7 days. Research assistants and graduate students were made available to keep in touch with the families via email or phone to answer any questions. For the purposes of this investigation, habitual PA and vascular endothelial function measurement methods will be discussed in more detail.

2.2.2.2. Physical activity assessment

Habitual physical activity was assessed using accelerometry in both the HOPP and SKIP studies. PA was assessed using uniaxial accelerometers, (ActiGraph GT3X line) for a period of 7 days during all waking hours, while participants were instructed to remove the device during prolonged water activities. Participants were instructed to wear the accelerometer around their hip as this is the most accurate location to measure whole-body movement. Data was downloaded in 3-second epochs and analyzed using ActiLife software (version 6.6.3; ActiGraph) allowing better accuracy for children's PA behaviour (101). Inclusion criteria for acceptable data included wear time of at least 10 hours per day, with at least 3 days of wear during the 7-day monitoring period each year. Data were analyzed in the vertical plane for total minutes per day of MVPA using the Pate cut-points of ≥84 counts per 3-sec epoch for participants in the HOPP study (102). Similar to the HOPP study, habitual physical activity measured in the SKIP study used the same uniaxial accelerometers placed on the hip. Data were downloaded and analyzed using the ActiLife software in 3-second epochs and inclusion criteria for acceptable data mimicked that used in the HOPP study. However, because children in the SKIP study were older, Evenson cut-points were used to determine time spent in MVPA at ≥116 counts per 3-second epochs (103).

2.2.2.3. Outcome variable: flow-mediated dilation

Prior to each visit, participants were instructed to abstain from vigorous physical activity for at least 24 hours and refrain from consuming food for 3 hours prior to their visit. In addition, participants were instructed to refrain from consuming foods containing vitamin C, nitrites and caffeine for at least 24 hours prior to their visit. Upon arrival to the laboratory, participants began each visit with at least 20 minutes of supine rest and were instrumented with two sets of single-lead ECG (Powerlab model ML795, AD Instruments, Colorado Springs, CO, USA). Brachial artery endothelial function was assessed using the FMD test at the left arm with a 12-MHz linear array ultrasound probe in the duplex mode at a sampling rate of 7.7 frames per second, depth level at 3.0 and an insonation angle of ≤68° (Vivid q; General Electric Medical Systems). B-mode ultrasound images of arterial diameter and blood velocity were collected simultaneously 3-5cm proximal to the antecubital fossa. Following collecting 30sec of resting arterial diameter, a pneumonic cuff on the left distal forearm was rapidly inflated (model E20 and AG101; Hokanson, Bellevue, WA) to supra-systolic pressure 50mmHg above maximum resting, supine systolic blood pressure to occlude the artery. Following 5 minutes of arterial occlusion, the cuff was deflated, and 3 minutes of continuous ultrasound imaging was used to capture the change in arterial diameter and blood velocity, in the post-occlusion phase of the test. Ultrasound images were saved in digital imaging and communications in medicine (DICOM) format for diameter analysis, and end-diastolic frames were selected using a DICOM editing software program (Sante DICOM Editor 3.1.13, Santesoft, Athens, Greece). A single rater analyzed images off-line using semi-automatic edge tracking software at specific regions of interest (ROI) (Arterial Measurement System, Gothenburg, Sweden) to determine arterial diameter. Within an individual, all 3 FMD time points were analyzed at the same time to permit consistent identification of the ROI. An online random number generator set between 1 and 3 was used to randomize the order of FMD analysis for each individual. Absolute and relative FMD was calculated using equations (1) and (2) respectively, where ED stands for end-diastolic:

$$absolute\ FMD\ (mm) = postocclusion_{EDdiameter} - preocclusion_{EDdiameter} \qquad [1]$$

$$relative\ FMD\ (\%) = 100\left(\frac{absolute\ FMD}{preocclusion_{EDdiameter}}\right) \qquad [2]$$

Blood velocity was obtained in duplex mode and saved in Audio Video Interleave (AVI) format. Signals were analyzed off-line using an automatic pixel-based software to determine mean blood velocity (Measurements from arterial Ultrasound Imaging software, Hedgehog Medical). Endothelial shear rate (SR in s^{-1}), tangential force of blood flow against the arterial wall, was calculated along with FMD (52) was calculated using the formula below, where V stands for blood velocity [3]:

$$SR = \frac{8 \times V}{ED\ diameter} \qquad [3]$$

The use of ratio statistics such as FMD% is based on the assumption that unity is satisfied such that the relationship between the numerator and denominator is linear and crosses through the origin. Allometric scaling is an option that should be performed to avoid under- or over-estimating FMD% for arteries of different sizes (105). In order to verify whether the data permits allometric scaling, linear regression analysis was conducted on the natural log-transformed data, with logged resting diameter $ln(Drest)$ as the independent predictor and logged peak diameter, $ln(Dpeak)$, as the dependent variable. An unstandardized β coefficient deviating from 1 and 95% confidence intervals with an upper limit less than 1 indicate a violation of the ratio assumption (105). To correctly adjust for differences in resting diameter, Atkinson and Batterham suggest an analysis of covariance (ANCOVA) on the natural log-transformed data, using [$ln(Dpeak)$ – $ln(Drest)$] as the dependent variable and $ln(Drest)$ as the covariate. The ANCOVA estimated means are back transformed to calculate scaled FMD for group averages, and the regression slope is used to calculate scaled FMD ratio for individual participants.

2.2.3. Statistical Analysis

Linear mixed-effects modeling with the restricted maximum likelihood method was used to determine both the trend in FMD, over the 3-year period, in school-aged children and the effect of MVPA (mins/day) during preschool (MVPA-H) and school-aged (MVPA-S) on the trends in FMD. This method accommodates for missing data by creating estimates using all data available for each participant. The same approach was used for modeling each independent variable, (age, sex, MVPA during SKIP (MVPA-S) and MVPA during HOPP (MVPA-H). We determined the effect of chronological age, in years, and biological age, using years to peak height velocity (YPHV), in school-aged children, on FMD (model 1), and subsequently assessed for the combined effects of age and sex on FMD (model 2). Biological age as YPHV, was calculated using the Mirwald Equation incorporates an individual's sex, chronological age, height, sitting height, weight and leg length to calculate the number of years remaining until a child reaches their age of peak height velocity (APHV) at which peak height velocity occurs (106). All models were adjusted for the child's chronological initial age at enrollment in the SKIP study, sex, height z-score and BMI z-score as a surrogates for growth at each visit as seen in **Table 9** (107). The most recent publication from the HOPP study implemented similar mixed-effects modeling to demonstrate the effect of MVPA-H on novel measures of vascular health indices measured during the preschool years, including cardiovascular fitness, systolic blood pressure, PWV and carotid β stiffness. This study showed significant MVPA-H × time interactions, suggesting that in preschoolers, age-related increases in arterial stiffness were diminished in children who performed greater amounts of MVPA (57). In the current study, sex differences were assessed using independent groups t-test or analysis of variance.

To determine if MVPA-S impacted the trends in FMD, linear mixed-effects modeling similar to that used in model 1 and 2 was used however, MVPA-S was added to the model (model 3) and MVPA-S × Age was included (model 4). To assess the additional impact of MVPA-H on school aged FMD, MVPA-H was added to model 3 and MVPA-H × Age was added to model 4. A random intercept at the participant level was included in all models. Significant interactions or main effects were examined using the Fisher's least significant difference (LSD) approach for multiple comparisons (105). Data are presented as means plus standard deviation (SD) unless stated otherwise and significance was set at p=0.05. Statistical analysis was performed using SPSS Statistics (Version 23.0, for macOS, Chicago, IL), SAS University Edition (release 3.8; SAS Institute, Inc, Cary, NC) and GraphPad Prism (Version 8.2.0 (272), for macOS; San Diego, CA),

Table 1. HOPP descriptive statistics.

	Cohort	Girls	Boys	*P* Value
n	279	135	144	
Age, yr	4.58(.894)	4.63(.878)	4.53(.909)	.355
Height, m	107(7.52)	108(7.47)	108(7.58)	.365
Weight, kg	18.0(3.05)	17.8(3.06)	18.2(3.04)	.337
BMI, kg/m^2	15.6(1.25)	15.5(1.32)	15.6(1.18)	.473
Valid days	5.62(1.36)	5.68(1.37)	5.56(1.35)	.446
Wear time, min/d	721(41.2)	721(40.5)	720(42.0)	.866
MVPA, min/d	95.6(21.5)	86.8(18.2)	104(21.0)	<.001**

Values are means (SD); *n*=number of subjects in each group who met accelerometer wear time criteria of ≥10 h on ≥3d; *P* value denotes significant sex differences; **$P < 0.001$.

Table 2. HOPP descriptive data by age in yearly decrements.

Age, yr	*n*	Height, m	Weight, kg	BMI, kg/m^2	Valid days	Wear time, min/d	MVPA, min/d
3	78	99.3(4.77)	15.7(2.05)	15.9(1.09)	5.30(1.58)	709(37.6)	94.0(21.7)
4	106	107.1(5.11)	17.9(2.41)	15.5(1.22)	5.65(1.32)	715(40.0)	96.2(21.2)
5	93	113.8(4.88)	20.0(3.05)	15.4(1.36)	5.85(1.16)	738(42.7)	96.3(21.7)
6	1	109.9	18.9	15.7	7.00	685	67.6
7	1	122.9	22.7	15.0	5.00	699	116.6

Values are means (SD); *n*=number of subjects in each group.

Table 3. SKIP descriptive statistics.

	Cohort	Girls	Boys	*p* value
n	279	135	144	
Age, yr	9.70(1.33)	9.78(1.29)	9.62(1.36)	.100
YPHV, yr	-2.62(1.31)	-1.87(1.17)	-3.31(1.03)	.006*
APHV, yr	12.3(.847)	11.6(.501)	12.9(.583)	.002*
Height, m	139.3(10.8)	139.1(10.6)	139.5(10.9)	.003*
Weight, kg	33.6(9.36)	33.8(9.57)	33.4(9.17)	.064
BMI, kg/m^2	17.0(2.73)	17.2(2.77)	16.9(2.69)	.331
Valid days	5.57(2.08)	5.44(2.15)	5.70(1.99)	.066
Wear time, min/d	763(49.9)	763(47.5)	763(52.0)	.950
MVPA, min/d	66.9(21.2)	60.4(18.7)	72.8(21.5)	<.001

Values are means (SD); *n*=number. of subjects in each group; YPHV, years to peak height velocity; APHV age of peak height velocity. *P* value denotes significant sex differences; **P* < 0.05.

Table 4. SKIP descriptive data by age in yearly decrements.

n	Age, yr	YHPV (yr)	APHV (yr)	Height, m	Weight, kg	BMI, kg/m^2	Valid days	Wear time, min/d	MVPA, min/d
4	6	-5.12(.514)	11.5(.578)	120(7.32)	23.1(3.42)	16.0(0.53)	5.00 (1.79)	700 (34.8)	74.8 (9.00)
67	7	-4.34(.641)	11.5(.617)	126(6.04)	25.9(5.22)	16.2(2.10)	5.98 (1.45)	744 (36.8)	72.9 (21.7)
135	8	-3.55(.692)	12.1(.665)	132.2(6.65)	29.0(5.55)	16.4(2.10)	6.01 (1.38)	753 (43.2)	72.3 (20.2)
204	9	-2.80(.773)	12.3(.765)	138.3(6.85)	32.6(7.34)	16.9(2.60)	5.91 (1.63)	767 (56.3)	67.2 (19.6)
187	10	-1.97(.907)	12.4(.874)	143.9(7.67)	36.3(8.62)	17.4(2.92)	5.97 (1.65)	771 (47.1)	64.7 (20.7)
105	11	-1.23(1.00)	12.7(.991)	150.1(7.74)	40.7(10.6)	17.9(3.18)	5.75 (1.89)	772 (50.8)	59.9 (23.1)
30	12	-.628(.980)	13.0(1.00)	152.3(16.4)	43.3(13.6)	18.3(3.78)	5.63 (1.73)	762 (58.5)	61.0 (22.6)

Values are means (SD); *n*=number of subjects in each group; YPHV, years to peak height velocity; APHV age of peak height velocity.

Table 5. SKIP FMD descriptive data by age in yearly decrements.

Age, yr	*n*	Baseline diameter (mm)	Peak diameter (mm)	FMD, %	Scaled FMD, %	Time to peak, s	Peak BF, ml/min	Average BF, ml/min	Peak SR, s^{-1}	SR AUC to peak
6	4	2.70(.316)	2.77(.403)	5.79(4.92)	6.18(4.92)	56.3(8.57)	147(48.8)	73.1(26.3)	14.4(5.00)	69.4(22.8)
7	67	2.56(.269)	2.73(.284)	6.61(3.36)	6.42(3.12)	50.1(19.1)	128(47.8)	62.6(34.3)	12.0(3.78)	51.3(22.6)
8	139	2.60(.260)	2.77(.274)	6.55(3.78)	6.43(4.09)	50.5(22.4)	151(52.4)	72.2(36.8)	13.7(4.10)	58.5(26.9)
9	206	2.68(.265)	2.85(.267)	6.46(3.32)	6.53(3.67)	48.9(21.1)	161(56.1)	74.6(34.8)	13.4(433)	54.9(26.5)
10	188	2.73(.291)	2.91(.301)	6.42(3.19)	6.21(3.84)	49.0(20.3)	170(62.3)	79.2(36.5)	13.4(4.24)	53.8(24.9)
11	106	2.82(.296)	3.01(.304)	6.75(3.72)	6.69(3.59)	45.2(19.7)	198(106)	87.9(39.7)	13.2(3.73)	48.4(19.8)
12	30	2.87(.348)	3.04(.384)	6.09(3.62)	8.11(12.3)	46.0(14.2)	203(80.6)	100.0(53.1)	13.5(3.78)	50.2(19.8)

Values are means (SD); *n*=number of subjects in each group; Peak SR, s^{-1}, (x10^2); SR AUC to peak (x10^3)

Table 6. SKIP FMD descriptive statistics by sex.

	Cohort	Girls	Boys	*p* value
n	736	358	378	
Baseline diameter (mm)	2.70(.292)	2.61(.256)	2.78(.302)	<.001**
Peak diameter (mm)	2.87(.305)	2.79(.268)	2.95(.317)	<.001**
FMD, %	6.52(3.64)	6.82(3.39)	6.23(3.50)	.019*
Scaled FMD, %	6.51(4.42)	6.65(4.04)	6.38(4.75)	.410
Time to peak, s	48.7(20.5)	46.3(17.9)	51.0(22.4)	.002*
Peak BF, ml/min	166.0(69.7)	163.0(76.2)	169.0(62.9)	.230
Average BF, ml/min	77.2(37.8)	75.6(38.3)	78.7(37.3)	.271
Peak SR, s^{-1} (x10^2)	13.3(4.12)	13.9(4.16)	12.7(4.00)	<.001**
SR AUC to peak (x10^3)	53.9(24.8)	55.5(26.4)	52.4(23.1)	.089

Values are means (SD); *n*=number of subjects in each group; FMD, flow-mediated dilation; BF, blood flow; SR, shear rate; AUC, area under the curve. *P* value denotes significant sex difference. *$P < 0.05$; **$P < 0.001$.

Table 7. SKIP FMD descriptive data by age in boys.

Age, yr	*n*	Baseline diameter (mm)	Peak diameter (mm)	FMD, %	Scaled FMD, %	Time to peak, s	Peak BF, ml/min	Average BF, ml/min	Peak SR, s^{-1}	SR AUC to peak
6	4	2.80(.251)	2.90(.375)	6.34(5.87)	7.23(5.45)	58.4(9.30)	147(57.3)	73.4(32.2)	12.0(172)	60.1(16.4)
7	49	2.63(.263)	2.79(.285)	5.93(2.78)	5.95(2.69)	49.2(19.4)	131(47.7)	61.6(32.0)	11.5(3.67)	48.8(19.5)
8	80	2.68(.274)	2.84(.293)	6.10(4.18)	6.14(4.20)	54.0(25.4)	157(56.2)	72.3(35.3)	13.1(4.10)	55.8(22.7)
9	113	2.76(.271)	2.93(.281)	6.23(3.40)	6.21(3.17)	50.9(23.3)	168(58.5)	77.6(34.8)	12.9(4.13)	54.3(25.3)
10	87	2.83(.284)	3.00(.293)	6.08(2.60)	5.96(2.64)	50.1(20.1)	170(62.3)	78.1(32.3)	12.4(4.18)	50.0(23.7)
11	52	2.91(.311)	3.10(.302)	6.85(4.20)	6.90(4.17)	50.7(24.9)	201(57.8)	95.9(40.4)	13.2(3.50)	51.3(21.2)
12	17	2.96(.428)	3.12(.459)	5.59(3.35)	9.44(16.1)	46.7(16.3)	203(94.0)	103.0(57.4)	12.5(4.12)	45.6(19.2)

Values are means (SD); *n*=number of subjects in each group; Peak SR, s^{-1}, $(x10^2)$; SR AUC to peak $(x10^3)$

Table 8. SKIP FMD descriptive data by age in girls.

Age, yr	*n*	Baseline diameter (mm)	Peak diameter (mm)	FMD, %	Scaled FMD, %	Time to peak, s	Peak BF, ml/min	Average BF, ml/min	Peak SR, s^{-1}	SR AUC to peak
6	1	2.29	2.38	2.14	3.04	50.4	147	72.3	21.6	97.1
7	31	2.46(.248)	2.65(.264)	2.61(3.91)	7.12(4.03)	51.5(19.0)	123.6(48.6)	64.2(38.1)	12.7(3.89)	54.8(26.3)
8	67	2.51(.211)	2.69(.226)	7.09(3.17)	6.77(3.95)	46.3(17.5)	143.7(47.0)	72.2(38.9)	14.5(3.99)	14.5(3.99)
9	105	2.59(.229)	2.76(.222)	6.71(3.24)	6.88(4.14)	46.8(18.1)	154.4(52.8)	71.2(34.7)	13.9(4.49)	13.9(4.49)
10	104	2.65(.272)	2.83(2.85)	6.71(3.58)	6.41(4.60)	48.1(20.6)	170.4(62.6)	80.0(39.6)	14.1(4.15)	14.1(4.15)
11	54	2.74(.258)	2.92(.280)	6.65(3.23)	6.49(2.94)	39.9(10.9)	193.8(138)	80.3(37.9)	13.2(3.97)	13.2(3.97)
12	13	2.75(.146)	2.94(.236)	6.74(3.98)	6.37(3.63)	45.2(11.5)	204.3(60.6)	96.2(48.6)	15.0(2.82)	14.9(2.83)

Values are means (SD); *n*=number of subjects in each group; Peak SR, s^{-1}, $(x10^2)$; SR AUC to peak $(x10^3)$

Table 9. Linear mixed-effects model results for the effect of age and sex on arterial diameter and arterial function (Model 1 and 2).

	Chronological		Biological	
	Model 1[a]	Model 2[b]	Model 1[a]	Model 2[b]
Resting Diameter				
Age at baseline	0.06(0.015)**	0.02(0.01)	0.06(0.015)**	0.01(0.01)
Height	0.10(0.013)**	0.04(0.01)	0.10(0.01)**	0.03(0.01)
BMI	0.09(0.01)**	0.11(0.01)	0.09(0.01)**	0.10(0.01)
Age	0.07(0.01)**	0.07(0.01)	0.15(0.01)**	0.08(0.01)
Sex	0.18(0.03)**	0.19(0.12)	-0.12(0.04)*	-0.43(0.38)
Age × Sex	--	-0.001(0.01)	--	0.05(0.03)*
Peak Diameter				
Age at baseline	0.062(0.015)**	0.01(0.01)	0.06(0.02)**	0.004(0.01)
Height	0.012(0.014)**	0.04(0.01)	0.01(0.01)**	0.01(0.01)
BMI	0.12(0.01)**	0.12(0.01)	0.12(0.01)**	0.12(0.01)
Age	0.08(0.01)**	0.08(0.01)	0.16(0.02)**	0.10(0.04)
Sex	0.17(0.03)**	0.18(0.12)	-0.19(0.04)**	0.34(0.05)
Age × Sex	--	-0.001(0.01)	--	0.01(0.02)
Absolute FMD				
Age at baseline	-0.0005(0.004)	-0.009(0.005)	-0.0005(0.004)	-0.01(0.01)
Height	0.003(0.004)	-0.002(0.004)	0.003(0.004)	-0.01(0.004)
BMI	0.01(0.004)	0.01(0.003)	0.01(0.004)*	0.01(0.004)
Age	0.01(0.002)*	0.009(0.004)	0.004(0.005)	0.01(0.01)
Sex	-0.003(0.008)	-0.03(0.05)	-0.06(0.02)*	0.03(0.02)
Age × Sex	--	0.003(0.005)	--	0.01(0.01)
Relative FMD				
Age at baseline	-0.15(0.14)	-0.4(0.19)	-0.15(0.14)	-0.42(0.19)
Height	-0.16(0.14)	-0.19(0.15)	-0.16(0.14)	-0.32(0.17)
BMI	0.16(0.15)	0.14(0.16)	0.016(0.15)	0.09(0.16)
Age	0.25(0.13)	0.14(0.17)	-0.17(0.19)	0.26(0.20)
Sex	-0.59(0.30)	-2.36(1.9)	-2.15(0.73)	0.59(0.77)
Age × Sex	--	0.19(0.20)	--	0.25(0.25)
Scaled FMD				
Age at baseline	-0.05(0.18)	-0.39(0.24)	-0.05(0.18)	-0.42(0.21)
Height	-0.07(0.18)	-0.18(0.20)	-0.07(0.18)	-0.28(0.19)
BMI	0.31(0.20)	0.31(0.20)	0.31(0.20)	0.07(0.17)
Age	0.38(0.17)*	0.17(0.22)	0.12(0.25)	0.26(0.21)
Sex	-0.22(0.38)	-4.10(2.4)	-2.4(0.94)*	0.70(0.85)
Age × Sex	--	0.42(0.26)	--	0.24(0.27)

Effects are reported as unstandardized estimates (SEs). Age at baseline (fixed variable); child's initial age (in years) at the first SKIP visit; sex (fixed variable), girls coded as 0 and boys coded as 1; height, entered as *z*-score at each year; BMI, entered as *z*-score at each year; Age, child's age (years) at testing date (chronological) or age of peak height velocity (biological) as determined by the Mirwald Equation (106); Model 1; --, not applicable. [a] Model 1 displays the estimates for main effects of age at study visit.
[b] Model 2 includes estimates for interactions between age and sex. * $P < 0.05$; ** $P < 0.001$.

Table 10. Linear mixed-effects model results for the effect of MVPA during HOPP and SKIP on FMD (Model 3 and 4).

	HOPP MVPA		SKIP MVPA	
	Model 3[a]	Model 4[b]	Model 3[a]	Model 4[b]
Absolute FMD				
Age at baseline	-0.01(0.01)	-0.007(-0.005)	-0.008(0.005)	-0.009(0.005)
Height	-0.004(0.004)	0.004(0.004)	0.003(0.004)	0.003(0.004)
Age	0.008(0.004)	0.013(0.012)	0.008(0.004)	0.004(0.008)
Sex	0.003(0.01)	0.003(0.009)	0.001(0.008)	0.001(0.01)
MVPA-S	-0.0002(0.0002)	-0.0002(0.0002)	-0.0002(0.0002)	-0.0008(0.001)
MVPA-H	-0.0002(0.0002)	0.0003(0.001)	--	--
Age × MVPA[1]	--	-0.0001(0.0001)	--	0.0001(0.0001)
Relative FMD				
Age at baseline	-0.29(0.20)	-0.29(0.20)	-0.35(0.19)	-0.35(0.19)
Height	-0.11(0.15)	-0.12(0.15)	-0.15(0.14)	-0.14(0.14)
Age	0.15(0.15)	0.29(0.47)	0.19(0.14)	0.13(0.33)
Sex	-0.25(0.34)	-0.35(0.34)	-0.31(0.32)	-0.31(0.32)
MVPA-S	-0.012(0.01)	-0.01(0.01)	-0.019(0.04)	-0.02(0.04)
MVPA-H	-0.003(0.01)	0.01(0.04)	--	--
Age × MVPA[1]	--	-0.001(0.005)	--	0.001(0.005)
Scaled FMD				
Age at baseline	-0.29(0.25)	-0.30(0.26)	-0.36(0.21)	-0.37(0.21)
Height	-0.087(0.19)	-0.08(0.19)	-0.13(0.16)	-0.13(0.16)
Age	-0.18(0.19)	-0.47(0.62)	0.19(0.15)	-0.03(0.36)
Sex	0.17(0.43)	0.16(0.44)	-0.05(0.36)	-0.05(0.36)
MVPA-S	-0.04(0.01)	-0.04(0.01)	-0.017(0.01)*	-0.05(0.31)
MVPA-H	0.01(0.01)	-0.05(0.06)	--	--
Age × MVPA[1]	--	0.01(0.01)	--	0.003(0.005)

Effects are reported as unstandardized estimates (SEs). Age at baseline (fixed variable); child's initial age (in years) at the first SKIP visit; sex (fixed variable), girls coded as 0 and boys coded as 1; height, entered as *z*-score at each year; Age, child's chronological age (years) at testing date.

[a] Model 3 displays the estimates for main effects of MVPA at study visit.

[b] Model 4 includes estimates for interactions between Age during SKIP and MVPA at study visit.

$MVPA^H$ displays estimate for MVPA during HOPP

$MVPA^S$ displays estimate for MVPA during HOPP

$MVPA^1$ represents MVPA during either HOPP or SKIP respectively.

* $P < 0.05$; ** $P < 0.001$.

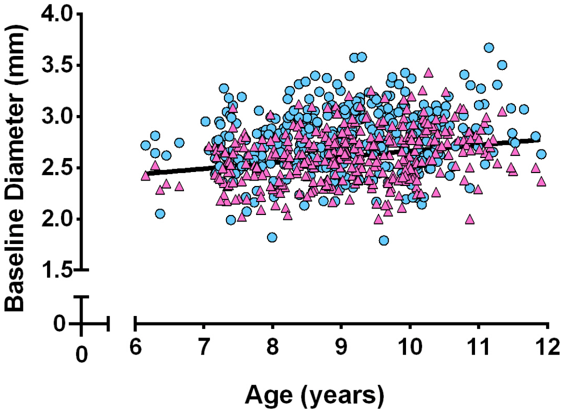
2.3. Results

Participant characteristics from HOPP study that are relevant to the current study are represented by sex in **Table 1** and by age in **Table 2.** Participant characteristics for children in the SKIP study are represented by sex in **Table 3**, and by age in **Table 4**. All participants in the SKIP study were young, healthy, school-aged children between the ages of 6 and 12-years-old. Additionally, in the SKIP study systolic blood pressure (SBP) was highest in the 12-year-olds compared to the 6, 7 and 8-year olds (p<0.01) and higher in boys compared to girls (p=0.02). There were no differences in diastolic blood pressure (DBP), mean arterial pressure (MAP), or heart rate (HR) with age or sex in the SKIP study (p>0.05). The impacts of age and sex on arterial diameters and FMD using mixed-effects models 1 and 2 are summarized in **Table 9** and the additional impacts of MVPA during HOPP and SKIP on FMD are summarized in **Table 10**. Estimates are unstandardized and presented along with standard error (SE).

2.3.1. Trends in baseline diameter with age and sex

Baseline brachial artery diameter increased each year (**Table 5)** between chronological ages 7 and 12 years of age as seen in **Table 7 and 8** with a main effect of age (p<0.001) and was larger in boys compared to girls (**Table 6**). There was a clear main effect of sex (p<0.01), however there was no significant age × sex interaction (p=0.95). Boys had larger baseline diameters as seen in **Figure 4** compared to girls (p<0.001) (**Table 6**). Pairwise comparison revealed diameter was larger at age 11 and 12 years compared to age 7 and 8 in boys (**Table 7**) and also largest at age 10, 11 and 12 in girls compared to age 7, 8 and 9 (**Table 8**). There was a main effect of age measured as years to peak height velocity (YPHV) (p<0.001) and sex (p=0.0046) on baseline arterial diameter, and YPHV × Sex was trending towards significance (p=0.55) as seen in **Figure 5.**

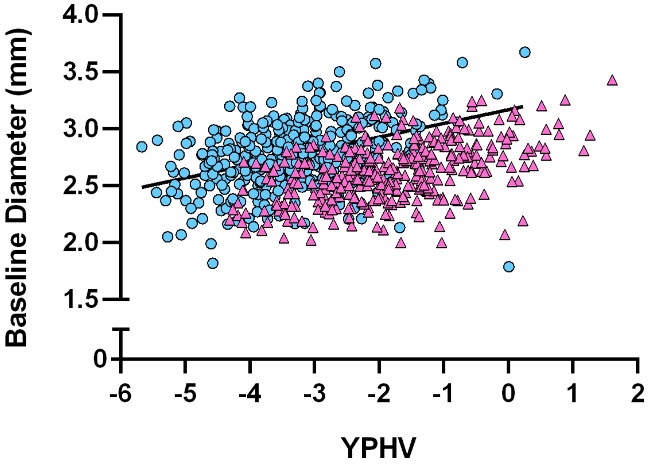
Figure 4. B*aseline diameter with chronological age in boys and girls.*



Age: *p*<0.001
Sex: *p*<0.001
Age × Sex: *p*=0.91

Significance set at p < 0.05. Main effect of age and sex. (Girls: △; Boys: ◯)

Figure 5. B*aseline diameter with biological age in boys and girls.*



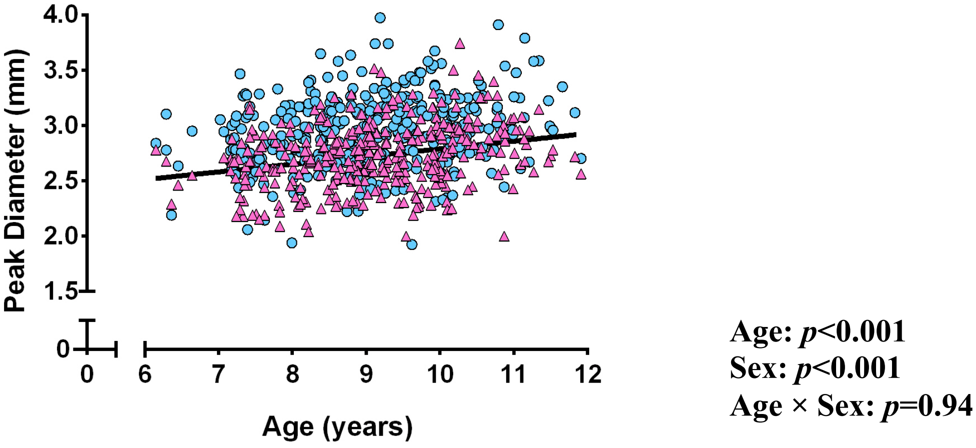
Age: *p*<0.001
Sex: *p*<0.001
Age × Sex: *p*=0.055

Significance set at p < 0.05. Main effect of age and sex. (Girls: △; Boys: ◯)

2.3.2. Trends in peak diameter with age and sex

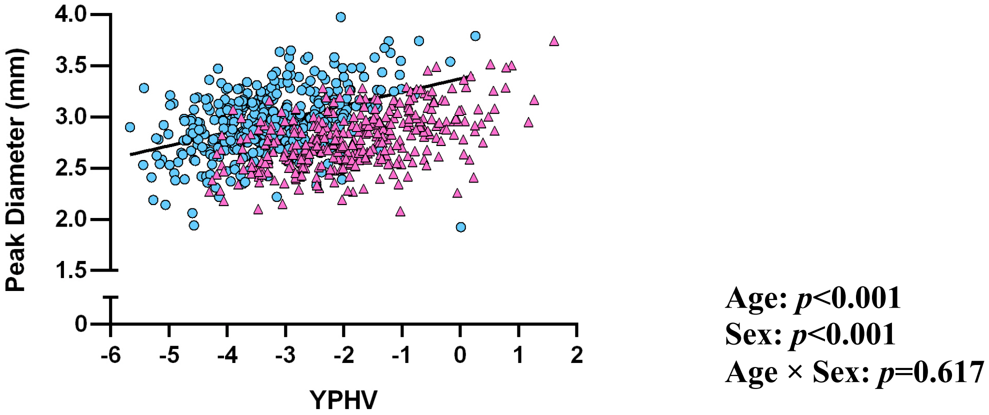
With increasing chronological age and nearing age at biological maturity, peak brachial artery diameter increased each year as seen in **Figure 6 and 7**, between 6-12 years (p<0.001) (**Table 5**). Peak arterial diameter was largest at age 12 (3.04±0.38mm) compared to age 7 (2.73±0.28 mm, p<0.001), 8 (2.77±0.27 mm, p<0.001) and 9 (2.85±0.27, p=0.004) years old. As with baseline arterial diameter, boys had a larger peak diameter compared to girls (2.95±.317 vs. 2.79±.268, p<0.001) (**Table 6**). Pairwise comparison suggests that at age 10-12 years, peak arterial diameter is larger than age 6-9 years in both boys and girls. There are main effects of chronological and biological age, along with sex on peak arterial diameter (p<0.001), however there was neither a sex × chronological age (p=0.95) nor sex × biological (p=0.55) interaction on peak arterial diameter (**Table 6**). These results suggest that age, calculated chronologically or biologically, have a main effect on peak arterial diameter in school aged children, however peak arterial diameter did not change differently over time between girls and boys in our cohort.

Figure 6. *Peak diameter with chronological age in boys and girls.*



Significance set at p < 0.05. (Girls: △; Boys: ◯)

Figure 7. *Peak diameter with biological age in boys and girls.*



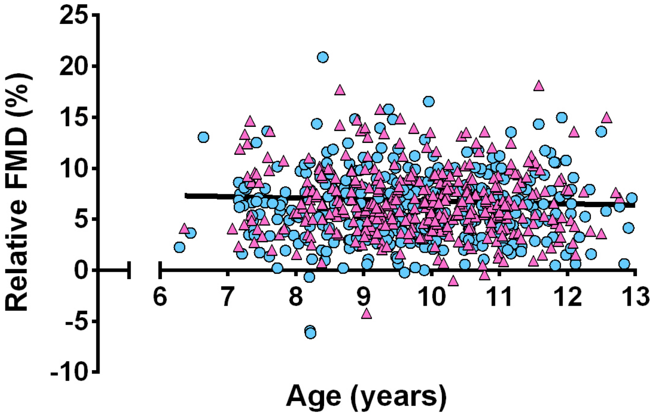
Significance set at p < 0.05. (Girls: △; Boys: ◯)

2.3.3. Trends in FMD with age and sex

We observed that in our cohort girls have larger relative FMDs compared to boys (p=0.019) as indicated in **Table 6**. With increased chronological age, relative and scaled FMD did not change (p=0.981) displayed **Figure 6, Figure 7** and **Table 5**. Upon controlling for initial age, height, BMI, age and sex, mixed linear effects modeling as seen in **Table 9**, revealed that as children approached their APHV, the larger their relative FMD (p=0.004), seen in Figure 9, which suggests that relative FMD continues to increase up until APHV. Using biological age, measured as maturity offset (YPHV), is based on the assumption that the changing relationship between leg length and sitting height with growth may provide an indication of maturational status (106). The main effect of age using biological age suggests that it should be considered when determining the effect of age on relative FMD in children. The difference in peak SR between girls13.9±4.16 x10^{2} s^{-1} and boys 12.7±4.00 x10^{2} s^{-1} may explain why girls display larger relative FMD compared to boys (*p*<0.001). In essence, and increased peak SR is the stimulus behind the

FMD response (10,108), and is likely a contributing factor to the difference in FMD between sexes. Upon allometrically scaling FMD, according to the method outlined by Atkinson and Batterham (2009), to remove the influence on differences in baseline arterial diameter, there was neither a main effect of chronological age (p=0.717), sex (p=0.40), nor a sex × age interaction (p=0.325) on FMD as seen in **Figures 10 and 11**. However, when using YPHV as a measure of age (**Figure 11)**, there was a main effect of age (*p*=0.023), but no main effect of sex (p=0.897) or sex × age interaction (p=0.290), suggesting that scaled FMD increases as children approach their APHV.

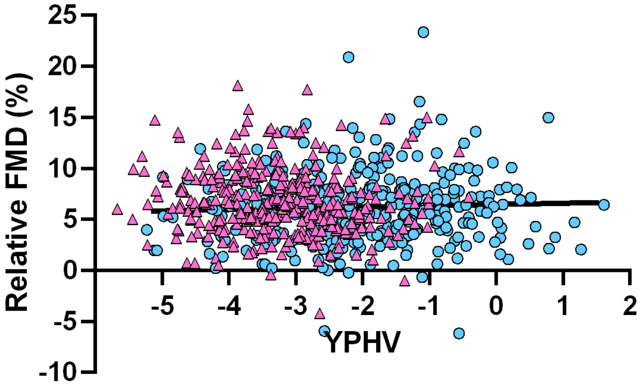
Figure 8. *Relative FMD with chronological age in boys and girls.*



Age: ***p*****=0.06**
Sex: ***p*****=0.05**
Age × Sex: ***p*****=0.34**

Significance set at p < 0.05. (Girls: △; Boys: ○)

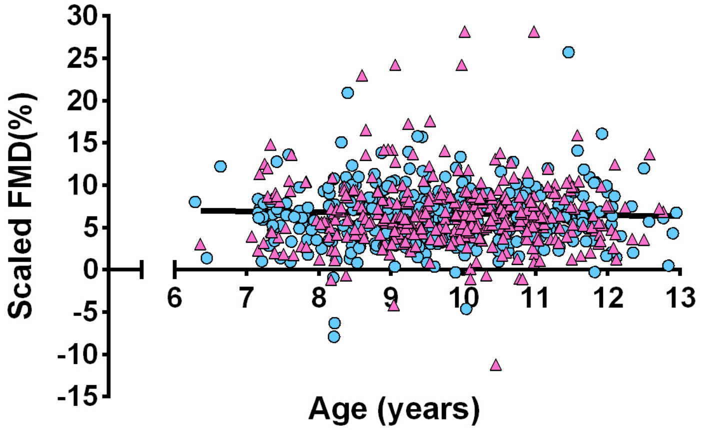
Figure 9. *Relative FMD with biological age in years to peak height velocity.*



Age: ***p*=0.004**
Sex: ***p*=0.81**
Age × Sex: ***p*=0.29**

Significance set at p < 0.05. (Girls: △; Boys: ○)

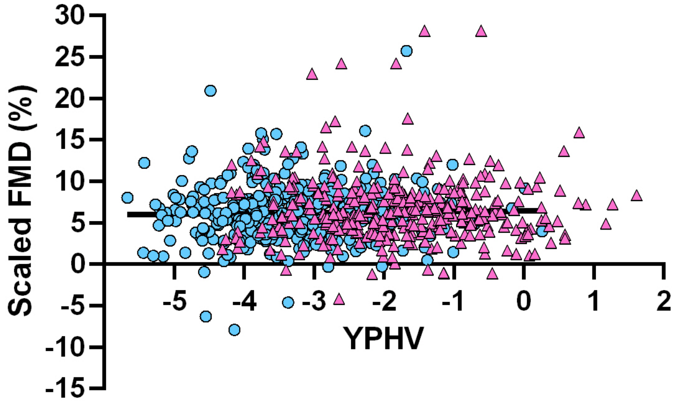
Figure 10. *Scaled FMD with chronological age in boys and girls.*



Age: ***p*=0.72**
Sex: ***p*=0.40**
Age × Sex: ***p*=0.33**

Significance set at p < 0.05. (Girls: △; Boys: ○)

Figure 11. *Scaled FMD with biological age in boys and girls.*



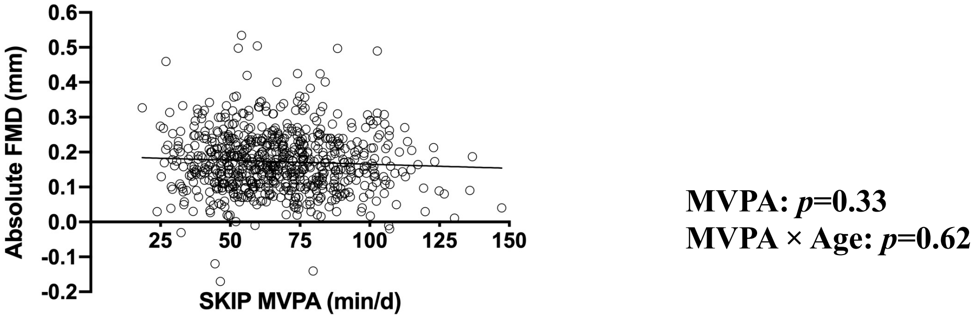
Age: ***p*=0.023**
Sex: ***p*=0.897**
Age × Sex: ***p*=0.376**

Significance set at p < 0.05. (Girls: △; Boys: ○)

2.3.4. Impact of MVPA on FMD.

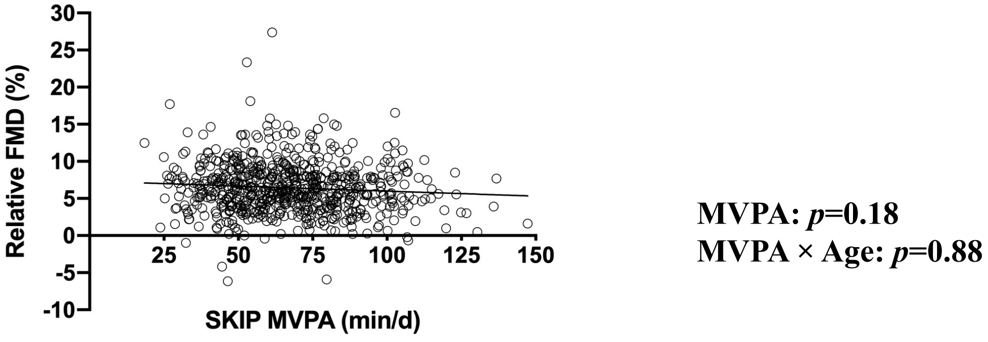
The linear mixed-effects model read 837 observations, but only used 704 for the analysis, leaving out 133, utilizing 84% of available data. Linear mixed effects modeling only uses the values available in a data set. Instead of removing all of a participant's data if they are missing an observation, the linear mixed-effect model will conduct analysis using the available data for an individual. Covariate control for initial age at the first SKIP visit, height z-score, BMI z-score, chronological age and sex were applied to each model (Results in **Table 10**). There was no significant main effect of MVPA during SKIP (MVPA-S) in mins/day on absolute FMD (p=0.33) as seen in **Figure 12**. Similarly, there was no main effect of MVPA-S on relative FMD (p=0.18), seen in **Figure 13**.

Figure 12. *Impact of school-aged PA on absolute FMD.*



Significance set at p < 0.05.

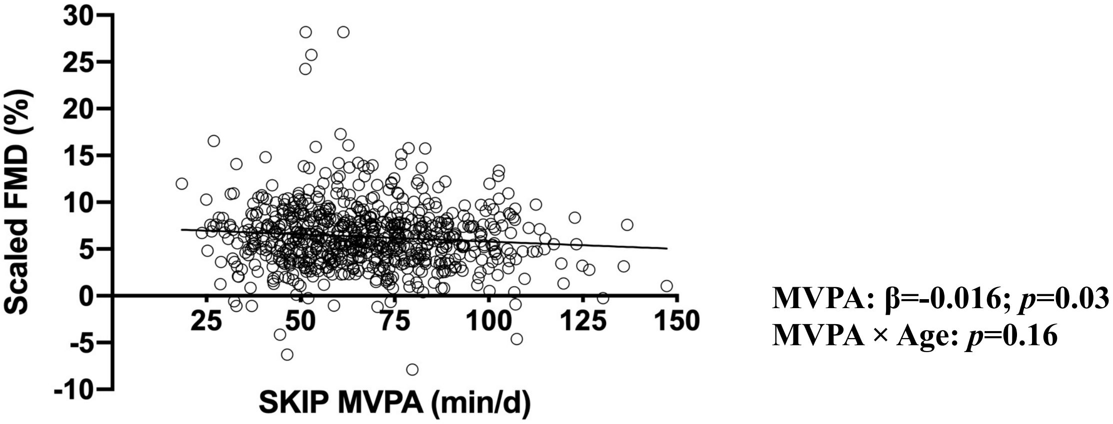
Figure 13. *Impact of school-aged PA on relative FMD.*



Significance set at p < 0.05.

However, upon allometrically scaling FMD, a main effect of MVPA-S was observed (Est.= -0.016; p=0.03), meaning that upon scaling FMD to account for the influence of differences in baseline diameters, those children that engaged in greater amounts of MVPA (min/d) during their school-age years, demonstrated lower FMD (**Figure 14**). There was no age by MVPA-S (p=0.50), sex by MVPA-S (p=0.47) or age by sex and MVPA-S interactions (p=0.10), meaning that MVPA did not impact scaled FMD differently with age, nor did it influence scaled FMD differently between boys and girls over time.

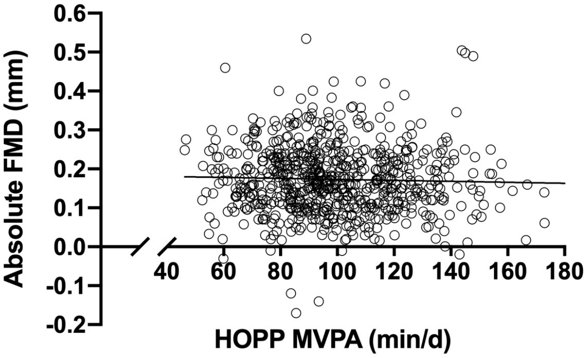
Figure 14. *Impact of school-aged PA on scaled FMD.*



Significance set at $p < 0.05$.

In order to examine the potential effect of early investment in PA during the preschool-aged years (HOPP) on arterial function later in life during the school-aged years (SKIP), time spent in MVPA-H was added to the assessments in model 3 and age by MVPA-H was added to the analysis in model 4. The HOPP study spanned over the course of 3 years, and the earliest valid MVPA-H for each SKIP participant was used in these determinations. Of the 279 participants that entered the SKIP study, 91% had MVPA-H from year 1 of HOPP, 8% had MVPA-H from year 2 and 1% had MVPA-H from year 3. The child's initial age (in years) at the first SKIP visit, sex, height *z*-score, BMI z-score chronological age (years) at test date and sex remained in the model. There were no main effects, and no subsequent age by sex by MVPA-H interactions, suggesting that the earliest investment in physical activity between the ages of 3-5 years in our sample did not have any effect on the relationships previously assessed for absolute, relative or scaled FMD measured during the school years.

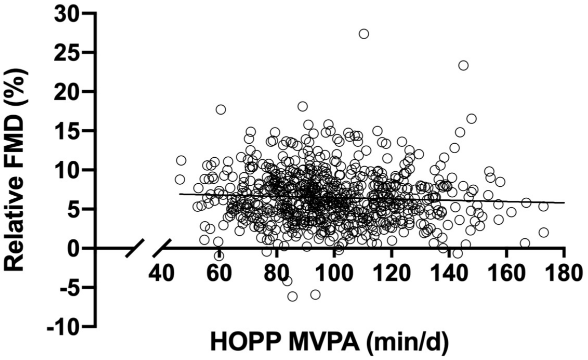
Figure 15. *Impact of preschool-aged PA on Absolute FMD.*



MVPA: p=0.164
MVPA × Age: *p*=0.516

Significance set at p < 0.05.

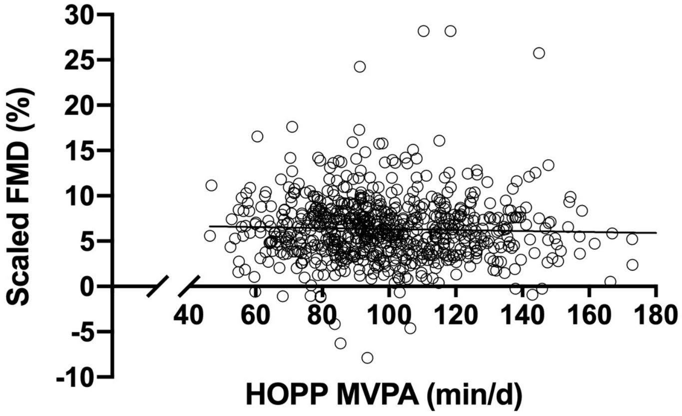
Figure 16. *Impact of preschool-aged PA on Relative FMD.*



MVPA: *p*=0.581
MVPA × Age: *p*=0.665

Significance set at p < 0.05.

Figure 17. *Impact of preschool-aged PA on Scaled FMD.*



MVPA: ***p*=0.299**
MVPA × Age: ***p*=0.323**

Significance set at p < 0.05.

2.4. Discussion

In the current study, we sought to determine the impact of biological and chronological age on brachial artery diameters and FMD in school-aged children between ages 6-12 years who participated in the SKIP study. We also wanted to understand the impact of habitual MVPA, on endothelial function during the school-age years. Finally, we wanted to assess the influence of MVPA engagement, during the school-age and preschool years, along with sex, age, BMI and height on FMD during school-age years.

In designing our study, we sought to longitudinally investigate the trends in brachial artery diameter and FMD in school-age children by inviting participants initially enrolled in the HOPP study back to the laboratory for 3 annual visits. We observed that baseline arterial diameter increased with aging in school aged children, and was observed to be larger at ages 10, 11 and 12 years of age compared to ages 7, 8 and 9 with the largest baseline diameter occurring at age 12. Our findings are in agreement with a previous cross-sectional study investigating a group of over 900 children and adolescents

(16), where baseline and peak arterial diameter increased steadily each year in participants between the age of 6-18 years-old. The values of baseline diameters for boys and girls in our study were 2.78±0.30 and 2.61±0.26 mm respectively (mean age 9.7±6.2), which are both smaller than those previously reported for boys and girls by Hopkins *et al* (2012), (3.24±0.56 vs. 2.96±0.43mm (mean age12±3)). We speculate, the reason for these between study differences is the fact that the average age in the SKIP cohort was 9.7±6.2, with a discrete range between 6-12 years while the average age in Hopkins *et al* (2012) was 12±3 years with a much wider age range. The same trends were found in peak arterial diameter when comparing the current study and Hopkins *et al* (2012) and we speculate the same reasons for the observable differences in baseline diameter account for the differences observed for peak diameter. When measuring biological age, using YPHV our cohort was on average 2.61±1.32 years away from reaching their age at peak-height velocity (APHV). Girls were 1.86±1.17 yrs away from their APHV, while boys were 3.31±1.03 yrs away from reaching their APHV, suggesting girls were closer to their biological maturation state compared to boys. When comparing baseline and peak diameters over time, at the chronological age of 12-years-old is when the maximum baseline and peak arterial diameter sizes occurred in our cohort. However, the maximum chronological age of participants in this cohort was 12 years, so it is possible that these baseline and peak arterial diameters continue to increase as children age.

Biological age is an important metric when determining maturity off-set in physiological-based studies investigating youth and adolescents as there is a range in somatic and biological growth between individuals of the same chronological age (106,109). Chronological age can therefore have limited utility when studying effects of growth and maturation. When determining the effect of maturity off-set on relative FMD, we observed that the closer children were to APHV the greater their relative FMD (p=0.004), in comparison to chronological age (p=0.06). The differing results between chronological and biological age when determining relative FMD should be considered when identifying trends in endothelial function in children. Biological age is considered to be a more accurate representation of a child's stage of maturation, taking account somatic and skeletal growth, while chronological age does not (106).

In our cohort, FMD was higher in girls (6.82±3.39 %) compared to boys (6.23±3.50 %, p=0.017), which is in-line with previously observed differences in FMD between sexes (16). Since the maximum age in our study was 12 years, we cannot directly compare our findings to previously work, which suggest that the year-to-year increases in FMD occur from age 15 years onwards (16). However, in the current study, at age 12, relative FMD in girls was 20% higher compared to boys, which is likely due to the fact that 18% of girls in this study reached their APHV by the end of their participation in the study. These results suggest that a higher level of circulating estrogen in the body, coincident with pubertal development in females, may be associated with enhanced endothelial function seen in girls, even at this young age (110). Contrary to our findings, a large cross-sectional study determined that relative FMD between 6 and 18-year-olds decreased over time (16) and may be attributable to the fact that a larger age-span – beyond 12 years of age, may demonstrate the differential effects of sex-hormones on arterial function.

A previous review hypothesized that FMD, regardless of age, was not different in healthy, non-obese children and adolescents between the ages of 4-17 years (38). In addition to small sample sizes, the data in this review was collected from multiple laboratories, all using different methodology to analyze and quantify FMD (80,98,111,112). On average, FMD in our study was 6.52±3.46%. Fernhall *et al* (2008) reported a normal range in FMD in a healthy pediatric population between 8% and 11% however, they acknowledge that there is a large degree of variability in relative FMD in pediatric populations (38). To overcome this limitation commonly seen in FMD research and unique to our study, was the single analyzer who performed all the FMD analysis, using semi-automated edge detection software. Semi-automated arterial border tracking allows the user to select a desired region of interest, and the software will detect the tunica-intima interface. The researcher then can make precise adjustments to the location of the tracking lines to ensure arterial borders are detected accurately. Importantly, it has been previously encouraged to standardize techniques and methodologies when measuring and analyzing FMD to reduce inter-rater variability (10). In this way, our single rater strengthens the validity and reliability of our results.

Our findings demonstrate that children who participated in greater amounts of MVPA (min/d) during their school-age years, did not show improvement in absolute or relative FMD trajectories also measured in their school-aged years. However, upon allometrically scaling FMD to adjust for differences in baseline diameter, a main effect of MVPA was found (Est-0.017; p=0.03). Atkinson and Batterham (2012) deem allometric scaling necessary when interpreting FMD results because the ratio-scaling technique unbiases estimates of endothelial function upon adjustment for baseline arterial diameter. Previous literature consistently reveals the negative relationship between FMD and baseline arterial diameters in that boys typically have larger baseline arterial diameters compared to girls, therefore the capacity for the brachial artery to dilate is diminished in boys (9,105,113). We expected to find an improvement in relative FMD in school-aged children who participated in more MVPA since Proudfoot *et al* (2019) found that preschoolers between 3-5 years old who engaged in greater amounts of MVPA attenuated their age-related increases in arterial stiffness. Arterial stiffness and FMD are both novel predictors associated with CVD, even after accounting for traditional risk factors like hypertension, diabetes, smoking, genetics and high LDL/low HDL (7–12,114,115). It may be that, unlike arterial stiffness, as there are no age-related increases in either relative or scaled FMD between the ages of 6-12 years (**Table 9**), and there was no potential for investment in physical activity to mitigate any age-related changes.

With respect to the impact of early investment in PA in the preschool years and vascular health indicators later in childhood, we did not find any relationship between amount of MVPA-H during the preschool years and the trends in relative or scaled FMD during the school-age years. On average 4.23 ± .704 years separated the very first HOPP visit and their subsequent participation in their first vascular visit in the SKIP study. Over the course of several years, it is likely that children's habitual PA patterns change. Longitudinal data investigating the trends in PA during the preschool years on novel measures of vascular function during the school age years is sparse however, a prospective observational study investigating MVPA in 277 participants, aged 15.7±0.4 years demonstrated that those with the largest decline in time spent in MVPA from adolescents into adulthood, displayed significantly less arterial compliance – another novel measure of vascular function, compared to those that engaged in more MVPA (116). Similar to our findings, a previous study sought to relate PA and fitness during the adolescent years (13-16 years) to CVD risk factors at 32 years-old and found no relationship (117). Twisk *et al* (2002) proposed that PA during youth relates to health status during youth but, is not translated to health status during adulthood. Although this possible mechanism is proposed in a cohort 20 years older than the one investigated in this study, it is possible that trends in the relationship between PA during the preschool years do not translate into health status in the school years, at least for endothelial function, the primary measure of the current study (117). To investigate if the amount of PA changed between HOPP and SKIP a dependent t-test for total MVPA was conducted between these 2 time points and there was a significant difference in the amount of PA performed during HOPP (95.5±21.5 min/d) and SKIP (69.8±21.2 min/d; $p<0.001$) such that MVPA declined between the preschool and school-aged years in our cohort. This decline in MVPA over time in our participants further supports the idea that considerations for current PA might be the most important influence of current health status. Despite this reduction in MVPA over time in our cohort, MVPA during the school-age years was significantly related to scaled FMD, thereby supporting the idea that simultaneously measured activity and health are related.

Strengths and Limitations

In the current study, habitual PA assessment may have been influenced by season, since assessments were done once on an annual basis for 3 years. Only 30% of participants in the SKIP study had both visits on the same day, with the vascular visit always before the fitness visit. The remaining 70% had both visits on average 14±22 days apart, so it can be assumed that both visits took place during the same season. The accelerometers cannot be worn while swimming, so any activity children did in water would have not been captured. This study was a longitudinal, within subject, observational design which allowed researchers to track the same participants over time (118). Due to the sporadic and short duration of PA patterns in young children, this study implemented the 3-sec accelerometer epoch length in an attempt to faithfully capture the amount of time spent in MVPA intensity. Moreover, during the HOPP study MVPA was measured using Pate *et al* (2006) cut-points designed for children 3-5 years old. Cut-points for the preschool years are 143-282 counts/3-sec epoch length while, different cut-points determined by Evenson *et al* (2008) were used to quantify MVPA in children age 5-8 years old using 116-200 counts/3-sec epochs. Children in the SKIP study were normally distributed around the age of 9.7 years old, with 70% of the cohort being above the Evenson cut-point threshold. Therefore, similar research measuring PA in children should be aware of the different cut-point age restrictions when designing both interventional and observational studies.

In conclusion, the observed trends in brachial artery diameter are in-line with expected changes into growth and maturation in children between 6-12 years of age. Baseline and peak brachial artery diameters increased with increasing age, with boys presenting with larger diameters and girls presenting with larger relative and scaled brachial artery FMD compared to boys. Relative and scaled FMD did not change with either biological or chronological aged over the 3-year period of assessment in our school-aged cohort. However, MVPA during the school-age years (MVPA-S) was a significant predictor for the trends in allometrically scaled FMD which removes the influence of differences in baseline diameters on the relative change in brachial artery diameter. More intense PA in the preschool years (MVPA-H) did not influence the trajectories of endothelial function (FMD) in school-age children, however similar study designs are suggested to further validate these findings, and investigate the effect of different PA intensities, such as vigorous intensity and/or physical fitness on FMD in children.

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Appendix A – SAS Code

```
*Question 1: How does FMD change over Chronological AGE in school-aged children;

*Baseline Diameter;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL baseline = iage /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*Baseline Diameter;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL baseline = iage HtzscoreRound /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*Baseline Diameter;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL baseline = iage HtzscoreRound BMIzscore AgeCon /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*Baseline Diameter;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL baseline = iage HtzscoreRound BMIzscore AgeCon sexcode
/SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*Baseline Diameter;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL baseline = iage HtzscoreRound BMIzscore AgeCon sexcode
agecon*sexcode /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;


*RH Diameter;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
```

```
        CLASS subjectid ;
        MODEL RH = iage /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*RH Diameter;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL RH = iage HtzscoreRound /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*RH Diameter;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL RH = iage HtzscoreRound  /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*RH Diameter;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL RH = iage HtzscoreRound BMIzscore AgeCon /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*RH Diameter;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL RH = iage HtzscoreRound BMIzscore AgeCon sexcode /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*RH Diameter;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL RH = iage HtzscoreRound BMIzscore AgeCon sexcode agecon*sexcode
/SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

 *Rel FMD;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
```

```
          MODEL rel = iage /SOLUTION;
          RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*Rel FMD;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
          CLASS subjectid ;
          MODEL rel = iage HtzscoreRound /SOLUTION;
          RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*Rel FMD;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
          CLASS subjectid ;
          MODEL rel = iage HtzscoreRound BMIzscore AgeCon /SOLUTION;
          RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*Rel FMD;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
          CLASS subjectid ;
          MODEL rel = iage HtzscoreRound BMIzscore AgeCon sexcode /SOLUTION;
          RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*REL FMD;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
          CLASS subjectid ;
          MODEL rel = iage HtzscoreRound BMIzscore AgeCon sexcode agecon*sexcode
/SOLUTION;
          RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*Abs FMD;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
          CLASS subjectid ;
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          RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*Abs FMD;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
          CLASS subjectid ;
          MODEL abs = iage HtzscoreRound /SOLUTION;
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```
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*Abs FMD;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
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        MODEL abs = iage HtzscoreRound BMIzscore AgeCon /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*Abs FMD;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL abs = iage HtzscoreRound BMIzscore AgeCon sexcode /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*Abs FMD;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL abs = iage HtzscoreRound BMIzscore AgeCon sexcode agecon*sexcode
/SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;


 *Scaled FMD;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL scaled = iage /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*Scaled FMD;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL scaled = iage HtzscoreRound /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*Scaled FMD;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL scaled = iage HtzscoreRound BMIzscore AgeCon /SOLUTION;
```

```
	RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*Scaled FMD;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
	CLASS subjectid ;
	MODEL scaled = iage HtzscoreRound BMIzscore AgeCon sexcode /SOLUTION;
	RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*Scaled FMD;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
	CLASS subjectid ;
	MODEL scaled = iage HtzscoreRound BMIzscore AgeCon sexcode
agecon*sexcode /SOLUTION;
	RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

******************************************************


*Question 2: How does FMD change over BIOLOGICAL AGE (APHV) in school-aged
children?;

*Baseline Diameter;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
	CLASS subjectid ;
	MODEL baseline = iage /SOLUTION;
	RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*Baseline Diameter;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
	CLASS subjectid ;
	MODEL baseline = iage HtzscoreRound /SOLUTION;
	RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*Baseline Diameter;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
	CLASS subjectid ;
	MODEL baseline = iage HtzscoreRound BMIzscore /SOLUTION;
	RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;
```

```
*Baseline Diameter;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL baseline = iage HtzscoreRound BMIzscore APHV /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*Baseline Diameter;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL baseline = iage HtzscoreRound BMIzscore APHV sexcode
/SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*Baseline Diameter;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL baseline = iage HtzscoreRound BMIzscore APHV sexcode
APHV*sexcode /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;


*RH Diameter;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL RH = iage /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*RH Diameter;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL RH = iage HtzscoreRound /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*RH Diameter;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL RH = iage HtzscoreRound BMIzscore APHV /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;
```

```
*RH Diameter;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
	CLASS subjectid ;
	MODEL RH = iage HtzscoreRound BMIzscore APHV sexcode /SOLUTION;
	RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*RH Diameter;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
	CLASS subjectid ;
	MODEL RH = iage HtzscoreRound BMIzscore APHV sexcode APHV*sexcode
/SOLUTION;
	RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

 *Abs FMD;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
	CLASS subjectid ;
	MODEL abs = iage /SOLUTION;
	RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*Abs FMD;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
	CLASS subjectid ;
	MODEL abs = iage HtzscoreRound /SOLUTION;
	RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*Abs FMD;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
	CLASS subjectid ;
	MODEL abs = iage HtzscoreRound BMIzscore APHV /SOLUTION;
	RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*Abs FMD;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
	CLASS subjectid ;
	MODEL abs = iage HtzscoreRound BMIzscore APHV sexcode /SOLUTION;
	RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*Abs FMD;
```

```
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL abs = iage HtzscoreRound BMIzscore APHV sexcode APHV*sexcode
/SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;


 *Rel FMD;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL rel = iage /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*Rel FMD;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL rel = iage HtzscoreRound /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*Rel FMD;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL rel = iage HtzscoreRound BMIzscore APHV /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*Rel FMD;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL rel = iage HtzscoreRound BMIzscore APHV sexcode /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*REL FMD;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL rel = iage HtzscoreRound BMIzscore APHV sexcode APHV*sexcode
/SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;
```

```
  *Scaled FMD;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL scaled = iage /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*Scaled FMD;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL scaled = iage HtzscoreRound /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*Scaled FMD;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL scaled = iage HtzscoreRound BMIzscore APHV /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*Scaled FMD;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL scaled = iage HtzscoreRound BMIzscore APHV sexcode /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*Scaled FMD;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL scaled = iage HtzscoreRound BMIzscore APHV sexcode
APHV*sexcode /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

************************************************
```

```
*Question 2: How does FMD change over BIOLOGICAL AGE (YPHV) in school-aged
children;

*Baseline Diameter;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL baseline = iage /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*Baseline Diameter;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL baseline = iage HtzscoreRound /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*Baseline Diameter;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL baseline = iage HtzscoreRound /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*Baseline Diameter;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL baseline = iage HtzscoreRound BMIzscore YPHV /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*Baseline Diameter;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL baseline = iage HtzscoreRound BMIzscore YPHV sexcode
/SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*Baseline Diameter;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL baseline = iage HtzscoreRound BMIzscore YPHV sexcode
APHV*sexcode /SOLUTION;
```

```
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;


*RH Diameter;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL RH = iage /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*RH Diameter;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL RH = iage HtzscoreRound /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*RH Diameter;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL RH = iage HtzscoreRound BMIzscore YPHV /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*RH Diameter;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL RH = iage HtzscoreRound BMIzscore YPHV sexcode /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*RH Diameter;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL RH = iage HtzscoreRound BMIzscore YPHV sexcode YPHV*sexcode
/SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

 *Abs FMD;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL abs = iage /SOLUTION;
```

```
	RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*Abs FMD;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
	CLASS subjectid ;
	MODEL abs = iage HtzscoreRound /SOLUTION;
	RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*Abs FMD;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
	CLASS subjectid ;
	MODEL abs = iage HtzscoreRound BMIzscore YPHV /SOLUTION;
	RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*Abs FMD;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
	CLASS subjectid ;
	MODEL abs = iage HtzscoreRound BMIzscore YPHV sexcode /SOLUTION;
	RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*Abs FMD;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
	CLASS subjectid ;
	MODEL abs = iage HtzscoreRound BMIzscore YPHV sexcode YPHV*sexcode
/SOLUTION;
	RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;


 *Rel FMD;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
	CLASS subjectid ;
	MODEL rel = iage /SOLUTION;
	RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*Rel FMD;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
	CLASS subjectid ;
	MODEL rel = iage HtzscoreRound /SOLUTION;
```

```
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*Rel FMD;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL rel = iage HtzscoreRound BMIzscore YPHV /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*Rel FMD;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL rel = iage HtzscoreRound BMIzscore YPHV sexcode /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*REL FMD;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL rel = iage HtzscoreRound BMIzscore YPHV sexcode YPHV*sexcode
/SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;


 *Scaled FMD;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL scaled = iage /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*Scaled FMD;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL scaled = iage HtzscoreRound /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*Scaled FMD;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL scaled = iage HtzscoreRound BMIzscore YPHV /SOLUTION;
```

```
	RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*Scaled FMD;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
	CLASS subjectid ;
	MODEL scaled = iage HtzscoreRound BMIzscore YPHV sexcode /SOLUTION;
	RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*Scaled FMD;
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
	CLASS subjectid ;
	MODEL scaled = iage HtzscoreRound BMIzscore YPHV sexcode
YPHV*sexcode /SOLUTION;
	RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*************************************************
*Question 3: Does SKIP MVPA (i.e. current) impact the trend in school-age FMD?
CHRON AGE ;


*(a) ABSOLUTE FMD ;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
	CLASS subjectid ;
	MODEL abs = iage sexcode HtzscoreRound AgeCon mvpa   /SOLUTION;
	RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
	CLASS subjectid ;
	MODEL abs = iage sexcode HtzscoreRound AgeCon mvpa AgeCon*mvpa
/SOLUTION;
	RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
	CLASS subjectid ;
	MODEL abs = iage sexcode HtzscoreRound AgeCon mvpa sexcode*mvpa
/SOLUTION;
	RANDOM INTERCEPT /  SUBJECT=subjectid;
```

```
RUN;


PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
          CLASS subjectid ;
          MODEL abs = iage sexcode HtzscoreRound AgeCon mvpa
AgeCon*mvpa*sexcode /SOLUTION;
          RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*(b) Relative FMD ;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
          CLASS subjectid ;
          MODEL rel = iage  /SOLUTION;
          RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
          CLASS subjectid ;
          MODEL rel = iage sexcode /SOLUTION;
          RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
          CLASS subjectid ;
          MODEL rel = iage sexcode HtzscoreRound /SOLUTION;
          RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
          CLASS subjectid ;
          MODEL rel = iage sexcode HtzscoreRound AgeCon mvpa   /SOLUTION;
          RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
          CLASS subjectid ;
          MODEL rel = iage sexcode HtzscoreRound AgeCon mvpa AgeCon*mvpa
/SOLUTION;
          RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
```

```
        CLASS subjectid ;
        MODEL rel = iage sexcode HtzscoreRound AgeCon mvpa sexcode*mvpa
/SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;


PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL rel = iage sexcode HtzscoreRound AgeCon mvpa
AgeCon*mvpa*sexcode /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*(c) Scaled FMD ;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL scaled = iage /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL scaled = iage sexcode /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL scaled = iage sexcode HtzscoreRound /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL scaled = iage sexcode HtzscoreRound AgeCon mvpa  /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*^^SIGNIFICANT^^* ;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
```

```
        MODEL scaled = iage sexcode HtzscoreRound AgeCon mvpa AgeCon*mvpa
/SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL scaled = iage sexcode HtzscoreRound AgeCon mvpa sexcode*mvpa
/SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL scaled = iage sexcode HtzscoreRound AgeCon mvpa
AgeCon*mvpa*sexcode /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*Question 3: Does SKIP MVPA (i.e. current) impact the trend in school-age FMD?
YPHV ;

*(a) Absolute FMD ;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL abs = iage  /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL abs = iage sexcode   /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL abs = iage sexcode HtzscoreRound   /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
```

```
        MODEL abs = iage sexcode HtzscoreRound YPHV   /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL abs = iage sexcode HtzscoreRound YPHV mvpa   /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL abs = iage sexcode HtzscoreRound YPHV mvpa YPHV*mvpa
/SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL abs = iage sexcode HtzscoreRound YPHV mvpa sexcode*mvpa
/SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL abs = iage sexcode HtzscoreRound YPHV mvpa YPHV*mvpa*sexcode
/SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*(b) Relative FMD ;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL rel = iage  /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL rel = iage sexcode   /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;
```

```
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL rel = iage sexcode HtzscoreRound   /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL rel = iage sexcode HtzscoreRound YPHV   /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL rel = iage sexcode HtzscoreRound YPHV mvpa   /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL rel = iage sexcode HtzscoreRound YPHV mvpa YPHV*mvpa
/SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL rel = iage sexcode HtzscoreRound YPHV mvpa sexcode*mvpa
/SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL rel = iage sexcode HtzscoreRound YPHV mvpa YPHV*mvpa*sexcode
/SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*(c) Scaled FMD ;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
```

```
        MODEL scaled = iage  /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL scaled = iage sexcode   /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL scaled = iage sexcode HtzscoreRound   /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL scaled = iage sexcode HtzscoreRound YPHV   /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL scaled = iage sexcode HtzscoreRound YPHV mvpa   /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL scaled = iage sexcode HtzscoreRound YPHV mvpa YPHV*mvpa
/SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL scaled = iage sexcode HtzscoreRound YPHV mvpa sexcode*mvpa
/SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
```

```
        MODEL scaled = iage sexcode HtzscoreRound YPHV mvpa
YPHV*mvpa*sexcode /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*(a) Relative FMD ;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL rel = iage  /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL rel = iage sexcode /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL rel = iage sexcode HtzscoreRound /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL rel = iage sexcode HtzscoreRound AgeCon mvpa   /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL rel = iage sexcode HtzscoreRound AgeCon mvpa AgeCon*mvpa
/SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL rel = iage sexcode HtzscoreRound AgeCon mvpa sexcode*mvpa
/SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;
```

```
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
	CLASS subjectid ;
	MODEL rel = iage sexcode HtzscoreRound AgeCon mvpa
AgeCon*mvpa*sexcode /SOLUTION;
	RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*(b) Scaled FMD ;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
	CLASS subjectid ;
	MODEL scaled = iage /SOLUTION;
	RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
	CLASS subjectid ;
	MODEL scaled = iage sexcode /SOLUTION;
	RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
	CLASS subjectid ;
	MODEL scaled = iage sexcode HtzscoreRound /SOLUTION;
	RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
	CLASS subjectid ;
	MODEL scaled = iage sexcode HtzscoreRound AgeCon mvpa  /SOLUTION;
	RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
	CLASS subjectid ;
	MODEL scaled = iage sexcode HtzscoreRound AgeCon mvpa AgeCon*mvpa
/SOLUTION;
	RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
	CLASS subjectid ;
```

```
        MODEL scaled = iage sexcode HtzscoreRound AgeCon mvpa sexcode*mvpa
/SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL scaled = iage sexcode HtzscoreRound AgeCon mvpa
AgeCon*mvpa*sexcode /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;


**********************************************

*Question 4: Does HOPP MVPA impact the trend in school-age FMD?
CHRONOLOGICAL AGE;

*(a) Absolute FMD ;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL abs = iage sexcode HtzscoreRound AGECON mvpa HOPPMVPA
/SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL abs = iage sexcode HtzscoreRound AGECON mvpa HOPPMVPA
AGECON*HOPPMVPA /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL abs = iage sexcode HtzscoreRound AGECON mvpa HOPPMVPA
sexcode*HOPPMVPA /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
```

```
        MODEL abs = iage sexcode HtzscoreRound AGECON mvpa HOPPMVPA
AGECON*HOPPMVPA*sexcode /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*(b) Relative FMD ;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL rel = iage sexcode HtzscoreRound AGECON mvpa HOPPMVPA
/SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL rel = iage sexcode HtzscoreRound AGECON mvpa HOPPMVPA
AGECON*HOPPMVPA /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL rel = iage sexcode HtzscoreRound AGECON mvpa HOPPMVPA
sexcode*HOPPMVPA /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL rel = iage sexcode HtzscoreRound AGECON mvpa HOPPMVPA
AGECON*HOPPMVPA*sexcode /SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

*(c) Scaled FMD ;


PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
        CLASS subjectid ;
        MODEL scaled = iage sexcode HtzscoreRound AGECON mvpa HOPPMVPA
/SOLUTION;
        RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;
```

```
PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
	CLASS subjectid ;
	MODEL scaled = iage sexcode HtzscoreRound AGECON mvpa HOPPMVPA
AGECON*HOPPMVPA /SOLUTION;
	RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
	CLASS subjectid ;
	MODEL scaled = iage sexcode HtzscoreRound AGECONE mvpa HOPPMVPA
sexcode*HOPPMVPA /SOLUTION;
	RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;

PROC MIXED DATA=_Temp0.skipfmd29jul19_SAS_JB  COVTEST NOCLPRINT;
	CLASS subjectid ;
	MODEL scaled = iage sexcode HtzscoreRound AGECON mvpa HOPPMVPA
AGECON*HOPPMVPA*sexcode /SOLUTION;
	RANDOM INTERCEPT /  SUBJECT=subjectid;
RUN;
```

Appendix B – SPSS Output

```
T-TEST GROUPS=SexCode(0 1)
  /MISSING=ANALYSIS
  /VARIABLES=hoppHtz hoppWtz hoppBMIz hoppValidDays hoppWeartime hoppMVPA AgeCon APHVCon
    HtzscoreRound Wtzscore BMIzscore baseline RH Abs Rel scaled averageBF ttp peakBF peakSR SRAUC vd wt
    mvpa
  /CRITERIA=CI(.95).
```

Independent T-Test

Notes

Output Created		06-AUG-2019 23:56:19
Comments		
Input	Data	/Users/joeybacauanu/Desktop/Thesis/Statistics/SASUniversityEdition/myfolders/skipfmd29Jul19_SAS_JB.sav
	Active Dataset	DataSet36
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	835
Missing Value Handling	Definition of Missing	User defined missing values are treated as missing.

	Cases Used	Statistics for each analysis are based on the cases with no missing or out-of-range data for any variable in the analysis.
Syntax		T-TEST GROUPS=SexCode(0 1) /MISSING=ANALYSIS /VARIABLES=hoppHtz hoppWtz hoppBMIz hoppValidDays hoppWeartime hoppMVPA AgeCon APHVCon HtzscoreRound Wtzscore BMIzscore baseline RH Abs Rel scaled averageBF ttp peakBF peakSR SRAUC vd wt mvpa /CRITERIA=CI(.95).
Resources	Processor Time	00:00:00.05
	Elapsed Time	00:00:00.00

Group Statistics

SexCode	N	Mean	Std. Deviation	Std. Error Mean

hoppHtz	.0	134	.4145	.87940	.07597
	1.0	144	.5117	1.03555	.08630
hoppWtz	.0	134	.1834	.81693	.07057
	1.0	144	.2831	1.01070	.08422
hoppBMIz	.0	134	.0325	.94461	.08160
	1.0	144	-.0522	.96510	.08043
hoppValidDays	.0	134	5.687	1.3788	.1191
	1.0	144	5.563	1.3469	.1122
hoppWeartime	.0	132	721.24453102453090	40.568222053258250	3.531010500660722
	1.0	143	720.24408341658350	42.039407389477210	3.515511853488337
hoppMVPA	.0	132	86.771076839826830	18.311900773389254	1.593846381362466
	1.0	143	103.858425740925750	21.019557825616882	1.757743728555413
AgeCon	.0	375	9.30	1.274	.066
	1.0	402	9.13	1.371	.068
APHVCon	.0	375	11.12	.558	.029
	1.0	402	12.42	.678	.034
HtzscoreRound	.0	375	.2895	1.01271	.05230
	1.0	402	.5108	1.06952	.05334
Wtzscore	.0	375	.0691	.99102	.05118
	1.0	402	.1988	1.05201	.05247
BMIzscore	.0	375	-.0226	1.01137	.05223

	1.0	402	-.1002	1.04803	.05227
baseline	.0	359	2.611867091072421	.256360823928674	.013530206796208
	1.0	384	2.775809658646246	.301724767647167	.015397327572820
RH	.0	358	2.78759217877	.268235162400	.014176668844
	1.0	383	2.94770739774	.317120967391	.016204124476
Abs	.0	358	.176525539958100	.084976999250679	.004491173964570
	1.0	383	.172483092983922	.091564351784947	.004678719814920
Rel	.0	358	6.834448748497208	3.395467392487335	.179456027927019
	1.0	383	6.229209234739080	3.496240522257703	.178649545268785
scaled	.0	358	6.654558606657802	4.052740009178782	.214193965130486
	1.0	382	6.383340608670832	4.752774568676681	.243173101579040
averageBF	.0	353	75.766976632211920	38.356010253797090	2.041484436438159
	1.0	374	78.706730826736990	37.337150313195956	1.930658080644730
ttp	.0	356	46.376497450021860	17.938871463995130	.950758286077071
	1.0	378	50.987452071737785	22.439063797268943	1.154140904643899

peakBF	.0	353	161.992307368313250	75.491713172745450	4.018018467052543
	1.0	374	168.781193431179100	62.923732137404386	3.253708729679579
peakSR	.0	354	1393.603539793877200	416.985878055087500	22.162549371075194
	1.0	374	1270.022436665100000	399.776545005786260	20.671953017123183
SRAUC	.0	357	55637.384	26448.6472	1399.8108
	1.0	372	52393.070	23133.3653	1199.4091
vd	.0	403	5.444	2.1577	.1075
	1.0	432	5.701	1.9945	.0960
wt	.0	356	762.85163055109650	47.577012829885110	2.521576636835680
	1.0	393	762.69478856173570	52.049632861757864	2.626555662674695
mvpa	.0	356	60.42040975566250	18.768791863348790	.994743979271517
	1.0	393	72.820716911022300	21.497822480904480	1.084421694148148

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
hoppHtz	Equal variances assumed	1.863	.173	-.840	276	.401	-.09719	.11565	-.32485	.13047
	Equal variances not assumed			-.845	273.753	.399	-.09719	.11497	-.32353	.12915
hoppWtz	Equal variances assumed	3.402	.066	-.901	276	.368	-.09977	.11072	-.31772	.11819
	Equal variances not assumed			-.908	270.776	.365	-.09977	.10988	-.31610	.11657
hoppBMIz	Equal variances assumed	.028	.866	.739	276	.461	.08469	.11466	-.14103	.31041

	Equal variances not assumed			.739	275.290	.460	.08469	.11457	-.14086	.31024
hoppValidDays	Equal variances assumed	.067	.796	.759	276	.449	.1241	.1635	-.1978	.4460
	Equal variances not assumed			.758	273.502	.449	.1241	.1637	-.1981	.4463
hoppWeartime	Equal variances assumed	.057	.811	.200	273	.841	1.000447607947422	4.989783613435870	-8.822897576413157	10.823792792308000
	Equal variances not assumed			.201	272.455	.841	1.000447607947422	4.982655792626386	-8.808952476679567	10.809847692574410
hoppMVPA	Equal variances assumed	4.156	.042	-7.162	273	.000	-17.087348901098920	2.385853578106937	-21.784358846375470	-12.390338955822372
	Equal variances not assumed			-7.201	272.106	.000	-17.087348901098920	2.372764063841602	-21.758657974378310	-12.416039827819530
AgeCon	Equal variances assumed	.865	.353	1.836	775	.067	.175	.095	-.012	.361

	Equal variances not assumed			1.841	774.992	.066	.175	.095	-.012	.361
APHVCon	Equal variances assumed	67.693	.000	-29.086	775	.000	-1.300	.045	-1.388	-1.212
	Equal variances not assumed			-29.281	763.319	.000	-1.300	.044	-1.387	-1.213
HtzscoreRound	Equal variances assumed	1.679	.195	-2.956	775	.003	-.22125	.07484	-.36817	-.07433
	Equal variances not assumed			-2.962	774.825	.003	-.22125	.07470	-.36789	-.07461
Wtzscore	Equal variances assumed	.673	.412	-1.766	775	.078	-.12971	.07345	-.27389	.01447
	Equal variances not assumed			-1.770	774.924	.077	-.12971	.07329	-.27359	.01417
BMIzscore	Equal variances assumed	.395	.530	1.049	775	.294	.07761	.07398	-.06762	.22284

	Equal variances not assumed			1.050	774.104	.294	.07761	.07389	-.06744	.22266
baseline	Equal variances assumed	6.277	.012	-7.955	741	.000	-.163942567573824	.020609259702910	-.204402059833984	-.123483075313665
	Equal variances not assumed			-7.998	734.390	.000	-.163942567573824	.020497419162736	-.204183090295290	-.123702044852359
RH	Equal variances assumed	5.981	.015	-7.395	739	.000	-.160115218965	.021651238626	-.202620481785	-.117609956146
	Equal variances not assumed			-7.437	731.812	.000	-.160115218965	.021530248246	-.202383637009	-.117846800921
Abs	Equal variances assumed	2.257	.133	.622	739	.534	.004042446974179	.006501798868150	-.008721749775391	.016806643723748
	Equal variances not assumed			.623	738.963	.533	.004042446974179	.006485450075866	-.008689655206974	.016774549155331
Rel	Equal variances assumed	.326	.568	2.388	739	.017	.605239513758129	.253469772073660	.107632911888992	1.102846115627266

	Equal variances not assumed			2.390	737.914	.017	.605239513758129	.253219521332946	.108122999250882	1.102356028265375
scaled	Equal variances assumed	.146	.702	.833	738	.405	.271217997986970	.325722977650646	-.368236020578916	.910672016552857
	Equal variances not assumed			.837	731.571	.403	.271217997986970	.324055877943743	-.364972381528598	.907408377502539
averageBF	Equal variances assumed	1.729	.189	-1.047	725	.295	-2.939754194525065	2.807635169672541	-8.451819962204214	2.572311573154083
	Equal variances not assumed			-1.046	719.829	.296	-2.939754194525065	2.809821938945246	-8.456179387629783	2.576670998579653
ttp	Equal variances assumed	5.499	.019	-3.063	732	.002	-4.610954621715926	1.505234181989286	-7.566045519993637	-1.655863723438216
	Equal variances not assumed			-3.084	713.398	.002	-4.610954621715926	1.495320215310569	-7.546709098609372	-1.675200144822481
peakBF	Equal variances assumed	.001	.980	-1.320	725	.187	-6.788886062865856	5.143345445938025	-16.886515081813500	3.308742956081785

	Equal variances not assumed			-1.313	686.449	.190	-6.788886062865856	5.170212074873560	-16.940214065778820	3.362441940047109
peakSR	Equal variances assumed	.912	.340	4.082	726	.000	123.581103128777160	30.271801962922858	64.150383351593290	183.011822905961030
	Equal variances not assumed			4.078	719.219	.000	123.581103128777160	30.306900801096337	64.080539257637160	183.081666999917160
SRAUC	Equal variances assumed	3.436	.064	1.765	727	.078	3244.3139	1838.3310	-364.7572	6853.3849
	Equal variances not assumed			1.760	705.646	.079	3244.3139	1843.3808	-374.8537	6863.4814
vd	Equal variances assumed	3.845	.050	-1.790	833	.074	-.2572	.1437	-.5393	.0248
	Equal variances not assumed			-1.785	815.191	.075	-.2572	.1441	-.5400	.0256
wt	Equal variances assumed	.357	.550	.043	747	.966	.156841989360828	3.656486749585308	-7.021370886475202	7.335054865196858

	Equal variances not assumed			.043	746.937	.966	.156841989360828	3.640315442973455	-6.989625242584888	7.303309221306544
mvpa	Equal variances assumed	7.711	.006	-8.371	747	.000	-12.400307155359755	1.481413528476318	-15.308536390910085	-9.492077919809425
	Equal variances not assumed			-8.427	746.000	.000	-12.400307155359755	1.471559035525273	-15.289196880294100	-9.511417430425410

```
ONEWAY averageBF ttp peakBF peakSR SRAUC vd wt mvpa baseline RH Abs Rel scaled HtzscoreRound
    Wtzscore BMIzscore APHVCon BY AgeCon
  /STATISTICS DESCRIPTIVES
  /MISSING ANALYSIS
  /POSTHOC=LSD ALPHA(0.05).
```

Oneway

Notes

Output Created		07-AUG-2019 00:03:00
Comments		
Input	Data	/Users/joeybacauanu/Desktop/Thesis/Statistics/SASUniversityEdition/myfolders/skipfmd29Jul19_SAS_JB.sav
	Active Dataset	DataSet36
	Filter	<none>
	Weight	<none>

	Split File	<none>
	N of Rows in Working Data File	835
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each analysis are based on cases with no missing data for any variable in the analysis.

Syntax

```
ONEWAY averageBF ttp peakBF
peakSR SRAUC vd wt mvpa
baseline RH Abs Rel scaled
HtzscoreRound
   Wtzscore BMIzscore APHVCon
BY AgeCon
  /STATISTICS DESCRIPTIVES
  /MISSING ANALYSIS
  /POSTHOC=LSD ALPHA(0.05).
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Resources	Processor Time	00:00:00.16
	Elapsed Time	00:00:00.00

Descriptives

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	Minimum	Maximum

						Lower Bound	Upper Bound		
averageBF	6	4	73.111018149008640	26.320537104507213	13.160268552253607	31.229170118349735	114.992866179667540	36.200934779719226	93.541421898748470
	7	65	62.621103980646560	34.275086466103346	4.251301252845300	54.128153398401140	71.114054562891980	7.011564900611200	153.997055058006650
	8	135	72.228294186380850	36.849825706295610	3.171528028247308	65.955564359619490	78.501024013142210	8.610000000000000	197.634626126114500
	9	202	74.581824387554200	34.816394506677010	2.449672969125917	69.751469797361050	79.412178977747360	-5.265474281661425	193.580000000000000
	10	184	79.193329875398390	36.487317191608610	2.689880710787491	73.886163182720710	84.500496568076070	17.707209626018823	191.010000000000000
	11	104	88.303469734844540	39.680654902973630	3.891008339661611	80.586572407780840	96.020367061908250	13.588752463119432	203.197517566017840
	12	29	100.007673135770640	53.127666025848250	9.865559909227360	79.798989759902330	120.216356511638960	17.788889505778474	225.012295588728450
	Total	723	77.226168939446620	37.861046752609920	1.408067479405941	74.461773279255820	79.990564599637420	-5.265474281661425	225.012295588728450
ttp	6	4	56.364090909090905	8.574527985148825	4.287263992574412	42.720103456147230	70.008078362034580	50.389610389610390	69.090000000000000
	7	67	50.131851133940670	19.119402854195698	2.335806823121445	45.468262341351256	54.795439926530086	15.064935064935064	99.480519480519480
	8	135	50.498228956228950	22.431610676762418	1.930605657326874	46.679827358460000	54.316630553997896	17.922077922077920	152.340000000000000

	9	204	48.939490705373050	21.071425590095770	1.475294879794463	46.030623983841410	51.848357426904700	12.597402597402597	170.129870129870100
	10	187	49.008838676296960	20.349359348835390	1.488092534045694	46.073129555496520	51.944547797097400	8.441558441558442	124.675300000000000
	11	104	45.233484015984010	19.803220413165757	1.941865525359830	41.382251745567020	49.084716286401004	11.038961038961040	173.506493506493500
	12	30	46.027779220779216	14.190989730232262	2.590908396190788	40.728776568839834	51.326781872718600	9.870129870129870	70.779220779220780
	Total	731	48.748257112654780	20.522680646444346	.759058763503430	47.258058545596540	50.238455679713010	8.441558441558442	173.506493506493500
peakBF	6	4	146.860880771001750	46.790266325656766	23.395133162828383	72.407125675341690	221.314635866661800	81.049296390009450	186.681919941166880
	7	65	127.814398485851610	47.834887733909625	5.933187604180064	115.961493664353170	139.667303307350040	35.422288165451036	226.320000000000000
	8	135	150.823960185138020	52.427000670608260	4.512197788641575	141.899619173180980	159.748301197095060	33.100000000000000	313.694745363381340
	9	202	161.291287096613620	56.099102202597610	3.947119057132138	153.508213643155800	169.074360550071420	11.797996694077451	342.411155919733800
	10	184	170.400309444793780	62.265938702492170	4.590305902058182	161.343581205914800	179.457037683672750	53.748690950248990	367.900554110329900
	11	104	195.728926732039580	105.292589381117220	10.324787844058253	175.252145198530430	216.205708265548740	53.982557612726936	1053.650000000000000
	12	29	203.752321280827300	80.603407175976270	14.967676953765524	173.092424912652700	234.412217649001900	40.210579795763780	402.016119891382600
	Total	723	165.222319057112170	69.180058380172350	2.572834054616048	160.171189477745430	170.273448636478920	11.797996694077451	1053.650000000000000

peakSR	6	4	1443.062478324078000	500.125923496797000	250.062961748398500	647.250529619623200	2238.874427028533000	1063.9189050470488000	2162.8914123993986000
	7	65	1199.733475560176200	377.650529271572340	46.841783165673576	1106.156256269008300	1293.310694851344100	456.6371336121853000	2215.4758877240447000
	8	135	1371.807837274791200	410.549647008285000	35.334487681209370	1301.922377390099000	1441.693297159483300	425.9800000000000000	2456.5127723195210000
	9	203	1339.016602497863200	432.966247835276140	30.388273257122485	1279.097692530311200	1398.935512465415300	1.4923109007780542	2764.7342854475870000
	10	184	1335.136516553335500	424.028140764761000	31.259769269540220	1273.460619320136600	1396.812413786534300	426.9470558375633700	2490.6500000000000000
	11	104	1323.245160930650900	374.839622326480300	36.756049013662940	1250.348206818333200	1396.142115042968500	493.4900000000000000	2363.3731800766280000
	12	29	1352.088094810950200	378.419925194215900	70.270815981874590	1208.144853493912000	1496.031336127988400	568.6196038378212000	2144.1779719188760000
	Total	724	1330.473100408825800	412.706161104114760	15.338103683441423	1300.360560061312000	1360.585640756339400	1.4923109007780542	2764.7342854475870000
SRAUC	6	4	69364.500	22811.4008	11405.7004	33066.471	105662.529	44644.0	97071.0
	7	65	51323.262	22586.0813	2801.4586	45726.705	56919.818	13615.0	119679.0
	8	135	58530.993	26906.3379	2315.7289	53950.884	63111.101	13485.0	222872.0
	9	205	54861.459	26482.7023	1849.6322	51214.611	58508.306	6080.0	165986.0
	10	184	53797.804	24853.4444	1832.2202	50182.812	57412.797	2387.0	143790.0
	11	104	48534.125	19833.9648	1944.8803	44676.914	52391.336	7965.0	124115.0
	12	29	50208.586	19790.3638	3674.9783	42680.734	57736.438	13221.0	97733.0
	Total	726	53945.106	24821.4882	921.2118	52136.545	55753.667	2387.0	222872.0
vd	6	6	5.000	1.7889	.7303	3.123	6.877	2.0	7.0

	7	80	5.975	1.4494	.1620	5.652	6.298	.0	7.0
	8	147	6.007	1.3824	.1140	5.781	6.232	.0	7.0
	9	218	5.913	1.6283	.1103	5.695	6.130	.0	7.0
	10	191	5.969	1.6540	.1197	5.733	6.205	.0	7.0
	11	105	5.762	1.8889	.1843	5.396	6.127	.0	7.0
	12	30	5.633	1.7317	.3162	4.987	6.280	1.0	7.0
	Total	777	5.912	1.6158	.0580	5.799	6.026	.0	7.0
wt	6	5	700.37507142857130	34.830928510142740	15.576864773622928	657.12676147351800	743.62338138362470	661.391666666667	748.987500000000
	7	78	743.79618589743620	36.800501984986750	4.166836324259310	735.49895475189260	752.09341704297980	659.083333333333	820.837500000000
	8	142	752.63271294433330	43.150378047309836	3.621099286075710	745.47404774222080	759.79137814644580	657.320000000000	859.871428571429
	9	208	766.79907165750940	56.309668622706376	3.904373029299107	759.10163774398220	774.49650557103670	654.300000000000	1297.278571428570
	10	181	770.57569652722960	47.085313256776445	3.499823771797603	763.66973638540160	777.48165666905770	634.783333333333	902.720000000000
	11	96	772.64314484126990	50.992154371633596	5.204364962322204	762.31117407721300	782.97511560532680	651.462500000000	958.060000000000
	12	28	762.14937500000000	58.486754054401880	11.052957587096145	739.47057932543580	784.82817067456410	659.400000000000	877.520000000000
	Total	738	762.70210769131520	50.133747517459206	1.845448748734690	759.07914483751260	766.32507054511780	634.783333333333	1297.278571428570
mvpa	6	5	74.813619047619070	8.975637429912310	4.014027086935085	63.668893189966790	85.958344905271360	61.675000000000	81.521428571429

	7	78	72.866481990232020	21.707864159176820	2.457931604776650	67.972114878657500	77.760849101806540	31.28333333333333	147.2642857142860
	8	142	72.298287223340010	20.152415363613010	1.691153129779583	68.954993348977140	75.641581097702880	26.9571428571429	136.7833333333330
	9	208	67.211158424908430	19.629459657332628	1.361058140464704	64.527845378210100	69.894471471606760	23.83333333333333	122.9071428571430
	10	181	64.715615408225900	20.665456122812078	1.536051256561388	61.684631722961875	67.746599093489930	25.2500000000000	119.3285714285710
	11	96	59.991385582010600	23.247359879446773	2.372673732145586	55.281032674278430	64.701738489742780	18.4333333333333	130.3714285714290
	12	28	60.956526360544220	22.633759133522954	4.277378421559893	52.180070784654134	69.732981936434300	26.8833333333333	115.0357142857140
	Total	738	67.050695896244680	21.139225337036255	.778145638002992	65.523049710856820	68.578342081632530	18.4333333333333	147.2642857142860
baseline	6	5	2.696780220000000	.316351342915914	.141476621506666	2.303978146717896	3.089582293282104	2.285868400000000	3.020000000000000
	7	67	2.562069140522388	.268707310166980	.032827822777577	2.496526277613018	2.627612003431759	2.050000000000000	3.274243200000000
	8	139	2.602032635417267	.259851972807723	.022040356669101	2.558452160107910	2.645613110726623	1.820000000000000	3.195354839000000
	9	206	2.677660458888352	.264649044547012	.018438972653664	2.641306115881554	2.714014801895149	1.998371400000000	3.374103448000000
	10	188	2.732371195750001	.291329218979332	.021247367024754	2.690455855442049	2.774286536057953	1.998827600000000	3.499666667000000
	11	105	2.822906024400000	.296948797010965	.028979235266498	2.765439113377746	2.880372935422253	2.071709677000000	3.580000000000000

	12	30	2.867050639438597	.347504715671496	.063445390537566	2.737290246054494	2.996811032822699	1.789028571000000	3.670000000000000
	Total	740	2.695304812047512	.291283680713432	.010707801061891	2.674283478985556	2.716326145109467	1.789028571000000	3.670000000000000
RH	6	4	2.77315000000	.402850489222	.201425244611	2.13212497450	3.41417502550	2.380600000	3.280000000
	7	67	2.73264179104	.283730797588	.034663233888	2.66343441162	2.80184917047	2.144000000	3.466800000
	8	139	2.77201870504	.274427941380	.023276674187	2.72599365472	2.81804375535	1.940000000	3.361400000
	9	205	2.84763772358	.267347539775	.018672362128	2.81082215745	2.88445328970	2.151400000	3.634400000
	10	188	2.90590106383	.301276372487	.021972837756	2.86255456490	2.94924756276	2.083800000	3.738200000
	11	105	3.01059428571	.304032769561	.029670560199	2.95175645141	3.06943212002	2.258600000	3.972400000
	12	30	3.04196000000	.384047767862	.070117208539	2.89855420667	3.18536579333	1.924200000	3.790000000
	Total	738	2.86847768744	.302812984375	.011146699993	2.84659461968	2.89036075520	1.924200000	3.972400000
Abs	6	4	.157174725000000	.149139344529143	.074569672264572	-.080139252984592	.394488702984592	.0644105000000000	.3800000000000000
	7	67	.170274146044776	.079518673507875	.009714752158407	.150878017546363	.189670274543189	.0337091000000000	.3612647000000000

	8	139	.169770245158273	.093849696524893	.007960227364624	.154030459394861	.185510030921686	-.1682486000000000	.4967529410000000
	9	205	.171298084887805	.083155947767835	.005807863319449	.159846947929325	.182749221846285	-.1160930000000000	.4900000000000000
	10	188	.173476676590426	.080888589498390	.005899406709730	.161838733895444	.185114619285407	-.0300000000000000	.6204285710000000
	11	105	.187688261314286	.096840203809593	.009450636196213	.168947295088053	.206429227540518	.0112812500000000	.5345142860000000
	12	30	.174909360561404	.107445751399868	.019616820583267	.134788457620111	.215030263502696	.0170275860000000	.4251255810000000
	Total	738	.173874527937455	.087708657258426	.003228600290341	.167536178563244	.180212877311667	-.1682486000000000	.6204285710000000
Rel	6	4	5.788490750000000	4.919132682942579	2.459566341471290	-2.038947066015107	13.615928566015107	2.269742900000000	13.070000000000000
	7	67	6.609403747850743	3.356622445753054	.410076699111553	5.790659201363361	7.428148294338124	.223608500000000	14.660189300000000
	8	139	6.549516977705035	3.775399376994744	.320225195668760	5.916334564062845	7.182699391347224	-6.147981400000000	20.901418210000000

	9	205	6.456796249039027	3.321665520864503	.231995183218501	5.999380419736275	6.914212078341780	-4.204603800000000	16.550000000000000
	10	188	6.424332888053189	3.185280234625662	.232310437171042	5.966046879261193	6.882618896845185	-.990000000000000	27.397173860000000
	11	105	6.775248705304758	3.729281542514034	.363940612938507	6.053540812436369	7.496956598173147	.474456872000000	23.344328630000000
	12	30	6.091626566502211	3.619079527735157	.660750498248563	4.740240061430431	7.443013071573992	.639161158000000	14.997400000000000
	Total	738	6.506686448599004	3.450584063234009	.127017754650826	6.257326715802921	6.756046181395088	-6.147981400000000	27.397173860000000
scaled	6	4	6.182320079440634	4.920509400965604	2.460254700482802	-1.647308402167369	14.011948561048637	1.4161459904424634	12.2292037734933920
	7	67	6.420266981359244	3.319555027119674	.405548193173390	5.610563888699010	7.229970074019478	.9737933364971196	14.8289207635510460
	8	139	6.425744231252148	4.092646387025108	.347133735856943	5.739355465785084	7.112132996719212	-7.8780363613182525	23.0057456517467360
	9	205	6.529898060804393	3.668070618035026	.256189164665790	6.024779904520893	7.035016217087893	-4.1464735270645985	24.2414867157368260

	10	188	6.208535771964785	3.844029661094673	.280354676916615	5.655471400450183	6.761600143479387	-11.2011295441104120	28.1717475410395260
	11	105	6.683310048111528	3.603486132225789	.351664237930818	5.985946667572567	7.380673428650488	-.2574306224627176	25.7486441963127530
	12	30	8.108131629705714	12.276317034053918	2.241338587545416	3.524079512402436	12.692183747008992	.5143823666278413	70.7792207792207800
	Total	738	6.502562259823905	4.426270310069315	.162933261720246	6.182693634230223	6.822430885417586	-11.2011295441104120	70.7792207792207800
HtzscoreRound	6	6	.5567	1.50387	.61395	-1.0215	2.1349	-.90	3.24
	7	80	.2720	.98911	.11059	.0519	.4921	-2.30	3.06
	8	147	.2716	1.04738	.08639	.1008	.4423	-2.53	2.86
	9	218	.4106	1.00367	.06798	.2767	.5446	-2.36	3.64
	10	191	.4719	1.05585	.07640	.3212	.6226	-2.18	4.78
	11	105	.5497	1.04284	.10177	.3479	.7515	-1.89	4.54
	12	30	.3837	1.34217	.24505	-.1175	.8848	-1.33	4.54
	Total	777	.4040	1.04768	.03759	.3302	.4778	-2.53	4.78
Wtzscore	6	6	.4433	.90719	.37036	-.5087	1.3954	-.58	1.86
	7	80	.2063	1.03868	.11613	-.0249	.4374	-2.54	2.43
	8	147	.1854	.95723	.07895	.0293	.3414	-2.63	2.57
	9	218	.1691	.99624	.06747	.0361	.3021	-2.56	2.89
	10	191	.0865	1.03558	.07493	-.0613	.2343	-2.52	2.99
	11	105	.0734	1.09016	.10639	-.1375	.2844	-2.60	3.08

	12	30	-.0553	1.24548	.22739	-.5204	.4097	-1.94	2.91
	Total	777	.1362	1.02443	.03675	.0641	.2084	-2.63	3.08
BMIzscore	6	6	.3950	.30284	.12363	.0772	.7128	.07	.88
	7	80	.0616	.99337	.11106	-.1594	.2827	-2.67	2.14
	8	147	.0172	.96435	.07954	-.1400	.1744	-2.54	2.26
	9	218	-.0457	1.01350	.06864	-.1810	.0896	-2.64	2.23
	10	191	-.1192	1.07708	.07793	-.2729	.0346	-2.61	2.23
	11	105	-.1682	1.08966	.10634	-.3791	.0427	-2.62	2.24
	12	30	-.2737	1.12286	.20501	-.6930	.1456	-1.65	2.34
	Total	777	-.0628	1.03057	.03697	-.1353	.0098	-2.67	2.34
APHVCon	6	6	11.00	.632	.258	10.34	11.66	10	12
	7	80	11.41	.669	.075	11.26	11.56	10	12
	8	147	11.56	.632	.052	11.45	11.66	10	13
	9	218	11.74	.843	.057	11.63	11.85	9	13
	10	191	11.94	.944	.068	11.80	12.07	9	14
	11	105	12.11	1.059	.103	11.91	12.32	9	14
	12	30	12.53	1.137	.208	12.11	12.96	11	14
	Total	777	11.80	.900	.032	11.73	11.86	9	14

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
averageBF	Between Groups	47241.807	6	7873.634	5.708	.000
	Within Groups	987715.491	716	1379.491		
	Total	1034957.298	722			
ttp	Between Groups	2300.654	6	383.442	.910	.487
	Within Groups	305161.053	724	421.493		
	Total	307461.707	730			
peakBF	Between Groups	268188.738	6	44698.123	10.041	.000
	Within Groups	3187216.967	716	4451.420		
	Total	3455405.705	722			
peakSR	Between Groups	1430197.459	6	238366.243	1.404	.210
	Within Groups	121715771.965	717	169757.004		
	Total	123145969.424	723			
SRAUC	Between Groups	7862946848.023	6	1310491141.337	2.147	.046
	Within Groups	438814102396.810	719	610311686.226		
	Total	446677049244.833	725			
vd	Between Groups	11.936	6	1.989	.761	.601
	Within Groups	2014.113	770	2.616		
	Total	2026.049	776			
wt	Between Groups	85908.693	6	14318.116	5.925	.000
	Within Groups	1766461.682	731	2416.500		
	Total	1852370.376	737			
mvpa	Between Groups	13666.038	6	2277.673	5.274	.000

	Within Groups	315674.828	731	431.840		
	Total	329340.867	737			
baseline	Between Groups	5.316	6	.886	11.316	.000
	Within Groups	57.386	733	.078		
	Total	62.701	739			
RH	Between Groups	5.942	6	.990	11.745	.000
	Within Groups	61.638	731	.084		
	Total	67.580	737			
Abs	Between Groups	.026	6	.004	.557	.765
	Within Groups	5.644	731	.008		
	Total	5.670	737			
Rel	Between Groups	17.552	6	2.925	.244	.962
	Within Groups	8757.561	731	11.980		
	Total	8775.113	737			
scaled	Between Groups	98.856	6	16.476	.840	.539
	Within Groups	14340.351	731	19.617		
	Total	14439.207	737			
HtzscoreRound	Between Groups	7.244	6	1.207	1.101	.360
	Within Groups	844.514	770	1.097		
	Total	851.757	776			
Wtzscore	Between Groups	3.535	6	.589	.559	.763
	Within Groups	810.839	770	1.053		
	Total	814.374	776			
BMIzscore	Between Groups	6.608	6	1.101	1.037	.400
	Within Groups	817.558	770	1.062		

	Total	824.165	776			
APHVCon	Between Groups	55.380	6	9.230	12.401	.000
	Within Groups	573.084	770	.744		
	Total	628.463	776			

Post Hoc Tests

Multiple Comparisons

LSD

Dependent Variable	(I) AgeCon	(J) AgeCon	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
averageBF	6	7	10.489914168362084	19.133626535599790	.584	-27.074804277924635	48.054632614648800
		8	.882723962627793	18.843863152689110	.963	-36.113107039617354	37.878554964872940
		9	-1.470806238545563	18.753716705082322	.938	-38.289654277473154	35.348041800382030
		10	-6.082311726389747	18.771519931531856	.746	-42.936112532257140	30.771489079477647

	11	-15.192451585835897	18.924509584232975	.422	-52.346614333973880	21.961711162302088
	12	-26.896654986762000	19.810133250016086	.175	-65.789547378891540	11.996237405367545
7	6	-10.489914168362084	19.133626535599790	.584	-48.054632614648800	27.074804277924635
	8	-9.607190205734291	5.607262099031993	.087	-20.615831019997398	1.401450608528815
	9	-11.960720406907647*	5.296423319982104	.024	-22.359096815963966	-1.562343997851329
	10	-16.572225894751830*	5.359120288803378	.002	-27.093694179612500	-6.050757609891166
	11	-25.682365754197980*	5.872586545440782	.000	-37.211913470648130	-14.152818037747831
	12	-37.386569155124086*	8.294069514620631	.000	-53.670172554143140	-21.102965756105030

	8	6	-.882723962627793	18.843863152689110	.963	-37.878554964872940	36.113107039617354
		7	9.607190205734291	5.607262099031993	.087	-1.401450608528815	20.615831019997398
		9	-2.353530201173356	4.128875645731657	.569	-10.459680430616935	5.752620028270222
		10	-6.965035689017540	4.209000401916085	.098	-15.228493468132648	1.298422090097567
		11	-16.075175548463690*	4.845904131032503	.001	-25.589055416519102	-6.561295680408279
		12	-27.779378949389795*	7.601782897901327	.000	-42.703827992970400	-12.854929905809186
	9	6	1.470806238545563	18.753716705082322	.938	-35.348041800382030	38.289654277473154
		7	11.960720406907647*	5.296423319982104	.024	1.562343997851329	22.359096815963966

	8	2.353530201173356	4.128875645731657	.569	-5.752620028270222	10.459680430616935
	10	-4.611505487844184	3.785022605023561	.223	-12.042574982484744	2.819564006796376
	11	-13.721645347290334*	4.482577225700351	.002	-22.522211778534945	-4.921078916045721
	12	-25.425848748216440*	7.375487439080529	.001	-39.906015826720530	-10.945681669712350
10	6	6.082311726389747	18.771519931531856	.746	-30.771489079477647	42.936112532257140
	7	16.572225894751830*	5.359120288803378	.002	6.050757609891166	27.093694179612500
	8	6.965035689017540	4.209000401916085	.098	-1.298422090097567	15.228493468132648
	9	4.611505487844184	3.785022605023561	.223	-2.819564006796376	12.042574982484744

	11	-9.110139859446150*	4.556486461055404	.046	-18.055811015690345	-.164468703201953
	12	-20.814343260372254*	7.420639140225618	.005	-35.383155893744390	-6.245530627000123
11	6	15.192451585835897	18.924509584232975	.422	-21.961711162302088	52.346614333973880
	7	25.682365754197980*	5.872586545440782	.000	14.152818037747831	37.211913470648130
	8	16.075175548463690*	4.845904131032503	.001	6.561295680408279	25.589055416519102
	9	13.721645347290334*	4.482577225700351	.002	4.921078916045721	22.522211778534945
	10	9.110139859446150*	4.556486461055404	.046	.164468703201953	18.055811015690345
	12	-11.704203400926104	7.799550481487797	.134	-27.016926124951233	3.608519323099023
12	6	26.896654986762000	19.810133250016086	.175	-11.996237405367545	65.789547378891540
	7	37.386569155124086*	8.294069514620631	.000	21.102965756105030	53.670172554143140

		8	27.779378949389795*	7.601782897901327	.000	12.854929905809186	42.703827992970400
		9	25.425848748216440*	7.375487439080529	.001	10.945681669712350	39.906015826720530
		10	20.814343260372254*	7.420639140225618	.005	6.245530627000123	35.383155893744390
		11	11.704203400926104	7.799550481487797	.134	-3.608519323099023	27.016926124951233
ttp	6	7	6.232239775150234	10.567129919493453	.556	-14.513635703575375	26.978115253875842
		8	5.865861952861955	10.416115568977695	.574	-14.583535207231350	26.315259112955260
		9	7.424600203717851	10.365299557299043	.474	-12.925032625034543	27.774233032470246
		10	7.355252232793944	10.374356177250748	.479	-13.012160968794560	27.722665434382450
		11	11.130606893106894	10.460693612470156	.288	-9.406307932277322	31.667521718491110

		12	10.336311688311689	10.928086025981427	.345	-11.118209420356557	31.790832796979934
	7	6	-6.232239775150234	10.567129919493453	.556	-26.978115253875842	14.513635703575375
		8	-.366377822288278	3.068079923150723	.905	-6.389773439583203	5.657017795006646
		9	1.192360428567618	2.890862463190661	.680	-4.483113720457545	6.867834577592780
		10	1.123012457643711	2.923168992891415	.701	-4.615887356384890	6.861912271672311
		11	4.898367117956660	3.216171905000562	.128	-1.415769489395263	11.212503725308583
		12	4.104071913161455	4.510068187931483	.363	-4.750301387841109	12.958445214164020
	8	6	-5.865861952861955	10.416115568977695	.574	-26.315259112955260	14.583535207231350

	7	.366377822288278	3.068079923150723	.905	-5.657017795006646	6.389773439583203
	9	1.558738250855896	2.277787213927265	.494	-2.913118371252671	6.030594872964463
	10	1.489390279931989	2.318651714218323	.521	-3.062693408655123	6.041473968519101
	11	5.264744940244938*	2.678617280120605	.050	.005960296551587	10.523529583938290
	12	4.470449735449734	4.143904423443829	.281	-3.665054021906071	12.605953492805538
9	6	-7.424600203717851	10.365299557299043	.474	-27.774233032470246	12.925032625034543
	7	-1.192360428567618	2.890862463190661	.680	-6.867834577592780	4.483113720457545
	8	-1.558738250855896	2.277787213927265	.494	-6.030594872964463	2.913118371252671
	10	-.069347970923907	2.078489147936980	.973	-4.149933463436721	4.011237521588907

		11	3.706006689389042	2.473653552865666	.135	-1.150383737929400	8.562397116707483
		12	2.911711484593837	4.014463256387031	.468	-4.969667420125538	10.793090389313214
	10	6	-7.355252232793944	10.374356177250748	.479	-27.722665434382450	13.012160968794560
		7	-1.123012457643711	2.923168992891415	.701	-6.861912271672311	4.615887356384890
		8	-1.489390279931989	2.318651714218323	.521	-6.041473968519101	3.062693408655123
		9	.069347970923907	2.078489147936980	.973	-4.011237521588907	4.149933463436721
		11	3.775354660312949	2.511332928849134	.133	-1.155009650947914	8.705718971573813
		12	2.981059455517745	4.037789793537870	.461	-4.946115179808526	10.908234090844015

	11	6	-11.130606893106894	10.460693612470156	.288	-31.667521718491110	9.406307932277322
		7	-4.898367117956660	3.216171905000562	.128	-11.212503725308583	1.415769489395263
		8	-5.264744940244938*	2.678617280120605	.050	-10.523529583938290	-.005960296551587
		9	-3.706006689389042	2.473653552865666	.135	-8.562397116707483	1.150383737929400
		10	-3.775354660312949	2.511332928849134	.133	-8.705718971573813	1.155009650947914
		12	-.794295204795205	4.254713994889872	.852	-9.147345409349487	7.558754999759078
	12	6	-10.336311688311689	10.928086025981427	.345	-31.790832796979934	11.118209420356557
		7	-4.104071913161455	4.510068187931483	.363	-12.958445214164020	4.750301387841109

		8	-4.470449735449734	4.143904423443829	.281	-12.605953492805538	3.665054021906071
		9	-2.911711484593837	4.014463256387031	.468	-10.793090389313214	4.969667420125538
		10	-2.981059455517745	4.037789793537870	.461	-10.908234090844015	4.946115179808526
		11	.794295204795205	4.254713994889872	.852	-7.558754999759078	9.147345409349487
peakBF	6	7	19.046482285150134	34.370604825844026	.580	-48.432732421438220	86.525696991738490
		8	-3.963079414136274	33.850089663258800	.907	-70.420375693856770	62.494216865584220
		9	-14.430406325611870	33.688155493519380	.669	-80.569780047275910	51.708967396052174
		10	-23.539428673792030	33.720136240074840	.485	-89.741589642704920	42.662732295120860

	11	-48.868045961037836	33.994958521446840	.151	-115.609760767447110	17.873668845371440
	12	-56.891440509825540	35.585844649824620	.110	-126.756514569715780	12.973633550064690
7	6	-19.046482285150134	34.370604825844026	.580	-86.525696991738490	48.432732421438220
	8	-23.009561699286408*	10.072580302650914	.023	-42.784884604889160	-3.234238793683659
	9	-33.476888610762000*	9.514206446059035	.000	-52.155965769557940	-14.797811451966070
	10	-42.585910958942165*	9.626831866813685	.000	-61.486103660715344	-23.685718257168983
	11	-67.914528246187970*	10.549194690476714	.000	-88.625579945953900	-47.203476546422040
	12	-75.937922794975680*	14.899014839382586	.000	-105.188901250477870	-46.686944339473484

	8	6	3.963079414136274	33.850089663258800	.907	-62.494216865584220	70.420375693856770
		7	23.009561699286408*	10.072580302650914	.023	3.234238793683659	42.784884604889160
		9	-10.467326911475595	7.416887380468870	.159	-25.028773779728496	4.094119956777304
		10	-19.576349259655757*	7.560819129447983	.010	-34.420374844276004	-4.732323675035511
		11	-44.904966546901560*	8.704918307135868	.000	-61.995182282903190	-27.814750810899940
		12	-52.928361095689270*	13.655428858167348	.000	-79.737828677067200	-26.118893514311345
	9	6	14.430406325611870	33.688155493519380	.669	-51.708967396052174	80.569780047275910
		7	33.476888610762000*	9.514206446059035	.000	14.797811451966070	52.155965769557940
		8	10.467326911475595	7.416887380468870	.159	-4.094119956777304	25.028773779728496

	10	-9.109022348180162	6.799208501958639	.181	-22.457790944580942	4.239746248220621
	11	-34.437639635425970*	8.052257638624665	.000	-50.246497955572700	-18.628781315279234
	12	-42.461034184213670*	13.248924018400501	.001	-68.472417835998700	-16.449650532428652
10	6	23.539428673792030	33.720136240074840	.485	-42.662732295120860	89.741589642704920
	7	42.585910958942165*	9.626831866813685	.000	23.685718257168983	61.486103660715344
	8	19.576349259655757*	7.560819129447983	.010	4.732323675035511	34.420374844276004
	9	9.109022348180162	6.799208501958639	.181	-4.239746248220621	22.457790944580942
	11	-25.328617287245805*	8.185024164439433	.002	-41.398133833999196	-9.259100740492418
	12	-33.352011836033510*	13.330032075693510	.013	-59.522633535570140	-7.181390136496887

	11	6	48.868045961037836	33.994958521446840	.151	-17.873668845371440	115.609760767447110
		7	67.914528246187970*	10.549194690476714	.000	47.203476546422040	88.625579945953900
		8	44.904966546901560*	8.704918307135868	.000	27.814750810899940	61.995182282903190
		9	34.437639635425970*	8.052257638624665	.000	18.628781315279234	50.246497955572700
		10	25.328617287245805*	8.185024164439433	.002	9.259100740492418	41.398133833999196
		12	-8.023394548787707	14.010687776290660	.567	-35.530335827062800	19.483546729487390
	12	6	56.891440509825540	35.585844649824620	.110	-12.973633550064690	126.756514569715780
		7	75.937922794975680*	14.899014839382586	.000	46.686944339473484	105.188901250477870
		8	52.928361095689270*	13.655428858167348	.000	26.118893514311345	79.737828677067200
		9	42.461034184213670*	13.248924018400501	.001	16.449650532428652	68.472417835998700
		10	33.352011836033510*	13.330032075693510	.013	7.181390136496887	59.522633535570140

		11	8.023394548787707	14.010687776290660	.567	-19.483546729487390	35.530335827062800
peakSR	6	7	243.329002763901830	212.251966424697970	.252	-173.380632219628000	660.038637747431700
		8	71.254641049286870	209.037581127366420	.733	-339.144261711073340	481.653543809647100
		9	104.045875826214800	208.027624207391680	.617	-304.370200642540340	512.461952294969900
		10	107.925961770742560	208.235067765900140	.604	-300.897384091092250	516.749307632577400
		11	119.817317393427170	209.932203150456080	.568	-292.337977182611160	531.972611969465600
		12	90.974383513127800	219.756549006949650	.679	-340.468834019628100	522.417601045883700
	7	6	-243.329002763901830	212.251966424697970	.252	-660.038637747431700	173.380632219628000

		8	-172.074361714614950*	62.202134266801810	.006	-294.194448996404050	-49.954274432825830
		9	-139.283126937687030*	58.718716071936704	.018	-254.564295603416100	-24.001958271957974
		10	-135.403040993159270*	59.449462833855556	.023	-252.118868765015550	-18.687213221302983
		11	-123.511685370474650	65.145415060227450	.058	-251.410251343143500	4.386880602194182
		12	-152.354619250774020	92.007260665714900	.098	-332.990458125071400	28.281219623523413
	8	6	-71.254641049286870	209.037581127366420	.733	-481.653543809647100	339.144261711073340
		7	172.074361714614950*	62.202134266801810	.006	49.954274432825830	294.194448996404050
		9	32.791234776927920	45.756974217772360	.474	-57.042430114008965	122.624899667864810
		10	36.671320721455686	46.691023801830895	.432	-54.996143251703785	128.338784694615160

	11	48.562676344140300	53.756284988812940	.367	-56.975860108977130	154.101212797257740
	12	19.719742463840930	84.327629443960840	.815	-145.838844702823480	185.278329630505340
9	6	-104.045875826214800	208.027624207391680	.617	-512.461952294969900	304.370200642540340
	7	139.283126937687030*	58.718716071936704	.018	24.001958271957974	254.564295603416100
	8	-32.791234776927920	45.756974217772360	.474	-122.624899667864810	57.042430114008965
	10	3.880085944527764	41.938452683123856	.926	-78.456759285873000	86.216931174928530
	11	15.771441567212378	49.684205594836214	.751	-81.772470635910140	113.315353770334900
	12	-13.071492313086992	81.791999593049770	.873	-173.651932952183800	147.508948326009830
10	6	-107.925961770742560	208.235067765900140	.604	-516.749307632577400	300.897384091092250

	7	135.403040993159270*	59.449462833855556	.023	18.687213221302983	252.118868765015550
	8	-36.671320721455686	46.691023801830895	.432	-128.338784694615160	54.996143251703785
	9	-3.880085944527764	41.938452683123856	.926	-86.216931174928530	78.456759285873000
	11	11.891355622684614	50.545734732885320	.814	-87.343977860021130	111.126689105390350
	12	-16.951578257614756	82.318176677612980	.837	-178.565050837656300	144.661894322426780
11	6	-119.817317393427170	209.932203150456080	.568	-531.972611969465600	292.337977182611160
	7	123.511685370474650	65.145415060227450	.058	-4.386880602194182	251.410251343143500
	8	-48.562676344140300	53.756284988812940	.367	-154.101212797257740	56.975860108977130
	9	-15.771441567212378	49.684205594836214	.751	-113.315353770334900	81.772470635910140

		10	-11.891355622684614	50.545734732885320	.814	-111.126689105390350	87.343977860021130
		12	-28.842933880299370	86.521492611154390	.739	-198.708684532911350	141.022816772312600
	12	6	-90.974383513127800	219.756549006949650	.679	-522.417601045883700	340.468834019628100
		7	152.354619250774020	92.007260665714900	.098	-28.281219623523413	332.990458125071400
		8	-19.719742463840930	84.327629443960840	.815	-185.278329630505340	145.838844702823480
		9	13.071492313086992	81.791999593049770	.873	-147.508948326009830	173.651932952183800
		10	16.951578257614756	82.318176677612980	.837	-144.661894322426780	178.565050837656300
		11	28.842933880299370	86.521492611154390	.739	-141.022816772312600	198.708684532911350
SRAUC	6	7	18041.2385	12726.6387	.157	-6944.575	43027.052
		8	10833.5074	12533.9040	.388	-13773.916	35440.931

		9	14503.0415	12472.1711	.245	-9983.184	38989.267
		10	15566.6957	12485.7852	.213	-8946.258	40079.649
		11	20830.3750	12587.5456	.098	-3882.361	45543.111
		12	19155.9138	13176.6138	.146	-6713.322	45025.149
	7	6	-18041.2385	12726.6387	.157	-43027.052	6944.575
		8	-7207.7311	3729.6431	.054	-14530.023	114.561
		9	-3538.1970	3516.6093	.315	-10442.246	3365.852
		10	-2474.5428	3564.5928	.488	-9472.797	4523.711
		11	2789.1365	3906.1224	.475	-4879.632	10457.905
		12	1114.6753	5516.7600	.840	-9716.208	11945.558
	8	6	-10833.5074	12533.9040	.388	-35440.931	13773.916
		7	7207.7311	3729.6431	.054	-114.561	14530.023
		9	3669.5341	2738.2399	.181	-1706.367	9045.435
		10	4733.1882	2799.5962	.091	-763.172	10229.548
		11	9996.8676*	3223.2296	.002	3668.801	16324.934
		12	8322.4064	5056.2889	.100	-1604.448	18249.261
	9	6	-14503.0415	12472.1711	.245	-38989.267	9983.184
		7	3538.1970	3516.6093	.315	-3365.852	10442.246
		8	-3669.5341	2738.2399	.181	-9045.435	1706.367
		10	1063.6542	2508.7928	.672	-3861.781	5989.089
		11	6327.3335*	2974.1405	.034	488.296	12166.371
		12	4652.8723	4901.2611	.343	-4969.621	14275.366
	10	6	-15566.6957	12485.7852	.213	-40079.649	8946.258
		7	2474.5428	3564.5928	.488	-4523.711	9472.797
		8	-4733.1882	2799.5962	.091	-10229.548	763.172

		9	-1063.6542	2508.7928	.672	-5989.089	3861.781
		11	5263.6793	3030.7248	.083	-686.448	11213.807
		12	3589.2181	4935.8021	.467	-6101.088	13279.525
	11	6	-20830.3750	12587.5456	.098	-45543.111	3882.361
		7	-2789.1365	3906.1224	.475	-10457.905	4879.632
		8	-9996.8676*	3223.2296	.002	-16324.934	-3668.801
		9	-6327.3335*	2974.1405	.034	-12166.371	-488.296
		10	-5263.6793	3030.7248	.083	-11213.807	686.448
		12	-1674.4612	5187.8331	.747	-11859.572	8510.650
	12	6	-19155.9138	13176.6138	.146	-45025.149	6713.322
		7	-1114.6753	5516.7600	.840	-11945.558	9716.208
		8	-8322.4064	5056.2889	.100	-18249.261	1604.448
		9	-4652.8723	4901.2611	.343	-14275.366	4969.621
		10	-3589.2181	4935.8021	.467	-13279.525	6101.088
		11	1674.4612	5187.8331	.747	-8510.650	11859.572
vd	6	7	-.9750	.6846	.155	-2.319	.369
		8	-1.0068	.6736	.135	-2.329	.316
		9	-.9128	.6693	.173	-2.227	.401
		10	-.9686	.6706	.149	-2.285	.348
		11	-.7619	.6789	.262	-2.095	.571
		12	-.6333	.7233	.382	-2.053	.787
	7	6	.9750	.6846	.155	-.369	2.319
		8	-.0318	.2247	.887	-.473	.409
		9	.0622	.2114	.769	-.353	.477
		10	.0064	.2154	.976	-.416	.429

		11	.2131	.2400	.375	-.258	.684
		12	.3417	.3462	.324	-.338	1.021
	8	6	1.0068	.6736	.135	-.316	2.329
		7	.0318	.2247	.887	-.409	.473
		9	.0940	.1726	.586	-.245	.433
		10	.0382	.1775	.830	-.310	.387
		11	.2449	.2067	.236	-.161	.651
		12	.3735	.3240	.249	-.263	1.010
	9	6	.9128	.6693	.173	-.401	2.227
		7	-.0622	.2114	.769	-.477	.353
		8	-.0940	.1726	.586	-.433	.245
		10	-.0557	.1603	.728	-.370	.259
		11	.1509	.1921	.432	-.226	.528
		12	.2795	.3149	.375	-.339	.898
	10	6	.9686	.6706	.149	-.348	2.285
		7	-.0064	.2154	.976	-.429	.416
		8	-.0382	.1775	.830	-.387	.310
		9	.0557	.1603	.728	-.259	.370
		11	.2067	.1965	.293	-.179	.592
		12	.3353	.3176	.292	-.288	.959
	11	6	.7619	.6789	.262	-.571	2.095
		7	-.2131	.2400	.375	-.684	.258
		8	-.2449	.2067	.236	-.651	.161
		9	-.1509	.1921	.432	-.528	.226
		10	-.2067	.1965	.293	-.592	.179

		12	.1286	.3348	.701	-.529	.786
	12	6	.6333	.7233	.382	-.787	2.053
		7	-.3417	.3462	.324	-1.021	.338
		8	-.3735	.3240	.249	-1.010	.263
		9	-.2795	.3149	.375	-.898	.339
		10	-.3353	.3176	.292	-.959	.288
		11	-.1286	.3348	.701	-.786	.529
wt	6	7	-43.421114468864860	22.677760522642746	.056	-87.94242307593416	1.10019413820444
		8	-52.257641515761975*	22.367781679994238	.020	-96.17039515985611	-8.34488787166784
		9	-66.424000228938100*	22.246748965953962	.003	-110.09914069213820	-22.74885976573800
		10	-70.200625098658290*	22.285665347950160	.002	-113.95216676783258	-26.44908342948401
		11	-72.268073412698530*	22.549322107147383	.001	-116.53722985828950	-27.99891696710755
		12	-61.774303571428620*	23.866370277680744	.010	-108.62910810128020	-14.91949904157705

	7	6	43.421114468864860	22.677760522642746	.056	-1.10019413820444	87.94242307593416
		8	-8.836527046897118	6.928086302844720	.203	-22.43784663210873	4.76479253831450
		9	-23.002885760073240*	6.526757394752186	.000	-35.81631060795902	-10.18946091218746
		10	-26.779510629793435*	6.658198144889153	.000	-39.85098186610234	-13.70803939348453
		11	-28.846958943833670*	7.493507191406735	.000	-43.55832102408876	-14.13559686357858
		12	-18.353189102563760	10.829790061083434	.091	-39.61439013596630	2.90801193083879
	8	6	52.257641515761975*	22.367781679994238	.020	8.34488787166784	96.17039515985611
		7	8.836527046897118	6.928086302844720	.203	-4.76479253831450	22.43784663210873
		9	-14.166358713176123*	5.351205196168846	.008	-24.67192242263108	-3.66079500372116

		10	-17.942983582896318*	5.510756526844338	.001	-28.76178078048957	-7.12418638530307
		11	-20.010431896936552*	6.495343331127044	.002	-32.76218419916419	-7.25867959470892
		12	-9.516662055666643	10.164703031997227	.349	-29.47215458037667	10.43883046904339
	9	6	66.424000228938100*	22.246748965953962	.003	22.74885976573800	110.09914069213820
		7	23.002885760073240*	6.526757394752186	.000	10.18946091218746	35.81631060795902
		8	14.166358713176123*	5.351205196168846	.008	3.66079500372116	24.67192242263108
		10	-3.776624869720195	4.996860991507088	.450	-13.58653489356889	6.03328515412850
		11	-5.844073183760429	6.065448644536057	.336	-17.75184999770532	6.06370363018446
		12	4.649696657509480	9.895522724898436	.639	-14.77733718137374	24.07673049639270
	10	6	70.200625098658290*	22.285665347950160	.002	26.44908342948401	113.95216676783258

	7	26.779510629793435*	6.658198144889153	.000	13.70803939348453	39.85098186610234
	8	17.942983582896318*	5.510756526844338	.001	7.12418638530307	28.76178078048957
	9	3.776624869720195	4.996860991507088	.450	-6.03328515412850	13.58653489356889
	11	-2.067448314040234	6.206666392368556	.739	-14.25246586018919	10.11756923210872
	12	8.426321527229675	9.982705567411791	.399	-11.17187093346292	28.02451398792227
11	6	72.268073412698530*	22.549322107147383	.001	27.99891696710755	116.53722985828950
	7	28.846958943833670*	7.493507191406735	.000	14.13559686357858	43.55832102408876
	8	20.010431896936552*	6.495343331127044	.002	7.25867959470892	32.76218419916419
	9	5.844073183760429	6.065448644536057	.336	-6.06370363018446	17.75184999770532
	10	2.067448314040234	6.206666392368556	.739	-10.11756923210872	14.25246586018919

		12	10.493769841269910	10.558193876638820	.321	-10.23422962083604	31.22176930337585
	12	6	61.774303571428620*	23.866370277680744	.010	14.91949904157705	108.62910810128020
		7	18.353189102563760	10.829790061083434	.091	-2.90801193083879	39.61439013596630
		8	9.516662055666643	10.164703031997227	.349	-10.43883046904339	29.47215458037667
		9	-4.649696657509480	9.895522724898436	.639	-24.07673049639270	14.77733718137374
		10	-8.426321527229675	9.982705567411791	.399	-28.02451398792227	11.17187093346292
		11	-10.493769841269910	10.558193876638820	.321	-31.22176930337585	10.23422962083604
mvpa	6	7	1.947137057387053	9.586675578426908	.839	-16.873563580881290	20.767837695655395
		8	2.515331824279059	9.455636775116483	.790	-16.048111533409948	21.078775181968066

	9	7.602460622710638	9.404472050860658	.419	-10.860535405705498	26.065456651126773
	10	10.098003639393170	9.420923354705726	.284	-8.397289827508732	28.593297106295072
	11	14.822233465608470	9.532380207420946	.120	-3.891873712248373	33.536340643465310
	12	13.857092687074854	10.089142129280795	.170	-5.950057576718002	33.664242950867710
7	6	-1.947137057387053	9.586675578426908	.839	-20.767837695655395	16.873563580881290
	8	.568194766892006	2.928742267050605	.846	-5.181554560063698	6.317944093847710
	9	5.655323565323585*	2.759086624100943	.041	.238644659018590	11.072002471628580
	10	8.150866582006117*	2.814651186046556	.004	2.625102521215640	13.676630642796594
	11	12.875096408221417*	3.167765278978868	.000	6.656093635025984	19.094099181416850
	12	11.909955629687800*	4.578127712144134	.009	2.922108857453145	20.897802401922455

	8	6	-2.515331824279059	9.455636775116483	.790	-21.078775181968066	16.048111533409948
		7	-.568194766892006	2.928742267050605	.846	-6.317944093847710	5.181554560063698
		9	5.087128798431579*	2.262139955047236	.025	.646062805584449	9.528194791278707
		10	7.582671815114111*	2.329587833940086	.001	3.009191167474125	12.156152462754097
		11	12.306901641329410*	2.745806810325962	.000	6.916293858173018	17.697509424485800
		12	11.341760862795795*	4.296972367333825	.008	2.905882344231014	19.777639381360576
	9	6	-7.602460622710638	9.404472050860658	.419	-26.065456651126773	10.860535405705498
		7	-5.655323565323585*	2.759086624100943	.041	-11.072002471628580	-.238644659018590
		8	-5.087128798431579*	2.262139955047236	.025	-9.528194791278707	-.646062805584449
		10	2.495543016682532	2.112346375130196	.238	-1.651446045941019	6.642532079306084

		11	7.219772842897832*	2.564075422470340	.005	2.185942758061021	12.253602927734644
		12	6.254632064364216	4.183180519427111	.135	-1.957848646795149	14.467112775523582
	10	6	-10.098003639393170	9.420923354705726	.284	-28.593297106295072	8.397289827508732
		7	-8.150866582006117*	2.814651186046556	.004	-13.676630642796594	-2.625102521215640
		8	-7.582671815114111*	2.329587833940086	.001	-12.156152462754097	-3.009191167474125
		9	-2.495543016682532	2.112346375130196	.238	-6.642532079306084	1.651446045941019
		11	4.724229826215300	2.623773060296375	.072	-.426799527663628	9.875259180094229
		12	3.759089047681684	4.220035729461899	.373	-4.525746346740997	12.043924442104364
	11	6	-14.822233465608470	9.532380207420946	.120	-33.536340643465310	3.891873712248373

	7	-12.875096408221417*	3.167765278978868	.000	-19.094099181416850	-6.656093635025984
	8	-12.306901641329410*	2.745806810325962	.000	-17.697509424485800	-6.916293858173018
	9	-7.219772842897832*	2.564075422470340	.005	-12.253602927734644	-2.185942758061021
	10	-4.724229826215300	2.623773060296375	.072	-9.875259180094229	.426799527663628
	12	-.965140778533616	4.463314589128331	.829	-9.727584761245724	7.797303204178492
12	6	-13.857092687074854	10.089142129280795	.170	-33.664242950867710	5.950057576718002
	7	-11.909955629687800*	4.578127712144134	.009	-20.897802401922455	-2.922108857453145
	8	-11.341760862795795*	4.296972367333825	.008	-19.777639381360576	-2.905882344231014

		9	-6.254632064364216	4.183180519427111	.135	-14.467112775523582	1.957848646795149
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		11	.965140778533616	4.463314589128331	.829	-7.797303204178492	9.727584761245724
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		12	-.170270419438597	.135156964292529	.208	-.435611332760044	.095070493882851
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		11	-.260836883877611*	.043750418191777	.000	-.346727951215257	-.174945816539965
		12	-.304981498916209*	.061466413674407	.000	-.425652708338028	-.184310289494389
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		12	-.265018004021330*	.056328133533734	.000	-.375601712939091	-.154434295103569
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		8	.075627823471085*	.030712740710251	.014	.015332397975846	.135923248966324
		10	-.054710736861649	.028221858636308	.053	-.110116048644022	.000694574920724

		11	-.145245565511648*	.033550729753752	.000	-.211112547076828	-.079378583946468
		12	-.189390180550245*	.054677896677243	.001	-.296734135179429	-.082046225921061
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		7	.170302055227613*	.039811065419476	.000	.092144747433688	.248459363021537
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		9	.054710736861649	.028221858636308	.053	-.000694574920724	.110116048644022
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		12	-.134679443688596*	.055009630887207	.015	-.242674660786661	-.026684226590531
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		7	.260836883877611*	.043750418191777	.000	.174945816539965	.346727951215257
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		12	-.044144615038597	.057924413268227	.446	-.157862149319217	.069572919242023
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		8	.001131294964	.147263782589	.994	-.28797910043	.29024169036
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		10	-.132751063830	.146725981251	.366	-.42080563983	.15530351217
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		8	-.039376913991	.043187109443	.362	-.12416247408	.04540864609
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		12	-.309318208955*	.063790082962	.000	-.43455182569	-.18408459222
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		11	-.238575580678*	.037545525916	.000	-.31228550210	-.16486565926
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	9	6	.074487723576	.146599181457	.612	-.21331791723	.36229336438
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		8	.075619018540*	.031905108008	.018	.01298244742	.13825558966
		10	-.058263340254*	.029322820954	.047	-.11583032795	-.00069635256
		11	-.162956562139*	.034847738202	.000	-.23137014756	-.09454297671
		12	-.194322276424*	.056762524426	.001	-.30575928824	-.08288526461
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		7	.173259272785*	.041316078393	.000	.09214694802	.25437159755
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		9	.058263340254*	.029322820954	.047	.00069635256	.11583032795
		11	-.104693221884*	.035377371695	.003	-.17414659147	-.03523985230
		12	-.136058936170*	.057089208695	.017	-.24813729928	-.02398057306
	11	6	.237444285714	.147929208080	.109	-.05297248266	.52786105409
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		8	.238575580678*	.037545525916	.000	.16486565926	.31228550210
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		10	.104693221884*	.035377371695	.003	.03523985230	.17414659147
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		7	.309318208955*	.063790082962	.000	.18408459222	.43455182569

		8	.269941294964*	.058457555865	.000	.15517657283	.38470601710
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		10	.136058936170*	.057089208695	.017	.02398057306	.24813729928
		11	.031365714286	.060114181176	.602	-.08665131871	.14938274728
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		10	-.016301951590426	.044398614407969	.714	-.103465955805473	.070862052624622
		11	-.030513536314286	.044762705372426	.496	-.118392329195236	.057365256566664
		12	-.017734635561403	.046770989526342	.705	-.109556121041911	.074086849919104
	7	6	.013099421044776	.045226137643233	.772	-.075689188796559	.101888030886111

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		10	-.003706431432152	.009829134420046	.706	-.023003130787378	.015590267923074
		11	-.017918016156012	.011361105331719	.115	-.040222303040331	.004386270728306
		12	-.005139115403130	.017688990456580	.771	-.039866398208616	.029588167402356
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		10	-.002178591702621	.008872952218862	.806	-.019598100282285	.015240916877043
		11	-.016390176426481	.010544767042912	.121	-.037091816133736	.004311463280774

		12	-.003611275673599	.017176081654552	.834	-.037331608474495	.030109057127298
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		11	-.014211584723860	.010705031728144	.185	-.035227858387271	.006804688939551
		12	-.001432683970978	.017274934828100	.934	-.035347086756956	.032481718815000
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		7	.017414115269510	.013739150959125	.205	-.009558785305906	.044387015844925
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		10	.014211584723860	.010705031728144	.185	-.006804688939551	.035227858387271
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		7	.004635214516627	.019302588896109	.810	-.033259908165394	.042530337198649
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		9	.003611275673599	.017176081654552	.834	-.030109057127298	.037331608474495
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		11	-.012778900752882	.018190277739116	.483	-.048490318027216	.022932516521451
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		8	-.761026227705035	1.755349181618364	.665	-4.207153218505909	2.685100763095840
		9	-.668305499039027	1.747427294564448	.702	-4.098880126195986	2.762269128117932
		10	-.635842138053189	1.748938717880288	.716	-4.069384013400870	2.797699737294493
		11	-.986757955304758	1.763280894839182	.576	-4.448456600623026	2.474940690013511

	12	-.303135816502211	1.842390704010574	.869	-3.920143987399483	3.313872354395062
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	8	.059886770145708	.514780049004611	.907	-.950736893668593	1.070510433960008
	9	.152607498811715	.487083051679847	.754	-.803641017855505	1.108856015478935
	10	.185070859797554	.492477804926958	.707	-.781768714744794	1.151910434339901
	11	-.165844957454016	.541209075635095	.759	-1.228354469944839	.896664555036808
	12	.517777181348532	.760362581713163	.496	-.974977675107405	2.010532037804468
8	6	.761026227705035	1.755349181618364	.665	-2.685100763095840	4.207153218505909

		7	-.059886770145708	.514780049004611	.907	-1.070510433960008	.950736893668593
		9	.092720728666007	.380301281463951	.807	-.653892266863914	.839333724195929
		10	.125184089651846	.387186716966176	.747	-.634946492792468	.885314672096160
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		7	-.152607498811715	.487083051679847	.754	-1.108856015478935	.803641017855505
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	10	6	.635842138053189	1.748938717880288	.716	-2.797699737294493	4.069384013400870
		7	-.185070859797554	.492477804926958	.707	-1.151910434339901	.781768714744794
		8	-.125184089651846	.387186716966176	.747	-.885314672096160	.634946492792468
		9	-.032463360985838	.349521035383579	.926	-.718648130660851	.653721408689174
		11	-.350915817251569	.421689836837041	.406	-1.178783425410735	.476951790907597

	12	.332706321550978	.680489757903352	.625	-1.003241047913282	1.668653691015238
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	7	.165844957454016	.541209075635095	.759	-.896664555036808	1.228354469944839
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	12	.683622138802547	.716546708746529	.340	-.723112759893982	2.090357037499076
12	6	.303135816502211	1.842390704010574	.869	-3.313872354395062	3.920143987399483

		7	-.517777181348532	.760362581713163	.496	-2.010532037804468	.974977675107405
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		10	-.332706321550978	.680489757903352	.625	-1.668653691015238	1.003241047913282
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		8	-.243424151811514	2.246217607185495	.914	-4.653231160236707	4.166382856613679
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	10	-.026215692524151	2.238014511944116	.991	-4.419918265310297	4.367486880261996
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	8	-.005477249892904	.658733898651376	.993	-1.298713200705305	1.287758700919498
	9	-.109631079445149	.623291672279245	.860	-1.333286337029056	1.114024178138759
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	11	-.263043066752283	.692553577140323	.704	-1.622674301238966	1.096588167734399

		12	-1.687864648346469	.972991491820717	.083	-3.598055667259068	.222326370566130
	8	6	.243424151811514	2.246217607185495	.914	-4.166382856613679	4.653231160236707
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		11	-.257565816859380	.572682705151030	.653	-1.381864815629697	.866733181910937
		12	-1.682387398453566	.891654342626529	.060	-3.432896145526402	.068121348619271
	9	6	.347577981363759	2.236080431990394	.877	-4.042327577585663	4.737483540313180

		7	.109631079445149	.623291672279245	.860	-1.114024178138759	1.333286337029056
		8	.104153829552245	.486649290867563	.831	-.851243121592618	1.059550780697107
		10	.321362288839608	.447261611525330	.473	-.556708198540857	1.199432776220073
		11	-.153411987307135	.531533291788311	.773	-1.196925860513918	.890101885899648
		12	-1.578233568901321	.865799992044909	.069	-3.277984679657715	.121517541855074
	10	6	.026215692524151	2.238014511944116	.991	-4.367486880261996	4.419918265310297
		7	-.211731209394459	.630195022254838	.737	-1.448939223846889	1.025476805057970
		8	-.217208459287363	.495460179675440	.661	-1.189903075222644	.755486156647918

	9	-.321362288839608	.447261611525330	.473	-1.199432776220073	.556708198540857
	11	-.474774276146743	.539611802707682	.379	-1.534147999243368	.584599446949883
	12	-1.899595857740929*	.870782914145128	.029	-3.609129513487484	-.190062201994374
11	6	.500989968670893	2.256367356351253	.824	-3.928743174631767	4.930723111973554
	7	.263043066752283	.692553577140323	.704	-1.096588167734399	1.622674301238966
	8	.257565816859380	.572682705151030	.653	-.866733181910937	1.381864815629697
	9	.153411987307135	.531533291788311	.773	-.890101885899648	1.196925860513918
	10	.474774276146743	.539611802707682	.379	-.584599446949883	1.534147999243368

		12	-1.424821581594186	.916922883726959	.121	-3.224937895307451	.375294732119079
	12	6	1.925811550265079	2.357599548853280	.414	-2.702662102659462	6.554285203189620
		7	1.687864648346469	.972991491820717	.083	-.222326370566130	3.598055667259068
		8	1.682387398453566	.891654342626529	.060	-.068121348619271	3.432896145526402
		9	1.578233568901321	.865799992044909	.069	-.121517541855074	3.277984679657715
		10	1.899595857740929*	.870782914145128	.029	.190062201994374	3.609129513487484
		11	1.424821581594186	.916922883726959	.121	-.375294732119079	3.224937895307451
HtzscoreRound	6	7	.28467	.44329	.521	-.5855	1.1549
		8	.28510	.43618	.514	-.5711	1.1414
		9	.14602	.43339	.736	-.7047	.9968
		10	.08478	.43421	.845	-.7676	.9372
		11	.00695	.43959	.987	-.8560	.8699
		12	.17300	.46835	.712	-.7464	1.0924

7	6	-.28467	.44329	.521	-1.1549	.5855
	8	.00044	.14550	.998	-.2852	.2861
	9	-.13864	.13690	.311	-.4074	.1301
	10	-.19988	.13947	.152	-.4737	.0739
	11	-.27771	.15542	.074	-.5828	.0274
	12	-.11167	.22421	.619	-.5518	.3285
8	6	-.28510	.43618	.514	-1.1414	.5711
	7	-.00044	.14550	.998	-.2861	.2852
	9	-.13908	.11177	.214	-.3585	.0803
	10	-.20032	.11491	.082	-.4259	.0252
	11	-.27815*	.13382	.038	-.5408	-.0155
	12	-.11210	.20981	.593	-.5240	.2998
9	6	-.14602	.43339	.736	-.9968	.7047
	7	.13864	.13690	.311	-.1301	.4074
	8	.13908	.11177	.214	-.0803	.3585
	10	-.06124	.10379	.555	-.2650	.1425
	11	-.13907	.12440	.264	-.3833	.1051
	12	.02698	.20394	.895	-.3734	.4273
10	6	-.08478	.43421	.845	-.9372	.7676
	7	.19988	.13947	.152	-.0739	.4737
	8	.20032	.11491	.082	-.0252	.4259
	9	.06124	.10379	.555	-.1425	.2650
	11	-.07783	.12723	.541	-.3276	.1719
	12	.08822	.20567	.668	-.3155	.4920
11	6	-.00695	.43959	.987	-.8699	.8560

		7	.27771	.15542	.074	-.0274	.5828
		8	.27815*	.13382	.038	.0155	.5408
		9	.13907	.12440	.264	-.1051	.3833
		10	.07783	.12723	.541	-.1719	.3276
		12	.16605	.21681	.444	-.2596	.5916
	12	6	-.17300	.46835	.712	-1.0924	.7464
		7	.11167	.22421	.619	-.3285	.5518
		8	.11210	.20981	.593	-.2998	.5240
		9	-.02698	.20394	.895	-.4273	.3734
		10	-.08822	.20567	.668	-.4920	.3155
		11	-.16605	.21681	.444	-.5916	.2596
Wtzscore	6	7	.23708	.43436	.585	-.6156	1.0898
		8	.25796	.42740	.546	-.5810	1.0970
		9	.27425	.42466	.519	-.5594	1.1079
		10	.35679	.42546	.402	-.4784	1.1920
		11	.36990	.43074	.391	-.4757	1.2155
		12	.49867	.45892	.278	-.4022	1.3995
	7	6	-.23708	.43436	.585	-1.0898	.6156
		8	.02088	.14257	.884	-.2590	.3007
		9	.03717	.13414	.782	-.2262	.3005
		10	.11971	.13666	.381	-.1486	.3880
		11	.13282	.15229	.383	-.1661	.4318
		12	.26158	.21969	.234	-.1697	.6928
	8	6	-.25796	.42740	.546	-1.0970	.5810
		7	-.02088	.14257	.884	-.3007	.2590

	9	.01629	.10952	.882	-.1987	.2313
	10	.09883	.11259	.380	-.1222	.3199
	11	.11195	.13112	.394	-.1454	.3693
	12	.24071	.20558	.242	-.1629	.6443
9	6	-.27425	.42466	.519	-1.1079	.5594
	7	-.03717	.13414	.782	-.3005	.2262
	8	-.01629	.10952	.882	-.2313	.1987
	10	.08254	.10170	.417	-.1171	.2822
	11	.09565	.12190	.433	-.1436	.3349
	12	.22442	.19983	.262	-.1679	.6167
10	6	-.35679	.42546	.402	-1.1920	.4784
	7	-.11971	.13666	.381	-.3880	.1486
	8	-.09883	.11259	.380	-.3199	.1222
	9	-.08254	.10170	.417	-.2822	.1171
	11	.01312	.12467	.916	-.2316	.2578
	12	.14188	.20153	.482	-.2537	.5375
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	7	-.13282	.15229	.383	-.4318	.1661
	8	-.11195	.13112	.394	-.3693	.1454
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		10	-.14188	.20153	.482	-.5375	.2537
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BMIzscore	6	7	.33338	.43616	.445	-.5228	1.1896
		8	.37779	.42917	.379	-.4647	1.2203
		9	.44073	.42642	.302	-.3963	1.2778
		10	.51416	.42722	.229	-.3245	1.3528
		11	.56319	.43252	.193	-.2859	1.4122
		12	.66867	.46082	.147	-.2359	1.5733
	7	6	-.33338	.43616	.445	-1.1896	.5228
		8	.04441	.14316	.756	-.2366	.3254
		9	.10736	.13469	.426	-.1571	.3718
		10	.18079	.13723	.188	-.0886	.4502
		11	.22982	.15292	.133	-.0704	.5300
		12	.33529	.22060	.129	-.0978	.7683
	8	6	-.37779	.42917	.379	-1.2203	.4647
		7	-.04441	.14316	.756	-.3254	.2366
		9	.06294	.10997	.567	-.1529	.2788
		10	.13637	.11306	.228	-.0856	.3583
		11	.18540	.13166	.159	-.0731	.4439
		12	.29088	.20643	.159	-.1144	.6961
	9	6	-.44073	.42642	.302	-1.2778	.3963
		7	-.10736	.13469	.426	-.3718	.1571
		8	-.06294	.10997	.567	-.2788	.1529
		10	.07343	.10212	.472	-.1270	.2739

		11	.12246	.12240	.317	-.1178	.3627
		12	.22793	.20066	.256	-.1660	.6218
	10	6	-.51416	.42722	.229	-1.3528	.3245
		7	-.18079	.13723	.188	-.4502	.0886
		8	-.13637	.11306	.228	-.3583	.0856
		9	-.07343	.10212	.472	-.2739	.1270
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		12	.15450	.20236	.445	-.2427	.5518
	11	6	-.56319	.43252	.193	-1.4122	.2859
		7	-.22982	.15292	.133	-.5300	.0704
		8	-.18540	.13166	.159	-.4439	.0731
		9	-.12246	.12240	.317	-.3627	.1178
		10	-.04903	.12518	.695	-.2948	.1967
		12	.10548	.21332	.621	-.3133	.5242
	12	6	-.66867	.46082	.147	-1.5733	.2359
		7	-.33529	.22060	.129	-.7683	.0978
		8	-.29088	.20643	.159	-.6961	.1144
		9	-.22793	.20066	.256	-.6218	.1660
		10	-.15450	.20236	.445	-.5518	.2427
		11	-.10548	.21332	.621	-.5242	.3133
APHVCon	6	7	-.412	.365	.259	-1.13	.30
		8	-.558	.359	.121	-1.26	.15
		9	-.739*	.357	.039	-1.44	-.04
		10	-.937*	.358	.009	-1.64	-.24
		11	-1.114*	.362	.002	-1.83	-.40

	12	-1.533*	.386	.000	-2.29	-.78
7	6	.412	.365	.259	-.30	1.13
	8	-.145	.120	.226	-.38	.09
	9	-.326*	.113	.004	-.55	-.10
	10	-.525*	.115	.000	-.75	-.30
	11	-.702*	.128	.000	-.95	-.45
	12	-1.121*	.185	.000	-1.48	-.76
8	6	.558	.359	.121	-.15	1.26
	7	.145	.120	.226	-.09	.38
	9	-.181	.092	.050	-.36	.00
	10	-.379*	.095	.000	-.57	-.19
	11	-.556*	.110	.000	-.77	-.34
	12	-.976*	.173	.000	-1.31	-.64
9	6	.739*	.357	.039	.04	1.44
	7	.326*	.113	.004	.10	.55
	8	.181	.092	.050	.00	.36
	10	-.199*	.086	.020	-.37	-.03
	11	-.376*	.102	.000	-.58	-.17
	12	-.795*	.168	.000	-1.12	-.47
10	6	.937*	.358	.009	.24	1.64
	7	.525*	.115	.000	.30	.75
	8	.379*	.095	.000	.19	.57
	9	.199*	.086	.020	.03	.37
	11	-.177	.105	.091	-.38	.03

		12	-.596*	.169	.000	-.93	-.26
	11	6	1.114*	.362	.002	.40	1.83
		7	.702*	.128	.000	.45	.95
		8	.556*	.110	.000	.34	.77
		9	.376*	.102	.000	.17	.58
		10	.177	.105	.091	-.03	.38
		12	-.419*	.179	.019	-.77	-.07
	12	6	1.533*	.386	.000	.78	2.29
		7	1.121*	.185	.000	.76	1.48
		8	.976*	.173	.000	.64	1.31
		9	.795*	.168	.000	.47	1.12
		10	.596*	.169	.000	.26	.93
		11	.419*	.179	.019	.07	.77

*. The mean difference is significant at the 0.05 level.

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DATASET ACTIVATE DataSet39.
ONEWAY HtzscoreRound Wtzscore BMIzscore baseline RH Abs Rel scaled averageBF ttp peakBF peakSR
    SRAUC vd wt mvpa BY AgeCon
  /STATISTICS DESCRIPTIVES
  /MISSING ANALYSIS
  /POSTHOC=TUKEY ALPHA(0.05).
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Females Oneway

Notes

Output Created		07-AUG-2019 04:15:56
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	N of Rows in Working Data File	402
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each analysis are based on cases with no missing data for any variable in the analysis.

Syntax

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ONEWAY HtzscoreRound
Wtzscore BMIzscore baseline RH
Abs Rel scaled averageBF ttp
peakBF peakSR
  SRAUC vd wt mvpa BY
AgeCon
 /STATISTICS DESCRIPTIVES
 /MISSING ANALYSIS
 /POSTHOC=TUKEY
ALPHA(0.05).
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[DataSet39] /Users/joeybacauanu/Desktop/Thesis/Statistics/SPSS/Girls_ALL variables.sav

Descriptives

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
HtzscoreRound	7	31	.0461	.95635	.17177	-.3047	.3969	-2.30	2.05
	8	67	.0521	.97487	.11910	-.1857	.2899	-2.10	2.42
	9	105	.2853	1.01485	.09904	.0889	.4817	-1.64	3.64
	10	104	.4480	1.03258	.10125	.2472	.6488	-1.72	3.59
	11	54	.4619	1.01568	.13822	.1846	.7391	-1.33	3.77

	12	13	.0700	.91615	.25409	-.4836	.6236	-1.33	1.81
	Total	374	.2870	1.01239	.05235	.1840	.3899	-2.30	3.77
Wtzscore	7	31	.1968	1.09756	.19713	-.2058	.5994	-2.27	2.43
	8	67	.0806	.93897	.11471	-.1484	.3096	-1.85	2.57
	9	105	.0665	.97134	.09479	-.1215	.2545	-2.08	2.89
	10	104	.0526	1.01041	.09908	-.1439	.2491	-2.28	2.99
	11	54	.0535	1.05745	.14390	-.2351	.3421	-2.00	3.08
	12	13	-.2300	.87651	.24310	-.7597	.2997	-1.68	1.21
	Total	374	.0638	.99301	.05135	-.0372	.1647	-2.28	3.08
BMIzscore	7	31	.2032	1.06282	.19089	-.1866	.5931	-2.08	2.14
	8	67	.0545	.98321	.12012	-.1853	.2943	-2.54	2.26
	9	105	-.0251	1.00220	.09780	-.2191	.1688	-2.35	2.21
	10	104	-.0751	1.05558	.10351	-.2804	.1302	-2.61	2.20
	11	54	-.1024	.99313	.13515	-.3735	.1687	-1.92	2.24
	12	13	-.3546	.90868	.25202	-.9037	.1945	-1.36	.97
	Total	374	-.0284	1.01349	.05241	-.1315	.0746	-2.61	2.26
baseline	7	27	2.46097195207	.248204142877	.047766909568	2.36278566326	2.55915824088	2.090000000	3.017710500
	8	63	2.51215189695	.210977772199	.026580700829	2.45901783309	2.56528596081	2.036605300	3.100000000
	9	98	2.59182449186	.229409899113	.023173899333	2.54583071654	2.63781826717	1.998371400	3.252333300
	10	104	2.65055966097	.271873493307	.026659389377	2.59768704990	2.70343227204	1.998827600	3.239484848

	11	54	2.73881236431	.258176617887	.035133387630	2.66834371277	2.80928101586	2.071709677	3.429228571
	12	13	2.75050105885	.145556977525	.040370241998	2.66254185765	2.83846026005	2.537214286	3.047035714
	Total	359	2.61287241948	.255785858912	.013499861303	2.58632342324	2.63942141573	1.998371400	3.429228571
RH	7	27	2.646674	.2644475	.0508929	2.542062	2.751286	2.1800	3.1860
	8	63	2.689029	.2262878	.0285096	2.632039	2.746018	2.1030	3.2800
	9	97	2.759188	.2217601	.0225163	2.714493	2.803882	2.1514	3.4862
	10	104	2.826479	.2848857	.0279353	2.771076	2.881882	2.0838	3.5154
	11	54	2.919641	.2800668	.0381123	2.843197	2.996084	2.2586	3.7430
	12	13	2.939062	.2358177	.0654041	2.796558	3.081565	2.5820	3.2848
	Total	358	2.788638	.2673724	.0141311	2.760847	2.816429	2.0838	3.7430
Abs	7	27	.18533175533	.094020375223	.018094229648	.14813853362	.22252497704	.052937900	.361264700
	8	63	.17687667924	.077539365121	.009769041759	.15734864301	.19640471546	.020000000	.461759200
	9	97	.17062709689	.076764395202	.007794243429	.15515564596	.18609854781	-.116093000	.357700000
	10	104	.17591918518	.088201380734	.008648856952	.15876621730	.19307215307	-.030000000	.620428571
	11	54	.18082837828	.090759028721	.012350739440	.15605593211	.20560082445	.020000000	.534514286
	12	13	.18856047962	.115953075659	.032159596911	.11849073727	.25863022196	.039212121	.424605556

	Total	358	.17656321370	.084943618265	.004489409725	.16773420045	.18539222695	-.116093000	.620428571
Rel	7	27	7.60968541630	3.908906139105	.752269337216	6.06337364786	9.15599718473	2.012189500	14.660189300
	8	63	7.08758176941	3.173707621156	.399849576172	6.28829385555	7.88686968328	.750000000	17.725602600
	9	97	6.70674613373	3.236811516567	.328648416061	6.05438418385	7.35910808362	-4.204603800	15.798951820
	10	104	6.70613223345	3.578939593936	.350943900528	6.01011777871	7.40214668820	-.990000000	27.397173860
	11	54	6.64878545580	3.231090292089	.439695696027	5.76686757433	7.53070333726	.850000000	18.130893650
	12	13	6.74395522192	3.984662691933	1.105146588553	4.33604765612	9.15186278773	1.542091715	14.997400000
	Total	358	6.83429362420	3.395591907698	.179462608760	6.48135685779	7.18723039060	-4.204603800	27.397173860
scaled	7	27	7.122238948102484	4.031559633906199	.775874013296591	5.527407073093479	8.717070823111490	1.7388896407595000	14.8289207635510460
	8	63	6.772211822892156	3.953411613726010	.498083045723503	5.776558001373825	7.767865644410486	-1.1949486571793178	23.0057456517467360
	9	97	6.884565835506134	4.140050622842870	.420358452336256	6.050160902402984	7.718970768609283	-4.1464735270645985	24.2414867157368260

	10	104	6.410734966518076	4.597278476396033	.450800243472375	5.516679007184364	7.304790925851788	-11.2011295441104120	28.1717475410395260
	11	54	6.492480950888877	2.942520730151107	.400426352579556	5.689327397782831	7.295634503994922	1.0539013622690830	15.9157308353748300
	12	13	6.366734291070876	3.627191134542784	1.006001817038647	4.174844625438530	8.558623956703222	1.2483532405404008	13.6804999089147330
	Total	358	6.667124681940974	4.048469163457022	.213968243920259	6.246328056704153	7.087921307177796	-11.2011295441104120	28.1717475410395260
averageBF	7	26	64.214646128199100	38.088729786356760	7.469814478022918	48.830275228797320	79.599017027600900	11.300000000000000	146.000000000000000
	8	62	72.198209717306650	38.866026285015586	4.935990274189722	62.328087149733050	82.068332284880260	8.610000000000000	164.950000000000000
	9	96	71.208765525309290	34.662074207007980	3.537683134735643	64.185576531992350	78.231954518626220	-2.330000000000000	193.580000000000000
	10	103	80.031011315782620	39.606765750521994	3.902570590738409	72.290281052847790	87.771741578717450	17.894047938145650	191.010000000000000
	11	54	80.349816466883450	37.871516744120140	5.153660656020204	70.012882244845460	90.686750688921450	13.588752463119432	185.880000000000000
	12	12	96.163965854481430	48.609241610967760	14.032279364597898	65.279127210741310	127.048804498221560	49.210000000000000	209.591394065515500
	Total	353	75.688280842002770	38.391564353415460	2.043376790219019	71.669518111170790	79.707043572834750	-2.330000000000000	209.591394065515500

ttp	7	27	51.515204425204416	19.036984719081104	3.663669417373423	43.984424084338370	59.045984766070460	23.376623376623375	91.430000000000000
	8	61	46.259199489035545	17.457691471404670	2.235228346829782	41.788077095168234	50.730321882902860	25.064935064935064	124.675324675324670
	9	97	46.769337260677450	18.112992031652027	1.839095699843369	43.118761149100735	50.419913372254170	12.597402597402597	102.857142857142860
	10	104	48.129750012487500	20.632557783919793	2.023188745298802	44.117232315828055	52.142267709146940	8.441558441558442	124.675300000000000
	11	54	39.948874458874464	10.924110266839016	1.486583113758587	36.967166331746526	42.930582586002400	18.571428571428570	67.532467532467540
	12	13	45.197142857142850	11.512339655061519	3.192948532837056	38.240305629330320	52.153980084955380	25.844155844155843	67.402597402597410
	Total	356	46.347313151174650	17.940775437288963	.950859196459824	44.477287948561840	48.217338353787470	8.441558441558442	124.675324675324670
peakBF	7	26	123.603885955083640	48.646304350607400	9.540325197996951	103.955218404006660	143.252553506160600	36.770000000000000	226.320000000000000
	8	62	143.660260407153320	46.979981029995390	5.966463557275955	131.729579159013700	155.590941655292940	33.100000000000000	231.880000000000000
	9	96	154.447009615468460	52.833849943152600	5.392332229479079	143.741876645662330	165.152142585274600	31.470000000000000	316.124510214290640
	10	103	170.415961371113980	62.560927347288214	6.164311338439228	158.189079059017100	182.642843683210860	53.748690950248990	367.900554110329900
	11	54	193.829055879873900	137.904064598917360	18.766366206842047	156.188492013838400	231.469619745909370	53.982557612726936	1053.650000000000000
	12	12	204.321609774380930	60.623416874903604	17.500473025960250	165.803328349658400	242.839891199103480	109.850000000000000	317.610000000000000

	Total	353	162.660120280994760	76.398958195998590	4.066306247318321	154.662809125708240	170.657431436281290	31.470000000000000	1053.650000000000000
peakSR	7	26	1271.196208163208700	389.140329236041570	76.316697396172960	1114.019027656995100	1428.373388669422200	473.86000000000000	1976.68582821066620
	8	62	1449.884491064124000	399.965422404565000	50.795659441064590	1348.312292430419000	1551.456689697829000	425.98000000000000	2456.51277231952100
	9	97	1389.898760796183500	449.956607099425300	45.686171549493610	1299.212427016934500	1480.585094575432500	225.77056032464495	2737.60422116527930
	10	103	1410.328491918222700	415.688667807410400	40.959021499175236	1329.086466979251800	1491.570516857193500	488.53562857322000	2490.65000000000000
	11	54	1321.241700743172300	397.066643923023600	54.033926193932600	1212.863369668409400	1429.620031817935100	493.49000000000000	2363.37318007662800
	12	12	1493.361818011116800	282.894811467725050	81.664697776619750	1313.619030101408000	1673.104605920825600	899.29000000000000	1896.06000000000000
	Total	354	1390.664824800255700	415.210956628910540	22.068213361613910	1347.263114912760600	1434.066534687750800	225.77056032464495	2737.60422116527930
SRAUC	7	27	54823.111	26279.7879	5057.5475	44427.173	65219.049	21968.0	119679.0
	8	63	61668.254	30937.2050	3897.7215	53876.820	69459.688	13485.0	222872.0
	9	98	55488.592	27826.4712	2810.8981	49909.737	61067.446	6080.0	134095.0
	10	103	56810.602	25429.1319	2505.6068	51840.743	61780.461	8884.0	143790.0
	11	54	45582.574	18125.6404	2466.5872	40635.227	50529.922	13126.0	87471.0
	12	12	56796.667	19445.7042	5613.4913	44441.456	69151.878	34041.0	97733.0
	Total	357	55455.790	26385.8491	1396.4872	52709.388	58202.192	6080.0	222872.0
vd	7	31	5.742	1.8068	.3245	5.079	6.405	.0	7.0
	8	67	5.881	1.5717	.1920	5.497	6.264	.0	7.0

	9	105	5.857	1.5407	.1504	5.559	6.155	.0	7.0
	10	104	5.942	1.6536	.1622	5.621	6.264	.0	7.0
	11	54	5.500	1.9787	.2693	4.960	6.040	.0	7.0
	12	13	5.538	1.8081	.5015	4.446	6.631	1.0	7.0
	Total	374	5.813	1.6737	.0865	5.643	5.983	.0	7.0
wt	7	29	748.65447865353040	40.255497861819380	7.475258288936138	733.34210618771090	763.96685111934990	659.083333333333	820.837500000000
	8	64	751.30651413690460	40.122467490694994	5.015308436336874	741.28421995532820	761.32880831848100	657.320000000000	859.871428571429
	9	101	767.48609500235770	42.357297610915470	4.214708639965362	759.12423310179300	775.84795690292240	671.816666666667	869.920000000000
	10	98	768.17034013605480	50.125962512170500	5.063486857979776	758.12072036694750	778.21995990516220	634.783333333333	902.720000000000
	11	49	768.58580903790080	55.165006266004220	7.880715180857746	752.74056918033390	784.43104889546780	651.462500000000	958.060000000000
	12	12	764.08692460317450	69.987824267337570	20.203744590371787	719.61878258148440	808.55506662486450	679.625000000000	877.520000000000
	Total	353	763.23267266963460	47.397590694947255	2.522719205885653	758.27117463682160	768.19417070244750	634.783333333333	958.060000000000
mvpa	7	29	63.413415435139584	16.375291666885126	3.040815323830093	57.184587608926170	69.642243261353000	34.3600000000000	105.6928571428570
	8	64	66.494228050595230	18.529397536006485	2.316174692000811	61.865722260010386	71.122733841180060	26.9571428571429	135.8500000000000
	9	101	61.218399339933990	15.975671469245840	1.589638725047627	58.064601384698065	64.372197295169910	26.3714285714286	105.9000000000000

10	98	59.013531341107870	18.709919013789932	1.889987230014569	55.262429864428440	62.764632817787300	25.2500000000000	119.3285714285710
11	49	53.362981859410420	22.615388308526080	3.230769758360868	46.867083889369870	59.858879829450960	18.4333333333333	124.8571428571430
12	12	56.195595238095244	22.361510577627293	6.455212075739891	41.987769254147395	70.403421222043100	26.8833333333333	85.8600000000000
Total	353	60.481975358604260	18.784020219188857	.999772517461394	58.515696524609446	62.448254192599070	18.4333333333333	135.8500000000000

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
HtzscoreRound	Between Groups	10.454	5	2.091	2.069	.069
	Within Groups	371.842	368	1.010		
	Total	382.297	373			
Wtzscore	Between Groups	1.709	5	.342	.344	.886
	Within Groups	366.092	368	.995		
	Total	367.801	373			
BMIzscore	Between Groups	4.030	5	.806	.782	.563
	Within Groups	379.098	368	1.030		
	Total	383.128	373			
baseline	Between Groups	2.556	5	.511	8.648	.000
	Within Groups	20.867	353	.059		
	Total	23.423	358			

RH	Between Groups	2.623	5	.525	8.065	.000
	Within Groups	22.898	352	.065		
	Total	25.521	357			
Abs	Between Groups	.008	5	.002	.230	.949
	Within Groups	2.568	352	.007		
	Total	2.576	357			
Rel	Between Groups	25.526	5	5.105	.439	.821
	Within Groups	4090.700	352	11.621		
	Total	4116.226	357			
scaled	Between Groups	20.531	5	4.106	.248	.941
	Within Groups	5830.736	352	16.565		
	Total	5851.267	357			
averageBF	Between Groups	14251.258	5	2850.252	1.960	.084
	Within Groups	504565.841	347	1454.080		
	Total	518817.099	352			
ttp	Between Groups	3297.216	5	659.443	2.080	.067
	Within Groups	110967.139	350	317.049		
	Total	114264.355	355			
peakBF	Between Groups	148002.554	5	29600.511	5.387	.000
	Within Groups	1906551.333	347	5494.384		
	Total	2054553.886	352			
peakSR	Between Groups	1015223.321	5	203044.664	1.181	.318
	Within Groups	59842025.571	348	171959.844		
	Total	60857248.892	353			
SRAUC	Between Groups	7916954408.417	5	1583390881.683	2.316	.043

	Within Groups	239934885812.827	351	683575173.256		
	Total	247851840221.244	356			
vd	Between Groups	8.676	5	1.735	.616	.688
	Within Groups	1036.222	368	2.816		
	Total	1044.898	373			
wt	Between Groups	20895.568	5	4179.114	1.884	.097
	Within Groups	769883.557	347	2218.685		
	Total	790779.124	352			
mvpa	Between Groups	5532.521	5	1106.504	3.236	.007
	Within Groups	118666.953	347	341.980		
	Total	124199.474	352			

Post Hoc Tests

Multiple Comparisons

Tukey HSD

Dependent Variable	(I) AgeCon	(J) AgeCon		Std. Error	Sig.	95% Confidence Interval

			Mean Difference (I-J)			Lower Bound	Upper Bound
HtzscoreRound	7	8	-.00596	.21835	1.000	-.6315	.6196
		9	-.23920	.20547	.854	-.8278	.3494
		10	-.40185	.20570	.371	-.9911	.1874
		11	-.41572	.22651	.444	-1.0646	.2332
		12	-.02387	.33215	1.000	-.9754	.9277
	8	7	.00596	.21835	1.000	-.6196	.6315
		9	-.23324	.15718	.675	-.6835	.2170
		10	-.39589	.15747	.123	-.8470	.0552
		11	-.40976	.18383	.227	-.9364	.1169
		12	-.01791	.30464	1.000	-.8907	.8548
	9	7	.23920	.20547	.854	-.3494	.8278
		8	.23324	.15718	.675	-.2170	.6835
		10	-.16265	.13906	.851	-.5610	.2357
		11	-.17652	.16833	.901	-.6588	.3057
		12	.21533	.29555	.978	-.6314	1.0620
	10	7	.40185	.20570	.371	-.1874	.9911
		8	.39589	.15747	.123	-.0552	.8470
		9	.16265	.13906	.851	-.2357	.5610
		11	-.01387	.16860	1.000	-.4969	.4691
		12	.37798	.29571	.797	-.4692	1.2251
	11	7	.41572	.22651	.444	-.2332	1.0646
		8	.40976	.18383	.227	-.1169	.9364

		9	.17652	.16833	.901	-.3057	.6588
		10	.01387	.16860	1.000	-.4691	.4969
		12	.39185	.31054	.806	-.4978	1.2815
	12	7	.02387	.33215	1.000	-.9277	.9754
		8	.01791	.30464	1.000	-.8548	.8907
		9	-.21533	.29555	.978	-1.0620	.6314
		10	-.37798	.29571	.797	-1.2251	.4692
		11	-.39185	.31054	.806	-1.2815	.4978
Wtzscore	7	8	.11618	.21665	.995	-.5045	.7368
		9	.13030	.20388	.988	-.4538	.7144
		10	.14418	.20410	.981	-.4405	.7289
		11	.14326	.22475	.988	-.5006	.7871
		12	.42677	.32957	.788	-.5174	1.3709
	8	7	-.11618	.21665	.995	-.7368	.5045
		9	.01412	.15596	1.000	-.4327	.4609
		10	.02800	.15625	1.000	-.4196	.4756
		11	.02708	.18240	1.000	-.4955	.5496
		12	.31060	.30228	.909	-.5554	1.1766
	9	7	-.13030	.20388	.988	-.7144	.4538
		8	-.01412	.15596	1.000	-.4609	.4327
		10	.01388	.13799	1.000	-.3814	.4092
		11	.01296	.16702	1.000	-.4655	.4914
		12	.29648	.29326	.914	-.5436	1.1366
	10	7	-.14418	.20410	.981	-.7289	.4405

		8	-.02800	.15625	1.000	-.4756	.4196
		9	-.01388	.13799	1.000	-.4092	.3814
		11	-.00092	.16730	1.000	-.4802	.4783
		12	.28260	.29341	.929	-.5580	1.1232
	11	7	-.14326	.22475	.988	-.7871	.5006
		8	-.02708	.18240	1.000	-.5496	.4955
		9	-.01296	.16702	1.000	-.4914	.4655
		10	.00092	.16730	1.000	-.4783	.4802
		12	.28352	.30813	.941	-.5992	1.1663
	12	7	-.42677	.32957	.788	-1.3709	.5174
		8	-.31060	.30228	.909	-1.1766	.5554
		9	-.29648	.29326	.914	-1.1366	.5436
		10	-.28260	.29341	.929	-1.1232	.5580
		11	-.28352	.30813	.941	-1.1663	.5992
BMIzscore	7	8	.14875	.22047	.985	-.4828	.7803
		9	.22837	.20747	.881	-.3660	.8227
		10	.27832	.20769	.762	-.3167	.8733
		11	.30563	.22871	.765	-.3496	.9608
		12	.55784	.33537	.557	-.4029	1.5186
	8	7	-.14875	.22047	.985	-.7803	.4828
		9	.07962	.15870	.996	-.3750	.5343
		10	.12957	.15900	.965	-.3259	.5851
		11	.15689	.18561	.959	-.3749	.6886
		12	.40909	.30760	.768	-.4721	1.2903
	9	7	-.22837	.20747	.881	-.8227	.3660

		8	-.07962	.15870	.996	-.5343	.3750
		10	.04995	.14041	.999	-.3523	.4522
		11	.07726	.16996	.998	-.4097	.5642
		12	.32947	.29842	.880	-.5254	1.1844
	10	7	-.27832	.20769	.762	-.8733	.3167
		8	-.12957	.15900	.965	-.5851	.3259
		9	-.04995	.14041	.999	-.4522	.3523
		11	.02731	.17024	1.000	-.4604	.5150
		12	.27952	.29858	.937	-.5758	1.1349
	11	7	-.30563	.22871	.765	-.9608	.3496
		8	-.15689	.18561	.959	-.6886	.3749
		9	-.07726	.16996	.998	-.5642	.4097
		10	-.02731	.17024	1.000	-.5150	.4604
		12	.25221	.31356	.967	-.6461	1.1505
	12	7	-.55784	.33537	.557	-1.5186	.4029
		8	-.40909	.30760	.768	-1.2903	.4721
		9	-.32947	.29842	.880	-1.1844	.5254
		10	-.27952	.29858	.937	-1.1349	.5758
		11	-.25221	.31356	.967	-1.1505	.6461
baseline	7	8	-.051179944878	.055925329963	.943	-.21143086236	.10907097261
		9	-.130852539783	.052844469668	.134	-.28227542372	.02057034416
		10	-.189587708897*	.052514175754	.005	-.34006415403	-.03911126377
		11	-.277840412241*	.057306410270	.000	-.44204873841	-.11363208607

	12	-.289529106772*	.082075945545	.006	-.52471315639	-.05434505715
8	7	.051179944878	.055925329963	.943	-.10907097261	.21143086236
	9	-.079672594905	.039261698409	.328	-.19217480448	.03282961467
	10	-.138407764019*	.038815997251	.005	-.24963284175	-.02718268628
	11	-.226660467362*	.045088442482	.000	-.35585888748	-.09746204725
	12	-.238349161894*	.074063512099	.018	-.45057402984	-.02612429395
9	7	.130852539783	.052844469668	.134	-.02057034416	.28227542372
	8	.079672594905	.039261698409	.328	-.03282961467	.19217480448
	10	-.058735169114	.034228308250	.522	-.15681447959	.03934414136
	11	-.146987872458*	.041205134250	.005	-.26505888917	-.02891685575
	12	-.158676566989	.071765585537	.235	-.36431685438	.04696372041
10	7	.189587708897*	.052514175754	.005	.03911126377	.34006415403
	8	.138407764019*	.038815997251	.005	.02718268628	.24963284175
	9	.058735169114	.034228308250	.522	-.03934414136	.15681447959
	11	-.088252703344	.040780678871	.257	-.20510746681	.02860206012
	12	-.099941397875	.071522723299	.729	-.30488577706	.10500298131
11	7	.277840412241*	.057306410270	.000	.11363208607	.44204873841
	8	.226660467362*	.045088442482	.000	.09746204725	.35585888748
	9	.146987872458*	.041205134250	.005	.02891685575	.26505888917
	10	.088252703344	.040780678871	.257	-.02860206012	.20510746681

		12	-.011688694531	.075111822978	1.000	-.22691743890	.20354004983
	12	7	.289529106772*	.082075945545	.006	.05434505715	.52471315639
		8	.238349161894*	.074063512099	.018	.02612429395	.45057402984
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		11	.011688694531	.075111822978	1.000	-.20354004983	.22691743890
RH	7	8	-.0423545	.0586674	.979	-.210465	.125756
		9	-.1125136	.0554972	.329	-.271540	.046513
		10	-.1798048*	.0550890	.015	-.337662	-.021948
		11	-.2729667*	.0601162	.000	-.445229	-.100704
		12	-.2923875*	.0861002	.010	-.539107	-.045668
	8	7	.0423545	.0586674	.979	-.125756	.210465
		9	-.0701591	.0412697	.533	-.188417	.048099
		10	-.1374503*	.0407192	.011	-.254131	-.020770
		11	-.2306122*	.0472992	.000	-.366147	-.095077
		12	-.2500330*	.0776949	.018	-.472667	-.027399
	9	7	.1125136	.0554972	.329	-.046513	.271540
		8	.0701591	.0412697	.533	-.048099	.188417
		10	-.0672912	.0360017	.423	-.170454	.035871
		11	-.1604531*	.0433045	.003	-.284542	-.036364
		12	-.1798739	.0753298	.163	-.395731	.035983
	10	7	.1798048*	.0550890	.015	.021948	.337662
		8	.1374503*	.0407192	.011	.020770	.254131
		9	.0672912	.0360017	.423	-.035871	.170454
		11	-.0931619	.0427802	.251	-.215748	.029424

		12	-.1125827	.0750296	.664	-.327579	.102414
	11	7	.2729667*	.0601162	.000	.100704	.445229
		8	.2306122*	.0472992	.000	.095077	.366147
		9	.1604531*	.0433045	.003	.036364	.284542
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		12	-.0194208	.0787946	1.000	-.245206	.206364
	12	7	.2923875*	.0861002	.010	.045668	.539107
		8	.2500330*	.0776949	.018	.027399	.472667
		9	.1798739	.0753298	.163	-.035983	.395731
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		11	.0194208	.0787946	1.000	-.206364	.245206
Abs	7	8	.008455076095	.019645072126	.998	-.04783766495	.06474781714
		9	.014704658447	.018583504754	.969	-.03854617281	.06795548970
		10	.009412570151	.018446824918	.996	-.04344660652	.06227174682
		11	.004503377056	.020130208687	1.000	-.05317951754	.06218627165
		12	-.003228724282	.028831083716	1.000	-.08584388188	.07938643331
	8	7	-.008455076095	.019645072126	.998	-.06474781714	.04783766495
		9	.006249582351	.013819374277	.998	-.03334968471	.04584884941
		10	.000957494055	.013635021307	1.000	-.03811351157	.04002849968
		11	-.003951699040	.015838363496	1.000	-.04933635781	.04143295973
		12	-.011683800377	.026016530221	.998	-.08623388547	.06286628471
	9	7	-.014704658447	.018583504754	.969	-.06795548970	.03854617281
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		10	-.005292088296	.012055355496	.998	-.03983657868	.02925240209
		11	-.010201281391	.014500743027	.981	-.05175300321	.03135044043

		12	-.017933382729	.025224544294	.981	-.09021404074	.05434727528
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		8	-.000957494055	.013635021307	1.000	-.04002849968	.03811351157
		9	.005292088296	.012055355496	.998	-.02925240209	.03983657868
		11	-.004909193095	.014325161394	.999	-.04595778765	.03613940146
		12	-.012641294433	.025124019094	.996	-.08463389857	.05935130971
	11	7	-.004503377056	.020130208687	1.000	-.06218627165	.05317951754
		8	.003951699040	.015838363496	1.000	-.04143295973	.04933635781
		9	.010201281391	.014500743027	.981	-.03135044043	.05175300321
		10	.004909193095	.014325161394	.999	-.03613940146	.04595778765
		12	-.007732101338	.026384773785	1.000	-.08333738436	.06787318169
	12	7	.003228724282	.028831083716	1.000	-.07938643331	.08584388188
		8	.011683800377	.026016530221	.998	-.06286628471	.08623388547
		9	.017933382729	.025224544294	.981	-.05434727528	.09021404074
		10	.012641294433	.025124019094	.996	-.05935130971	.08463389857
		11	.007732101338	.026384773785	1.000	-.06787318169	.08333738436
Rel	7	8	.522103646884	.784145381867	.986	-1.72485643753	2.76906373130
		9	.902939282564	.741772254039	.828	-1.22260106377	3.02847962890
		10	.903553182844	.736316592634	.823	-1.20635402492	3.01346039061
		11	.960899960500	.803509912135	.839	-1.34154897531	3.26334889631
		12	.865730194373	1.150810799036	.975	-2.43190566492	4.16336605367
	8	7	-.522103646884	.784145381867	.986	-2.76906373130	1.72485643753
		9	.380835635681	.551608996392	.983	-1.19979395898	1.96146523034
		10	.381449535961	.544250431903	.982	-1.17809417199	1.94099324391

		11	.438796313616	.632198218075	.983	-1.37276082145	2.25035344868
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		11	.057960677936	.578806257651	1.000	-1.60060237380	1.71652372967
		12	-.037209088191	1.006853514755	1.000	-2.92233691120	2.84791873481
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		9	-.000613900280	.481197079776	1.000	-1.37947891179	1.37825111123
		11	.057346777656	.571797806591	1.000	-1.58113363360	1.69582718891
		12	-.037822988471	1.002840988343	1.000	-2.91145296057	2.83580698363
	11	7	-.960899960500	.803509912135	.839	-3.26334889631	1.34154897531
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		9	-.057960677936	.578806257651	1.000	-1.71652372967	1.60060237380
		10	-.057346777656	.571797806591	1.000	-1.69582718891	1.58113363360
		12	-.095169766127	1.053164802968	1.000	-3.11300208307	2.92266255081
	12	7	-.865730194373	1.150810799036	.975	-4.16336605367	2.43190566492
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		9	.037209088191	1.006853514755	1.000	-2.84791873481	2.92233691120
		10	.037822988471	1.002840988343	1.000	-2.83580698363	2.91145296057
		11	.095169766127	1.053164802968	1.000	-2.92266255081	3.11300208307
scaled	7	8	.350027125210328	.936180175667902	.999	-2.332587011386678	3.032641261807334
		9	.237673112596350	.885591492534611	1.000	-2.299979701327516	2.775325926520216
		10	.711503981584408	.879078054885517	.966	-1.807484647421380	3.230492610590196
		11	.629757997213607	.959299216813640	.986	-2.119103500964066	3.378619495391281
		12	.755504657031608	1.373936875629253	.994	-3.181496554007095	4.692505868070310
	8	7	-.350027125210328	.936180175667902	.999	-3.032641261807334	2.332587011386678

	9	-.112354012613978	.658558245809926	1.000	-1.999445521170910	1.774737495942954
	10	.361476856374080	.649772958852452	.994	-1.500440507719295	2.223394220467455
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	12	.405477531821280	1.239810150663576	1.000	-3.147185003992131	3.958140067634690
9	7	-.237673112596350	.885591492534611	1.000	-2.775325926520216	2.299979701327516
	8	.112354012613978	.658558245809926	1.000	-1.774737495942954	1.999445521170910
	10	.473830868988058	.574494445919165	.963	-1.172376733004485	2.120038470980601
	11	.392084884617257	.691028674651007	.993	-1.588050285506536	2.372220054741050

		12	.517831544435258	1.202068292579310	.998	-2.926682106505582	3.962345195376098
	10	7	-.711503981584408	.879078054885517	.966	-3.230492610590196	1.807484647421380
		8	-.361476856374080	.649772958852452	.994	-2.223394220467455	1.500440507719295
		9	-.473830868988058	.574494445919165	.963	-2.120038470980601	1.172376733004485
		11	-.081745984370801	.682661383206601	1.000	-2.037904771638829	1.874412802897228
		12	.044000675447200	1.197277793561778	1.000	-3.386785852531849	3.474787203426249
	11	7	-.629757997213607	.959299216813640	.986	-3.378619495391281	2.119103500964066
		8	-.279730872003279	.754772587508204	.999	-2.442523532850723	1.883061788844164

		9	-.392084884617257	.691028674651007	.993	-2.372220054741050	1.588050285506536
		10	.081745984370801	.682661383206601	1.000	-1.874412802897228	2.037904771638829
		12	.125746659818001	1.257358690173221	1.000	-3.477201025573181	3.728694345209183
	12	7	-.755504657031608	1.373936875629253	.994	-4.692505868070310	3.181496554007095
		8	-.405477531821280	1.239810150663576	1.000	-3.958140067634690	3.147185003992131
		9	-.517831544435258	1.202068292579310	.998	-3.962345195376098	2.926682106505582
		10	-.044000675447200	1.197277793561778	1.000	-3.474787203426249	3.386785852531849
		11	-.125746659818001	1.257358690173221	1.000	-3.728694345209183	3.477201025573181

averageBF	7	8	-7.983563589107547	8.909493239479128	.947	-33.515652850537300	17.548525672322207
		9	-6.994119397110183	8.430470443276628	.962	-31.153464725505990	17.165225931285626
		10	-15.816365187583514	8.369196294557720	.410	-39.800116125540040	8.167385750373011
		11	-16.135170338684347	9.102393889651156	.485	-42.220058338089004	9.949717660720314
		12	-31.949319726282326	13.307874193181332	.159	-70.085925551918210	6.187286099353557
	8	7	7.983563589107547	8.909493239479128	.947	-17.548525672322207	33.515652850537300
		9	.989444191997364	6.212855710066093	1.000	-16.814844143381045	18.793732527375774
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		11	-8.151606749576800	7.097909459939507	.861	-28.492208962247318	12.188995463093718
		12	-23.965756137174780	12.026065845515804	.349	-58.429061555148490	10.497549280798935
	9	7	6.994119397110183	8.430470443276628	.962	-17.165225931285626	31.153464725505990
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		10	-8.822245790473332	5.409616706072183	.579	-24.324678184443180	6.680186603496514
		11	-9.141050941574164	6.486453639095501	.721	-27.729393606189547	9.447291723041218
		12	-24.955200329172143	11.675616550371900	.271	-58.414217125479830	8.503816467135543
	10	7	15.816365187583514	8.369196294557720	.410	-8.167385750373011	39.800116125540040

	8	7.832801598475967	6.129452732175910	.797	-9.732477377006940	25.398080573958875
	9	8.822245790473332	5.409616706072183	.579	-6.680186603496514	24.324678184443180
	11	-.318805151100833	6.406613421614662	1.000	-18.678348320101815	18.040738017900150
	12	-16.132954538698810	11.631450320282338	.735	-49.465403403623970	17.199494326226343
11	7	16.135170338684347	9.102393889651156	.485	-9.949717660720314	42.220058338089004
	8	8.151606749576800	7.097909459939507	.861	-12.188995463093718	28.492208962247318
	9	9.141050941574164	6.486453639095501	.721	-9.447291723041218	27.729393606189547
	10	.318805151100833	6.406613421614662	1.000	-18.040738017900150	18.678348320101815

		12	-15.814149387597979	12.169665749671030	.785	-50.688971540842076	19.060672765646117
	12	7	31.949319726282326	13.307874193181332	.159	-6.187286099353557	70.085925551918210
		8	23.965756137174780	12.026065845515804	.349	-10.497549280798935	58.429061555148490
		9	24.955200329172143	11.675616550371900	.271	-8.503816467135543	58.414217125479830
		10	16.132954538698810	11.631450320282338	.735	-17.199494326226343	49.465403403623970
		11	15.814149387597979	12.169665749671030	.785	-19.060672765646117	50.688971540842076
ttp	7	8	5.256004936168871	4.115832654887814	.797	-6.538241326704739	17.050251199042480
		9	4.745867164526963	3.874416141628911	.824	-6.356580852876581	15.848315181930507

		10	3.385454412716918	3.845920194933534	.951	-7.635336199976582	14.406245025410417
		11	11.566329966329953	4.196883553654371	.067	-.460174101958749	23.592834034618654
		12	6.318061568061566	6.010901474766734	.900	-10.906655323933016	23.542778460056148
	8	7	-5.256004936168871	4.115832654887814	.797	-17.050251199042480	6.538241326704739
		9	-.510137771641908	2.909651204350127	1.000	-8.847975026132415	7.827699482848599
		10	-1.870550523451954	2.871597436664665	.987	-10.099341675987970	6.358240629084063
		11	6.310325030161081	3.326980801777495	.406	-3.223403422432194	15.844053482754356
		12	1.062056631892695	5.439292806221631	1.000	-14.524670096724360	16.648783360509750

	9	7	-4.745867164526963	3.874416141628911	.824	-15.848315181930507	6.356580852876581
		8	.510137771641908	2.909651204350127	1.000	-7.827699482848599	8.847975026132415
		10	-1.360412751810046	2.513382946097325	.994	-8.562711752955085	5.841886249334993
		11	6.820462801802989	3.023214059716879	.215	-1.842797859035189	15.483723462641168
		12	1.572194403534603	5.258985475097662	1.000	-13.497847307835183	16.642236114904390
	10	7	-3.385454412716918	3.845920194933534	.951	-14.406245025410417	7.635336199976582
		8	1.870550523451954	2.871597436664665	.987	-6.358240629084063	10.099341675987970
		9	1.360412751810046	2.513382946097325	.994	-5.841886249334993	8.562711752955085

		11	8.180875553613035	2.986607600297158	.070	-.377486382371654	16.739237489597723
		12	2.932607155344648	5.238027294179662	.993	-12.077377219467685	17.942591530156980
	11	7	-11.566329966329953	4.196883553654371	.067	-23.592834034618654	.460174101958749
		8	-6.310325030161081	3.326980801777495	.406	-15.844053482754356	3.223403422432194
		9	-6.820462801802989	3.023214059716879	.215	-15.483723462641168	1.842797859035189
		10	-8.180875553613035	2.986607600297158	.070	-16.739237489597723	.377486382371654
		12	-5.248268398268387	5.500878052793759	.932	-21.011472555667410	10.514935759130639
	12	7	-6.318061568061566	6.010901474766734	.900	-23.542778460056148	10.906655323933016

		8	-1.062056631892695	5.439292806221631	1.000	-16.648783360509750	14.524670096724360
		9	-1.572194403534603	5.258985475097662	1.000	-16.642236114904390	13.497847307835183
		10	-2.932607155344648	5.238027294179662	.993	-17.942591530156980	12.077377219467685
		11	5.248268398268387	5.500878052793759	.932	-10.514935759130639	21.011472555667410
peakBF	7	8	-20.056374452069676	17.318821312471700	.856	-69.687220984776730	29.574472080637370
		9	-30.843123660384820	16.387667318743920	.415	-77.805546047636820	16.119298726867193
		10	-46.812075416030340*	16.268558857217254	.048	-93.433166619818980	-.190984212241702
		11	-70.225169924790250*	17.693793468753878	.001	-120.930580667538380	-19.519759182042115

	12	-80.717723819297290*	25.868664917920210	.024	-154.850005421092280	-6.585442217502305
8	7	20.056374452069676	17.318821312471700	.856	-29.574472080637370	69.687220984776730
	9	-10.786749208315143	12.076931312548446	.948	-45.395820677139770	23.822322260509480
	10	-26.755700963960663	11.914807470913143	.220	-60.900171328684730	7.388769400763401
	11	-50.168795472720575*	13.797353264054050	.004	-89.708109959018130	-10.629480986423019
	12	-60.661349367227615	23.377006960126900	.101	-127.653243555579780	6.330544821124548
9	7	30.843123660384820	16.387667318743920	.415	-16.119298726867193	77.805546047636820
	8	10.786749208315143	12.076931312548446	.948	-23.822322260509480	45.395820677139770

	10	-15.968951755645520	10.515545899544690	.653	-46.103533972976320	14.165630461685279
	11	-39.382046264405430*	12.608767806158001	.024	-75.515210794679970	-3.248881734130897
	12	-49.874600158912470	22.695782051084400	.242	-114.914296313406620	15.165095995581680
10	7	46.812075416030340*	16.268558857217254	.048	.190984212241702	93.433166619818980
	8	26.755700963960663	11.914807470913143	.220	-7.388769400763401	60.900171328684730
	9	15.968951755645520	10.515545899544690	.653	-14.165630461685279	46.103533972976320
	11	-23.413094508759910	12.453569477483994	.416	-59.101504497511144	12.275315479991320
	12	-33.905648403266950	22.609929014732430	.665	-98.699314022849170	30.888017216315262
11	7	70.225169924790250*	17.693793468753878	.001	19.519759182042115	120.930580667538380

	8	50.168795472720575*	13.797353264054050	.004	10.629480986423019	89.708109959018130
	9	39.382046264405430*	12.608767806158001	.024	3.248881734130897	75.515210794679970
	10	23.413094508759910	12.453569477483994	.416	-12.275315479991320	59.101504497511144
	12	-10.492553894507040	23.656145291983112	.998	-78.284379640544090	57.299271851530010
12	7	80.717723819297290*	25.868664917920210	.024	6.585442217502305	154.850005421092280
	8	60.661349367227615	23.377006960126900	.101	-6.330544821124548	127.653243555579780
	9	49.874600158912470	22.695782051084400	.242	-15.165095995581680	114.914296313406620
	10	33.905648403266950	22.609929014732430	.665	-30.888017216315262	98.699314022849170
	11	10.492553894507040	23.656145291983112	.998	-57.299271851530010	78.284379640544090

peakSR	7	8	-178.688282900915280	96.888523585851020	.439	-456.338932163660840	98.962366361830280
		9	-118.702552632974860	91.578502013020200	.787	-381.136426133942100	143.731320867992400
		10	-139.132283755014000	91.012928657576340	.646	-399.945409993736600	121.680842483708600
		11	-50.045492579963590	98.986270190686100	.996	-333.707593821385400	233.616608661458200
		12	-222.165609847908170	144.719822776246700	.642	-636.885034480385800	192.553814784569450
	8	7	178.688282900915280	96.888523585851020	.439	-98.962366361830280	456.338932163660840
		9	59.985730267940426	67.426461846511060	.949	-133.236337901828160	253.207798437709020
		10	39.555999145901296	66.656274340975200	.991	-151.458964889634070	230.570963181436670

		11	128.642790320951700	77.188000443422420	.555	-92.552637633108080	349.838218275011460
		12	-43.477326946992890	130.780475723934130	.999	-418.251166528378750	331.296512634392970
	9	7	118.702552632974860	91.578502013020200	.787	-143.731320867992400	381.136426133942100
		8	-59.985730267940426	67.426461846511060	.949	-253.207798437709020	133.236337901828160
		10	-20.429731122039130	58.671074110860474	.999	-188.561737028690900	147.702274784612650
		11	68.657060053011260	70.407552441172910	.926	-133.107833505003840	270.421953611026370
		12	-103.463057214933310	126.896685767916170	.965	-467.107231868222400	260.181117438355800
	10	7	139.132283755014000	91.012928657576340	.646	-121.680842483708600	399.945409993736600

	8	-39.555999145901296	66.656274340975200	.991	-230.570963181436670	151.458964889634070
	9	20.429731122039130	58.671074110860474	.999	-147.702274784612650	188.561737028690900
	11	89.086791175050400	69.670327921123290	.797	-110.565459326093050	288.739041676193840
	12	-83.033326092894190	126.489130010296120	.986	-445.509579959221240	279.442927773432870
11	7	50.045492579963590	98.986270190686100	.996	-233.616608661458200	333.707593821385400
	8	-128.642790320951700	77.188000443422420	.555	-349.838218275011460	92.552637633108080
	9	-68.657060053011260	70.407552441172910	.926	-270.421953611026370	133.107833505003840
	10	-89.086791175050400	69.670327921123290	.797	-288.739041676193840	110.565459326093050

		12	-172.120117267944580	132.342088974732550	.785	-551.369026929196900	207.128792393307830
	12	7	222.165609847908170	144.719822776246700	.642	-192.553814784569450	636.885034480385800
		8	43.477326946992890	130.780475723934130	.999	-331.296512634392970	418.251166528378750
		9	103.463057214933310	126.896685767916170	.965	-260.181117438355800	467.107231868222400
		10	83.033326092894190	126.489130010296120	.986	-279.442927773432870	445.509579959221240
		11	172.120117267944580	132.342088974732550	.785	-207.128792393307830	551.369026929196900
SRAUC	7	8	-6845.1429	6013.9836	.865	-24078.419	10388.133
		9	-665.4807	5682.6803	1.000	-16949.396	15618.435
		10	-1987.4908	5652.8091	.999	-18185.809	14210.827
		11	9240.5370	6162.4994	.665	-8418.316	26899.390
		12	-1973.5556	9070.9535	1.000	-27966.684	24019.572
	8	7	6845.1429	6013.9836	.865	-10388.133	24078.419
		9	6179.6621	4222.0441	.688	-5918.750	18278.074
		10	4857.6520	4181.7522	.855	-7125.302	16840.606

		11	16085.6799*	4848.6286	.013	2191.769	29979.591
		12	4871.5873	8234.9862	.992	-18726.048	28469.222
	9	7	665.4807	5682.6803	1.000	-15618.435	16949.396
		8	-6179.6621	4222.0441	.688	-18278.074	5918.750
		10	-1322.0101	3689.4321	.999	-11894.204	9250.184
		11	9906.0178	4431.0333	.224	-2791.260	22603.296
		12	-1308.0748	7996.2400	1.000	-24221.575	21605.425
	10	7	1987.4908	5652.8091	.999	-14210.827	18185.809
		8	-4857.6520	4181.7522	.855	-16840.606	7125.302
		9	1322.0101	3689.4321	.999	-9250.184	11894.204
		11	11228.0279	4392.6588	.111	-1359.287	23815.342
		12	13.9353	7975.0392	1.000	-22838.813	22866.683
	11	7	-9240.5370	6162.4994	.665	-26899.390	8418.316
		8	-16085.6799*	4848.6286	.013	-29979.591	-2191.769
		9	-9906.0178	4431.0333	.224	-22603.296	2791.260
		10	-11228.0279	4392.6588	.111	-23815.342	1359.287
		12	-11214.0926	8344.0636	.760	-35124.293	12696.108
	12	7	1973.5556	9070.9535	1.000	-24019.572	27966.684
		8	-4871.5873	8234.9862	.992	-28469.222	18726.048
		9	1308.0748	7996.2400	1.000	-21605.425	24221.575
		10	-13.9353	7975.0392	1.000	-22866.683	22838.813
		11	11214.0926	8344.0636	.760	-12696.108	35124.293
vd	7	8	-.1387	.3645	.999	-1.183	.906
		9	-.1152	.3430	.999	-1.098	.867
		10	-.2004	.3434	.992	-1.184	.783

	11	.2419	.3781	.988	-.841	1.325
	12	.2035	.5545	.999	-1.385	1.792
8	7	.1387	.3645	.999	-.906	1.183
	9	.0235	.2624	1.000	-.728	.775
	10	-.0617	.2629	1.000	-.815	.691
	11	.3806	.3069	.817	-.499	1.260
	12	.3421	.5086	.985	-1.115	1.799
9	7	.1152	.3430	.999	-.867	1.098
	8	-.0235	.2624	1.000	-.775	.728
	10	-.0852	.2321	.999	-.750	.580
	11	.3571	.2810	.801	-.448	1.162
	12	.3187	.4934	.987	-1.095	1.732
10	7	.2004	.3434	.992	-.783	1.184
	8	.0617	.2629	1.000	-.691	.815
	9	.0852	.2321	.999	-.580	.750
	11	.4423	.2815	.618	-.364	1.249
	12	.4038	.4936	.964	-1.010	1.818
11	7	-.2419	.3781	.988	-1.325	.841
	8	-.3806	.3069	.817	-1.260	.499
	9	-.3571	.2810	.801	-1.162	.448
	10	-.4423	.2815	.618	-1.249	.364
	12	-.0385	.5184	1.000	-1.524	1.447
12	7	-.2035	.5545	.999	-1.792	1.385
	8	-.3421	.5086	.985	-1.799	1.115
	9	-.3187	.4934	.987	-1.732	1.095

		10	-.4038	.4936	.964	-1.818	1.010
		11	.0385	.5184	1.000	-1.447	1.524
wt	7	8	-2.652035483374220	10.543875589457677	1.000	-32.86780258430782	27.56373161755938
		9	-18.831616348827310	9.923383486606298	.405	-47.26922847167375	9.60599577401913
		10	-19.515861482524430	9.957208662103046	.368	-48.05040699729935	9.01868403225049
		11	-19.931330384370426	11.035653271424843	.463	-51.55639331563553	11.69373254689468
		12	-15.432445949644034	16.167768831130793	.932	-61.76470142804052	30.89980952875245
	8	7	2.652035483374220	10.543875589457677	1.000	-27.56373161755938	32.86780258430782
		9	-16.179580865453090	7.525564507715813	.264	-37.74572156380790	5.38655983290172
		10	-16.863825999150208	7.570111338560439	.228	-38.55762532307072	4.82997332477030

		11	-17.279294900996206	8.941265260837039	.384	-42.90243379493836	8.34384399294595
		12	-12.780410466269814	14.817467068106671	.955	-55.24308276897791	29.68226183643829
	9	7	18.831616348827310	9.923383486606298	.405	-9.60599577401913	47.26922847167375
		8	16.179580865453090	7.525564507715813	.264	-5.38655983290172	37.74572156380790
		10	-.684245133697118	6.678833210560840	1.000	-19.82389327200248	18.45540300460824
		11	-1.099714035543116	8.200393395498798	1.000	-24.59972357872954	22.40029550764331
		12	3.399170399183277	14.382543505608274	1.000	-37.81713390916993	44.61547470753648
	10	7	19.515861482524430	9.957208662103046	.368	-9.01868403225049	48.05040699729935

	8	16.863825999150208	7.570111338560439	.228	-4.82997332477030	38.55762532307072
	9	.684245133697118	6.678833210560840	1.000	-18.45540300460824	19.82389327200248
	11	-.415468901845998	8.241293366902415	1.000	-24.03268620226375	23.20174839857175
	12	4.083415532880395	14.405902339288719	1.000	-37.19982859017846	45.36665965593925
11	7	19.931330384370426	11.035653271424843	.463	-11.69373254689468	51.55639331563553
	8	17.279294900996206	8.941265260837039	.384	-8.34384399294595	42.90243379493836
	9	1.099714035543116	8.200393395498798	1.000	-22.40029550764331	24.59972357872954
	10	.415468901845998	8.241293366902415	1.000	-23.20174839857175	24.03268620226375

		12	4.498884434726392	15.171343414331310	1.000	-38.97789744935273	47.97566631880552
	12	7	15.432445949644034	16.167768831130793	.932	-30.89980952875245	61.76470142804052
		8	12.780410466269814	14.817467068106671	.955	-29.68226183643829	55.24308276897791
		9	-3.399170399183277	14.382543505608274	1.000	-44.61547470753648	37.81713390916993
		10	-4.083415532880395	14.405902339288719	1.000	-45.36665965593925	37.19982859017846
		11	-4.498884434726392	15.171343414331310	1.000	-47.97566631880552	38.97789744935273
mvpa	7	8	-3.080812615455642	4.139545370822535	.976	-14.943579561755978	8.781954330844695
		9	2.195016095205595	3.895939005193701	.993	-8.969643865129790	13.359676055540980

		10	4.399884094031712	3.909218832659119	.871	-6.802832098135243	15.602600286198667
		11	10.050433575729166	4.332618212927810	.189	-2.365625561954886	22.466492713413217
		12	7.217820197044340	6.347496426110500	.866	-10.972310372888543	25.407950766977223
	8	7	3.080812615455642	4.139545370822535	.976	-8.781954330844695	14.943579561755978
		9	5.275828710661237	2.954550768020176	.476	-3.191078655321247	13.742736076643721
		10	7.480696709487354	2.972039937523662	.122	-1.036329672792556	15.997723091767265
		11	13.131246191184808*	3.510357544127478	.003	3.071553709568882	23.190938672800733
		12	10.298632812499982	5.817365416415277	.486	-6.372292130808326	26.969557755808290

	9	7	-2.195016095205595	3.895939005193701	.993	-13.359676055540980	8.969643865129790
		8	-5.275828710661237	2.954550768020176	.476	-13.742736076643721	3.191078655321247
		10	2.204867998826117	2.622122469551538	.960	-5.309393828135486	9.719129825787721
		11	7.855417480523570	3.219489857524652	.146	-1.370730428130415	17.081565389177555
		12	5.022804101838744	5.646613608455593	.949	-11.158794424669672	21.204402628347160
	10	7	-4.399884094031712	3.909218832659119	.871	-15.602600286198667	6.802832098135243
		8	-7.480696709487354	2.972039937523662	.122	-15.997723091767265	1.036329672792556
		9	-2.204867998826117	2.622122469551538	.960	-9.719129825787721	5.309393828135486

	11	5.650549481697453	3.235547263158297	.502	-3.621614412706263	14.922713376101170
	12	2.817936103012627	5.655784330455232	.996	-13.389943120544753	19.025815326570008
11	7	-10.050433575729166	4.332618212927810	.189	-22.466492713413217	2.365625561954886
	8	-13.131246191184808*	3.510357544127478	.003	-23.190938672800733	-3.071553709568882
	9	-7.855417480523570	3.219489857524652	.146	-17.081565389177555	1.370730428130415
	10	-5.650549481697453	3.235547263158297	.502	-14.922713376101170	3.621614412706263
	12	-2.832613378684826	5.956297934959263	.997	-19.901679649387830	14.236452892018178
12	7	-7.217820197044340	6.347496426110500	.866	-25.407950766977223	10.972310372888543

	8	-10.298632812499982	5.817365416415277	.486	-26.969557755808290	6.372292130808326
	9	-5.022804101838744	5.646613608455593	.949	-21.204402628347160	11.158794424669672
	10	-2.817936103012627	5.655784330455232	.996	-19.025815326570008	13.389943120544753
	11	2.832613378684826	5.956297934959263	.997	-14.236452892018178	19.901679649387830

*. The mean difference is significant at the 0.05 level.

Homogeneous Subsets

HtzscoreRound

Tukey HSD[a,b]

AgeCon	N	Subset for alpha = 0.05
		1
7	31	.0461
8	67	.0521
12	13	.0700
9	105	.2853
10	104	.4480
11	54	.4619
Sig.		.479

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 37.091.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Wtzscore

Tukey HSD[a,b]

AgeCon	N	Subset for alpha = 0.05
		1
12	13	-.2300

10	104	.0526
11	54	.0535
9	105	.0665
8	67	.0806
7	31	.1968
Sig.		.440

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 37.091.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

BMIzscore

Tukey HSD[a,b]

		Subset for alpha = 0.05
AgeCon	N	1
12	13	-.3546
11	54	-.1024
10	104	-.0751
9	105	-.0251
8	67	.0545
7	31	.2032

Sig.		.171

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 37.091.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

baseline

Tukey HSD[a,b]

AgeCon	N	Subset for alpha = 0.05		
		1	2	3
7	27	2.46097195207		
8	63	2.51215189695	2.51215189695	
9	98	2.59182449186	2.59182449186	2.59182449186
10	104		2.65055966097	2.65055966097
11	54			2.73881236431
12	13			2.75050105885
Sig.		.208	.157	.067

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 35.678.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

RH

Tukey HSD^{a,b}

AgeCon	N	Subset for alpha = 0.05			
		1	2	3	4
7	27	2.646674			
8	63	2.689029	2.689029		
9	97	2.759188	2.759188	2.759188	
10	104		2.826479	2.826479	2.826479
11	54			2.919641	2.919641
12	13				2.939062
Sig.		.427	.207	.087	.426

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 35.656.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Abs

Tukey HSD^{a,b}

AgeCon	N	Subset for alpha = 0.05
		1

9	97	.17062709689
10	104	.17591918518
8	63	.17687667924
11	54	.18082837828
7	27	.18533175533
12	13	.18856047962
Sig.		.950

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 35.656.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Rel

Tukey HSD[a,b]

AgeCon	N	Subset for alpha = 0.05
		1
11	54	6.64878545580
10	104	6.70613223345
9	97	6.70674613373
12	13	6.74395522192
8	63	7.08758176941

7	27	7.60968541630
Sig.		.841

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 35.656.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

scaled

Tukey HSD[a,b]

		Subset for alpha = 0.05
AgeCon	N	1
12	13	6.366734291070876
10	104	6.410734966518076
11	54	6.492480950888877
8	63	6.772211822892156
9	97	6.884565835506134

7	27	7.122238948102484
Sig.		.970

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 35.656.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

averageBF

Tukey HSD[a,b]

AgeCon	N	Subset for alpha = 0.05	
		1	2
7	26	64.214646128199100	
9	96	71.208765525309290	71.208765525309290
8	62	72.198209717306650	72.198209717306650
10	103	80.031011315782620	80.031011315782620
11	54	80.349816466883450	80.349816466883450

12	12		96.163965854481430
Sig.		.504	.078

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 33.981.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

ttp

Tukey HSD[a,b]

AgeCon	N	Subset for alpha = 0.05
		1
11	54	39.948874458874464
12	13	45.197142857142850
8	61	46.259199489035545
9	97	46.769337260677450
10	104	48.129750012487500

7	27	51.515204425204416
Sig.		.070

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 35.546.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

peakBF

Tukey HSD[a,b]

		Subset for alpha = 0.05		
AgeCon	N	1	2	3
7	26	123.603885955083640		
8	62	143.660260407153320	143.660260407153320	
9	96	154.447009615468460	154.447009615468460	154.447009615468460
10	103	170.415961371113980	170.415961371113980	170.415961371113980
11	54		193.829055879873900	193.829055879873900

12	12			204.321609774380930
Sig.		.099	.061	.064

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 33.981.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

peakSR

Tukey HSD[a,b]

AgeCon	N	Subset for alpha = 0.05
		1
7	26	1271.196208163208700
11	54	1321.241700743172300
9	97	1389.898760796183500
10	103	1410.328491918222700
8	62	1449.884491064124000

12	12	1493.36181801111 6800
Sig.		.236

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 34.002.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

SRAUC

Tukey HSD[a,b]

AgeCon	N	Subset for alpha = 0.05
		1
11	54	45582.574
7	27	54823.111
9	98	55488.592
12	12	56796.667
10	103	56810.602
8	63	61668.254
Sig.		.113

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 34.350.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

vd

Tukey HSD[a,b]

AgeCon	N	Subset for alpha = 0.05
		1
11	54	5.500
12	13	5.538
7	31	5.742
9	105	5.857
8	67	5.881
10	104	5.942
Sig.		.866

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 37.091.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

wt

Tukey HSD[a,b]

AgeCon	N	Subset for alpha = 0.05
		1
7	29	748.65447865353040
8	64	751.30651413690460
12	12	764.08692460317450
9	101	767.48609500235770
10	98	768.17034013605480
11	49	768.58580903790080
Sig.		.495

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 34.492.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

mvpa

Tukey HSD^{a,b}

AgeCon	N	Subset for alpha = 0.05	
		1	2
11	49	53.362981859410420	
12	12	56.195595238095244	56.195595238095244
10	98	59.013531341107870	59.013531341107870
9	101	61.218399339933990	61.218399339933990
7	29	63.413415435139584	63.413415435139584
8	64		66.494228050595230
Sig.		.215	.192

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 34.492.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.