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Ankle-Knee Initial Contact Angle and Latency Period to Maximum Angle are Affected by Prolonged Run

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ANKLE-KNEE INITIAL CONTACT ANGLE AND LATENCY PERIOD TO MAXIMUM ANGLE ARE AFFECTED BY PROLONGED RUN

by

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Under the Direction of Li Li

ABSTRACT

INTRODUCTION: The angle experienced at initial contact and midstance have been suggested to influence the risk of injury. Previous literature has not assessed these angles under the influence of novel footwear for a non-exhaustive prolonged run or the relationship between the angles. PURPOSE: The purpose of this study was to assess the change of lower extremity kinematic parameters and the relationship between kinematic parameters at initial contact and midstance with prolonged running under the influence of different types of footwear. METHODS: The participants included 12 experienced, recreational runners (6 male; 6 female; 24.8 ± 8.4 years; 70.5 ± 9.3 kg; 174.1 ± 9.7 cm). There were a total of three testing sessions consisting of three different types of footwear: maximalist, habitual, and minimalist. Sixteen anatomical retroreflective markers, as well as seven tracking clusters, were placed on the participants' lower extremities. The participants ran at a self-selected pace for 31 minutes. Kinematic data was collected every five minutes beginning at minute one. Angle at initial contact (IC), maximum angle (MAX) during midstance, and latency period between IC and MAX were calculated for the ankle and knee in the frontal and sagittal planes. RESULTS: Failed to see significant differences between footwear. Rearfoot inversion ($F_{3,33}$=9.72, p<.001) and knee flexion ($F_{6,66}$=5.34, p<.001) at IC increased over time. No significant differences were seen for MA over time. The latency period for dorsiflexion ($F_{6,66}$=10.26, p<.001), rearfoot eversion, ($F_{6,66}$=7.84, p<.001) and knee flexion ($F_{6,66}$=11.76, p<.001) increased over time. CONCLUSION:

IC and the latency period to MAX during midstance were effected by the duration of the run. The eversion MAX during midstance has a relationship with rearfoot IC. In addition to improving shoe design, gait retraining should be further investigated to reduce injury at the ankle and knee.

INDEX WORDS: Biomechanics, Lower extremity, Joint timing, Footwear, Injury prevention

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LITERATURE REVIEW

Footwear

Shoes are imperative especially for runners. The main goal of footwear is to attenuate impact forces (Even-Tzur, Weisz, Hirsch-Falk, & Gefen, 2006; Novacheck, 1998), protection, and proper forefoot alignment (Novacheck, 1998). Footwear also focuses on attenuating the stress that can be transferred from the foot to more proximal musculature during stance phase (Even-Tzur et al., 2006). The main purposes of footwear can be achieved through the design of the shoe. The running shoe has three main parts: insole, midsole, and outsole. The insole and outsole provide arch support and traction respectively. While the midsole focuses on cushioning and shock attenuation (Madehow.com, 2019). The design of a shoe should primarily focus on shock attenuation at initial contact, rearfoot motion control during the stance phase, and forefoot stability during stance phase; therefore, a well-constructed shoe has features for both shock absorption and foot stabilization (Novacheck, 1998). However, cushioning and stabilization require opposite design features. Attenuation of impact forces or stress can be achieved through alterations in the midsole (Even-Tzur et al., 2006). The most popular midsole material is ethylene vinyl acetate (EVA), and the characteristics of this material are made specifically to reduce tissue stress and strains experienced at initial contact (Even-Tzur et al., 2006). Degradation of this material may lead to changes in gait and cause running injuries (Even-Tzur et al., 2006). Novacheck (1998) suggested that features that can control the tendency for excessive pronation and allow for a more neutral forefoot position during the stance phase can minimize stress experienced by the Achilles’ tendon or plantar fascia. Therefore, geometric modifications have been made to shoes that are intended to change rearfoot motion during running (Sterzing, Lam, and Cheung, 2012).

Due to various alterations in movement patterns, shoes should be tested in vivo and in a laboratory to accurately assess dynamic changes (Novacheck, 1998). It has been suggested that runners should change their shoes every 250-500 miles due to the 60% decrease in absorption capacity (Even-Tzur et al., 2006). Runners alter footwear in hopes to achieve improvements in comfort, performance and injury prevention (Sterzing et al., 2012). There is not a standard definition for various shoe types; however, there are guidelines that investigators and manufacturers tend to follow. Minimalist shoes tend to have greater sole flexibility, less cushioned midsoles and lack motion control features (Bonacci et al., 2013). A maximalist shoe is heavily cushioned with elevated heels and provides thick midsoles, arch supports and motion control features (Bonacci et al., 2013). Esculier, Dubois, Dionne, Leblond, and Roy (2015) reported that minimalist footwear should not restrict the natural movement of the foot. To achieve this, the minimalist shoe should have a wide toe box to allow for natural expansion of the foot, high flexibility, low weight, stack height, and heel to toe drop, and the absence of motion control features (Esculier, Dubois, Dionne, Leblond, & Roy, 2015). Other researchers reported that a minimalist designed can be achieved by a reduction in one or more of the following: midsole thickness, heel to toe drop, heel stiffness, and control features (Ryan, Elashi, Newsham-West, and Taunton, 2013). Minimalist footwear tends to have less than a 30 mm stack-height combined with a heel height of less than 10 mm, while a conventional shoe has a stack-height of greater than 30 mm with a 10- 12 mm elevated heel (Ryan et al., 2013). A maximalist shoe tends to have an elevated heel of greater than 14 mm.

Running

Running provides many physical benefits; however, it is also known to be associated with a high injury rate. In one training year, at least 80% of runners will experience at least one musculoskeletal injury in response to their training regimen (Sinclair, Richards & Shore, 2015). These injuries that are commonly investigated tend to be overuse injuries (Hreljac, 2004). Running injuries are commonly thought to be caused by footwear, surface, kinetics, and kinematics Squadrone & Gallozzi, 2009). Therefore, understanding the biomechanics of running will assist in assessing how changes in one's footwear can potentially reduce the risk of injury.

Biomechanics of Running

The gait cycle or stride is defined as the period of initial contact of one foot to initial contact of that same foot (Novacheck, 1998). The gait cycle can be broken in up into two phases; the stance phase (STP) and the swing phase (SWP). The STP begins when the foot makes initial contact with the ground and ends when the foot is no longer in contact with the ground, known as toe off (Novacheck, 1998). The SWP begins when the foot leaves the ground and ends when the foot makes contact with the ground again (Novacheck, 1998). Each of the phases can be further divided. The STP has two subdivisions including absorption and propulsion with midstance separating the two (Ounpuu, 1994). Absorption can be defined as when the body's center of mass (COM) falls from it's peak height and the velocity decelerates horizontally (Novacheck, 1998). Propulsion can be defined as when the COM is propelled upward and forward (Novacheck, 1998). The SWP is further divided into initial and terminal swing where midswing separates the two (Ounpuu, 1994). The main difference between walking and running is that walking has a period of double support, meaning that both feet are in contact with the ground while running has a period of no support, meaning that neither feet are in contact with the ground (Novacheck, 1998). These changes can be achieved through increases in velocity.

Generally, walking consists of 60% of the cycle being STP while running usually consists of 40% of the gait cycle in STP (Novacheck, 1998).

Joint Kinematics

Kinematics consist of movements of body segments that include linear and angular displacements, velocities, and accelerations (Ounpuu, 1994) without taking forces into consideration (Novacheck, 1998). Joint angles in particular occur due to movement in one distal segment mass relative to a more proximal segment mass. During absorption, the hip extends, the knee flexes, and the ankle exhibits dorsiflexion (Ounpuu, 1994). During propulsion, there is continued hip extension, knee extension, and ankle plantarflexion (Novacheck, 1998; Ounpuu, 1994). During the initial SWP, there is hip flexion, knee flexion and ankle dorsiflexion (Ounpuu, 1994). During the terminal SWP, there is slight hip extension, knee extension and slight ankle plantar flexion (Ounpuu, 1994). The hip extension during terminal SWP is needed to prep for initial contact to avoid excessive deceleration (Novacheck, 1998). Maximum hip extension usually occurs just at the time of toe off, while maximum hip flexion usually occurs in mid to terminal swing (Novacheck, 1998). Greater knee extension is exhibited during the propulsion phase to propel the body forward (Novacheck, 1998).

For the frontal plane, movement in the knee is limited due to collateral ligaments (Novacheck, 1998). However, the hip tends to adduct when it’s loaded and abducted during swing phase (Novacheck, 1998; Ounpuu, 1994). In the transverse plane, the hip undergoes slight internal rotation upon absorption and light external rotation upon propulsion (Ounpuu, 1994). During SWP, the hip internally rotates (Ounpuu, 1994). During STP, the rearfoot exhibits pronation (eversion and abduction) during absorption or loading, then the foot supinates (inversion and adduction) during the propulsion phase providing a stable lever for toe off (Novacheck, 1998; Ounpuu, 1994; Wu et al., 2002).

When assessing footwear, foot biomechanics is extremely important due to it being the most proximal segment to the perturbation. If there is abnormal movement of the rearfoot overtime, it can lead to overuse injuries (Novacheck, 1998). The magnitude and rate of foot pronation is suggested to be contributed to overuse running injuries (Willson et al., 2014). Upon initial contact, the rearfoot is usually inverted and everts upon loading which increases the flexibility of the foot because the tarsal join is opened and allows the joint to function more as a shock absorber (Novacheck, 1998). Sagittal plane ankle motion is accompanied by rotation of the tibia and eversion of the foot during stance phase. In particular, ankle dorsiflexion causes the tibial to internally rotate and the rearfoot to experience eversion (Novacheck, 1998). Peak eversion usually occurs at 40% of the STP while a neutral position usually occurs at 70% of the STP (Novacheck, 1998).

How Joint Angles are Measured

Three dimensional (3D) kinematics are often used to calculated joint angles using an XYZ cardan sequence of rotations, where x is the mediolateral axis of rotation (sagittal plane), y is the anterioposterior axis of rotation (frontal plane), and z is the transverse axis of rotation (transverse plane) (Soares et al., 2017). All kinematic joint references have been defined from the International Society of Biomechanics recommendations (Wu et al., 2002). The kinematic joint motions of the sagittal plane motions are: 1) hip flexion/extension, referenced as femur relative to pelvis, 2) knee flexion/extension, referenced as tibia relative to femur, and 3) ankle dorsiflexion/plantarflexion, referenced as foot relative to leg. Frontal plane kinematic joint motions are 1) hip adduction/abduction, referenced as femur relative to pelvis 2) knee adduction/abduction, referenced as tibia relative to femur, and 3) rearfoot inversion/eversion referenced as calcaneus to tibia. Transverse plane kinematic joint motions are 1) hip internal/ external rotation, referenced as femur relative to pelvis, 2) knee internal/external rotation, referenced as tibia relative to femur, and 3) ankle adduction/abduction referenced as foot relative to leg (Wu et al., 2002).

Joint centers can be defined in various ways based on previous literature; however, the center of each joint for this investigation has been defined by Weinhandl, Irmischer, and Sievert (2015). Anatomical and cluster retroreflective markers are commonly utilized to calculate joint kinematics. The hip joint center is defined as 25% of the distance from the ipsilateral to contralateral greater trochanter markers (Weinhandl & OConnor, 2010). The knee joint is defined as the midpoint between the femoral epicondyle markers (Sinclair, Richards, Selfe, Fau-Goodwin, & Shore, 2016b); Grood & Suntay, 1983). Finally, the center of the ankle joint is defined as the midpoint between the medial and lateral malleoli markers (Sinclair et al., 2016b; Wu et al., 2002). Body segment parameters are estimated from Dempster and Wright (1955). Positive sagittal plane angular kinematics are expressed for hip flexion, knee flexion, and ankle dorsiflexion while negative kinematics are expressed for hip extension, knee extension, and ankle plantarflexion (Soares et al., 2017; Wu et al., 2002). For the rearfoot, neutral inversion and eversion are exhibited as 0 degrees between the long axis of the tibia and the line perpendicular to the plantar aspect of the foot, where inversion is positive and eversion is negative (Wu et al., 2002). Similarly, neutral abduction and adduction are exhibited as 0 degrees between the line perpendicular to the tibia and long axis of the second metatarsal, where adduction is positive and abduction is negative (Wu et al., 2002). Zero degrees in the sagittal plane corresponds to a vertical posture of the hip and knee and the foot at a right angle (Willson et al., 2014).

Marker trajectories have been sampled at various frequencies ranging from 120- 250 Hz (Fukuchi, Fukuchi, & Duarte, 2017; Malisoux, Gette, Chambon, Urhausen, & Theisen, 2017; Sinclair et al., 2016b; Willson et al., 2014; Willy and Davis, 2013). A standing static calibration is collected to allow for anatomical markers to be referenced in relation to the tracking markers (Malisoux et al., 2017; Sinclair et al., 2016b). After data collection, a 4th order low-pass butterworth filter with a cutoff frequency ranging from 6-16 Hz is commonly utilized for running studies (Fukuchi et al., 2017; Kong, Candelaria, & Smith, 2009; Malisoux et al., 2017; Soares et al., 2017; Willson et al., 2014; Willy and Davis, 2013). Initial contact is commonly defined as the point at which ground reaction force exceeds 20-50 Newtons (Fleming, Walters, Grounds, Fife, & Finch, 2015); Fukuchi et al., 2017; Willson et al., 2014). It has been reported that repeatability is decreased for the transverse and frontal plant kinematics; however, within day repeatability is greater than between day repeatability. This could be due to the slight changes in marker placement between day trials (Queen, Gross, & Liu, 2005).

Adaptations of Running

Shoes

Majority of running studies assessing the differences in footwear mainly look at barefoot running in comparison to minimalist or conventional footwear due to barefoot running becoming increasingly popular within the past decade. Barefoot running was adopted due to the notion that modern running shoes impair the natural way to run (Agresta et al., 2018). However, for the purpose of this investigation, the focus will be on studies assessing differences in various footwear. Running in inappropriate footwear has been associated with injuries such as bone fractures and plantar fasciitis (Kong et al., 2009). It has been suggested that worn shoes increase stance time and alter kinematic variables, specifically reduced dorsiflexion and increased plantarflexion at toe off, but do not influence force variables (Kong et al., 2009). However, Bonacci et al. (2013) claimed that changing footwear had little impact on experience runner's gait.

Minimalist footwear has said to reduce the loads experienced by the patellofemoral joint through reduced impact at initial contact through joint angle adaptations (Sinclair et al., 2016b; Sores et al., 2017). Bonacci et al. (2013) assessed the differences associated between a Nike minimalist shoe, racing flat, runner's habitual shoes, and barefoot after a 10 day familiarization period and reported differences at the knee and ankle with no differences more proximally at the hip. Knee flexion during midstance decrease the footwear conditions and barefoot, but there were not significant differences between the shod conditions (Bonacci et al., 2013). Ankle dorsiflexion and adduction during stance was also reduced in the barefoot and minimalist shoe compared to the racing flat and regular shoe (Bonacci et al., 2013). This suggests that small changes in cushioning could impact the ankle but show little or no differences in the knee due to adaptations dissipating over more proximal joints. Sores et al. (2017) investigated similar footwear (minimalist, habitual, and barefoot) and reported that the minimalist shoe condition implied intermediate values between the runner's habitual shoes and barefoot condition. Decreased knee flexion and increased plantar flexion was exhibited in the minimalist shoe at initial contact (Sores et al., 2017). Studies assessing the differences between conventional and minimalist footwear has been controversial. Willy and Davis (2013) reported that runners struck the ground with a more dorsiflexed foot and more knee flexion in the minimalist shoe compared to the conventional which contradicts the aforementioned studies.

Other studies have assessed the relation of minimalist footwear to maximalist. Increases in heel thickness have been sown to alter joint kinematics at initial contact (Sinclair et al., 2016b). Chambon, Delattre, Guéguen, Berton, and Rao (2014) assessed the differences in midsole thickness (0-16 mm) and reported no significant differences in joint kinematics in the knee or hip, but reported more plantarflexion in the reduced midsole conditions with increased dorsiflexion in the increased midsole conditions. Knee flexion range of motion (ROM) was significantly lower in the barefoot condition compared to all shoe conditions (2-16 mm midsole thickness) and ankle flexion ROM was higher in the barefoot condition compared to all shod conditions (Chambon et al., 2014). Sinclair, Richards, Selfe, Fau-Goodwin, and Shore (2016b) investigated the differences between a minimalist shoe (7 mm in heel thickness), conventional shoe (14 mm) and a maximalist (45 mm). Similarly to the aforementioned study, there was significantly greater knee ROM in the maximalist and conventional shoe compared to minimalist. However, contrary to the aforementioned study, there was significantly more plantarflexion in the maximalist and conventional compared to the minimalist condition (Sinclair et al., 2016b; Sinclair, Fau-Goodwin, Richards, & Shore, 2016a). The knee exhibited greater knee flexion and less plantar flexion in the maximalist and conventional footwear compared to the minimalist (Sinclair et al., 2016b). There were also reports of increased tibial rotation in the minimalist condition compared to the conventional footwear (Sinclair et al., 2016a). It has been suggested that runners adopt a flatter foot position in order to compensate for the lack of cushioning and reduce impact experienced by the lower extremities (Sinclair et al., 2016a).

Time

Differences in footwear kinematics has also been investigated across longer durations. Moore and Dixon (2014) analyzed the differences across a 30 minute run while barefoot running. In this investigation, sagittal kinematic variables did not stabilize until 11-20 minutes of running. Dorsiflexion and knee flexion increased at initial contact over time; however, there were no significant differences after 20 minutes (Moore and Dixon, 2014). It was suggested that these adaptations were adopted to reduce forces. Willson et al. (2014) investigated the short term effects of minimalist footwear after two weeks of training. A significant increase was exhibited in knee flexion angle at initial contact post-training (Willson et al., 2014). After assessing a 4 month training period, runners who utilized conventional footwear exhibited spontaneous adaptations to novel footwear; however, there were no significant alterations after 4 weeks of exposure to the novel footwear (Agresta et al., 2018). Another study assessing a 6 month follow up between minimalist and conventional footwear reported no shoe by time interactions at initial contact; however, there was a significant shoe interaction for maximum knee angles upon midstance, where the conventional shoe exhibited larger knee abduction angles upon midstance (Malisoux et al., 2017). There was also a significant time interaction between ankle and knee angles at initial contact and an increase in ankle eversion at midstance over time. Ankle dorsiflexion and ankle eversion at initial contact increased over time while knee flexion decreased (Malisoux et al., 2017). There was also an increase in ankle eversion during midstance over time (Malisoux et al., 2017). Few studies have assessed kinematic changes over a prolonged run in relation to footwear. It is imperative to accurately analyse gait over time to provide physicians and the shoe industry with appropriate information concerning injury risk and optimal performance.

Other effects

Previous research has also investigated the effect that midsole hardness, gender, age and surface affects running gait adaptations. Hardin, Van Den Bogert, and Hamill (2004) reported that a hard surface resulted in greater knee and hip extension at initial contact than a medium or soft surface and that maximum hip flexion was significantly less on a hard surface. Similarly, Nigg, Blatich, Maurer, and Federolf (2012) reported that movements affected by shoe midsole hardness were more predominantly seen in the sagittal plane. However, movements were not affected in the frontal plane at the knee and hip as strongly as they were in the knee and ankle in the sagittal plane (Nigg, Blatich, Maurer & Federolf, 2012). It has been suggested that the ankle and knee joint kinematics become stiffer with aging. For example, there is reported less knee flexion in older individuals (Nigg et al., 2012). Different running patterns have also been express in male and female runners. For example, females have an increase ROM in the frontal plane due to the increased Q- angle, specifically increased hip adduction and knee abduction (Nigg et al., 2012).

Running Related Injuries

An injury can be defined as pain or deformant in a localized area that alters or reduces training, requires a visit to a medical professional, or requires the use of medication (Hesar et al., 2009). Running injuries are commonly thought to be caused by footwear, surface, kinetics, and kinematics Squadrone & Gallozzi, 2009). Changing one's footwear might result in rapid changes to joint mechanics resulting in stresors to musculoskeletal tissues (Willson et al., 2014). Smaller knee flexion angles have been suggested to reduce stress across the patellofemoral joint (Bonacci et al., 2013; Sinclair et al., 2016b; Soares et al., 2017). Adoption of an extended position upon initial contact has been suggested to increase the risk of anterior cruciate ligament injury (Soares et al., 2017). While adopting a more plantarflexed position upon initial contact has been suggested to increase stress on the achilles tendon and potentially lead to injuries such as achilles tendinopathy and metatarsal stress fractures (Chambon et al., 2014; Willson et al., 2014). Adopting a more plantarflexed position, is suggested to reduce the knee joint function as shock absorber (Chambon et al., 2014; Sinclair et al., 2016b).

Overuse injuries occur when exposed to a large amount of repetitive forces and can be caused by both extrinsic and intrinsic factors (Hesar et al., 2009). Extrinsic factors include poor technique and improper changes to training regimen, and intrinsic factors include biomechanical abnormalities (Hesar et al., 2009). Kinetics and rearfoot kinematics are often investigated to assess overuse running injuries (Squadrone & Gallozzi, 2009). Research on footwear mainly focuses on reduction of impact forces; however, the kinematic boundaries of the impact force are equally important because if the foot was to land in a vulnerable position upon initial contact than it could increase the risk of injury. If the body has poor proprioception and is unaware of the movement and/or positions of the lower extremity, improper loading at initial contact may be exhibited (Hesar et al., 2009). Those vulnerable positions usually occur in the frontal and transverse plane and those alterations have been associated with overuse running injuries (Bonacci et al., 2013). For example, excessive rearfoot pronation can lead to knee injuries (Hamill, Emmerik, Heiderscheit, & Li, 1999) The most prevalent site for overuse running injuries occur at the knee and ankle (Braunstein, Arampatzis, Eysel, & Brüggemann, 2010; Hamill et al., 1999).

Patellofemoral Pain Syndrome

Patellofemoral pain syndrome (PPS) is a common overuse running injury associated with muscle weakness at the hip and excessive femoral adduction leading to more knee abduction (Dierks, Manal, Hamill, & Davis, 2008). This leads to a more lateral force on the patella and could potentially lead to rearfoot eversion (Dierks et al., 2008; Thijs, Tiggelen, Roosen, De Clercq, & Witvrouw, 2007). Other factors that lead to development of PPS are shortened time to maximum pressure on the fourth metatarsal and delayed change of center of pressure in the mediolateral direction during the forefoot contact moment (Hesar et al., 2009; Thijs et al., 2007).

Knee abduction was previously suggested to lead to a higher risk of injury such as patellofemoral pain syndrome, iliotibial band syndrome (IBS), and osteoarthritis (Malisoux et al., 2017). Although excessive pronation can exist in individuals with PPS, pronation is needed for shock absorption at initial contact (Hesar et al., 2009). Less pronation may cause a more rigid landing at initial contact and therefore increase shock to the lower leg (Hesar et al., 2009). Less pronation suggests a more laterally directed pressure which could lead to alterations in tibia internal rotation (Hesar et al., 2009; Thijs et al., 2007).

Iliotibial Band Syndrome

It has been suggested that the knee has an impingement zone between 20 and 30 degrees of knee flexion (Noehren, Davis, & Hamill, 2007). Within this range, the iliotibial band (ITB) fibers compress and slide over the lateral femoral condyle; however, no differences in the sagittal plane kinematics have been reported that may contribute to IBS (Noehren et al., 2007). This sliding motion creates friction over the lateral femoral condyle resulting in IBS (Noehren et al., 2007). Therefore, it’s important to not only assess sagittal plane kinematics in relation to injury prevention, but the frontal and transverse planes as well. The ITB is elongated due to increased rearfoot eversion and associated adduction leading to increased tibial internal rotation (Noehren et al., 2007).

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CHAPTER 2

INTRODUCTION

Running provides many physical benefits; however, it is also known to be associated with a high injury rate. Footwear degradation may lead to injuries and changes in running gait. Literature has suggested that runners should change their shoes every 250-500 miles due to a 60% decrease in absorption capacity once this mileage is reached, leading to an increased risk of injury (Even-Tzur, Weisz, Hirsch-Falk, and Gefen, 2006). Although alterations in footwear are meant to decrease foot and lower leg injuries, these alterations may increase the risk of injuries to the proximal joints and structures such as the knee and hip. (Novacheck, 1998). The three main purposes of footwear were presented by Winter and Bishop (1992): (1) Shock absorption at initial contact; (2) Protection against the ground; and (3) Alignment of the forefoot to achieve a uniform force distribution at chronic injury sites. However, the first and last points have been debated by recent literature assessing barefoot and minimalist running. Davis, Rice, and Wearing (2017) argued that cushioning in footwear alters the way human's run and therefore, increase the risk of injury.

Many studies have investigated the biomechanical effects of different types of running shoes on the human body, especially the lower extremity musculoskeletal system. There has been contradicting reports that joint angle adaptations between a minimalist shoe and an individual's habitual running shoe react similarly (Bonacci et al., 2013; Squadrone, Rodano, Hamill, & Preatoni, 2015). The two extremes of running footwear include: minimalist and maximalist. Although a standard definition is lacking for the two types of footwear, a minimalist shoe may be defined as having less cushioned midsoles (<10mm), greater sole flexibility, reduced heel-to-toe drops, and tend to lack motion control (Bonacci et al., 2013). A maximalist shoe is heavily cushioned with elevated heels. It provides thick midsoles, arch supports, and motion control features (Bonacci et al., 2013).

Minimalist footwear has been commonly investigated due to claims of reducing the risk of injury. Specific kinematic changes have been suggested to alter the risk of injury (Soares et al., 2017; Sinclair, Fau-Goodwin, Richards & Shore, 2016b). Soares et al. (2017) reported a decreased knee flexion angle in minimalist footwear, which has been suggested to reduce patellofemoral pain while running. On the contrary, Willy and Davis (2013) reported more dorsiflexion and knee flexion while running in a cushioned minimalist shoe compared to a neutral shoe. Ankle motion may be the source of the majority of running injuries (Stacoff, Nigg, Reinschmidt, van den Bogert, & Lundberg 2000). The coupling of rearfoot motion and other joint motions have been suggested to be influenced by vertical load, ligaments, forces, and sagittal plane movement from the ankle (Stacoff et al., 2000).

Currently, maximalist footwear is far less investigated. The cushion difference associated with maximalist and minimalist shoes has been shown to alter joint angles primarily in the sagittal plane. Minimalist running shoes are reported to have significantly greater plantar flexion upon initial contact than maximalist shoes, (Sinclair et al., 2016b; Sinclair, Richards, Self, Fau-Goodwin & Shore, 2016a) which is supported by the studies above that investigated primarily minimalist footwear. Maximalist and habitual shoes were observed to exhibit significantly greater knee flexion angles (Sinclair et al., 2016a) compared to minimalist footwear. Literature suggests that minimalist shoes reduce impact forces between the runner’s foot and the ground (Cohler & Casey, 2013) by adopting a more plantarflexed ankle joint which alters the location of force absorption due to a reduction in the shock absorption capacity at the knee upon landing (Chambon, Delattre, Guéguen, Berton, & Rao, 2014; Sinclair et al., 2016b; Soares et al., 2017;

Squadrone & Gallozzi, 2009). These adaptations have been suggested to reduce the risk of injury for runners. . Therefore, since injury prevention tends to focus on the reduction of impact forces, the maximalist design of more cushioned midsoles has surfaced in hopes to reduce impact between the foot and ankle at initial contact and potentially reduce injury.

Differences in footwear kinematics have also been investigated across various prolonged running durations. Moore and Dixon (2014) analyzed the differences across a 30-minute run during barefoot running. In this investigation, sagittal kinematic variables did not stabilize until 11-20 minutes of running. Dorsiflexion and knee flexion angles increased at initial contact over time; however, there were no significant differences after 20 minutes (Moore and Dixon, 2014). Kinematic changes throughout an exhuastive prolonged run regardless of footwear have been previously reported (Derrick, Dereu, & McLean, 2001; Dierks, Davis & Hamill, 2010; Gheluwe & Madsen, 1997). These reports include increased knee flexion at initial contact and midstance (Derrick et al.,2001), increased maximum eversion during midstance (Derrick, et al., 2001; Dierks, Davis, & Hamill, 2010; Gheluwe & Madsen, 1997), and increased inversion angle at initial contact (Derrick et al., 2001).It was suggested that an exhaustive run increases rearfoot motion (Gheluwe & Madsen, 1997). Willson et al. (2014) investigated the short term effects of minimalist footwear after two weeks of training. A significant increase was exhibited in the knee flexion angle at initial contact post-training (Willson et al., 2014). Another study assessing a 6-month follow up between minimalist and neutral footwear reported no shoe by time interactions at initial contact; however, the neutral shoe exhibited larger knee abduction angles upon midstance (Malisoux et al., 2017). Regardless of footwear, ankle dorsiflexion and eversion angles at initial contact increased over time while knee flexion angles decreased (Malisoux et al., 2017). There was also an increase in ankle eversion angle during midstance over time (Malisoux et al., 2017). Few studies have assessed kinematic changes over one bout of prolonged running in relation to footwear. It is imperative to accurately analyze gait over time to provide physicians and the shoe industry with appropriate information concerning injury risk and optimal performance.

Reduction in the force upon impact is reported to reduce the potential risk of overuse running injuries which can be influenced by sagittal plane kinematics at the ankle and knee. However, overuse running injuries are commonly investigated through either rearfoot kinetic or kinematic variables (Hreljac, 2004). Rearfoot kinematics, including magnitude and rate of foot pronation, have been suggested to be contributing factors for overuse running injuries (Hreljac, 2004), indicating that the risk of injury increases if the foot lands in a vulnerable position. Forces experienced during initial contact are shorter in duration and less in amplitude compared to the forces experienced in midstance phase. If an individual lands in a vulnerable position at initial contact, it is likely that vulnerable position will follow through to midstance, increasing the risk of injury.

The most prevalent sites for overuse running injuries occur at the knee and ankle joints (Braunstein, Arampatzis, Eysel, & Brüggemann, 2010; Hamill, Emmerik, Heiderscheit, & Li, 1999). Current research is primarily focusing on kinetics; however, the kinematic boundaries of the impact force are equally important. Novecheck (1998) stated that forces associated with initial contact have less amplitude and shorter durations, but active forces during the latter portion of the stance phase are also threatening. This statement can also be applied to kinematics at initial contact indicating angles occurring within the midstance phase under larger forces can be threatening. With this relationship between initial contact and the midstance phase, initial contact kinematics might be a precursor for when the maximum (MAX) joint angles occur during the stance phase. If the body has poor proprioception and is unaware of the movement and positions of the lower extremity, improper loading at initial contact may be exhibited (Hesar et al., 2009). Few researchers have assessed the influence of initial contact on the MAX joint angles during midstance. Furthermore, the time period when MAX angle occurs during midstance is often investigated and suggested that abnormal timing of two joints can lead to increases in injury (Stergiou, Bates, & James 1999). Small timing differences between MAX rearfoot eversion and MAX knee flexion have been reported in previous literature (Dierks & Davis, 2007; Stergiou et al., 1999). Synchronicity between the timing of MAX rearfoot eversion and MAX knee flexion has been suggested to be a normal occurrence, with asynchronicity representing a potential risk for injury (Dierks & Davis, 2007; Dierks et al., 2010).

Most studies compare the frontal and sagittal planes of motion between the beginning and end of the run dismissing important variables produced during the middle of the run. To make running studies more relevant to injury prevention and to properly understand how one progresses from the beginning to the end, the middle portion of the prolonged run is important to investigate. The aforementioned studies lack an in-depth comparison of how footwear can alter changes in kinematics over prolonged running. Therefore, the purpose of this study was to assess the change of lower extremity kinematic parameters and the relationship between kinematic parameters at initial contact and midstance with prolonged running under the influence of different types of footwear. The first hypothesis was that each joint angle and latency period to MAX joint angle would be sensitive to shoe types and duration of the run. Many reports focused on the rearfoot motion in relation to injury prevention but few looked at the relationship between initial contact and maximum rearfoot angle; therefore, the second hypothesis was that there would be a significant relationship between the rearfoot angle at initial contact and MAX angle during midstance.

CHAPTER 3

METHODS

2.1 Participants

Before the recruitment of this study, the experimental protocol and all documents were approved by the Institutional Review Board (IRB). Twelve healthy participants were recruited and informed about the testing procedures and possible risks. Participants were excluded from the study if they did not meet the following inclusion criteria: 1) 18-45 years of age (Dierks, Manal, Hamill, & Davis, 2011); 2) Recreational runner (≥ 10 miles/week) (Dierks et al., 2011); 3) No existing lower extremity injuries at the time of testing; and 4) Answered no to all PAR-Q questions (Appendix B). If the participant became injured and could not finish the remaining testing sessions, the participant was excluded from the study.

An initial visit consisted of informed consent, a health screening, and collection of the required anthropometric data (i.e., age, sex, height, body mass, and years of running experience). Each participant completed three testing sessions with different running shoes for each session. The three testing shoes utilized in this study included: 1) participant's habitual running shoes; 2) a minimalist Nike Flex; and 3) a maximalist Hoka One One. Testing orders were counterbalanced, and occurred 48-72 hours a part to reduce the impact of delayed onset of muscle soreness or fatigue. The participant was instructed to run at a self-selected pace for 31 minutes for each testing session. The pace selected at the first session was utilized for each following session. Kinematic data were collected for 10 seconds at 5-minute intervals starting at the 1-minute mark. Marker trajectories were tracked at 120Hz using a 3-D motion capture system (Bonita 10 cameras; Nexus Version 2.3.0.88202; Vicon Motion Systems Ltd., Oxford, UK).

2.2 Protocol

Participants were instructed to wear compression shorts and their habitual running shoes for the warm-up. For each session, seven retro-reflective marker (14mm) cluster sets were placed on the participant prior to the warm-up utilizing a modified Helen Hayes model (Weinhandl, Joshi, & OConnor, 2010; Zhang, Pan, & Li, 2018). Participants were instructed to perform a 10-minute walk/ run warm-up in their habitual running shoes to become accustomed to the tracking clusters as well as to reduce injury and muscle cramping throughout the session. Following the warm-up, 16 retro-reflective anatomical markers were placed on the left and right iliac crests, greater trochanters, lateral and medial femoral epicondyles, lateral and medial malleoli, and the first and fifth metatarsal heads (Weinhandl, et al., 2010; Zhang et al., 2018). A 5-second standing static trial was recorded (Figure 1), and the anatomical markers were then removed.

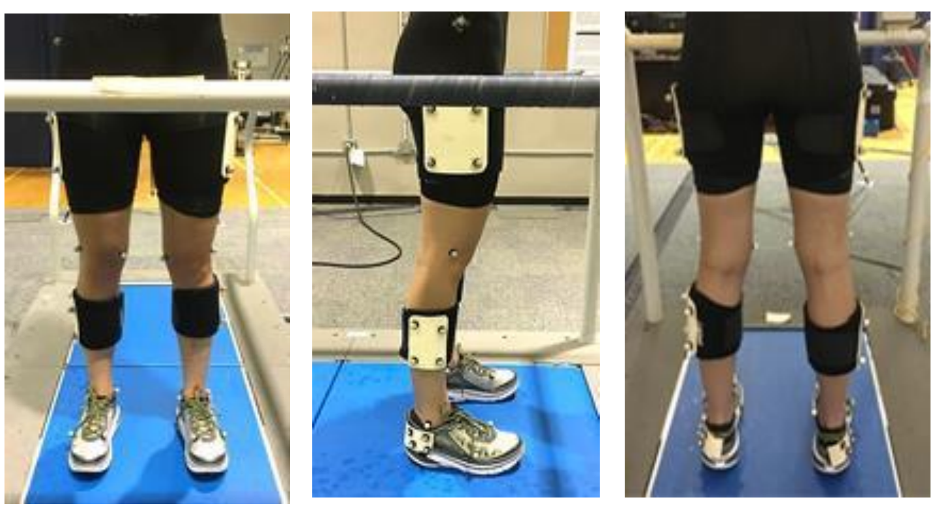

Figure 1. Retroreflective marker placement for each participant during the static trial. Following the static trial, the single anatomical markers were removed, and the cluster markers remained.

2.3 Data Analysis

The sagittal and frontal planes for the knee and ankle joints were examined in this study. The 2-D lower extremity joint kinematics were analyzed for every 10 seconds of data collected. Within every 10 seconds of data collected, ten consecutive strides were averaged and analyzed.

2-D marker coordinates were filtered with a 14 Hz low-pass, fourth-order zero-lag Butterworth filter. The beginning of the stance phase was indicated by initial contact. Visual 3D (Visual 3D, Version: 6.00.27, C-Motion Inc., Germantown, MD) was used for kinematic data analysis.

Stance phase was defined with a force threshold set at 50N. The first 40% of the gait cycle represents the major events in the stance phase. The initial contact angle was defined as initial heel contact with the ground and beginning of the stance phase (Novacheck, 1998).

Maximum angle during midstance and time of MAX angle during midstance were calculated in the sagittal and frontal planes. Time of MAX angle is also known as the latency period from initial contact to MAX angle during midstance.

2.4 Statistical Analysis

Initial contact angle, MAX angle during midstance, and relative time from initial contact to maximum angle for knee and ankle joints in both sagittal and frontal planes were selected as outcome variables. All outcome variables were assessed for normality using skewness, kurtosis, Shapiro-Wilks, and Kolomogorov-Smirnov. Each outcome variable was examined using a separate 3 (shoes) x 7 (time points) ANOVA with repeated measures only when the sphericity assumption satisfied after Mauchly's sphericity test. Greenhouse-Geisser correction was applied if the sphericity assumption was violated. Statistical significance was set at .05 *a priori*. Pairwise comparisons with Bonferroni adjustments were used for post-hoc analysis following a significant main effect. Cohen’s D (D) effect sizes were calculated for each significant comparison. Small effect defined as $0 < D \leq .2$, medium effect as $.2 < D \leq .5$, and large effect $.5 < D \leq .8$ (Cohen, 1988). A Pearson Product correlation was run to assess the relationship between initial contact angle and MAX angle during midstance for the rearfoot. All statistical analyses were completed using SPSS/PASW (IBM Inc., v.25, Chicago, IL).

CHAPTER 4

RESULTS

Twelve participants (6 male; 6 female) were recruited for this study, and no one was excluded due to injury during the testing period. They all finished the three 31-minute data collect section without any incidents. Their age was 24.8±8.4 (Mean ± Standard deviation) years old, height of 174.1±9.7 cm, and body mass of 70.5±9.3 kg. The participants spent on average, 8.2±5.8 months running in their habitual shoes by the time the testing started. The weekly average running distance was 26.4±12.6 km and the participants had on average 6.7±2.4 years of running experience. The average shoe size tested was 9.5±1.5. The average self-selected pace for the duration of the prolonged run during testing was 2.9±0.3 m/s. Outcome variables are presented in Figure 2A-D with the ensemble curves of knee and ankle joint angles in the sagittal and frontal planes during the first 40% of the gait cycle.

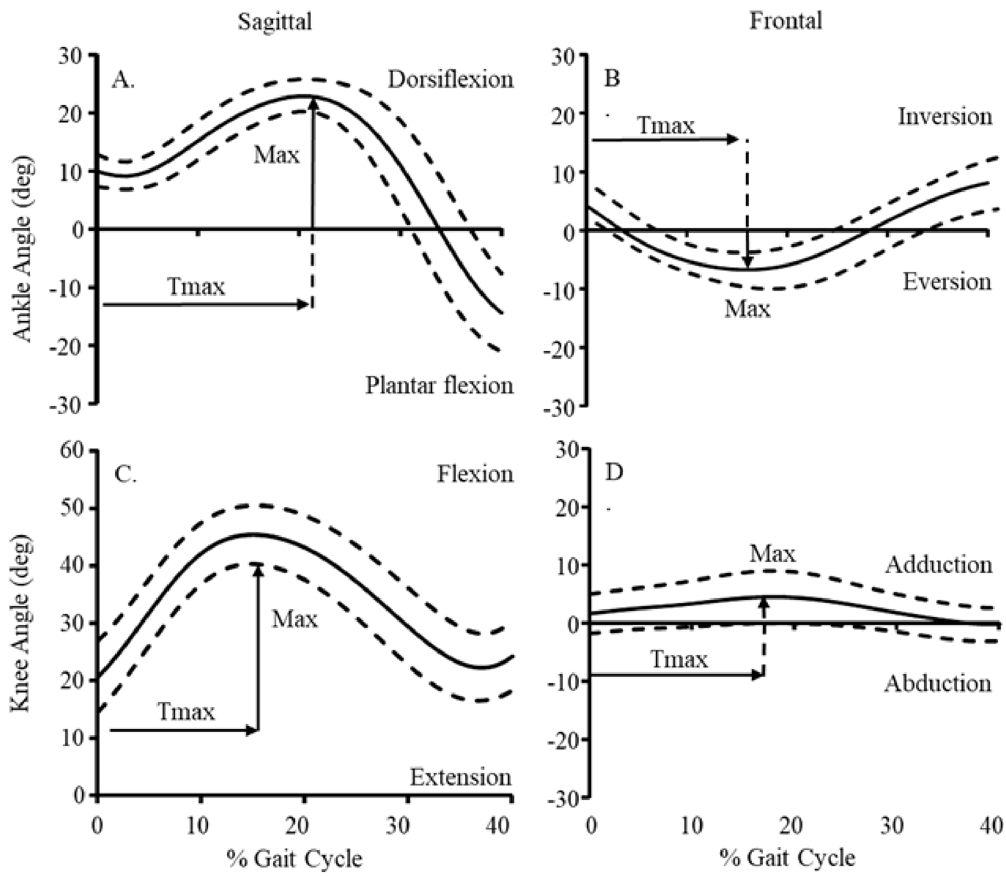

Figure 2A-D. Ensemble curves of the ankle (A, B) and knee (C, D) joint angles in the sagittal (A, C) and frontal (B, D) planes for the first 40% of the gait cycle (subsequent initial contacts defined as 100% gait cycle). Maximum angles (Max) during midstance phase are indicated by the vertical arrows while the relative time (Tmax) it took to get to the maximum angles during midstance phase are indicated by the horizontal arrows. One standard deviation above and below the mean are represented by the dashed lines.

We failed to observe differences between shoes nor shoe by time interactions. We will only report the influence of running time on the outcome variables in the following results.

Among all of the outcome variables, the sphericity assumption was violated by only the fontal plane ankle joint angle in which Greenhouse-Geisser correction applied. Among all four initial contact angles, only ankle joint angle in the frontal plane ($F_{3,33}$=9.72, p<.001) and sagittal plane ($F_{6,66}$=5.95, p<.008) and knee joint angle in the sagittal plane ($F_{6,66}$=5.34, p<.001) changed with time significantly (Figure 3B & 3C). The detailed pair-wise comparisons with effect sizes are presented in the corresponding figures. Every effect size (D) presented in Figure 3 represents a significant difference in the results of pairwise comparisons (p<.05). Initial contact inversion angle at minute 6 was significantly less than that of minute 15, 20, 25, and 30 (see the specific effect sizes reported in Figure 2). Moreover, initial contact inversion angle at minute 11 was significantly less than that of minute 20, 25, and 30. Finally, initial contact inversion angle at minute 16 was significantly less than that of minute 30. Sagittal ankle angle at initial contact was significantly increased from minute 0 to 10. Initial contact knee flexion angle at minute 1 was significantly less than that of minute 5 while that of minute 5 and 10 was significantly more than that of minute 25.

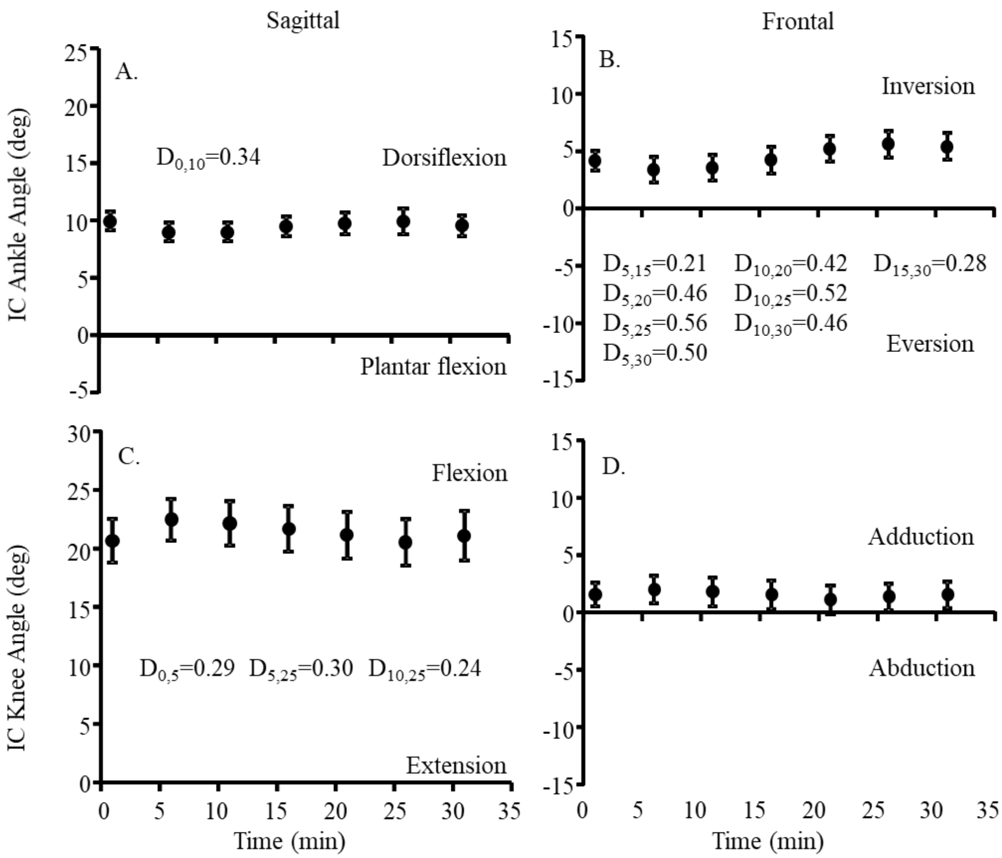

Figure 3A-D. Mean and standard error of the mean angles at initial contact for the ankle (A, B) and knee (C, D) joints in the sagittal (A, C) and frontal (B, D) planes across the 31-minute run. Greater than moderate effect sizes of pair-wise comparisons were reported here only if the outcome variable exhibited significant changes with time (B, C).

We failed to see the significant impact of running time on the maximum knee and ankle joint angles in the frontal and sagittal planes during midstance phase across the 30-minute prolonged run (Figure 4A-D).

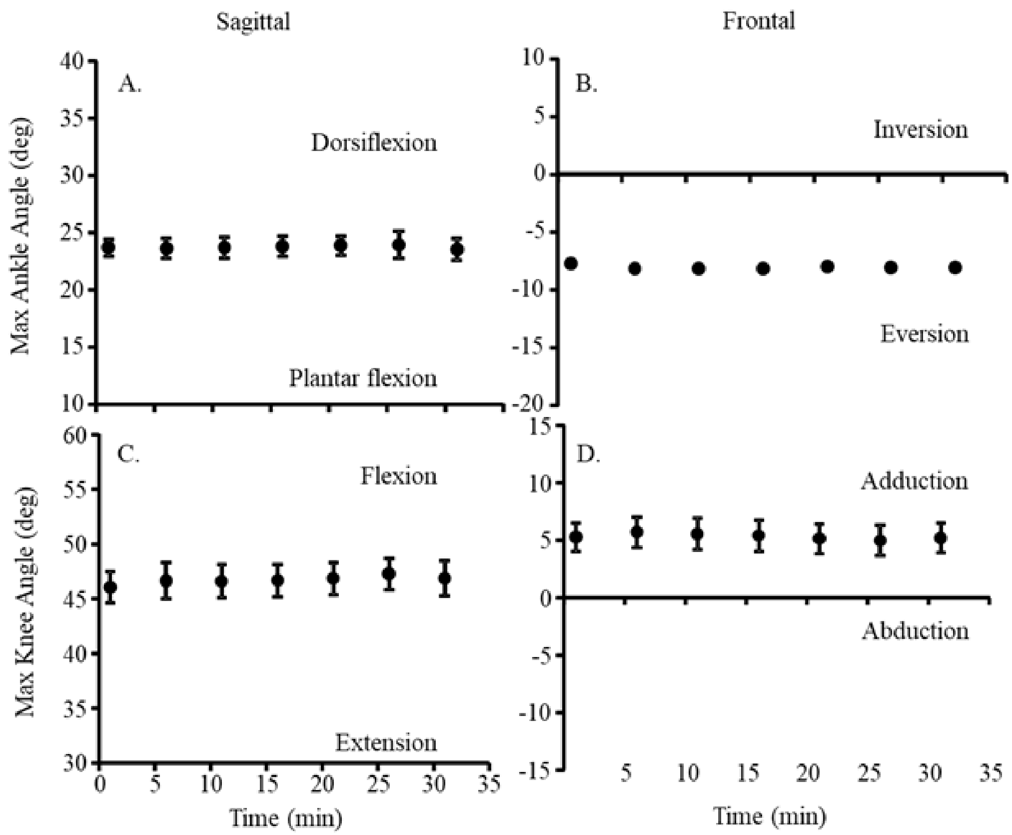

Figure 4A-D. Mean and standard error of the mean of the maximum (Max) angle during stance phase for the ankle (A, B) and knee (C, D) in the sagittal (A, C) and frontal (B, D) planes across the 31-minute run.

There were significant differences observed for the time it took to reach the maximum angle during stance phase for the ankle joint in both dorsiflexion ($F_{6,66}$=10.26, p<.001) and eversion angles ($F_{6,66}$=7.84, p<.001) (Figure 5A, 4B) and only in knee joint flexion angle ($F_{6,66}$=11.76, p<.001) but not adduction (Figure 5D). Every effect size (D) presented in Figure 4 represents a significant difference in the results of pairwise comparisons (p<.05). The time to maximum dorsiflexion/eversion angles (Figure 5A/5B) during stance phase occurred relatively earlier during the gait cycle at minute 5 and 10 (6 for eversion) compared to minutes 20, 25, and

30. Maximum eversion angle was reached significantly earlier at minute 10 comparing to minute 20 and 30. Maximum knee flexion angle reacted to running time in a nonlinear fashion (Figure 5C). The maximum knee flexion angle during stance phase was reached significantly earlier at minutes 5 and 10 compared to minutes 0, 20, 25, and 30. Similarly, maximum knee flexion angle was reached earlier at minute 15 compared to minute 20.

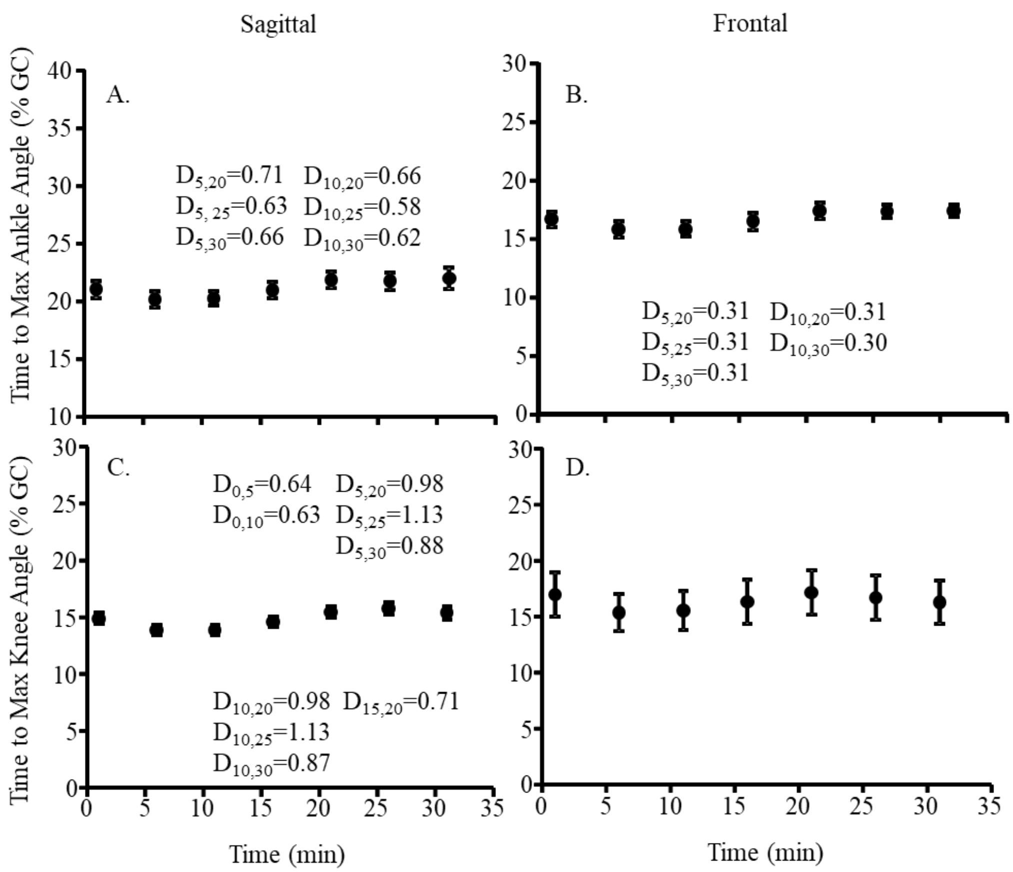

Figure 5A-D. Mean and standard error of the mean of the time it took to reach maximum (Max) angles during stance phase for the ankle (A, B) and knee (C, D) in the sagittal (A, C) and frontal (B, D) planes across the 31-minute run. Greater than moderate effect sizes of pair-wise comparisons were reported here only if the outcome variable exhibited significant changes with time (A-C).

The relationship between initial contact and maximum rearfoot angles during stance were examined using Pearson Product correlation after satisfactory normality tests. Initial contact rearfoot angle was significantly (Rp=.487, p<.0001) correlated with maximum eversion during stance phase (Figure 6).

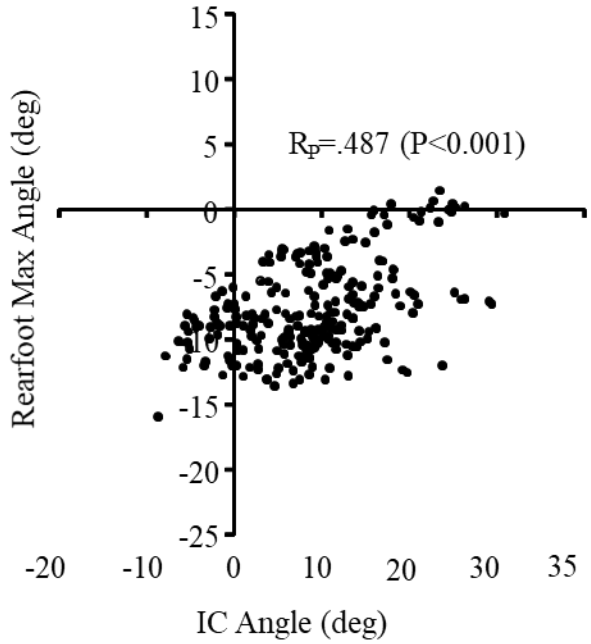

Figure 6. Parametric (R_P) correlation coefficients presented here, where the horizontal axis represents the angle at initial contact (IC) and the vertical axis represents the Maximum angle during stance phase for the rearfoot.

CHAPTER 5

DISCUSSION/ CONCLUSION

The purpose of this study was to assess the change of knee and ankle kinematic parameters such as initial contact angle, MAX midstance angle, and latency between initial contact and MAX midstance angle with prolonged running under the influence of different types of footwears. The first hypothesis that each joint angle and latency period would be sensitive to shoe types and duration of the run was partially supported. We failed to observe the effects of different footwear on joint kinematics nor kinematics reactions to footwear over prolonged running. However, running time affected the rearfoot inversion and ankle and knee flexion angles at initial contact and the latency period to MAX midstance angles for affected joint angles at initial contact. There was no affect for the knee abduction angle for initial contact or latency period to MAX angle. The second hypothesis stated that there would be a significant relationship between rearfoot angles at initial contact and midstance. This hypothesis was supported by the significant correlation between initial contact and the MAX midstance rearfoot angles.

Knee flexion angles at initial contact presented in this study are relatively smaller than knee flexion angles presented in previous literature (e.g., Moore & Dixon, 2014). This could potentially be attributed to the fact that our runners were running shod while the previous study investigated barefoot running. The changes in knee flexion angle at initial contact over time are similar to previous literature (Derrick et al., 2001; Moore & Dixon, 2014). We have observed an increase of knee flexion angle at initial contact from 20.6 ± 6.3 to 22.4 ± 6.2° from minutes 0 to 5. Then there was a significant decrease in knee flexion angle towards the end of the run at minute 26 (20.5 ± 6.7°). The lack of change in the dorsiflexion angle at initial contact over time, which was previously observed in the study by Moore and Dixon (2014), suggests that runners may utilized their knee joint more rather than their ankle to reduce the magnitude of impact and potentially reduce injuries (Moore & Dixon, 2014). Although the lack of change to dorsiflexion angle was contrary to reports from Moore and Dixon (2014), it does coincide with other previous literature of prolonged running (Koblbauer et al., 2014).

We have observed a significant increase in inversion angle at initial contact from the beginning of the run at minute 5 (3.4°) to the second half of the run for minutes 15-30 (4.2-5.6°). The results from the current study coincide with works from Derrick et al. (2001), in which inversion angle at initial contact increased over a prolonged run. Inversion at initial contact has been accepted as normal in heelstrike runners, and usually ranges from 6-8° (Nicola & Jewison, 2012). Derrick et al. (2001) provided the rationale that increases in inversion angle coupled with increases in knee flexion angle at initial contact may lead to a more efficient way to accelerate the effective mass forward during running, which is suggested to attenuate the impact forces and reduce the risk of injury. The observations in the current study and those reported in the study by Derrick et al. (2001) are not consistent with that of other previous literature (Dierks et al., 2010; Gheluwe & Madsen, 1997). Gheluwe and Madsen (1997) reported no changes in the inversion angle (9-10.3°) at initial contact between the beginning and end of an exhaustive run. Similarly, Dierks, Davis, and Hamill (2010) did not report changes in initial contact angle of the rearfoot over a 45-minute exhaustive run.

The lack of changes observed in MAX angle at midstance also differs from what has been previously reported (Dierks et al., 2010; Koblbauer et al., 2014) The participants in this study were experienced runners, and not running in an exhaustive state like previous works. Running at an exerted state has been reported to alter joint mechanics (Brown, Zifchock, Hillstrom, Song, & Tucker, 2016; Koblbauer et al., 2014); therefore, this could give explanation as to why changes in MAX midstance angle in the present study were not observed over time since participants were not running to fatigue. Although we did not observe changes over time for the MAX eversion angle during midstance, values were similar to previous studies, reporting an average of 8° (Dierks et al., 2010; Nicola & Jewison, 2012).

While most studies focus on joint angles alone, abnormal timing of two joints has also been suggested to influence the risk of injury (Stergiou et al., 1999). It has been previously reported that ankle plantar/ dorsiflexion may contribute to coupling mechanisms at the ankle (Stacoff et al., 2000) and excessive pronation can lead to knee joint injuries (Hamill et al., 1999). Smaller differences in timing between two joints represents a more synchronous relationship (Dierks & Davis, 2007). It has been suggested that knee joint flexion and rearfoot motion occur at approximately the same time duirng midstance (Stergiou et al., 1999). The latency period to MAX angle during midstance was significantly different over time in the sagittal and frontal planes of the ankle and the sagittal plane of the knee. The results from this study exhibited increased latency periods for eversion and knee flexion during midstance at the end of the run for minutes 20-30 compared to the beginning of the run at minutes 5 and 10. The latency period for the MAX knee flexion angle during midstance ranged from 13.9-15.8% of the gait cycle while the MAX angle for eversion and dorsiflexion ranged from 15.8-17.4% and 20.1-21.9% respectively. Since eversion is relatively synchronous with knee flexion and occurs before plantar/ dorsiflexion, controlling MAX eversion angle could potentially reduce ankle and knee injury rates. It has been suggested that delayed eversion could disrupt normal joint coupling and contribute to overuse running injuries (Tiberio 1987; Dierks et al., 2010). The MAX joint kinematics occurred in the following order: (1) knee flexion, (2) rearfoot eversion, and (3) ankle dorsiflexion. Dierks and Davis (2007) observed similar results in which MAX knee flexion angle during midstance occurred prior to MAX eversion angle. The relatively small timing differences between MAX knee flexion and MAX eversion coincide with previous literature (Dierks & Davis, 2007; Stergiou et al., 1999). Few studies have assessed how the latency period changes with prolonged running. Dierks and colleagues (2010) reported no changes in latency period between the beginning and end of an exhaustive run; however, the flow of joint motions were similar to the results from this study with MAX knee flexion occurring first and relatively synchronous with MAX eversion. Although latency period of eversion and knee flexion increased over time for this study, these alterations occurred simultaneously. If delayed eversion occurred apart from delayed knee flexion, the risk of injury may increase.

Joint angle at initial contact and MAX angles during midstance phase have both been suggested to contribute to injury rates, yet the relationship between the two angles has not been thoroughly assessed. Eversion angle at initial contact and MAX eversion angle during midstance were significantly correlated. This result suggests that the MAX everison angle experienced during midstance is influenced by the eversion angle at initial contact. Therefore, regardless of shoe designs incorporating rearfoot motion control and stability during stance phase (Novacheck, 1998), the MAX eversion angle may still be influenced by the degree of eversion the runner is in upon initial contact with the ground. This suggests that in addition to studying new shoe designs to control for undesirable rearfoot motion, gait retraining may be necessary to truly change gait mechanics, and thereby reduce injuries (Chan et al., 2018; Crowell & Davis, 2011; Warne et al., 2014). A review on gait retraining methods (Agresta & Brown, 2015) reported that only a few studies have focused on the kinematic feedback for gait retraining in individuals with patellofemoral pain, in which the researchers provided runners with visual feedback in regards to their stance phase (Noehren, Scholz, & Davis, 2011; Willy, Scholz & Davis, 2012). Both studies were effective in modifying hip and pelvis patterns that have been related to running injuries (Agresta & Brown, 2015). Gait retraining has primarily been focused on hip mechanics; however, excessive foot pronation and eversion have also been suggested to lead to the development of running injuries (Cheung & Davis, 2011). Therefore, future research should further investigate gait retraining through feedback targeting ankle and rearfoot kinematics.

Limitations should be noted in this study. First, although the protocol chosen for this study did not have the intent to have runners reach an exhaustive state, neither rating of perceived exertion nor heart rate were recorded. Due to the lack of fatigue measures, we were not able to quantify the amount of exertion experienced by the participants in this study. Participants were recreational and experienced runners given the feedback to choose a self-selected pace that would allow them to run comfortably for approximately 30 minutes without reaching fatigue. The same self-selected pace was used for all testing sessions, and no comments or expressions of fatgiue were reported by any of the participants at the end of the testing sessions. Secondly, all participants in this study were rearfoot strikers. Therefore, the information in this study may not be generalizable for forefoot strikers. Future studies should investigate reactions to different footwear and prolonged treadmill running among midfoot and forefoot strikers. Finally, the running time was only 30 minutes. The interpretation and discussion of our observations should be limited within our testing frame.

CONCLUSION

Joint angle at initial contact and the latency period to the maximum angle during midstance were effected by duration of the run. The maximum eversion angle experienced during midstance is related to the rearfoot angle at initial contact regardless of footwear type. In addition to improving shoe designs that control for vulnerable motion, gait retraining may also be an effective tool to reduce injury at the ankle and knee.

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FIGURE CAPTIONS

Figure 1. Retroreflective marker placement for each participant during the static trial. Following the static trial, the single anatomical markers were removed, and the cluster markers remained.

Figure 2A-D. Ensemble curves of the ankle (A, B) and knee (C, D) joint angles in the sagittal (A, C) and frontal (B, D) planes for the first 40% of the gait cycle (subsequent initial contacts defined as 100% gait cycle). Maximum angles (Max) during midstance phase are indicated by the vertical arrows while the relative time (Tmax) it took to get to the maximum angles during midstance phase are indicated by the horizontal arrows. One standard deviation above and below the mean are represented by the dashed lines.

Figure 3A-D. Mean and standard error of the mean angles at initial contact for the ankle (A, B) and knee (C, D) joints in the sagittal (A, C) and frontal (B, D) planes across the 31-minute run. Greater than moderate effect sizes of pair-wise comparisons were reported here only if the outcome variable exhibited significant changes with time (B, C).

Figure 4A-D. Mean and standard error of the mean of the maximum (Max) angle during stance phase for the ankle (A, B) and knee (C, D) in the sagittal (A, C) and frontal (B, D) planes across the 31-minute run.

Figure 5A-D. Mean and standard error of the mean of the time it took to reach maximum (Max) angles during stance phase for the ankle (A, B) and knee (C, D) in the sagittal (A, C) and frontal (B, D) planes across the 31-minute run. Greater than moderate effect sizes of pair-wise comparisons were reported here only if the outcome variable exhibited significant changes with time (A-C).

Figure 6. Parametric (R_p) correlation coefficients presented here, where the horizontal axis represents the angle at initial contact (IC) and the vertical axis represents the Maximum angle during stance phase for the rearfoot.

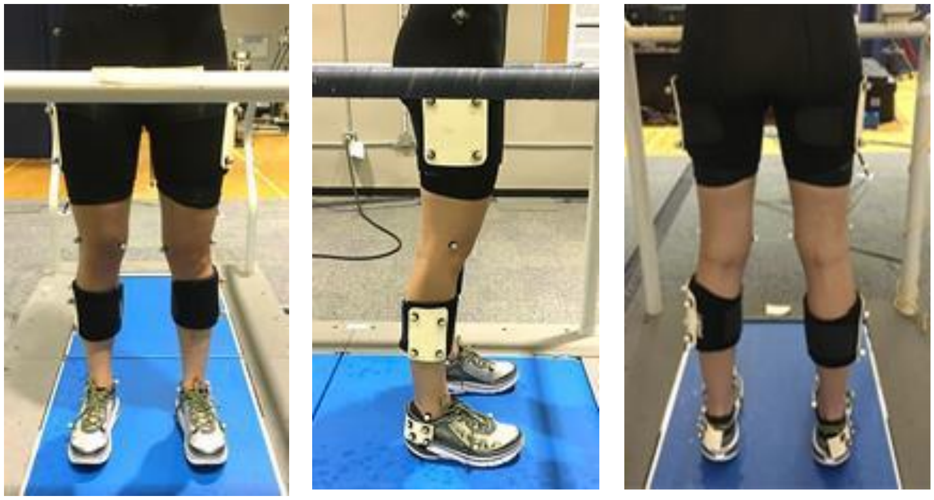


Figure 1

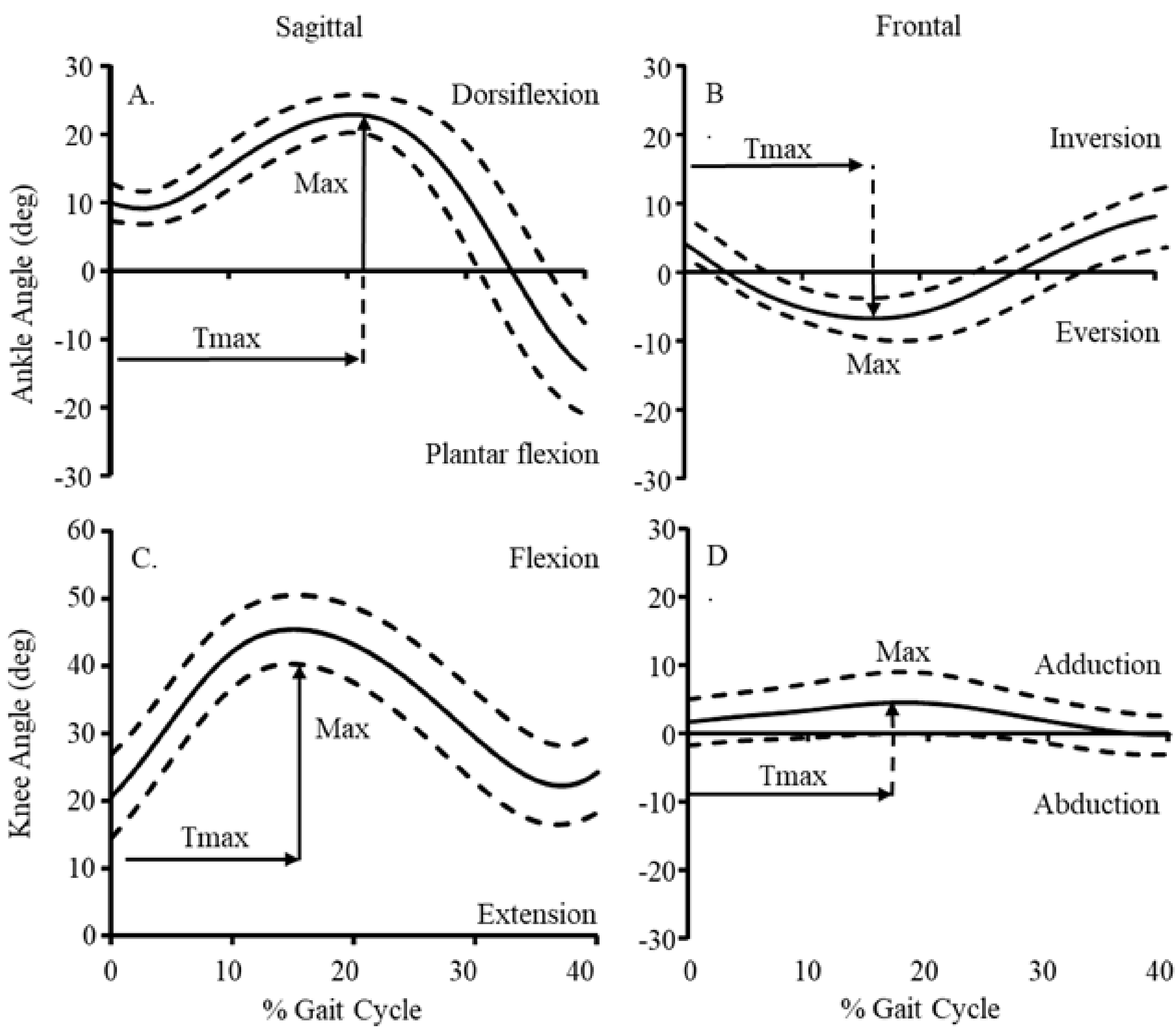
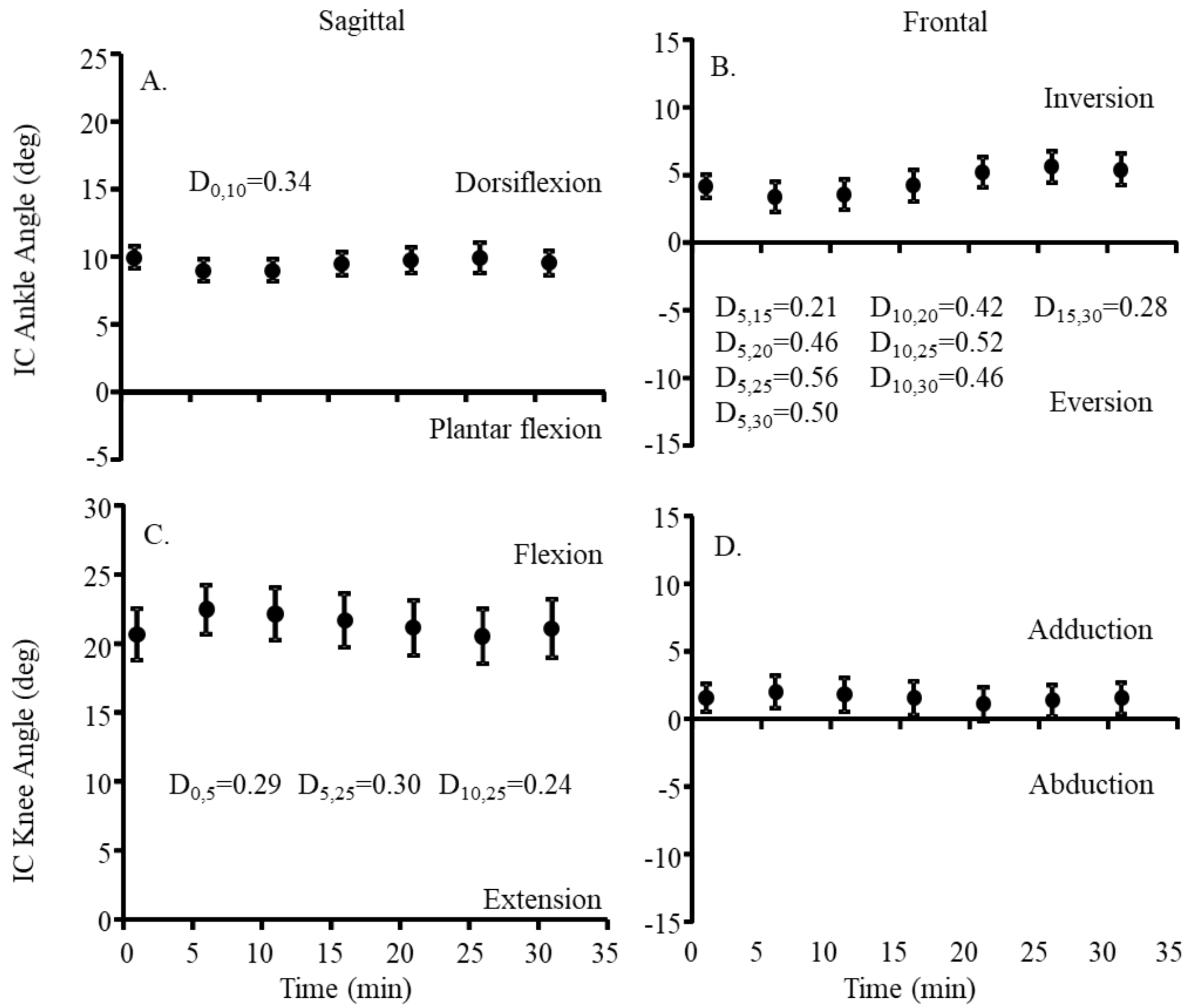

Sagittal
Frontal
A.
Dorsiflexion
Max
Tmax
Plantar flexion
Ankle Angle (deg)
B
Tmax
Inversion
Eversion
Max
C.
Flexion
Max
Tmax
Extension
Knee Angle (deg)
D
Max
Adduction
Tmax
Abduction
% Gait Cycle
% Gait Cycle

Figure 2



Sagittal
Frontal
A.
D0,10=0.34
Dorsiflexion
Plantar flexion
IC Ankle Angle (deg)
B.
Inversion
Eversion
D5,15=0.21 D10,20=0.42 D15,30=0.28
D5,20=0.46 D10,25=0.52
D5,25=0.56 D10,30=0.46
D5,30=0.50
C.
Flexion
Extension
D0,5=0.29 D5,25=0.30 D10,25=0.24
IC Knee Angle (deg)
D.
Adduction
Abduction
Time (min)
Time (min)

Figure 3

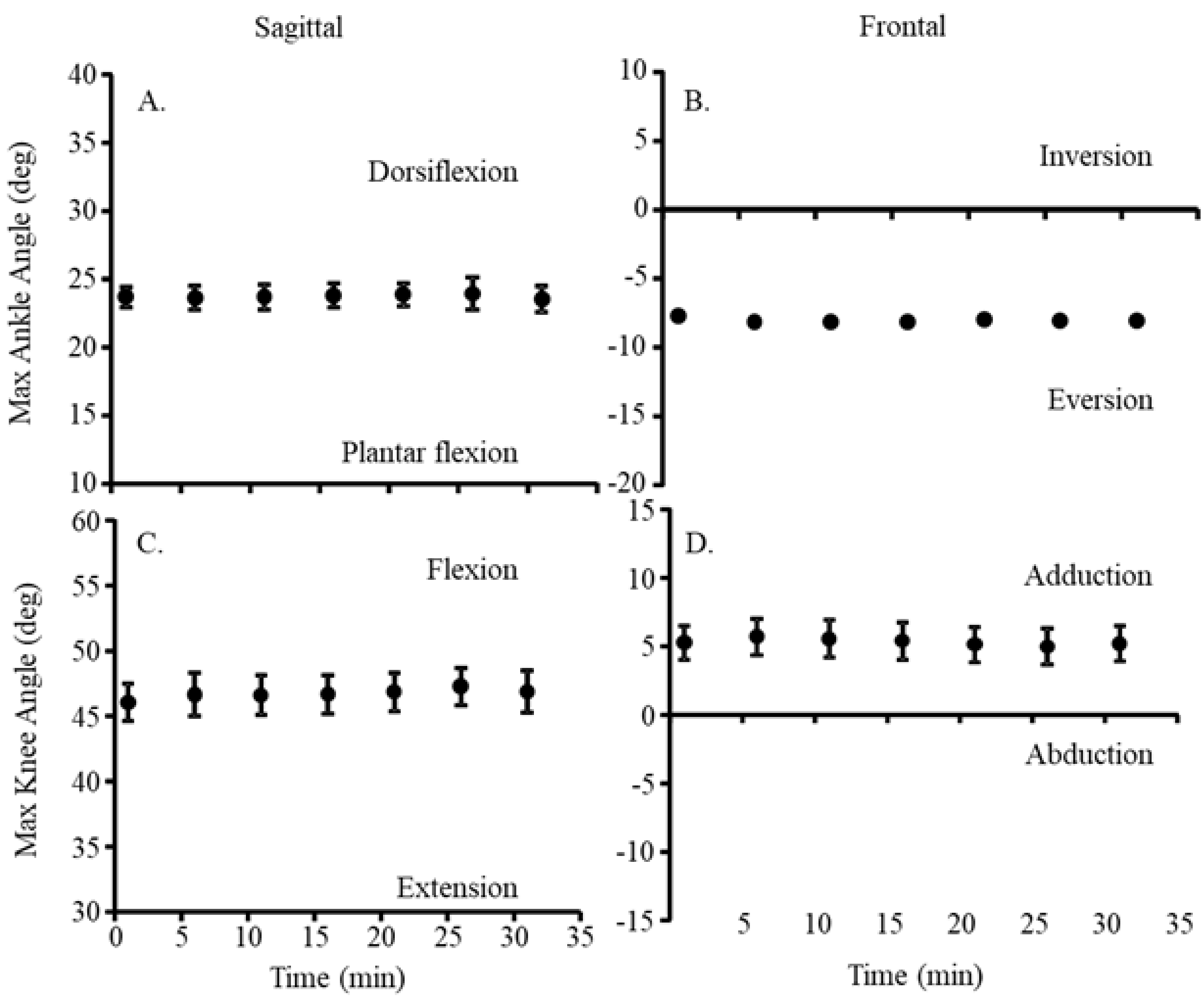

Sagittal
Frontal
A.
Dorsiflexion
Plantar flexion
Max Ankle Angle (deg)
B.
Inversion
Eversion
C.
Flexion
Extension
Max Knee Angle (deg)
D.
Adduction
Abduction
Time (min)
Time (min)

Figure 4

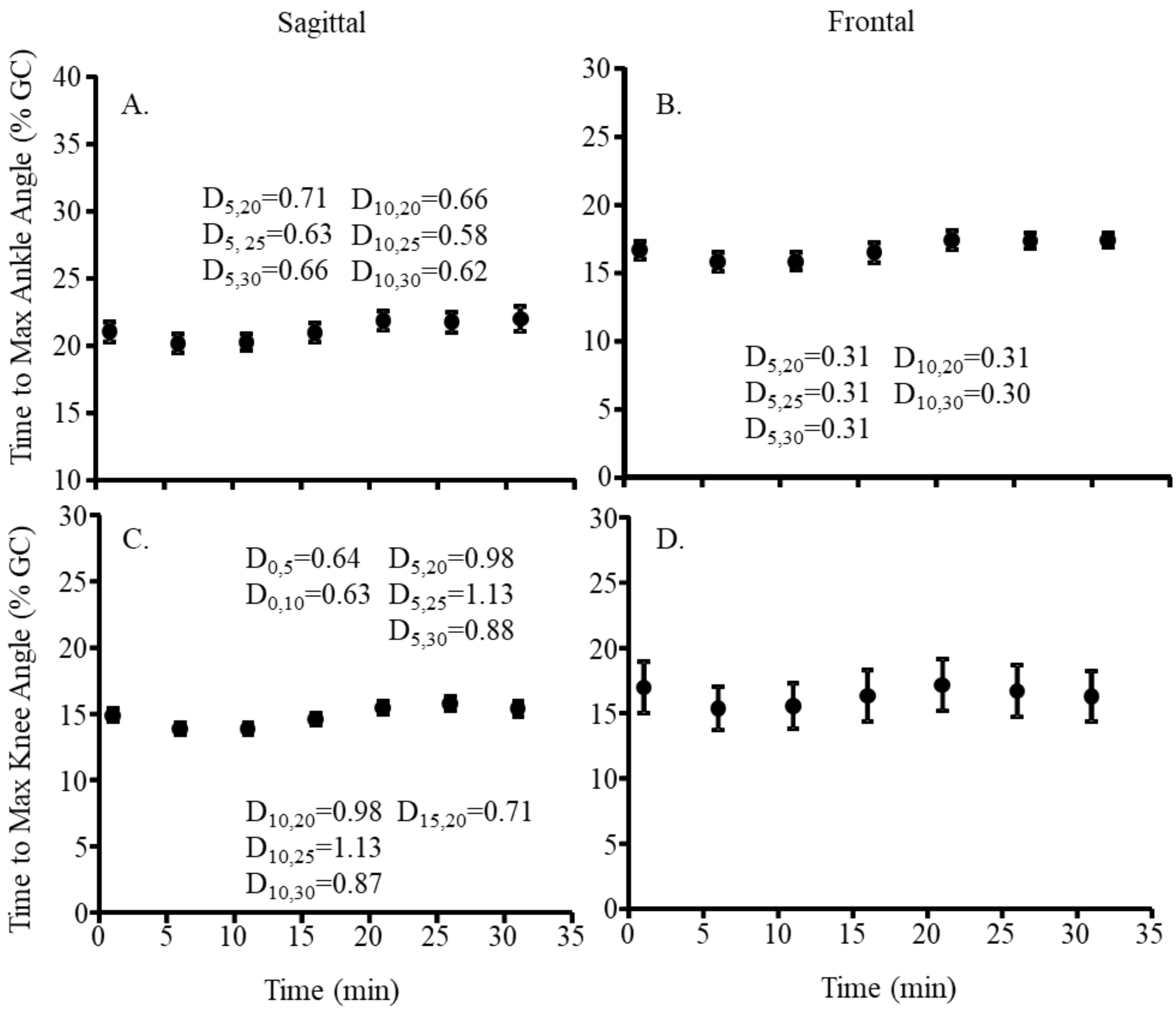
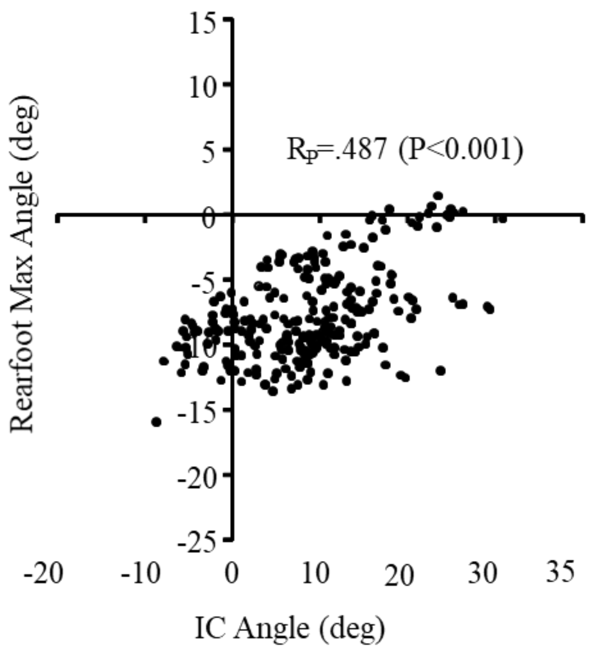

Sagittal
Frontal
Time to Max Ankle Angle (% GC)
A.
D5,20=0.71 D10,20=0.66
D5, 25=0.63 D10,25=0.58
D5,30=0.66 D10,30=0.62
B.
D5,20=0.31 D10,20=0.31
D5,25=0.31 D10,30=0.30
D5,30=0.31
Time to Max Knee Angle (% GC)
C.
D0,5=0.64 D5,20=0.98
D0,10=0.63 D5,25=1.13
D5,30=0.88
D10,20=0.98 D15,20=0.71
D10,25=1.13
D10,30=0.87
D.
Time (min)
Time (min)

Figure 5



Rearfoot Max Angle (deg)
15
10
5
0
-5
-10
-15
-20
-25
R_P=.487 (P<0.001)
-20
-10
0
10
20
30
35
IC Angle (deg)

Figure 6

APPENDIX A

EXTENDED INTRODUCTION

Research Questions

1. Do joint angles and latency period change with shoe and/or time during a prolonged run?
2. Is there a relationship between initial contact angle and maximum angle during midstance?

Research Hypotheses

1. We hypothesize that each joint angle and latency period to maximum joint angle would be sensitive to shoe types and duration of the run.
2. We hypothesize that there would be a significant relationship between the rearfoot angle at initial contact and maximum angle during midstance.

Independent Variables

1. Recreational Runners
    a. Shoe
        i. Habitual
        ii. Minimalist
        iii. Maximalist
    b. Time points within the prolonged run
        i. 1 minutes
        ii. 5 minutes
        iii. 11 minutes
        iv. 16 minutes
        v. 21 minutes

vi. 26 minutes

vii. 31 minutes

Dependent Variables

1. Kinematics during stance
    a. Knee Flexion/ Extension
        i. Initial contact angle
        ii. Maximum angle during midstance
        iii. Time of maximum angle
    b. Ankle Dorsiflexion/ Plantarflexion
        i. Initial contact angle
        ii. Maximum angle during midstance
        iii. Time of maximum angle
    c. Knee Abduction/ Adduction
        i. Initial contact angle
        ii. Maximum angle during midstance
        iii. Time of maximum angle
    d. Rearfoot Eversion/ Inversion
        i. Initial contact angle
        ii. Maximum angle during midstance
        iii. Time of maximum angle

Limitations

1. The protocol chosen for the study did not have the intent to have runners reach exhaustion, neither rating of perceived exertion nor heart rate were recorded.

2. All participants were rearfoot strikers; therefore, the information in this study may not be generalizable for forefoot strikers.
3. The running time was only 31 minutes long.
4. There were not enough participants to assess the relationship between initial contact and midstance angle with prolonged running.

Delimitations

1. Participants were required to run ≥10 miles/week, be between the ages of 18 and 45, and recreationally trained runners.
2. Participants could not have answered “yes” to any question from the physical activity readiness questionnaire.
3. Participants could not have had any history of lower extremity injury or surgery within the last 6 months.

Assumptions

1. The participants complete the PAR-Q honestly.
2. The participants are comfortable running for at least 35 minutes on a treadmill.

Operational Definitions

1. Stance phase – the period of foot contact with the ground between foot-contact and toe-off
2. Foot-contact – the point at which vertical ground reaction forces ≥50N
3. Stride – foot contact of one foot to the following foot contact of the same foot
4. Initial contact angle – the angle that occurs at foot contact
5. Maximum Angle – the maximum angle that occurs during midstance phase

6. Time of Maximum Angle (Latency Period) – the time or percent of stance phase where the maximum angle occurs.

APPENDIX B

STATISTICAL OUTPUT

```
GET DATA
  /TYPE=XLSX
  /FILE='F:\Thesis\Data\Results Graphs\SydniThesisDataForANOVAs.xlsm'
  /SHEET=name 'Knee_F'
  /CELLRANGE=FULL
  /READNAMES=ON
  /DATATYPEMIN PERCENTAGE=95.0
  /HIDDEN IGNORE=YES.
EXECUTE.
DATASET NAME DataSet1 WINDOW=FRONT.
GLM Tangle_F_K_T1 Tangle_F_K_T2 Tangle_F_K_T3 Tangle_F_K_T4 Tangle_F_K_T5
Tangle_F_K_T6
    Tangle_F_K_T7 @2Tangle_F_K_T1 @2Tangle_F_K_T2 @2Tangle_F_K_T3
@2Tangle_F_K_T4 @2Tangle_F_K_T5
    @2Tangle_F_K_T6 @2Tangle_F_K_T7 @3Tangle_F_K_T1 @3Tangle_F_K_T2
@3Tangle_F_K_T3 @3Tangle_F_K_T4
    @3Tangle_F_K_T5 @3Tangle_F_K_T6 @3Tangle_F_K_T7
  /WSFACTOR=shoe 3 Polynomial time 7 Repeated
  /METHOD=SSTYPE(3)
  /EMMEANS=TABLES(OVERALL)
  /EMMEANS=TABLES(shoe) COMPARE ADJ(BONFERRONI)
  /EMMEANS=TABLES(time) COMPARE ADJ(BONFERRONI)
  /EMMEANS=TABLES(shoe*time)
  /PRINT=DESCRIPTIVE ETASQ OPOWER
  /CRITERIA=ALPHA(.05)
  /WSDESIGN=shoe time shoe*time.
```

General Linear Model

Notes

Output Created		14-MAR-2019 10:18:10
Comments		
Input	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>

	N of Rows in Working Data File	12
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on all cases with valid data for all variables in the model.

Syntax	GLM Tangle_F_K_T1 Tangle_F_K_T2 Tangle_F_K_T3 Tangle_F_K_T4 Tangle_F_K_T5 Tangle_F_K_T6 Tangle_F_K_T7 @2Tangle_F_K_T1 @2Tangle_F_K_T2 @2Tangle_F_K_T3 @2Tangle_F_K_T4 @2Tangle_F_K_T5 @2Tangle_F_K_T6 @2Tangle_F_K_T7 @3Tangle_F_K_T1 @3Tangle_F_K_T2 @3Tangle_F_K_T3 @3Tangle_F_K_T4 @3Tangle_F_K_T5 @3Tangle_F_K_T6 @3Tangle_F_K_T7 /WSFACTOR=shoe 3 Polynomial time 7 Repeated /METHOD=SSTYPE(3) /EMMEANS=TABLES(OVERALL) /EMMEANS=TABLES(shoe) COMPARE ADJ(BONFERRONI) /EMMEANS=TABLES(time) COMPARE ADJ(BONFERRONI) /EMMEANS=TABLES(shoe*time)

		/PRINT=DESCRIPTIVE ETASQ OPOWER /CRITERIA=ALPHA(.05) /WSDESIGN=shoe time shoe*time.
Resources	Processor Time	00:00:00.00
	Elapsed Time	00:00:00.06

[DataSet1]

Within-Subjects Factors

Measure: MEASURE_1

shoe	time	Dependent Variable
1	1	Tangle_F_K_T1
	2	Tangle_F_K_T2
	3	Tangle_F_K_T3
	4	Tangle_F_K_T4
	5	Tangle_F_K_T5
	6	Tangle_F_K_T6
	7	Tangle_F_K_T7
2	1	@2Tangle_F_K_T1
	2	@2Tangle_F_K_T2
	3	@2Tangle_F_K_T3
	4	@2Tangle_F_K_T4

	5	@2Tangle_F_K_T5
	6	@2Tangle_F_K_T6
	7	@2Tangle_F_K_T7
3	1	@3Tangle_F_K_T1
	2	@3Tangle_F_K_T2
	3	@3Tangle_F_K_T3
	4	@3Tangle_F_K_T4
	5	@3Tangle_F_K_T5
	6	@3Tangle_F_K_T6

Within-Subjects Factors

Measure: MEASURE_1

shoe	time	Dependent Variable
3	7	@3Tangle_F_K_T7

Descriptive Statistics

	Mean	Std. Deviation	N
Tangle_F_K_T1	1.858157925000000	3.291137053232791	12
Tangle_F_K_T2	2.067961783333333	3.635263370067953	12
Tangle_F_K_T3	1.702571975000000	3.646731600614453	12
Tangle_F_K_T4	1.566570891666666	3.719667385026698	12
Tangle_F_K_T5	1.074496216666667	3.858185658721973	12

Tangle_F_K_T6	1.410446341666667	3.869949661687468	12
Tangle_F_K_T7	1.693891133333333	3.776867800548521	12
2Tangle_F_K_T1	1.022112483333333	4.294138771032614	12
2Tangle_F_K_T2	1.823379333333333	5.040058929299407	12
2Tangle_F_K_T3	1.774510658333333	5.279725110817526	12
2Tangle_F_K_T4	1.444219350000000	5.337835079981944	12
2Tangle_F_K_T5	.748956358333333	4.600845357117231	12
2Tangle_F_K_T6	1.142875300000000	4.541518518783174	12
2Tangle_F_K_T7	1.037529425000000	4.609078464930310	12
3Tangle_F_K_T1	1.890833100000000	2.931875957013827	12
3Tangle_F_K_T2	2.088066766666667	3.569810506928596	12
3Tangle_F_K_T3	1.903230141666666	3.778387461969745	12
3Tangle_F_K_T4	1.751119941666667	3.890318328506842	12
3Tangle_F_K_T5	1.557545325000000	4.262069627547033	12
3Tangle_F_K_T6	1.548304075000000	3.908025131921376	12
3Tangle_F_K_T7	1.875329283333334	3.878062922773291	12

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.
shoe	Pillai's Trace	.054	.283[b]	2.000	10.000	.759

	Wilks' Lambda	.946	.283[b]	2.000	10.000	.759
	Hotelling's Trace	.057	.283[b]	2.000	10.000	.759
	Roy's Largest Root	.057	.283[b]	2.000	10.000	.759
time	Pillai's Trace	.583	1.396[b]	6.000	6.000	.348
	Wilks' Lambda	.417	1.396[b]	6.000	6.000	.348
	Hotelling's Trace	1.396	1.396[b]	6.000	6.000	.348
	Roy's Largest Root	1.396	1.396[b]	6.000	6.000	.348
shoe * time	Pillai's Trace	.[c]	.	.	.	.
	Wilks' Lambda	.[c]	.	.	.	.
	Hotelling's Trace	.[c]	.	.	.	.
	Roy's Largest Root	.[c]	.	.	.	.

Multivariate Tests[a]

Effect		Partial Eta Squared	Noncent. Parameter	Observed Power[d]
shoe	Pillai's Trace	.054	.566	.083
	Wilks' Lambda	.054	.566	.083
	Hotelling's Trace	.054	.566	.083
	Roy's Largest Root	.054	.566	.083
time	Pillai's Trace	.583	8.374	.248
	Wilks' Lambda	.583	8.374	.248
	Hotelling's Trace	.583	8.374	.248
	Roy's Largest Root	.583	8.374	.248
shoe * time	Pillai's Trace	.	.	.
	Wilks' Lambda	.	.	.
	Hotelling's Trace	.	.	.
	Roy's Largest Root	.	.	.

a. Design: Intercept
Within Subjects Design: shoe + time + shoe * time
b. Exact statistic
c. Cannot produce multivariate test statistics because of insufficient residual degrees of freedom.
d. Computed using alpha = .05

Mauchly's Test of Sphericity[a]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[b] Greenhouse-Geisser
shoe	.900	1.053	2	.591	.909
time	.000	68.726	20	.000	.398
shoe * time	.000	.	77	.	.220

Mauchly's Test of Sphericity[a]

Measure: MEASURE_1

Within Subjects Effect	Epsilon	
	Huynh-Feldt	Lower-bound
shoe	1.000	.500
time	.515	.167
shoe * time	.295	.083

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.[a]

a. Design: Intercept

Within Subjects Design: shoe + time + shoe * time

b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F
shoe	Sphericity Assumed	11.609	2	5.805	.390
	Greenhouse-Geisser	11.609	1.818	6.385	.390
	Huynh-Feldt	11.609	2.000	5.805	.390
	Lower-bound	11.609	1.000	11.609	.390
Error(shoe)	Sphericity Assumed	327.606	22	14.891	
	Greenhouse-Geisser	327.606	20.001	16.379	
	Huynh-Feldt	327.606	22.000	14.891	
	Lower-bound	327.606	11.000	29.782	
time	Sphericity Assumed	16.857	6	2.809	2.358
	Greenhouse-Geisser	16.857	2.385	7.068	2.358
	Huynh-Feldt	16.857	3.090	5.455	2.358

	Lower-bound	16.857	1.000	16.857	2.358
Error(time)	Sphericity Assumed	78.627	66	1.191	
	Greenhouse-Geisser	78.627	26.235	2.997	
	Huynh-Feldt	78.627	33.990	2.313	
	Lower-bound	78.627	11.000	7.148	
shoe * time	Sphericity Assumed	5.207	12	.434	.594
	Greenhouse-Geisser	5.207	2.637	1.975	.594
	Huynh-Feldt	5.207	3.544	1.469	.594
	Lower-bound	5.207	1.000	5.207	.594
Error(shoe*time)	Sphericity Assumed	96.420	132	.730	
	Greenhouse-Geisser	96.420	29.004	3.324	
	Huynh-Feldt	96.420	38.986	2.473	
	Lower-bound	96.420	11.000	8.765	

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[a]
shoe	Sphericity Assumed	.682	.034	.780	.105
	Greenhouse-Geisser	.663	.034	.709	.102
	Huynh-Feldt	.682	.034	.780	.105
	Lower-bound	.545	.034	.390	.088
Error(shoe)	Sphericity Assumed				
	Greenhouse-Geisser				
	Huynh-Feldt				
	Lower-bound				
time	Sphericity Assumed	.040	.177	14.149	.773
	Greenhouse-Geisser	.106	.177	5.624	.472
	Huynh-Feldt	.087	.177	7.287	.549
	Lower-bound	.153	.177	2.358	.289
Error(time)	Sphericity Assumed				
	Greenhouse-Geisser				
	Huynh-Feldt				
	Lower-bound				
shoe * time	Sphericity Assumed	.844	.051	7.128	.328
	Greenhouse-Geisser	.603	.051	1.566	.151
	Huynh-Feldt	.650	.051	2.105	.172
	Lower-bound	.457	.051	.594	.109

Error(shoe*time)	Sphericity Assumed				
	Greenhouse-Geisser				
	Huynh-Feldt				
	Lower-bound				

a. Computed using alpha = .05

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	shoe	time	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
shoe	Linear		.188	1	.188	.128	.727	.012
	Quadratic		1.470	1	1.470	.528	.483	.046
Error(shoe)	Linear		16.169	11	1.470			
	Quadratic		30.632	11	2.785			
time		Level 1 vs. Level 2	5.840	1	5.840	3.990	.071	.266
		Level 2 vs. Level 3	1.436	1	1.436	2.154	.170	.164
		Level 3 vs. Level 4	1.530	1	1.530	3.451	.090	.239
		Level 4 vs. Level 5	7.628	1	7.628	3.222	.100	.227
		Level 5 vs. Level 6	2.077	1	2.077	5.683	.036	.341
		Level 6 vs. Level 7	1.021	1	1.021	1.288	.281	.105
Error(time)		Level 1 vs. Level 2	16.102	11	1.464			
		Level 2 vs. Level 3	7.332	11	.667			
		Level 3 vs. Level 4	4.876	11	.443			
		Level 4 vs. Level 5	26.041	11	2.367			

		Level 5 vs. Level 6	4.020	11	.365			
		Level 6 vs. Level 7	8.717	11	.792			
shoe * time	Linear	Level 1 vs. Level 2	.001	1	.001	.003	.959	.000
		Level 2 vs. Level 3	.196	1	.196	.325	.580	.029
		Level 3 vs. Level 4	.002	1	.002	.006	.942	.001
		Level 4 vs. Level 5	.535	1	.535	1.573	.236	.125
		Level 5 vs. Level 6	.715	1	.715	1.300	.278	.106
		Level 6 vs. Level 7	.011	1	.011	.026	.875	.002
	Quadratic	Level 1 vs. Level 2	2.858	1	2.858	1.505	.245	.120
		Level 2 vs. Level 3	.409	1	.409	1.311	.276	.107
		Level 3 vs. Level 4	.277	1	.277	1.636	.227	.129
		Level 4 vs. Level 5	.994	1	.994	.287	.603	.025
		Level 5 vs. Level 6	.425	1	.425	.572	.465	.049
		Level 6 vs. Level 7	1.349	1	1.349	3.204	.101	.226
Error(shoe* time)	Linear	Level 1 vs. Level 2	3.716	11	.338			
		Level 2 vs. Level 3	6.623	11	.602			
		Level 3 vs. Level 4	3.068	11	.279			
		Level 4 vs. Level 5	3.739	11	.340			
		Level 5 vs. Level 6	6.047	11	.550			

		Level 6 vs. Level 7	4.830	11	.439			
	Quadratic	Level 1 vs. Level 2	20.890	11	1.899			
		Level 2 vs. Level 3	3.435	11	.312			
		Level 3 vs. Level 4	1.866	11	.170			
		Level 4 vs. Level 5	38.127	11	3.466			
		Level 5 vs. Level 6	8.172	11	.743			
		Level 6 vs. Level 7	4.630	11	.421			

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	shoe	time	Noncent. Parameter	Observed Power[a]
shoe	Linear		.128	.062
	Quadratic		.528	.102
Error(shoe)	Linear			
	Quadratic			
time		Level 1 vs. Level 2	3.990	.446
		Level 2 vs. Level 3	2.154	.268
		Level 3 vs. Level 4	3.451	.396
		Level 4 vs. Level 5	3.222	.374
		Level 5 vs. Level 6	5.683	.585
		Level 6 vs. Level 7	1.288	.180
Error(time)		Level 1 vs. Level 2		
		Level 2 vs. Level 3		
		Level 3 vs. Level 4		
		Level 4 vs. Level 5		
		Level 5 vs. Level 6		
		Level 6 vs. Level 7		
shoe * time	Linear	Level 1 vs. Level 2	.003	.050
		Level 2 vs. Level 3	.325	.082
		Level 3 vs. Level 4	.006	.051

		Level 4 vs. Level 5	1.573	.209
		Level 5 vs. Level 6	1.300	.181
		Level 6 vs. Level 7	.026	.052
	Quadratic	Level 1 vs. Level 2	1.505	.202
		Level 2 vs. Level 3	1.311	.182
		Level 3 vs. Level 4	1.636	.215
		Level 4 vs. Level 5	.287	.078
		Level 5 vs. Level 6	.572	.106
		Level 6 vs. Level 7	3.204	.373
Error(shoe*time)	Linear	Level 1 vs. Level 2		
		Level 2 vs. Level 3		
		Level 3 vs. Level 4		
		Level 4 vs. Level 5		
		Level 5 vs. Level 6		
		Level 6 vs. Level 7		
	Quadratic	Level 1 vs. Level 2		
		Level 2 vs. Level 3		
		Level 3 vs. Level 4		
		Level 4 vs. Level 5		
		Level 5 vs. Level 6		
		Level 6 vs. Level 7		

a. Computed using alpha = .05

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	88.802	1	88.802	1.992	.186	.153
Error	490.422	11	44.584			

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Noncent. Parameter	Observed Power[a]
Intercept	1.992	.252
Error		

a. Computed using alpha = .05

Estimated Marginal Means

1. Grand Mean

Measure: MEASURE_1

Mean	Std. Error	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
1.571	1.113	-.879	4.020

2. shoe

Estimates

Measure: MEASURE_1

shoe	Mean	Std. Error	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
1	1.625	1.034	-.651	3.900
2	1.285	1.358	-1.704	4.274
3	1.802	1.075	-.565	4.169

Pairwise Comparisons

Measure: MEASURE_1

(I) shoe	(J) shoe	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	95% Confidence Interval for Difference[a] Upper Bound
1	2	.340	.624	1.000	-1.419	2.099
	3	-.177	.495	1.000	-1.573	1.219
2	1	-.340	.624	1.000	-2.099	1.419
	3	-.517	.656	1.000	-2.366	1.331
3	1	.177	.495	1.000	-1.219	1.573
	2	.517	.656	1.000	-1.331	2.366

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared

Pillai's trace	.054	.283[a]	2.000	10.000	.759	.054
Wilks' lambda	.946	.283[a]	2.000	10.000	.759	.054
Hotelling's trace	.057	.283[a]	2.000	10.000	.759	.054
Roy's largest root	.057	.283[a]	2.000	10.000	.759	.054

Multivariate Tests

	Noncent. Parameter	Observed Power[b]
Pillai's trace	.566	.083
Wilks' lambda	.566	.083
Hotelling's trace	.566	.083
Roy's largest root	.566	.083

Each F tests the multivariate effect of shoe. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

a. Exact statistic

b. Computed using alpha = .05

3. time

Estimates

Measure: MEASURE_1

time	Mean	Std. Error	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
1	1.590	.987	-.581	3.762
2	1.993	1.129	-.492	4.479
3	1.793	1.160	-.760	4.347
4	1.587	1.168	-.984	4.158
5	1.127	1.161	-1.429	3.683
6	1.367	1.124	-1.107	3.842
7	1.536	1.138	-.970	4.041

Pairwise Comparisons

Measure: MEASURE_1

(I) time	(J) time	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	95% Confidence Interval for Difference[a] Upper Bound
1	2	-.403	.202	1.000	-1.194	.388

	3	-.203	.257	1.000	-1.209	.803
	4	.003	.330	1.000	-1.293	1.299
	5	.463	.352	1.000	-.916	1.843
	6	.223	.292	1.000	-.923	1.370
	7	.055	.257	1.000	-.954	1.064
2	1	.403	.202	1.000	-.388	1.194
	3	.200	.136	1.000	-.334	.734
	4	.406	.238	1.000	-.529	1.341
	5	.866	.368	.801	-.577	2.309
	6	.626	.323	1.000	-.642	1.894
	7	.458	.284	1.000	-.657	1.572
3	1	.203	.257	1.000	-.803	1.209
	2	-.200	.136	1.000	-.734	.334
	4	.206	.111	1.000	-.229	.641
	5	.666	.277	.731	-.420	1.753
	6	.426	.249	1.000	-.549	1.401
	7	.258	.251	1.000	-.728	1.243
4	1	-.003	.330	1.000	-1.299	1.293
	2	-.406	.238	1.000	-1.341	.529
	3	-.206	.111	1.000	-.641	.229
	5	.460	.256	1.000	-.546	1.466
	6	.220	.247	1.000	-.750	1.190
	7	.052	.291	1.000	-1.088	1.191
5	1	-.463	.352	1.000	-1.843	.916
	2	-.866	.368	.801	-2.309	.577
	3	-.666	.277	.731	-1.753	.420
	4	-.460	.256	1.000	-1.466	.546
	6	-.240	.101	.761	-.635	.155
	7	-.409	.214	1.000	-1.249	.432
6	1	-.223	.292	1.000	-1.370	.923
	2	-.626	.323	1.000	-1.894	.642
	3	-.426	.249	1.000	-1.401	.549
	4	-.220	.247	1.000	-1.190	.750
	5	.240	.101	.761	-.155	.635
	7	-.168	.148	1.000	-.750	.414
7	1	-.055	.257	1.000	-1.064	.954
	2	-.458	.284	1.000	-1.572	.657
	3	-.258	.251	1.000	-1.243	.728

	4	-.052	.291	1.000	-1.191	1.088
	5	.409	.214	1.000	-.432	1.249
	6	.168	.148	1.000	-.414	.750

Based on estimated marginal means
a. Adjustment for multiple comparisons: Bonferroni.

Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Pillai's trace	.583	1.396[a]	6.000	6.000	.348	.583
Wilks' lambda	.417	1.396[a]	6.000	6.000	.348	.583
Hotelling's trace	1.396	1.396[a]	6.000	6.000	.348	.583
Roy's largest root	1.396	1.396[a]	6.000	6.000	.348	.583

Multivariate Tests

	Noncent. Parameter	Observed Power[b]
Pillai's trace	8.374	.248
Wilks' lambda	8.374	.248
Hotelling's trace	8.374	.248
Roy's largest root	8.374	.248

Each F tests the multivariate effect of time. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.
a. Exact statistic
b. Computed using alpha = .05

4. shoe * time

Measure: MEASURE_1

shoe	time	Mean	Std. Error	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
1	1	1.858	.950	-.233	3.949
	2	2.068	1.049	-.242	4.378
	3	1.703	1.053	-.614	4.020
	4	1.567	1.074	-.797	3.930

	5	1.074	1.114	-1.377	3.526
	6	1.410	1.117	-1.048	3.869
	7	1.694	1.090	-.706	4.094
2	1	1.022	1.240	-1.706	3.750
	2	1.823	1.455	-1.379	5.026
	3	1.775	1.524	-1.580	5.129
	4	1.444	1.541	-1.947	4.836
	5	.749	1.328	-2.174	3.672
	6	1.143	1.311	-1.743	4.028
	7	1.038	1.331	-1.891	3.966
3	1	1.891	.846	.028	3.754
	2	2.088	1.031	-.180	4.356
	3	1.903	1.091	-.497	4.304
	4	1.751	1.123	-.721	4.223
	5	1.558	1.230	-1.150	4.266
	6	1.548	1.128	-.935	4.031
	7	1.875	1.120	-.589	4.339

```
GLM MaxA_F_K_T1 MaxA_F_K_T2 MaxA_F_K_T3 MaxA_F_K_T4 MaxA_F_K_T5
MaxA_F_K_T6 MaxA_F_K_T7
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@2MaxA_F_K_T5 @2MaxA_F_K_T6 @2MaxA_F_K_T7
   @3MaxA_F_K_T1 @3MaxA_F_K_T2 @3MaxA_F_K_T3 @3MaxA_F_K_T4
@3MaxA_F_K_T5 @3MaxA_F_K_T6 @3MaxA_F_K_T7
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  /EMMEANS=TABLES(shoe) COMPARE ADJ(BONFERRONI)
  /EMMEANS=TABLES(time) COMPARE ADJ(BONFERRONI)
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General Linear Model

Notes

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	Cases Used	Statistics are based on all cases with valid data for all variables in the model.

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Within-Subjects Factors

Measure: MEASURE_1

shoe	time	Dependent Variable
1	1	MaxA_F_K_T1
	2	MaxA_F_K_T2
	3	MaxA_F_K_T3
	4	MaxA_F_K_T4
	5	MaxA_F_K_T5
	6	MaxA_F_K_T6
	7	MaxA_F_K_T7
2	1	@2MaxA_F_K_T1
	2	@2MaxA_F_K_T2
	3	@2MaxA_F_K_T3
	4	@2MaxA_F_K_T4
	5	@2MaxA_F_K_T5

	6	@2MaxA_F_K_T6
	7	@2MaxA_F_K_T7
3	1	@3MaxA_F_K_T1
	2	@3MaxA_F_K_T2
	3	@3MaxA_F_K_T3
	4	@3MaxA_F_K_T4
	5	@3MaxA_F_K_T5
	6	@3MaxA_F_K_T6

Within-Subjects Factors

Measure: MEASURE_1

shoe	time	Dependent Variable
3	7	@3MaxA_F_K_T7

Descriptive Statistics

	Mean	Std. Deviation	N
MaxA_F_K_T1	6.137382666666667	4.585383799823592	12
MaxA_F_K_T2	6.316106849999999	4.647462240556242	12
MaxA_F_K_T3	6.088189558333333	4.312390334864533	12
MaxA_F_K_T4	5.882262791666667	4.067978881912292	12
MaxA_F_K_T5	5.990999666666667	4.200224402061690	12
MaxA_F_K_T6	5.427645675000000	3.889055870185152	12

MaxA_F_K_T7	5.884856491666667	4.027009098390639	12
2MaxA_F_K_T1	4.694216475000001	4.880664458705375	12
2MaxA_F_K_T2	5.630032808333333	5.590987703682895	12
2MaxA_F_K_T3	5.454276158333333	5.622037334242985	12
2MaxA_F_K_T4	5.369961374999999	5.785687590804376	12
2MaxA_F_K_T5	4.693442683333333	4.895505724890510	12
2MaxA_F_K_T6	4.767103441666666	5.056346524994865	12
2MaxA_F_K_T7	4.720918433333333	5.045909533951848	12
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3MaxA_F_K_T2	5.165296758333333	3.994013933179196	12
3MaxA_F_K_T3	5.171530100000000	4.131476762904924	12
3MaxA_F_K_T4	4.956447099999999	4.285274841397042	12
3MaxA_F_K_T5	4.814299941666666	4.405687643918844	12
3MaxA_F_K_T6	4.803592591666667	4.412841342009614	12
3MaxA_F_K_T7	5.009349400000001	4.388261739732577	12

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.
shoe	Pillai's Trace	.173	1.046[b]	2.000	10.000	.387
	Wilks' Lambda	.827	1.046[b]	2.000	10.000	.387
	Hotelling's Trace	.209	1.046[b]	2.000	10.000	.387
	Roy's Largest Root	.209	1.046[b]	2.000	10.000	.387

time	Pillai's Trace	.467	.876[b]	6.000	6.000	.562
	Wilks' Lambda	.533	.876[b]	6.000	6.000	.562
	Hotelling's Trace	.876	.876[b]	6.000	6.000	.562
	Roy's Largest Root	.876	.876[b]	6.000	6.000	.562
shoe * time	Pillai's Trace	.[c]	.	.	.	.
	Wilks' Lambda	.[c]	.	.	.	.
	Hotelling's Trace	.[c]	.	.	.	.
	Roy's Largest Root	.[c]	.	.	.	.

Multivariate Tests[a]

Effect		Partial Eta Squared	Noncent. Parameter	Observed Power[d]
shoe	Pillai's Trace	.173	2.091	.184
	Wilks' Lambda	.173	2.091	.184
	Hotelling's Trace	.173	2.091	.184
	Roy's Largest Root	.173	2.091	.184
time	Pillai's Trace	.467	5.254	.166
	Wilks' Lambda	.467	5.254	.166
	Hotelling's Trace	.467	5.254	.166
	Roy's Largest Root	.467	5.254	.166
shoe * time	Pillai's Trace	.	.	.
	Wilks' Lambda	.	.	.
	Hotelling's Trace	.	.	.
	Roy's Largest Root	.	.	.

a. Design: Intercept
Within Subjects Design: shoe + time + shoe * time
b. Exact statistic
c. Cannot produce multivariate test statistics because of insufficient residual degrees of freedom.
d. Computed using alpha = .05

Mauchly's Test of Sphericity[a]

Measure: MEASURE_1

		df	Sig.	Epsilon[b]

Within Subjects Effect	Mauchly's W	Approx. Chi-Square			Greenhouse-Geisser
shoe	.786	2.403	2	.301	.824
time	.005	46.710	20	.001	.406
shoe * time	.000	.	77	.	.188

Mauchly's Test of Sphericity[a]

Measure: MEASURE_1

Within Subjects Effect	Epsilon Huynh-Feldt	 Lower-bound
shoe	.950	.500
time	.529	.167
shoe * time	.238	.083

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.[a]

a. Design: Intercept

Within Subjects Design: shoe + time + shoe * time

b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F
shoe	Sphericity Assumed	49.345	2	24.672	.632
	Greenhouse-Geisser	49.345	1.648	29.942	.632
	Huynh-Feldt	49.345	1.901	25.960	.632
	Lower-bound	49.345	1.000	49.345	.632
Error(shoe)	Sphericity Assumed	859.261	22	39.057	
	Greenhouse-Geisser	859.261	18.128	47.400	
	Huynh-Feldt	859.261	20.908	41.097	
	Lower-bound	859.261	11.000	78.115	
time	Sphericity Assumed	12.798	6	2.133	2.052
	Greenhouse-Geisser	12.798	2.433	5.260	2.052
	Huynh-Feldt	12.798	3.175	4.031	2.052
	Lower-bound	12.798	1.000	12.798	2.052
Error(time)	Sphericity Assumed	68.610	66	1.040	

	Greenhouse-Geisser	68.610	26.764	2.564	
	Huynh-Feldt	68.610	34.922	1.965	
	Lower-bound	68.610	11.000	6.237	
shoe * time	Sphericity Assumed	7.031	12	.586	.575
	Greenhouse-Geisser	7.031	2.251	3.124	.575
	Huynh-Feldt	7.031	2.858	2.460	.575
	Lower-bound	7.031	1.000	7.031	.575
Error(shoe*time)	Sphericity Assumed	134.420	132	1.018	
	Greenhouse-Geisser	134.420	24.759	5.429	
	Huynh-Feldt	134.420	31.443	4.275	
	Lower-bound	134.420	11.000	12.220	

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[a]
shoe	Sphericity Assumed	.541	.054	1.263	.142
	Greenhouse-Geisser	.514	.054	1.041	.132
	Huynh-Feldt	.534	.054	1.201	.139
	Lower-bound	.444	.054	.632	.112
Error(shoe)	Sphericity Assumed				
	Greenhouse-Geisser				
	Huynh-Feldt				
	Lower-bound				
time	Sphericity Assumed	.071	.157	12.311	.703
	Greenhouse-Geisser	.140	.157	4.992	.422
	Huynh-Feldt	.121	.157	6.514	.494
	Lower-bound	.180	.157	2.052	.258
Error(time)	Sphericity Assumed				
	Greenhouse-Geisser				
	Huynh-Feldt				
	Lower-bound				
shoe * time	Sphericity Assumed	.859	.050	6.905	.317
	Greenhouse-Geisser	.589	.050	1.295	.139
	Huynh-Feldt	.627	.050	1.645	.153
	Lower-bound	.464	.050	.575	.107
Error(shoe*time)	Sphericity Assumed				
	Greenhouse-Geisser				

	Huynh-Feldt				
	Lower-bound				

a. Computed using alpha = .05

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	shoe	time	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
shoe	Linear		5.549	1	5.549	1.121	.312	.092
	Quadratic		1.501	1	1.501	.242	.633	.021
Error(shoe)	Linear		54.448	11	4.950			
	Quadratic		68.304	11	6.209			
time		Level 1 vs. Level 2	5.803	1	5.803	3.206	.101	.226
		Level 2 vs. Level 3	.632	1	.632	1.264	.285	.103
		Level 3 vs. Level 4	1.021	1	1.021	2.462	.145	.183
		Level 4 vs. Level 5	2.016	1	2.016	.774	.398	.066
		Level 5 vs. Level 6	1.002	1	1.002	1.037	.330	.086
		Level 6 vs. Level 7	1.522	1	1.522	2.239	.163	.169
Error(time)		Level 1 vs. Level 2	19.910	11	1.810			
		Level 2 vs. Level 3	5.497	11	.500			
		Level 3 vs. Level 4	4.563	11	.415			
		Level 4 vs. Level 5	28.643	11	2.604			
		Level 5 vs. Level 6	10.621	11	.966			

		Level 6 vs. Level 7	7.476	11	.680			
shoe * time	Linear	Level 1 vs. Level 2	.047	1	.047	.080	.782	.007
		Level 2 vs. Level 3	.329	1	.329	.573	.465	.049
		Level 3 vs. Level 4	.001	1	.001	.002	.963	.000
		Level 4 vs. Level 5	.378	1	.378	1.068	.324	.088
		Level 5 vs. Level 6	1.833	1	1.833	1.900	.196	.147
		Level 6 vs. Level 7	.379	1	.379	.817	.385	.069
	Quadratic	Level 1 vs. Level 2	5.139	1	5.139	1.607	.231	.127
		Level 2 vs. Level 3	.034	1	.034	.127	.729	.011
		Level 3 vs. Level 4	.127	1	.127	.403	.539	.035
		Level 4 vs. Level 5	3.483	1	3.483	.645	.439	.055
		Level 5 vs. Level 6	1.041	1	1.041	1.742	.214	.137
		Level 6 vs. Level 7	1.141	1	1.141	2.712	.128	.198
Error(shoe* time)	Linear	Level 1 vs. Level 2	6.482	11	.589			
		Level 2 vs. Level 3	6.319	11	.574			
		Level 3 vs. Level 4	2.393	11	.218			
		Level 4 vs. Level 5	3.890	11	.354			
		Level 5 vs. Level 6	10.612	11	.965			
		Level 6 vs. Level 7	5.106	11	.464			

	Quadratic	Level 1 vs. Level 2	35.170	11	3.197			
		Level 2 vs. Level 3	2.928	11	.266			
		Level 3 vs. Level 4	3.478	11	.316			
		Level 4 vs. Level 5	59.359	11	5.396			
		Level 5 vs. Level 6	6.574	11	.598			
		Level 6 vs. Level 7	4.628	11	.421			

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	shoe	time	Noncent. Parameter	Observed Power[a]
shoe	Linear		1.121	.162
	Quadratic		.242	.074
Error(shoe)	Linear			
	Quadratic			
time		Level 1 vs. Level 2	3.206	.373
		Level 2 vs. Level 3	1.264	.177
		Level 3 vs. Level 4	2.462	.300
		Level 4 vs. Level 5	.774	.127
		Level 5 vs. Level 6	1.037	.154
		Level 6 vs. Level 7	2.239	.277
Error(time)		Level 1 vs. Level 2		
		Level 2 vs. Level 3		
		Level 3 vs. Level 4		
		Level 4 vs. Level 5		
		Level 5 vs. Level 6		
		Level 6 vs. Level 7		
shoe * time	Linear	Level 1 vs. Level 2	.080	.058
		Level 2 vs. Level 3	.573	.107
		Level 3 vs. Level 4	.002	.050
		Level 4 vs. Level 5	1.068	.157
		Level 5 vs. Level 6	1.900	.243

		Level 6 vs. Level 7	.817	.131
	Quadratic	Level 1 vs. Level 2	1.607	.213
		Level 2 vs. Level 3	.127	.062
		Level 3 vs. Level 4	.403	.089
		Level 4 vs. Level 5	.645	.114
		Level 5 vs. Level 6	1.742	.226
		Level 6 vs. Level 7	2.712	.325
Error(shoe*time)	Linear	Level 1 vs. Level 2		
		Level 2 vs. Level 3		
		Level 3 vs. Level 4		
		Level 4 vs. Level 5		
		Level 5 vs. Level 6		
		Level 6 vs. Level 7		
	Quadratic	Level 1 vs. Level 2		
		Level 2 vs. Level 3		
		Level 3 vs. Level 4		
		Level 4 vs. Level 5		
		Level 5 vs. Level 6		
		Level 6 vs. Level 7		

a. Computed using alpha = .05

Tests of Between-Subjects Effects

Measure: MEASURE_1

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	1024.975	1	1024.975	20.697	.001	.653
Error	544.739	11	49.522			

Tests of Between-Subjects Effects

Measure: MEASURE_1

Transformed Variable: Average

Source	Noncent. Parameter	Observed Power[a]
Intercept	20.697	.985
Error		

a. Computed using alpha = .05

Estimated Marginal Means

1. Grand Mean

Measure: MEASURE_1

Mean	Std. Error	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
5.336	1.173	2.754	7.917

2. shoe

Estimates

Measure: MEASURE_1

shoe	Mean	Std. Error	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
1	5.961	1.198	3.325	8.597
2	5.047	1.486	1.777	8.318
3	4.999	1.189	2.382	7.617

Pairwise Comparisons

Measure: MEASURE_1

(I) shoe	(J) shoe	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	95% Confidence Interval for Difference[a] Upper Bound
1	2	.914	.788	.813	-1.309	3.137
	3	.962	.908	.937	-1.600	3.523
2	1	-.914	.788	.813	-3.137	1.309
	3	.048	1.159	1.000	-3.221	3.316
3	1	-.962	.908	.937	-3.523	1.600
	2	-.048	1.159	1.000	-3.316	3.221

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Pillai's trace	.173	1.046[a]	2.000	10.000	.387	.173
Wilks' lambda	.827	1.046[a]	2.000	10.000	.387	.173

Hotelling's trace	.209	1.046[a]	2.000	10.000	.387	.173
Roy's largest root	.209	1.046[a]	2.000	10.000	.387	.173

Multivariate Tests

	Noncent. Parameter	Observed Power[b]
Pillai's trace	2.091	.184
Wilks' lambda	2.091	.184
Hotelling's trace	2.091	.184
Roy's largest root	2.091	.184

Each F tests the multivariate effect of shoe. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

a. Exact statistic

b. Computed using alpha = .05

3. time

Estimates

Measure: MEASURE_1

time	Mean	Std. Error	95% Confidence Interval Lower Bound	Upper Bound
1	5.302	1.113	2.852	7.753
2	5.704	1.217	3.025	8.383
3	5.571	1.204	2.921	8.221
4	5.403	1.198	2.766	8.040
5	5.166	1.173	2.584	7.749
6	4.999	1.183	2.395	7.604
7	5.205	1.191	2.583	7.827

Pairwise Comparisons

Measure: MEASURE_1

(I) time	(J) time	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	Upper Bound
1	2	-.401	.224	1.000	-1.281	.478
	3	-.269	.235	1.000	-1.190	.652
	4	-.101	.293	1.000	-1.252	1.051

	5	.136	.227	1.000	-.755	1.027
	6	.303	.305	1.000	-.892	1.498
	7	.097	.235	1.000	-.824	1.018
2	1	.401	.224	1.000	-.478	1.281
	3	.132	.118	1.000	-.330	.595
	4	.301	.194	1.000	-.461	1.063
	5	.538	.265	1.000	-.500	1.575
	6	.704	.327	1.000	-.578	1.987
	7	.499	.294	1.000	-.656	1.654
3	1	.269	.235	1.000	-.652	1.190
	2	-.132	.118	1.000	-.595	.330
	4	.168	.107	1.000	-.253	.590
	5	.405	.252	1.000	-.584	1.394
	6	.572	.286	1.000	-.549	1.693
	7	.366	.273	1.000	-.706	1.439
4	1	.101	.293	1.000	-1.051	1.252
	2	-.301	.194	1.000	-1.063	.461
	3	-.168	.107	1.000	-.590	.253
	5	.237	.269	1.000	-.818	1.292
	6	.403	.259	1.000	-.612	1.419
	7	.198	.278	1.000	-.892	1.288
5	1	-.136	.227	1.000	-1.027	.755
	2	-.538	.265	1.000	-1.575	.500
	3	-.405	.252	1.000	-1.394	.584
	4	-.237	.269	1.000	-1.292	.818
	6	.167	.164	1.000	-.476	.809
	7	-.039	.114	1.000	-.486	.408
6	1	-.303	.305	1.000	-1.498	.892
	2	-.704	.327	1.000	-1.987	.578
	3	-.572	.286	1.000	-1.693	.549
	4	-.403	.259	1.000	-1.419	.612
	5	-.167	.164	1.000	-.809	.476
	7	-.206	.137	1.000	-.745	.333
7	1	-.097	.235	1.000	-1.018	.824
	2	-.499	.294	1.000	-1.654	.656
	3	-.366	.273	1.000	-1.439	.706
	4	-.198	.278	1.000	-1.288	.892
	5	.039	.114	1.000	-.408	.486

6	.206	.137	1.000	-.333	.745

Based on estimated marginal means
a. Adjustment for multiple comparisons: Bonferroni.

Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Pillai's trace	.467	.876[a]	6.000	6.000	.562	.467
Wilks' lambda	.533	.876[a]	6.000	6.000	.562	.467
Hotelling's trace	.876	.876[a]	6.000	6.000	.562	.467
Roy's largest root	.876	.876[a]	6.000	6.000	.562	.467

Multivariate Tests

	Noncent. Parameter	Observed Power[b]
Pillai's trace	5.254	.166
Wilks' lambda	5.254	.166
Hotelling's trace	5.254	.166
Roy's largest root	5.254	.166

Each F tests the multivariate effect of time. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.
a. Exact statistic
b. Computed using alpha = .05

4. shoe * time

Measure: MEASURE_1

shoe	time	Mean	Std. Error	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
1	1	6.137	1.324	3.224	9.051
	2	6.316	1.342	3.363	9.269
	3	6.088	1.245	3.348	8.828
	4	5.882	1.174	3.298	8.467
	5	5.991	1.213	3.322	8.660
	6	5.428	1.123	2.957	7.899
	7	5.885	1.162	3.326	8.443

2	1	4.694	1.409	1.593	7.795
	2	5.630	1.614	2.078	9.182
	3	5.454	1.623	1.882	9.026
	4	5.370	1.670	1.694	9.046
	5	4.693	1.413	1.583	7.804
	6	4.767	1.460	1.554	7.980
	7	4.721	1.457	1.515	7.927
3	1	5.075	.991	2.894	7.257
	2	5.165	1.153	2.628	7.703
	3	5.172	1.193	2.547	7.797
	4	4.956	1.237	2.234	7.679
	5	4.814	1.272	2.015	7.614
	6	4.804	1.274	2.000	7.607
	7	5.009	1.267	2.221	7.798

```
GLM Tmax_F_K_T1 Tmax_F_K_T2 Tmax_F_K_T3 Tmax_F_K_T4 Tmax_F_K_T5
Tmax_F_K_T6 Tmax_F_K_T7
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@2Tmax_F_K_T5 @2Tmax_F_K_T6 @2Tmax_F_K_T7
   @3Tmax_F_K_T1 @3Tmax_F_K_T2 @3Tmax_F_K_T3 @3Tmax_F_K_T4
@3Tmax_F_K_T5 @3Tmax_F_K_T6 @3Tmax_F_K_T7
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  /EMMEANS=TABLES(shoe) COMPARE ADJ(BONFERRONI)
  /EMMEANS=TABLES(time) COMPARE ADJ(BONFERRONI)
  /EMMEANS=TABLES(shoe*time)
  /PRINT=DESCRIPTIVE ETASQ OPOWER
  /CRITERIA=ALPHA(.05)
  /WSDESIGN=shoe time shoe*time.
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General Linear Model

Notes

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	Cases Used	Statistics are based on all cases with valid data for all variables in the model.

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Within-Subjects Factors

Measure: MEASURE_1

shoe	time	Dependent Variable
1	1	Tmax_F_K_T1
	2	Tmax_F_K_T2
	3	Tmax_F_K_T3
	4	Tmax_F_K_T4
	5	Tmax_F_K_T5
	6	Tmax_F_K_T6
	7	Tmax_F_K_T7
2	1	@2Tmax_F_K_T1
	2	@2Tmax_F_K_T2
	3	@2Tmax_F_K_T3
	4	@2Tmax_F_K_T4
	5	@2Tmax_F_K_T5

	6	@2Tmax_F_K_T6
	7	@2Tmax_F_K_T7
3	1	@3Tmax_F_K_T1
	2	@3Tmax_F_K_T2
	3	@3Tmax_F_K_T3
	4	@3Tmax_F_K_T4
	5	@3Tmax_F_K_T5
	6	@3Tmax_F_K_T6

Within-Subjects Factors

Measure: MEASURE_1

shoe	time	Dependent Variable
3	7	@3Tmax_F_K_T7

Descriptive Statistics

	Mean	Std. Deviation	N
Tmax_F_K_T1	14.975000000000000	6.212030117587823	12
Tmax_F_K_T2	14.658333333333331	5.563265609552023	12
Tmax_F_K_T3	14.375	6.8964	12
Tmax_F_K_T4	15.225000000000000	7.386858724666515	12
Tmax_F_K_T5	15.700000000000000	7.544775434937501	12
Tmax_F_K_T6	14.866666666666667	7.432035489363025	12

Tmax_F_K_T7	14.641666666666670	7.209521271880467	12
2Tmax_F_K_T1	16.841666666666670	6.706232966879439	12
2Tmax_F_K_T2	15.375000000000002	6.310038899174149	12
2Tmax_F_K_T3	15.466666666666667	5.703002930408016	12
2Tmax_F_K_T4	16.716666666666665	6.899912164570493	12
2Tmax_F_K_T5	16.950	5.8527	12
2Tmax_F_K_T6	16.750000000000000	6.656439124500562	12
2Tmax_F_K_T7	16.741666666666664	6.975601418624429	12
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3Tmax_F_K_T2	16.008333333333333	5.504949563526417	12
3Tmax_F_K_T3	16.766666666666666	5.804909103247844	12
3Tmax_F_K_T4	17.099999999999998	6.421696179217903	12
3Tmax_F_K_T5	18.825000000000000	7.058215715810130	12
3Tmax_F_K_T6	18.466666666666670	6.367436095026194	12
3Tmax_F_K_T7	17.475000000000000	5.826448317800475	12

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.
shoe	Pillai's Trace	.185	1.137[b]	2.000	10.000	.359
	Wilks' Lambda	.815	1.137[b]	2.000	10.000	.359
	Hotelling's Trace	.227	1.137[b]	2.000	10.000	.359
	Roy's Largest Root	.227	1.137[b]	2.000	10.000	.359

time	Pillai's Trace	.759	3.144[b]	6.000	6.000	.095
	Wilks' Lambda	.241	3.144[b]	6.000	6.000	.095
	Hotelling's Trace	3.144	3.144[b]	6.000	6.000	.095
	Roy's Largest Root	3.144	3.144[b]	6.000	6.000	.095
shoe * time	Pillai's Trace	.[c]	.	.	.	.
	Wilks' Lambda	.[c]	.	.	.	.
	Hotelling's Trace	.[c]	.	.	.	.
	Roy's Largest Root	.[c]	.	.	.	.

Multivariate Tests[a]

Effect		Partial Eta Squared	Noncent. Parameter	Observed Power[d]
shoe	Pillai's Trace	.185	2.273	.197
	Wilks' Lambda	.185	2.273	.197
	Hotelling's Trace	.185	2.273	.197
	Roy's Largest Root	.185	2.273	.197
time	Pillai's Trace	.759	18.866	.520
	Wilks' Lambda	.759	18.866	.520
	Hotelling's Trace	.759	18.866	.520
	Roy's Largest Root	.759	18.866	.520
shoe * time	Pillai's Trace	.	.	.
	Wilks' Lambda	.	.	.
	Hotelling's Trace	.	.	.
	Roy's Largest Root	.	.	.

a. Design: Intercept
Within Subjects Design: shoe + time + shoe * time
b. Exact statistic
c. Cannot produce multivariate test statistics because of insufficient residual degrees of freedom.
d. Computed using alpha = .05

Mauchly's Test of Sphericity[a]

Measure: MEASURE_1

			df	Sig.	Epsilon[b]

Within Subjects Effect	Mauchly's W	Approx. Chi-Square			Greenhouse-Geisser
shoe	.895	1.115	2	.573	.905
time	.005	47.425	20	.001	.447
shoe * time	.000	.	77	.	.346

Mauchly's Test of Sphericity[a]

Measure: MEASURE_1

Within Subjects Effect	Epsilon Huynh-Feldt	Epsilon Lower-bound
shoe	1.000	.500
time	.604	.167
shoe * time	.581	.083

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.[a]

a. Design: Intercept
 Within Subjects Design: shoe + time + shoe * time

b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F
shoe	Sphericity Assumed	323.154	2	161.577	1.314
	Greenhouse-Geisser	323.154	1.809	178.618	1.314
	Huynh-Feldt	323.154	2.000	161.577	1.314
	Lower-bound	323.154	1.000	323.154	1.314
Error(shoe)	Sphericity Assumed	2704.804	22	122.946	
	Greenhouse-Geisser	2704.804	19.901	135.912	
	Huynh-Feldt	2704.804	22.000	122.946	
	Lower-bound	2704.804	11.000	245.891	
time	Sphericity Assumed	103.430	6	17.238	2.822
	Greenhouse-Geisser	103.430	2.680	38.591	2.822
	Huynh-Feldt	103.430	3.625	28.530	2.822
	Lower-bound	103.430	1.000	103.430	2.822
Error(time)	Sphericity Assumed	403.194	66	6.109	

	Greenhouse-Geisser	403.194	29.482	13.676	
	Huynh-Feldt	403.194	39.879	10.110	
	Lower-bound	403.194	11.000	36.654	
shoe * time	Sphericity Assumed	42.432	12	3.536	.604
	Greenhouse-Geisser	42.432	4.147	10.233	.604
	Huynh-Feldt	42.432	6.969	6.089	.604
	Lower-bound	42.432	1.000	42.432	.604
Error(shoe*time)	Sphericity Assumed	773.050	132	5.856	
	Greenhouse-Geisser	773.050	45.613	16.948	
	Huynh-Feldt	773.050	76.658	10.084	
	Lower-bound	773.050	11.000	70.277	

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[a]
shoe	Sphericity Assumed	.289	.107	2.628	.254
	Greenhouse-Geisser	.288	.107	2.378	.241
	Huynh-Feldt	.289	.107	2.628	.254
	Lower-bound	.276	.107	1.314	.182
Error(shoe)	Sphericity Assumed				
	Greenhouse-Geisser				
	Huynh-Feldt				
	Lower-bound				
time	Sphericity Assumed	.017	.204	16.931	.854
	Greenhouse-Geisser	.061	.204	7.563	.587
	Huynh-Feldt	.042	.204	10.230	.689
	Lower-bound	.121	.204	2.822	.335
Error(time)	Sphericity Assumed				
	Greenhouse-Geisser				
	Huynh-Feldt				
	Lower-bound				
shoe * time	Sphericity Assumed	.836	.052	7.245	.334
	Greenhouse-Geisser	.668	.052	2.504	.187
	Huynh-Feldt	.750	.052	4.208	.244
	Lower-bound	.454	.052	.604	.110
Error(shoe*time)	Sphericity Assumed				
	Greenhouse-Geisser				

	Huynh-Feldt				
	Lower-bound				

a. Computed using alpha = .05

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	shoe	time	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
shoe	Linear		46.085	1	46.085	2.333	.155	.175
	Quadratic		.080	1	.080	.005	.944	.000
Error(shoe)	Linear		217.244	11	19.749			
	Quadratic		169.157	11	15.378			
time		Level 1 vs. Level 2	99.003	1	99.003	9.015	.012	.450
		Level 2 vs. Level 3	1.284	1	1.284	.333	.575	.029
		Level 3 vs. Level 4	23.684	1	23.684	7.265	.021	.398
		Level 4 vs. Level 5	23.684	1	23.684	7.421	.020	.403
		Level 5 vs. Level 6	7.747	1	7.747	1.226	.292	.100
		Level 6 vs. Level 7	6.003	1	6.003	.337	.573	.030
Error(time)		Level 1 vs. Level 2	120.801	11	10.982			
		Level 2 vs. Level 3	42.396	11	3.854			
		Level 3 vs. Level 4	35.862	11	3.260			
		Level 4 vs. Level 5	35.109	11	3.192			
		Level 5 vs. Level 6	69.503	11	6.318			

		Level 6 vs. Level 7	195.754	11	17.796			
shoe * time	Linear	Level 1 vs. Level 2	49.594	1	49.594	2.316	.156	.174
		Level 2 vs. Level 3	6.510	1	6.510	.885	.367	.074
		Level 3 vs. Level 4	1.602	1	1.602	1.454	.253	.117
		Level 4 vs. Level 5	9.375	1	9.375	2.250	.162	.170
		Level 5 vs. Level 6	1.354	1	1.354	.169	.689	.015
		Level 6 vs. Level 7	3.527	1	3.527	.560	.470	.048
	Quadratic	Level 1 vs. Level 2	.661	1	.661	.070	.797	.006
		Level 2 vs. Level 3	.170	1	.170	.027	.873	.002
		Level 3 vs. Level 4	3.467	1	3.467	.557	.471	.048
		Level 4 vs. Level 5	6.009	1	6.009	.564	.468	.049
		Level 5 vs. Level 6	1.253	1	1.253	.118	.738	.011
		Level 6 vs. Level 7	2.880	1	2.880	.385	.548	.034
Error(shoe*time)	Linear	Level 1 vs. Level 2	235.511	11	21.410			
		Level 2 vs. Level 3	80.955	11	7.360			
		Level 3 vs. Level 4	12.118	11	1.102			
		Level 4 vs. Level 5	45.835	11	4.167			
		Level 5 vs. Level 6	88.341	11	8.031			
		Level 6 vs. Level 7	69.293	11	6.299			

	Quadratic	Level 1 vs. Level 2	104.280	11	9.480			
		Level 2 vs. Level 3	69.405	11	6.310			
		Level 3 vs. Level 4	68.506	11	6.228			
		Level 4 vs. Level 5	117.168	11	10.652			
		Level 5 vs. Level 6	116.892	11	10.627			
		Level 6 vs. Level 7	82.313	11	7.483			

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	shoe	time	Noncent. Parameter	Observed Power[a]
shoe	Linear		2.333	.287
	Quadratic		.005	.051
Error(shoe)	Linear			
	Quadratic			
time		Level 1 vs. Level 2	9.015	.780
		Level 2 vs. Level 3	.333	.083
		Level 3 vs. Level 4	7.265	.690
		Level 4 vs. Level 5	7.421	.699
		Level 5 vs. Level 6	1.226	.173
		Level 6 vs. Level 7	.337	.083
Error(time)		Level 1 vs. Level 2		
		Level 2 vs. Level 3		
		Level 3 vs. Level 4		
		Level 4 vs. Level 5		
		Level 5 vs. Level 6		
		Level 6 vs. Level 7		
shoe * time	Linear	Level 1 vs. Level 2	2.316	.285
		Level 2 vs. Level 3	.885	.138
		Level 3 vs. Level 4	1.454	.197
		Level 4 vs. Level 5	2.250	.278
		Level 5 vs. Level 6	.169	.066

		Level 6 vs. Level 7	.560	.105
	Quadratic	Level 1 vs. Level 2	.070	.057
		Level 2 vs. Level 3	.027	.053
		Level 3 vs. Level 4	.557	.105
		Level 4 vs. Level 5	.564	.106
		Level 5 vs. Level 6	.118	.061
		Level 6 vs. Level 7	.385	.088
Error(shoe*time)	Linear	Level 1 vs. Level 2		
		Level 2 vs. Level 3		
		Level 3 vs. Level 4		
		Level 4 vs. Level 5		
		Level 5 vs. Level 6		
		Level 6 vs. Level 7		
	Quadratic	Level 1 vs. Level 2		
		Level 2 vs. Level 3		
		Level 3 vs. Level 4		
		Level 4 vs. Level 5		
		Level 5 vs. Level 6		
		Level 6 vs. Level 7		

a. Computed using alpha = .05

Tests of Between-Subjects Effects

Measure: MEASURE_1

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	9611.001	1	9611.001	119.346	.000	.916
Error	885.837	11	80.531			

Tests of Between-Subjects Effects

Measure: MEASURE_1

Transformed Variable: Average

Source	Noncent. Parameter	Observed Power[a]
Intercept	119.346	1.000
Error		

a. Computed using alpha = .05

Estimated Marginal Means

1. Grand Mean

Measure: MEASURE_1

Mean	Std. Error	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
16.339	1.496	13.047	19.631

2. shoe

Estimates

Measure: MEASURE_1

shoe	Mean	Std. Error	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
1	14.920	1.945	10.640	19.200
2	16.406	1.716	12.629	20.183
3	17.692	1.706	13.936	21.448

Pairwise Comparisons

Measure: MEASURE_1

(I) shoe	(J) shoe	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	95% Confidence Interval for Difference[a] Upper Bound
1	2	-1.486	1.872	1.000	-6.766	3.794
	3	-2.771	1.814	.465	-7.888	2.345
2	1	1.486	1.872	1.000	-3.794	6.766
	3	-1.286	1.409	1.000	-5.259	2.687
3	1	2.771	1.814	.465	-2.345	7.888
	2	1.286	1.409	1.000	-2.687	5.259

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Pillai's trace	.185	1.137[a]	2.000	10.000	.359	.185
Wilks' lambda	.815	1.137[a]	2.000	10.000	.359	.185

Hotelling's trace	.227	1.137[a]	2.000	10.000	.359	.185
Roy's largest root	.227	1.137[a]	2.000	10.000	.359	.185

Multivariate Tests

	Noncent. Parameter	Observed Power[b]
Pillai's trace	2.273	.197
Wilks' lambda	2.273	.197
Hotelling's trace	2.273	.197
Roy's largest root	2.273	.197

Each F tests the multivariate effect of shoe. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

a. Exact statistic

b. Computed using alpha = .05

3. time

Estimates

Measure: MEASURE_1

time	Mean	Std. Error	95% Confidence Interval Lower Bound	Upper Bound
1	17.006	1.520	13.660	20.351
2	15.347	1.390	12.289	18.406
3	15.536	1.465	12.311	18.761
4	16.347	1.532	12.974	19.720
5	17.158	1.628	13.575	20.742
6	16.694	1.568	13.243	20.146
7	16.286	1.682	12.584	19.988

Pairwise Comparisons

Measure: MEASURE_1

(I) time	(J) time	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b] Lower Bound	Upper Bound
1	2	1.658	.552	.253	-.508	3.825
	3	1.469	.679	1.000	-1.196	4.135
	4	.658	.672	1.000	-1.978	3.295

	5	-.153	.807	1.000	-3.317	3.012
	6	.311	.639	1.000	-2.195	2.817
	7	.719	.995	1.000	-3.184	4.623
2	1	-1.658	.552	.253	-3.825	.508
	3	-.189	.327	1.000	-1.472	1.095
	4	-1.000	.439	.921	-2.724	.724
	5	-1.811	.596	.237	-4.151	.528
	6	-1.347*	.340	.047	-2.681	-.013
	7	-.939	.766	1.000	-3.945	2.067
3	1	-1.469	.679	1.000	-4.135	1.196
	2	.189	.327	1.000	-1.095	1.472
	4	-.811	.301	.437	-1.992	.369
	5	-1.622*	.376	.026	-3.097	-.147
	6	-1.158	.337	.116	-2.479	.162
	7	-.750	.534	1.000	-2.843	1.343
4	1	-.658	.672	1.000	-3.295	1.978
	2	1.000	.439	.921	-.724	2.724
	3	.811	.301	.437	-.369	1.992
	5	-.811	.298	.416	-1.979	.357
	6	-.347	.384	1.000	-1.856	1.161
	7	.061	.734	1.000	-2.819	2.941
5	1	.153	.807	1.000	-3.012	3.317
	2	1.811	.596	.237	-.528	4.151
	3	1.622*	.376	.026	.147	3.097
	4	.811	.298	.416	-.357	1.979
	6	.464	.419	1.000	-1.180	2.107
	7	.872	.653	1.000	-1.688	3.433
6	1	-.311	.639	1.000	-2.817	2.195
	2	1.347*	.340	.047	.013	2.681
	3	1.158	.337	.116	-.162	2.479
	4	.347	.384	1.000	-1.161	1.856
	5	-.464	.419	1.000	-2.107	1.180
	7	.408	.703	1.000	-2.350	3.166
7	1	-.719	.995	1.000	-4.623	3.184
	2	.939	.766	1.000	-2.067	3.945
	3	.750	.534	1.000	-1.343	2.843
	4	-.061	.734	1.000	-2.941	2.819
	5	-.872	.653	1.000	-3.433	1.688

6	-.408	.703	1.000	-3.166	2.350

Based on estimated marginal means
*. The mean difference is significant at the .05 level.
b. Adjustment for multiple comparisons: Bonferroni.

Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Pillai's trace	.759	3.144[a]	6.000	6.000	.095	.759
Wilks' lambda	.241	3.144[a]	6.000	6.000	.095	.759
Hotelling's trace	3.144	3.144[a]	6.000	6.000	.095	.759
Roy's largest root	3.144	3.144[a]	6.000	6.000	.095	.759

Multivariate Tests

	Noncent. Parameter	Observed Power[b]
Pillai's trace	18.866	.520
Wilks' lambda	18.866	.520
Hotelling's trace	18.866	.520
Roy's largest root	18.866	.520

Each F tests the multivariate effect of time. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.
a. Exact statistic
b. Computed using alpha = .05

4. shoe * time

Measure: MEASURE_1

				95% Confidence Interval	
shoe	time	Mean	Std. Error	Lower Bound	Upper Bound
1	1	14.975	1.793	11.028	18.922
	2	14.658	1.606	11.124	18.193
	3	14.375	1.991	9.993	18.757
	4	15.225	2.132	10.532	19.918
	5	15.700	2.178	10.906	20.494

	6	14.867	2.145	10.145	19.589
	7	14.642	2.081	10.061	19.222
2	1	16.842	1.936	12.581	21.103
	2	15.375	1.822	11.366	19.384
	3	15.467	1.646	11.843	19.090
	4	16.717	1.992	12.333	21.101
	5	16.950	1.690	13.231	20.669
	6	16.750	1.922	12.521	20.979
	7	16.742	2.014	12.310	21.174
3	1	19.200	2.218	14.318	24.082
	2	16.008	1.589	12.511	19.506
	3	16.767	1.676	13.078	20.455
	4	17.100	1.854	13.020	21.180
	5	18.825	2.038	14.340	23.310
	6	18.467	1.838	14.421	22.512
	7	17.475	1.682	13.773	21.177

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General Linear Model

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	Cases Used	Statistics are based on all cases with valid data for all variables in the model.

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Within-Subjects Factors

Measure: MEASURE_1

shoe	time	Dependent Variable
1	1	Tangle_S_K_T1
	2	Tangle_S_K_T2
	3	Tangle_S_K_T3
	4	Tangle_S_K_T4
	5	Tangle_S_K_T5
	6	Tangle_S_K_T6
	7	Tangle_S_K_T7
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	3	@2Tangle_S_K_T3
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	5	@2Tangle_S_K_T5
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	7	@2Tangle_S_K_T7
3	1	@3Tangle_S_K_T1
	2	@3Tangle_S_K_T2
	3	@3Tangle_S_K_T3
	4	@3Tangle_S_K_T4
	5	@3Tangle_S_K_T5
	6	@3Tangle_S_K_T6

Within-Subjects Factors

Measure: MEASURE_1

shoe	time	Dependent Variable
3	7	@3Tangle_S_K_T7

Descriptive Statistics

	Mean	Std. Deviation	N
Tangle_S_K_T1	-20.266520483333334	7.061189771704641	12
Tangle_S_K_T2	-22.232347416666663	7.231296115934798	12
Tangle_S_K_T3	-21.600859783333327	6.509493369927354	12

Tangle_S_K_T4	-21.201553875000000	7.274280922031673	12
Tangle_S_K_T5	-19.713515808333334	7.688603497238464	12
Tangle_S_K_T6	-21.094291683333335	6.355691352499751	12
Tangle_S_K_T7	-20.762027491666670	6.983635336736119	12
2Tangle_S_K_T1	-21.218069916666660	6.831427073567472	12
2Tangle_S_K_T2	-23.799978175000000	6.329800259375196	12
2Tangle_S_K_T3	-23.581506533333332	7.529507802044573	12
2Tangle_S_K_T4	-22.309802525000000	6.866970863359779	12
2Tangle_S_K_T5	-22.052444808333330	6.832109402180735	12
2Tangle_S_K_T6	-20.550826883333336	6.986891994486340	12
2Tangle_S_K_T7	-21.163799816666668	8.022521623444018	12
3Tangle_S_K_T1	-20.465598775000000	5.515237525163736	12
3Tangle_S_K_T2	-21.312547558333335	5.282846191549883	12

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3Tangle_S_K_T 4	-21.510123858333330	5.923055803912940	12
3Tangle_S_K_T 5	-21.693606225000000	6.087311137033954	12
3Tangle_S_K_T 6	-19.891791516666668	7.167286140948357	12
3Tangle_S_K_T 7	-21.219244141666668	6.870665598274596	12

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.
shoe	Pillai's Trace	.142	.830[b]	2.000	10.000	.464
	Wilks' Lambda	.858	.830[b]	2.000	10.000	.464
	Hotelling's Trace	.166	.830[b]	2.000	10.000	.464
	Roy's Largest Root	.166	.830[b]	2.000	10.000	.464
time	Pillai's Trace	.909	9.976[b]	6.000	6.000	.007
	Wilks' Lambda	.091	9.976[b]	6.000	6.000	.007
	Hotelling's Trace	9.976	9.976[b]	6.000	6.000	.007
	Roy's Largest Root	9.976	9.976[b]	6.000	6.000	.007
shoe * time	Pillai's Trace	.[c]	.	.	.	.
	Wilks' Lambda	.[c]	.	.	.	.
	Hotelling's Trace	.[c]	.	.	.	.
	Roy's Largest Root	.[c]	.	.	.	.

Multivariate Tests[a]

Effect		Partial Eta Squared	Noncent. Parameter	Observed Power[d]

shoe	Pillai's Trace	.142	1.659	.154
	Wilks' Lambda	.142	1.659	.154
	Hotelling's Trace	.142	1.659	.154
	Roy's Largest Root	.142	1.659	.154
time	Pillai's Trace	.909	59.854	.962
	Wilks' Lambda	.909	59.854	.962
	Hotelling's Trace	.909	59.854	.962
	Roy's Largest Root	.909	59.854	.962
shoe * time	Pillai's Trace	.	.	.
	Wilks' Lambda	.	.	.
	Hotelling's Trace	.	.	.
	Roy's Largest Root	.	.	.

a. Design: Intercept
Within Subjects Design: shoe + time + shoe * time
b. Exact statistic
c. Cannot produce multivariate test statistics because of insufficient residual degrees of freedom.
d. Computed using alpha = .05

Mauchly's Test of Sphericity[a]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[b] Greenhouse-Geisser
shoe	.915	.886	2	.642	.922
time	.107	19.611	20	.514	.617
shoe * time	.000	.	77	.	.327

Mauchly's Test of Sphericity[a]

Measure: MEASURE_1

	Epsilon	
Within Subjects Effect	Huynh-Feldt	Lower-bound
shoe	1.000	.500
time	.970	.167
shoe * time	.532	.083

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.[a]
a. Design: Intercept
 Within Subjects Design: shoe + time + shoe * time
b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F
shoe	Sphericity Assumed	66.150	2	33.075	.665
	Greenhouse-Geisser	66.150	1.844	35.880	.665
	Huynh-Feldt	66.150	2.000	33.075	.665
	Lower-bound	66.150	1.000	66.150	.665
Error(shoe)	Sphericity Assumed	1093.936	22	49.724	
	Greenhouse-Geisser	1093.936	20.280	53.941	
	Huynh-Feldt	1093.936	22.000	49.724	
	Lower-bound	1093.936	11.000	99.449	
time	Sphericity Assumed	116.204	6	19.367	5.337
	Greenhouse-Geisser	116.204	3.704	31.373	5.337
	Huynh-Feldt	116.204	5.818	19.974	5.337
	Lower-bound	116.204	1.000	116.204	5.337
Error(time)	Sphericity Assumed	239.490	66	3.629	
	Greenhouse-Geisser	239.490	40.743	5.878	
	Huynh-Feldt	239.490	63.995	3.742	
	Lower-bound	239.490	11.000	21.772	
shoe * time	Sphericity Assumed	73.241	12	6.103	1.508
	Greenhouse-Geisser	73.241	3.928	18.646	1.508
	Huynh-Feldt	73.241	6.382	11.475	1.508
	Lower-bound	73.241	1.000	73.241	1.508
Error(shoe*time)	Sphericity Assumed	534.164	132	4.047	
	Greenhouse-Geisser	534.164	43.209	12.362	
	Huynh-Feldt	534.164	70.207	7.608	
	Lower-bound	534.164	11.000	48.560	

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[a]
shoe	Sphericity Assumed	.524	.057	1.330	.147
	Greenhouse-Geisser	.513	.057	1.226	.143
	Huynh-Feldt	.524	.057	1.330	.147
	Lower-bound	.432	.057	.665	.116
Error(shoe)	Sphericity Assumed				
	Greenhouse-Geisser				
	Huynh-Feldt				
	Lower-bound				
time	Sphericity Assumed	.000	.327	32.024	.992
	Greenhouse-Geisser	.002	.327	19.769	.944
	Huynh-Feldt	.000	.327	31.051	.991
	Lower-bound	.041	.327	5.337	.558
Error(time)	Sphericity Assumed				
	Greenhouse-Geisser				
	Huynh-Feldt				
	Lower-bound				
shoe * time	Sphericity Assumed	.129	.121	18.099	.783
	Greenhouse-Geisser	.217	.121	5.924	.423
	Huynh-Feldt	.184	.121	9.626	.565
	Lower-bound	.245	.121	1.508	.202
Error(shoe*time)	Sphericity Assumed				
	Greenhouse-Geisser				
	Huynh-Feldt				
	Lower-bound				

a. Computed using alpha = .05

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	shoe	time	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
shoe	Linear		.021	1	.021	.002	.963	.000
	Quadratic		9.429	1	9.429	1.813	.205	.141

Error(shoe)	Linear		99.056	11	9.005			
	Quadra tic		57.220	11	5.202			
time		Level 1 vs. Level 2	116.410	1	116.410	37.26 9	.000	.772
		Level 2 vs. Level 3	3.786	1	3.786	.760	.402	.065
		Level 3 vs. Level 4	7.296	1	7.296	1.460	.252	.117
		Level 4 vs. Level 5	9.758	1	9.758	1.917	.194	.148
		Level 5 vs. Level 6	14.786	1	14.786	2.136	.172	.163
		Level 6 vs. Level 7	10.345	1	10.345	1.210	.295	.099
Error(time)		Level 1 vs. Level 2	34.358	11	3.123			
		Level 2 vs. Level 3	54.788	11	4.981			
		Level 3 vs. Level 4	54.953	11	4.996			
		Level 4 vs. Level 5	55.998	11	5.091			
		Level 5 vs. Level 6	76.145	11	6.922			
		Level 6 vs. Level 7	94.063	11	8.551			
shoe * time	Linear	Level 1 vs. Level 2	7.511	1	7.511	1.010	.337	.084
		Level 2 vs. Level 3	1.552	1	1.552	.358	.562	.032
		Level 3 vs. Level 4	3.109	1	3.109	.751	.405	.064
		Level 4 vs. Level 5	16.764	1	16.764	2.062	.179	.158
		Level 5 vs. Level 6	60.773	1	60.773	2.983	.112	.213
		Level 6 vs. Level 7	16.528	1	16.528	5.313	.042	.326

	Quadratic	Level 1 vs. Level 2	11.055	1	11.055	1.844	.202	.144
		Level 2 vs. Level 3	.202	1	.202	.080	.783	.007
		Level 3 vs. Level 4	12.149	1	12.149	5.860	.034	.348
		Level 4 vs. Level 5	1.248	1	1.248	.420	.530	.037
		Level 5 vs. Level 6	13.335	1	13.335	2.726	.127	.199
		Level 6 vs. Level 7	.106	1	.106	.020	.890	.002
Error(shoe*time)	Linear	Level 1 vs. Level 2	81.821	11	7.438			
		Level 2 vs. Level 3	47.674	11	4.334			
		Level 3 vs. Level 4	45.517	11	4.138			
		Level 4 vs. Level 5	89.422	11	8.129			
		Level 5 vs. Level 6	224.069	11	20.370			
		Level 6 vs. Level 7	34.222	11	3.111			
	Quadratic	Level 1 vs. Level 2	65.946	11	5.995			
		Level 2 vs. Level 3	27.757	11	2.523			
		Level 3 vs. Level 4	22.803	11	2.073			
		Level 4 vs. Level 5	32.649	11	2.968			
		Level 5 vs. Level 6	53.819	11	4.893			
		Level 6 vs. Level 7	58.545	11	5.322			

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	shoe	time	Noncent. Parameter	Observed Power[a]
shoe	Linear		.002	.050
	Quadratic		1.813	.234
Error(shoe)	Linear			
	Quadratic			
time		Level 1 vs. Level 2	37.269	1.000
		Level 2 vs. Level 3	.760	.125
		Level 3 vs. Level 4	1.460	.197
		Level 4 vs. Level 5	1.917	.244
		Level 5 vs. Level 6	2.136	.267
		Level 6 vs. Level 7	1.210	.172
Error(time)		Level 1 vs. Level 2		
		Level 2 vs. Level 3		
		Level 3 vs. Level 4		
		Level 4 vs. Level 5		
		Level 5 vs. Level 6		
		Level 6 vs. Level 7		
shoe * time	Linear	Level 1 vs. Level 2	1.010	.151
		Level 2 vs. Level 3	.358	.085
		Level 3 vs. Level 4	.751	.125
		Level 4 vs. Level 5	2.062	.259
		Level 5 vs. Level 6	2.983	.351
		Level 6 vs. Level 7	5.313	.556
	Quadratic	Level 1 vs. Level 2	1.844	.237
		Level 2 vs. Level 3	.080	.058
		Level 3 vs. Level 4	5.860	.598
		Level 4 vs. Level 5	.420	.091
		Level 5 vs. Level 6	2.726	.326
		Level 6 vs. Level 7	.020	.052
Error(shoe*time)	Linear	Level 1 vs. Level 2		
		Level 2 vs. Level 3		
		Level 3 vs. Level 4		
		Level 4 vs. Level 5		
		Level 5 vs. Level 6		
		Level 6 vs. Level 7		
	Quadratic	Level 1 vs. Level 2		
		Level 2 vs. Level 3		

		Level 3 vs. Level 4		
		Level 4 vs. Level 5		
		Level 5 vs. Level 6		
		Level 6 vs. Level 7		

a. Computed using alpha = .05

Tests of Between-Subjects Effects

Measure: MEASURE_1

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	16444.771	1	16444.771	146.078	.000	.930
Error	1238.325	11	112.575			

Tests of Between-Subjects Effects

Measure: MEASURE_1

Transformed Variable: Average

Source	Noncent. Parameter	Observed Power[a]
Intercept	146.078	1.000
Error		

a. Computed using alpha = .05

Estimated Marginal Means

1. Grand Mean

Measure: MEASURE_1

Mean	Std. Error	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
-21.373	1.768	-25.265	-17.481

2. shoe

Estimates

Measure: MEASURE_1

shoe	Mean	Std. Error	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
1	-20.982	1.946	-25.265	-16.698

2	-22.097	1.979	-26.452	-17.742
3	-21.040	1.692	-24.764	-17.316

Pairwise Comparisons

Measure: MEASURE_1

(I) shoe	(J) shoe	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	Upper Bound
1	2	1.115	1.069	.958	-1.900	4.130
	3	.059	1.225	1.000	-3.396	3.514
2	1	-1.115	1.069	.958	-4.130	1.900
	3	-1.056	.953	.874	-3.743	1.631
3	1	-.059	1.225	1.000	-3.514	3.396
	2	1.056	.953	.874	-1.631	3.743

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Pillai's trace	.142	.830[a]	2.000	10.000	.464	.142
Wilks' lambda	.858	.830[a]	2.000	10.000	.464	.142
Hotelling's trace	.166	.830[a]	2.000	10.000	.464	.142
Roy's largest root	.166	.830[a]	2.000	10.000	.464	.142

Multivariate Tests

	Noncent. Parameter	Observed Power[b]
Pillai's trace	1.659	.154
Wilks' lambda	1.659	.154
Hotelling's trace	1.659	.154
Roy's largest root	1.659	.154

Each F tests the multivariate effect of shoe. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

a. Exact statistic

b. Computed using alpha = .05

3. time

Estimates

Measure: MEASURE_1

time	Mean	Std. Error	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
1	-20.650	1.774	-24.555	-16.745
2	-22.448	1.724	-26.242	-18.655
3	-22.124	1.775	-26.030	-18.218
4	-21.674	1.775	-25.582	-17.766
5	-21.153	1.771	-25.051	-17.256
6	-20.512	1.754	-24.372	-16.652
7	-21.048	1.965	-25.374	-16.723

Pairwise Comparisons

Measure: MEASURE_1

(I) time	(J) time	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b] Lower Bound	95% Confidence Interval for Difference[b] Upper Bound
1	2	1.798*	.295	.002	.643	2.954
	3	1.474	.527	.365	-.593	3.541
	4	1.024	.521	1.000	-1.019	3.066
	5	.503	.542	1.000	-1.623	2.629
	6	-.138	.541	1.000	-2.259	1.983
	7	.398	.653	1.000	-2.161	2.958
2	1	-1.798*	.295	.002	-2.954	-.643
	3	-.324	.372	1.000	-1.783	1.135
	4	-.774	.431	1.000	-2.465	.916
	5	-1.295	.371	.107	-2.752	.161
	6	-1.936*	.447	.025	-3.689	-.183
	7	-1.400	.455	.222	-3.186	.386
3	1	-1.474	.527	.365	-3.541	.593
	2	.324	.372	1.000	-1.135	1.783
	4	-.450	.373	1.000	-1.912	1.011
	5	-.971	.312	.207	-2.193	.252
	6	-1.612*	.370	.024	-3.064	-.160
	7	-1.076	.480	.979	-2.959	.808

4	1	-1.024	.521	1.000	-3.066	1.019
	2	.774	.431	1.000	-.916	2.465
	3	.450	.373	1.000	-1.011	1.912
	5	-.521	.376	1.000	-1.996	.955
	6	-1.162	.338	.117	-2.489	.166
	7	-.625	.520	1.000	-2.667	1.416
5	1	-.503	.542	1.000	-2.629	1.623
	2	1.295	.371	.107	-.161	2.752
	3	.971	.312	.207	-.252	2.193
	4	.521	.376	1.000	-.955	1.996
	6	-.641	.439	1.000	-2.361	1.079
	7	-.105	.397	1.000	-1.661	1.451
6	1	.138	.541	1.000	-1.983	2.259
	2	1.936*	.447	.025	.183	3.689
	3	1.612*	.370	.024	.160	3.064
	4	1.162	.338	.117	-.166	2.489
	5	.641	.439	1.000	-1.079	2.361
	7	.536	.487	1.000	-1.376	2.448
7	1	-.398	.653	1.000	-2.958	2.161
	2	1.400	.455	.222	-.386	3.186
	3	1.076	.480	.979	-.808	2.959
	4	.625	.520	1.000	-1.416	2.667
	5	.105	.397	1.000	-1.451	1.661
	6	-.536	.487	1.000	-2.448	1.376

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

b. Adjustment for multiple comparisons: Bonferroni.

Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Pillai's trace	.909	9.976[a]	6.000	6.000	.007	.909
Wilks' lambda	.091	9.976[a]	6.000	6.000	.007	.909
Hotelling's trace	9.976	9.976[a]	6.000	6.000	.007	.909
Roy's largest root	9.976	9.976[a]	6.000	6.000	.007	.909

Multivariate Tests

	Noncent. Parameter	Observed Power[b]
Pillai's trace	59.854	.962
Wilks' lambda	59.854	.962
Hotelling's trace	59.854	.962
Roy's largest root	59.854	.962

Each F tests the multivariate effect of time. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

a. Exact statistic

b. Computed using alpha = .05

4. shoe * time

Measure: MEASURE_1

				95% Confidence Interval	
shoe	time	Mean	Std. Error	Lower Bound	Upper Bound
1	1	-20.267	2.038	-24.753	-15.780
	2	-22.232	2.087	-26.827	-17.638
	3	-21.601	1.879	-25.737	-17.465
	4	-21.202	2.100	-25.823	-16.580
	5	-19.714	2.220	-24.599	-14.828
	6	-21.094	1.835	-25.133	-17.056
	7	-20.762	2.016	-25.199	-16.325
2	1	-21.218	1.972	-25.559	-16.878
	2	-23.800	1.827	-27.822	-19.778
	3	-23.582	2.174	-28.366	-18.797
	4	-22.310	1.982	-26.673	-17.947
	5	-22.052	1.972	-26.393	-17.712
	6	-20.551	2.017	-24.990	-16.112
	7	-21.164	2.316	-26.261	-16.067
3	1	-20.466	1.592	-23.970	-16.961
	2	-21.313	1.525	-24.669	-17.956
	3	-21.190	1.648	-24.818	-17.562
	4	-21.510	1.710	-25.273	-17.747
	5	-21.694	1.757	-25.561	-17.826
	6	-19.892	2.069	-24.446	-15.338
	7	-21.219	1.983	-25.585	-16.854

```
GLM MinA_S_K_T1 MinA_S_K_T2 MinA_S_K_T3 MinA_S_K_T4 MinA_S_K_T5
MinA_S_K_T6 MinA_S_K_T7
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@2MinA_S_K_T5 @2MinA_S_K_T6 @2MinA_S_K_T7
    @3MinA_S_K_T1 @3MinA_S_K_T2 @3MinA_S_K_T3 @3MinA_S_K_T4
@3MinA_S_K_T5 @3MinA_S_K_T6 @3MinA_S_K_T7
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  /METHOD=SSTYPE(3)
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  /EMMEANS=TABLES(shoe) COMPARE ADJ(BONFERRONI)
  /EMMEANS=TABLES(time) COMPARE ADJ(BONFERRONI)
  /EMMEANS=TABLES(shoe*time)
  /PRINT=DESCRIPTIVE ETASQ OPOWER
  /CRITERIA=ALPHA(.05)
  /WSDESIGN=shoe time shoe*time.
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General Linear Model

Notes

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Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on all cases with valid data for all variables in the model.

Syntax	GLM MinA_S_K_T1 MinA_S_K_T2 MinA_S_K_T3 MinA_S_K_T4 MinA_S_K_T5 MinA_S_K_T6 MinA_S_K_T7 @2MinA_S_K_T1 @2MinA_S_K_T2 @2MinA_S_K_T3 @2MinA_S_K_T4 @2MinA_S_K_T5 @2MinA_S_K_T6 @2MinA_S_K_T7 @3MinA_S_K_T1 @3MinA_S_K_T2 @3MinA_S_K_T3 @3MinA_S_K_T4 @3MinA_S_K_T5 @3MinA_S_K_T6 @3MinA_S_K_T7 /WSFACTOR=shoe 3 Polynomial time 7 Repeated /METHOD=SSTYPE(3) /EMMEANS=TABLES(OVERALL) /EMMEANS=TABLES(shoe) COMPARE ADJ(BONFERRONI) /EMMEANS=TABLES(time) COMPARE ADJ(BONFERRONI) /EMMEANS=TABLES(shoe*time)

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Within-Subjects Factors

Measure: MEASURE_1

shoe	time	Dependent Variable
1	1	MinA_S_K_T1
	2	MinA_S_K_T2
	3	MinA_S_K_T3
	4	MinA_S_K_T4
	5	MinA_S_K_T5
	6	MinA_S_K_T6
	7	MinA_S_K_T7
2	1	@2MinA_S_K_T1
	2	@2MinA_S_K_T2
	3	@2MinA_S_K_T3
	4	@2MinA_S_K_T4
	5	@2MinA_S_K_T5

	6	@2MinA_S_K_T6
	7	@2MinA_S_K_T7
3	1	@3MinA_S_K_T1
	2	@3MinA_S_K_T2
	3	@3MinA_S_K_T3
	4	@3MinA_S_K_T4
	5	@3MinA_S_K_T5
	6	@3MinA_S_K_T6

Within-Subjects Factors

Measure: MEASURE_1

shoe	time	Dependent Variable
3	7	@3MinA_S_K_T7

Descriptive Statistics

	Mean	Std. Deviation	N
MinA_S_K_T1	-46.043763100000010	5.505344487508205	12
MinA_S_K_T2	-47.041951816666670	6.770073504008711	12
MinA_S_K_T3	-46.473115924999995	5.589802102897044	12
MinA_S_K_T4	-46.452099266666664	5.708699075965912	12

MinA_S_K_T5	-46.926050766666680	5.677616103238312	12
MinA_S_K_T6	-47.790368466666660	5.181000941179267	12
MinA_S_K_T7	-47.152119916666660	5.755035458836360	12
2MinA_S_K_T1	-46.800648850000000	5.642000262337671	12
2MinA_S_K_T2	-47.784474275000000	6.006823036576546	12
2MinA_S_K_T3	-47.776965258333330	5.833269568140532	12
2MinA_S_K_T4	-47.893472983333340	5.654242457079707	12
2MinA_S_K_T5	-47.970908116666670	5.729938981361428	12
2MinA_S_K_T6	-47.771941666666660	5.875006449280532	12
2MinA_S_K_T7	-47.810941600000000	5.710096768386785	12
3MinA_S_K_T1	-45.197955691666664	3.967586600715454	12
3MinA_S_K_T2	-45.048043758333336	4.134725312587383	12
3MinA_S_K_T3	-45.403367125000010	4.364180074156965	12

3MinA_S_K_T4	-45.633419150000010	4.000266063908335	12
3MinA_S_K_T5	-45.604000974999990	3.920206970833776	12
3MinA_S_K_T6	-46.210936916666660	3.831993887859111	12
3MinA_S_K_T7	-45.560892933333335	4.984908524347816	12

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.
shoe	Pillai's Trace	.457	4.200[b]	2.000	10.000	.047
	Wilks' Lambda	.543	4.200[b]	2.000	10.000	.047
	Hotelling's Trace	.840	4.200[b]	2.000	10.000	.047
	Roy's Largest Root	.840	4.200[b]	2.000	10.000	.047
time	Pillai's Trace	.516	1.065[b]	6.000	6.000	.471
	Wilks' Lambda	.484	1.065[b]	6.000	6.000	.471
	Hotelling's Trace	1.065	1.065[b]	6.000	6.000	.471
	Roy's Largest Root	1.065	1.065[b]	6.000	6.000	.471
shoe * time	Pillai's Trace	.[c]	.	.	.	.
	Wilks' Lambda	.[c]	.	.	.	.
	Hotelling's Trace	.[c]	.	.	.	.
	Roy's Largest Root	.[c]	.	.	.	.

Multivariate Tests[a]

Effect		Partial Eta Squared	Noncent. Parameter	Observed Power[d]
shoe	Pillai's Trace	.457	8.400	.597
	Wilks' Lambda	.457	8.400	.597
	Hotelling's Trace	.457	8.400	.597

	Roy's Largest Root	.457	8.400	.597
time	Pillai's Trace	.516	6.388	.195
	Wilks' Lambda	.516	6.388	.195
	Hotelling's Trace	.516	6.388	.195
	Roy's Largest Root	.516	6.388	.195
shoe * time	Pillai's Trace	.	.	.
	Wilks' Lambda	.	.	.
	Hotelling's Trace	.	.	.
	Roy's Largest Root	.	.	.

a. Design: Intercept
Within Subjects Design: shoe + time + shoe * time
b. Exact statistic
c. Cannot produce multivariate test statistics because of insufficient residual degrees of freedom.
d. Computed using alpha = .05

Mauchly's Test of Sphericity[a]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[b] Greenhouse-Geisser
shoe	.831	1.855	2	.396	.855
time	.055	25.403	20	.213	.542
shoe * time	.000	.	77	.	.323

Mauchly's Test of Sphericity[a]

Measure: MEASURE_1

	Epsilon	
Within Subjects Effect	Huynh-Feldt	Lower-bound
shoe	.997	.500
time	.796	.167
shoe * time	.522	.083

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.[a]
a. Design: Intercept
Within Subjects Design: shoe + time + shoe * time

b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F
shoe	Sphericity Assumed	199.847	2	99.924	2.817
	Greenhouse-Geisser	199.847	1.710	116.841	2.817
	Huynh-Feldt	199.847	1.994	100.216	2.817
	Lower-bound	199.847	1.000	199.847	2.817
Error(shoe)	Sphericity Assumed	780.351	22	35.471	
	Greenhouse-Geisser	780.351	18.815	41.476	
	Huynh-Feldt	780.351	21.936	35.574	
	Lower-bound	780.351	11.000	70.941	
time	Sphericity Assumed	30.485	6	5.081	2.501
	Greenhouse-Geisser	30.485	3.251	9.377	2.501
	Huynh-Feldt	30.485	4.776	6.382	2.501
	Lower-bound	30.485	1.000	30.485	2.501
Error(time)	Sphericity Assumed	134.103	66	2.032	
	Greenhouse-Geisser	134.103	35.761	3.750	
	Huynh-Feldt	134.103	52.540	2.552	
	Lower-bound	134.103	11.000	12.191	
shoe * time	Sphericity Assumed	14.586	12	1.215	.950
	Greenhouse-Geisser	14.586	3.880	3.759	.950
	Huynh-Feldt	14.586	6.258	2.331	.950
	Lower-bound	14.586	1.000	14.586	.950
Error(shoe*time)	Sphericity Assumed	168.806	132	1.279	
	Greenhouse-Geisser	168.806	42.679	3.955	
	Huynh-Feldt	168.806	68.841	2.452	
	Lower-bound	168.806	11.000	15.346	

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[a]
shoe	Sphericity Assumed	.081	.204	5.634	.496

	Greenhouse-Geisser	.092	.204	4.818	.453
	Huynh-Feldt	.082	.204	5.618	.495
	Lower-bound	.121	.204	2.817	.335
Error(shoe)	Sphericity Assumed				
	Greenhouse-Geisser				
	Huynh-Feldt				
	Lower-bound				
time	Sphericity Assumed	.031	.185	15.004	.801
	Greenhouse-Geisser	.071	.185	8.129	.593
	Huynh-Feldt	.044	.185	11.944	.724
	Lower-bound	.142	.185	2.501	.303
Error(time)	Sphericity Assumed				
	Greenhouse-Geisser				
	Huynh-Feldt				
	Lower-bound				
shoe * time	Sphericity Assumed	.499	.080	11.405	.533
	Greenhouse-Geisser	.442	.080	3.688	.271
	Huynh-Feldt	.468	.080	5.948	.358
	Lower-bound	.351	.080	.950	.145
Error(shoe*time)	Sphericity Assumed				
	Greenhouse-Geisser				
	Huynh-Feldt				
	Lower-bound				

a. Computed using alpha = .05

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	shoe	time	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
shoe	Linear		10.411	1	10.411	2.257	.161	.170
	Quadratic		18.138	1	18.138	3.285	.097	.230
Error(shoe)	Linear		50.735	11	4.612			
	Quadratic		60.743	11	5.522			

time		Level 1 vs. Level 2	13.426	1	13.426	2.736	.126	.199
		Level 2 vs. Level 3	.195	1	.195	.109	.748	.010
		Level 3 vs. Level 4	.424	1	.424	.499	.495	.043
		Level 4 vs. Level 5	1.090	1	1.090	.751	.405	.064
		Level 5 vs. Level 6	6.475	1	6.475	.761	.402	.065
		Level 6 vs. Level 7	6.243	1	6.243	.956	.349	.080
Error(time)		Level 1 vs. Level 2	53.980	11	4.907			
		Level 2 vs. Level 3	19.798	11	1.800			
		Level 3 vs. Level 4	9.348	11	.850			
		Level 4 vs. Level 5	15.968	11	1.452			
		Level 5 vs. Level 6	93.616	11	8.511			
		Level 6 vs. Level 7	71.837	11	6.531			
shoe * time	Linear	Level 1 vs. Level 2	7.909	1	7.909	2.966	.113	.212
		Level 2 vs. Level 3	5.124	1	5.124	1.738	.214	.136
		Level 3 vs. Level 4	.378	1	.378	.471	.507	.041
		Level 4 vs. Level 5	1.520	1	1.520	1.370	.267	.111
		Level 5 vs. Level 6	.397	1	.397	.451	.516	.039
		Level 6 vs. Level 7	.001	1	.001	.001	.982	.000
	Quadratic	Level 1 vs. Level 2	2.506	1	2.506	1.053	.327	.087

		Level 2 vs. Level 3	.079	1	.079	.039	.847	.004
		Level 3 vs. Level 4	.001	1	.001	.004	.949	.000
		Level 4 vs. Level 5	.168	1	.168	.180	.679	.016
		Level 5 vs. Level 6	6.988	1	6.988	.960	.348	.080
		Level 6 vs. Level 7	3.734	1	3.734	.556	.471	.048
Error(shoe* time)	Linear	Level 1 vs. Level 2	29.335	11	2.667			
		Level 2 vs. Level 3	32.425	11	2.948			
		Level 3 vs. Level 4	8.829	11	.803			
		Level 4 vs. Level 5	12.210	11	1.110			
		Level 5 vs. Level 6	9.684	11	.880			
		Level 6 vs. Level 7	17.241	11	1.567			
	Quadratic	Level 1 vs. Level 2	26.168	11	2.379			
		Level 2 vs. Level 3	22.147	11	2.013			
		Level 3 vs. Level 4	2.906	11	.264			
		Level 4 vs. Level 5	10.244	11	.931			
		Level 5 vs. Level 6	80.102	11	7.282			
		Level 6 vs. Level 7	73.850	11	6.714			

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	shoe	time	Noncent. Parameter	Observed Power[a]

shoe	Linear		2.257	.279
	Quadratic		3.285	.380
Error(shoe)	Linear			
	Quadratic			
time		Level 1 vs. Level 2	2.736	.327
		Level 2 vs. Level 3	.109	.060
		Level 3 vs. Level 4	.499	.099
		Level 4 vs. Level 5	.751	.125
		Level 5 vs. Level 6	.761	.126
		Level 6 vs. Level 7	.956	.145
Error(time)		Level 1 vs. Level 2		
		Level 2 vs. Level 3		
		Level 3 vs. Level 4		
		Level 4 vs. Level 5		
		Level 5 vs. Level 6		
		Level 6 vs. Level 7		
shoe * time	Linear	Level 1 vs. Level 2	2.966	.349
		Level 2 vs. Level 3	1.738	.226
		Level 3 vs. Level 4	.471	.096
		Level 4 vs. Level 5	1.370	.188
		Level 5 vs. Level 6	.451	.094
		Level 6 vs. Level 7	.001	.050
	Quadratic	Level 1 vs. Level 2	1.053	.155
		Level 2 vs. Level 3	.039	.054
		Level 3 vs. Level 4	.004	.050
		Level 4 vs. Level 5	.180	.067
		Level 5 vs. Level 6	.960	.146
		Level 6 vs. Level 7	.556	.105
Error(shoe*time)	Linear	Level 1 vs. Level 2		
		Level 2 vs. Level 3		
		Level 3 vs. Level 4		
		Level 4 vs. Level 5		
		Level 5 vs. Level 6		
		Level 6 vs. Level 7		
	Quadratic	Level 1 vs. Level 2		
		Level 2 vs. Level 3		
		Level 3 vs. Level 4		
		Level 4 vs. Level 5		

	Level 5 vs. Level 6		
	Level 6 vs. Level 7		

a. Computed using alpha = .05

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	78455.600	1	78455.600	1119.994	.000	.990
Error	770.551	11	70.050			

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Noncent. Parameter	Observed Power[a]
Intercept	1119.994	1.000
Error		

a. Computed using alpha = .05

Estimated Marginal Means

1. Grand Mean

Measure: MEASURE_1

Mean	Std. Error	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
-46.683	1.395	-49.753	-43.613

2. shoe

Estimates

Measure: MEASURE_1

shoe	Mean	Std. Error	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
1	-46.840	1.615	-50.395	-43.284
2	-47.687	1.655	-51.329	-44.045
3	-45.523	1.155	-48.066	-42.980

Pairwise Comparisons

Measure: MEASURE_1

(I) shoe	(J) shoe	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b] Lower Bound	Upper Bound
1	2	.847	1.085	1.000	-2.211	3.905
	3	-1.317	.877	.483	-3.790	1.155
2	1	-.847	1.085	1.000	-3.905	2.211
	3	-2.164*	.767	.050	-4.328	-.001
3	1	1.317	.877	.483	-1.155	3.790
	2	2.164*	.767	.050	.001	4.328

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

b. Adjustment for multiple comparisons: Bonferroni.

Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Pillai's trace	.457	4.200[a]	2.000	10.000	.047	.457
Wilks' lambda	.543	4.200[a]	2.000	10.000	.047	.457
Hotelling's trace	.840	4.200[a]	2.000	10.000	.047	.457
Roy's largest root	.840	4.200[a]	2.000	10.000	.047	.457

Multivariate Tests

	Noncent. Parameter	Observed Power[b]
Pillai's trace	8.400	.597
Wilks' lambda	8.400	.597
Hotelling's trace	8.400	.597
Roy's largest root	8.400	.597

Each F tests the multivariate effect of shoe. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

a. Exact statistic

b. Computed using alpha = .05

3. time

Estimates

Measure: MEASURE_1

time	Mean	Std. Error	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
1	-46.014	1.384	-49.061	-42.968
2	-46.625	1.507	-49.942	-43.308
3	-46.551	1.427	-49.692	-43.411
4	-46.660	1.394	-49.729	-43.591
5	-46.834	1.386	-49.885	-43.782
6	-47.258	1.277	-50.069	-44.446
7	-46.841	1.496	-50.134	-43.548

Pairwise Comparisons

Measure: MEASURE_1

(I) time	(J) time	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	95% Confidence Interval for Difference[a] Upper Bound
1	2	.611	.369	1.000	-.838	2.059
	3	.537	.324	1.000	-.736	1.810
	4	.646	.301	1.000	-.535	1.826
	5	.820	.391	1.000	-.716	2.355
	6	1.244	.433	.319	-.455	2.943
	7	.827	.315	.497	-.410	2.064
2	1	-.611	.369	1.000	-2.059	.838
	3	-.074	.224	1.000	-.951	.803
	4	.035	.237	1.000	-.897	.966
	5	.209	.332	1.000	-1.092	1.510
	6	.633	.503	1.000	-1.342	2.608
	7	.216	.228	1.000	-.679	1.112
3	1	-.537	.324	1.000	-1.810	.736
	2	.074	.224	1.000	-.803	.951
	4	.109	.154	1.000	-.494	.711
	5	.283	.257	1.000	-.727	1.292
	6	.707	.450	1.000	-1.057	2.470
	7	.290	.223	1.000	-.583	1.163

4	1	-.646	.301	1.000	-1.826	.535
	2	-.035	.237	1.000	-.966	.897
	3	-.109	.154	1.000	-.711	.494
	5	.174	.201	1.000	-.614	.962
	6	.598	.396	1.000	-.956	2.152
	7	.182	.212	1.000	-.651	1.014
5	1	-.820	.391	1.000	-2.355	.716
	2	-.209	.332	1.000	-1.510	1.092
	3	-.283	.257	1.000	-1.292	.727
	4	-.174	.201	1.000	-.962	.614
	6	.424	.486	1.000	-1.483	2.331
	7	.008	.273	1.000	-1.065	1.080
6	1	-1.244	.433	.319	-2.943	.455
	2	-.633	.503	1.000	-2.608	1.342
	3	-.707	.450	1.000	-2.470	1.057
	4	-.598	.396	1.000	-2.152	.956
	5	-.424	.486	1.000	-2.331	1.483
	7	-.416	.426	1.000	-2.087	1.254
7	1	-.827	.315	.497	-2.064	.410
	2	-.216	.228	1.000	-1.112	.679
	3	-.290	.223	1.000	-1.163	.583
	4	-.182	.212	1.000	-1.014	.651
	5	-.008	.273	1.000	-1.080	1.065
	6	.416	.426	1.000	-1.254	2.087

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Pillai's trace	.516	1.065[a]	6.000	6.000	.471	.516
Wilks' lambda	.484	1.065[a]	6.000	6.000	.471	.516
Hotelling's trace	1.065	1.065[a]	6.000	6.000	.471	.516
Roy's largest root	1.065	1.065[a]	6.000	6.000	.471	.516

Multivariate Tests

	Noncent. Parameter	Observed Power[b]
Pillai's trace	6.388	.195
Wilks' lambda	6.388	.195
Hotelling's trace	6.388	.195
Roy's largest root	6.388	.195

Each F tests the multivariate effect of time. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

a. Exact statistic

b. Computed using alpha = .05

4. shoe * time

Measure: MEASURE_1

shoe	time	Mean	Std. Error	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
1	1	-46.044	1.589	-49.542	-42.546
	2	-47.042	1.954	-51.343	-42.740
	3	-46.473	1.614	-50.025	-42.922
	4	-46.452	1.648	-50.079	-42.825
	5	-46.926	1.639	-50.533	-43.319
	6	-47.790	1.496	-51.082	-44.499
	7	-47.152	1.661	-50.809	-43.496
2	1	-46.801	1.629	-50.385	-43.216
	2	-47.784	1.734	-51.601	-43.968
	3	-47.777	1.684	-51.483	-44.071
	4	-47.893	1.632	-51.486	-44.301
	5	-47.971	1.654	-51.612	-44.330
	6	-47.772	1.696	-51.505	-44.039
	7	-47.811	1.648	-51.439	-44.183
3	1	-45.198	1.145	-47.719	-42.677
	2	-45.048	1.194	-47.675	-42.421
	3	-45.403	1.260	-48.176	-42.630
	4	-45.633	1.155	-48.175	-43.092
	5	-45.604	1.132	-48.095	-43.113
	6	-46.211	1.106	-48.646	-43.776
	7	-45.561	1.439	-48.728	-42.394

```
GLM Tmin_S_K_T1 Tmin_S_K_T2 Tmin_S_K_T3 Tmin_S_K_T4 Tmin_S_K_T5
Tmin_S_K_T6 Tmin_S_K_T7
   @2Tmin_S_K_T1 @2Tmin_S_K_T2 @2Tmin_S_K_T3 @2Tmin_S_K_T4
@2Tmin_S_K_T5 @2Tmin_S_K_T6 @2Tmin_S_K_T7
   @3Tmin_S_K_T1 @3Tmin_S_K_T2 @3Tmin_S_K_T3 @3Tmin_S_K_T4
@3Tmin_S_K_T5 @3Tmin_S_K_T6 @3Tmin_S_K_T7
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  /METHOD=SSTYPE(3)
  /EMMEANS=TABLES(OVERALL)
  /EMMEANS=TABLES(shoe) COMPARE ADJ(BONFERRONI)
  /EMMEANS=TABLES(time) COMPARE ADJ(BONFERRONI)
  /EMMEANS=TABLES(shoe*time)
  /PRINT=DESCRIPTIVE ETASQ OPOWER
  /CRITERIA=ALPHA(.05)
  /WSDESIGN=shoe time shoe*time.
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General Linear Model

Notes

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Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on all cases with valid data for all variables in the model.

Syntax	GLM Tmin_S_K_T1 Tmin_S_K_T2 Tmin_S_K_T3 Tmin_S_K_T4 Tmin_S_K_T5 Tmin_S_K_T6 Tmin_S_K_T7 @2Tmin_S_K_T1 @2Tmin_S_K_T2 @2Tmin_S_K_T3 @2Tmin_S_K_T4 @2Tmin_S_K_T5 @2Tmin_S_K_T6 @2Tmin_S_K_T7 @3Tmin_S_K_T1 @3Tmin_S_K_T2 @3Tmin_S_K_T3 @3Tmin_S_K_T4 @3Tmin_S_K_T5 @3Tmin_S_K_T6 @3Tmin_S_K_T7 /WSFACTOR=shoe 3 Polynomial time 7 Repeated /METHOD=SSTYPE(3) /EMMEANS=TABLES(OVERALL) /EMMEANS=TABLES(shoe) COMPARE ADJ(BONFERRONI) /EMMEANS=TABLES(time) COMPARE ADJ(BONFERRONI) /EMMEANS=TABLES(shoe*time)

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Within-Subjects Factors

Measure: MEASURE_1

shoe	time	Dependent Variable
1	1	Tmin_S_K_T1
	2	Tmin_S_K_T2
	3	Tmin_S_K_T3
	4	Tmin_S_K_T4
	5	Tmin_S_K_T5
	6	Tmin_S_K_T6
	7	Tmin_S_K_T7
2	1	@2Tmin_S_K_T1
	2	@2Tmin_S_K_T2
	3	@2Tmin_S_K_T3
	4	@2Tmin_S_K_T4
	5	@2Tmin_S_K_T5

	6	@2Tmin_S_K_T6
	7	@2Tmin_S_K_T7
3	1	@3Tmin_S_K_T1
	2	@3Tmin_S_K_T2
	3	@3Tmin_S_K_T3
	4	@3Tmin_S_K_T4
	5	@3Tmin_S_K_T5
	6	@3Tmin_S_K_T6

Within-Subjects Factors

Measure: MEASURE_1

shoe	time	Dependent Variable
3	7	@3Tmin_S_K_T7

Descriptive Statistics

	Mean	Std. Deviation	N
Tmin_S_K_T1	14.716666666666669	1.220158956360964	12
Tmin_S_K_T2	14.275000000000000	1.834083868410504	12
Tmin_S_K_T3	14.183333333333334	1.465874441685876	12
Tmin_S_K_T4	14.708333333333332	1.729139740571665	12
Tmin_S_K_T5	15.583333333333334	1.317596526278286	12
Tmin_S_K_T6	15.550000000000000	2.373528252125170	12

Tmin_S_K_T7	15.041666666666668	1.881710215026037	12
2Tmin_S_K_T1	14.491666666666667	1.512648690412305	12
2Tmin_S_K_T2	13.683333333333334	1.376975165375399	12
2Tmin_S_K_T3	13.583	1.3306	12
2Tmin_S_K_T4	14.516666666666664	1.306510503964548	12
2Tmin_S_K_T5	14.966666666666667	1.275170814463931	12
2Tmin_S_K_T6	15.891666666666667	1.710639611019188	12
2Tmin_S_K_T7	16.133333333333333	2.000605968806512	12
3Tmin_S_K_T1	15.541666666666666	2.299983530902828	12
3Tmin_S_K_T2	13.692	1.2435	12
3Tmin_S_K_T3	13.941666666666666	1.612709934654504	12
3Tmin_S_K_T4	14.658	1.4841	12
3Tmin_S_K_T5	15.866666666666665	2.406178914731191	12
3Tmin_S_K_T6	15.950000000000000	1.592881893698565	12
3Tmin_S_K_T7	15.108333333333333	2.069017480190376	12

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.
shoe	Pillai's Trace	.077	.416[b]	2.000	10.000	.670
	Wilks' Lambda	.923	.416[b]	2.000	10.000	.670
	Hotelling's Trace	.083	.416[b]	2.000	10.000	.670
	Roy's Largest Root	.083	.416[b]	2.000	10.000	.670

time	Pillai's Trace	.892	8.275[b]	6.000	6.000	.011
	Wilks' Lambda	.108	8.275[b]	6.000	6.000	.011
	Hotelling's Trace	8.275	8.275[b]	6.000	6.000	.011
	Roy's Largest Root	8.275	8.275[b]	6.000	6.000	.011
shoe * time	Pillai's Trace	.[c]	.	.	.	.
	Wilks' Lambda	.[c]	.	.	.	.
	Hotelling's Trace	.[c]	.	.	.	.
	Roy's Largest Root	.[c]	.	.	.	.

Multivariate Tests[a]

Effect		Partial Eta Squared	Noncent. Parameter	Observed Power[d]
shoe	Pillai's Trace	.077	.832	.100
	Wilks' Lambda	.077	.832	.100
	Hotelling's Trace	.077	.832	.100
	Roy's Largest Root	.077	.832	.100
time	Pillai's Trace	.892	49.652	.924
	Wilks' Lambda	.892	49.652	.924
	Hotelling's Trace	.892	49.652	.924
	Roy's Largest Root	.892	49.652	.924
shoe * time	Pillai's Trace	.	.	.
	Wilks' Lambda	.	.	.
	Hotelling's Trace	.	.	.
	Roy's Largest Root	.	.	.

a. Design: Intercept
 Within Subjects Design: shoe + time + shoe * time
b. Exact statistic
c. Cannot produce multivariate test statistics because of insufficient residual degrees of freedom.
d. Computed using alpha = .05

Mauchly's Test of Sphericity[a]

Measure: MEASURE_1

		df	Sig.	Epsilon[b]

Within Subjects Effect	Mauchly's W	Approx. Chi-Square			Greenhouse-Geisser
shoe	.681	3.848	2	.146	.758
time	.022	33.370	20	.040	.541
shoe * time	.000	.	77	.	.385

Mauchly's Test of Sphericity[a]

Measure: MEASURE_1

	Epsilon	
Within Subjects Effect	Huynh-Feldt	Lower-bound
shoe	.854	.500
time	.795	.167
shoe * time	.699	.083

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.[a]

a. Design: Intercept

Within Subjects Design: shoe + time + shoe * time

b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F
shoe	Sphericity Assumed	1.910	2	.955	.347
	Greenhouse-Geisser	1.910	1.516	1.260	.347
	Huynh-Feldt	1.910	1.707	1.119	.347
	Lower-bound	1.910	1.000	1.910	.347
Error(shoe)	Sphericity Assumed	60.554	22	2.752	
	Greenhouse-Geisser	60.554	16.674	3.632	
	Huynh-Feldt	60.554	18.778	3.225	
	Lower-bound	60.554	11.000	5.505	
time	Sphericity Assumed	126.103	6	21.017	11.755
	Greenhouse-Geisser	126.103	3.248	38.825	11.755
	Huynh-Feldt	126.103	4.770	26.438	11.755
	Lower-bound	126.103	1.000	126.103	11.755
Error(time)	Sphericity Assumed	118.007	66	1.788	

	Greenhouse-Geisser	118.007	35.727	3.303	
	Huynh-Feldt	118.007	52.467	2.249	
	Lower-bound	118.007	11.000	10.728	
shoe * time	Sphericity Assumed	25.802	12	2.150	1.157
	Greenhouse-Geisser	25.802	4.624	5.580	1.157
	Huynh-Feldt	25.802	8.390	3.075	1.157
	Lower-bound	25.802	1.000	25.802	1.157
Error(shoe*time)	Sphericity Assumed	245.255	132	1.858	
	Greenhouse-Geisser	245.255	50.868	4.821	
	Huynh-Feldt	245.255	92.291	2.657	
	Lower-bound	245.255	11.000	22.296	

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[a]
shoe	Sphericity Assumed	.711	.031	.694	.099
	Greenhouse-Geisser	.654	.031	.526	.092
	Huynh-Feldt	.678	.031	.592	.095
	Lower-bound	.568	.031	.347	.084
Error(shoe)	Sphericity Assumed				
	Greenhouse-Geisser				
	Huynh-Feldt				
	Lower-bound				
time	Sphericity Assumed	.000	.517	70.528	1.000
	Greenhouse-Geisser	.000	.517	38.179	.999
	Huynh-Feldt	.000	.517	56.067	1.000
	Lower-bound	.006	.517	11.755	.876
Error(time)	Sphericity Assumed				
	Greenhouse-Geisser				
	Huynh-Feldt				
	Lower-bound				
shoe * time	Sphericity Assumed	.321	.095	13.887	.639
	Greenhouse-Geisser	.342	.095	5.351	.363
	Huynh-Feldt	.333	.095	9.709	.520
	Lower-bound	.305	.095	1.157	.166
Error(shoe*time)	Sphericity Assumed				
	Greenhouse-Geisser				

Huynh-Feldt					
Lower-bound					

a. Computed using alpha = .05

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	shoe	time	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
shoe	Linear		.060	1	.060	.109	.748	.010
	Quadratic		.213	1	.213	.907	.361	.076
Error(shoe)	Linear		6.071	11	.552			
	Quadratic		2.580	11	.235			
time		Level 1 vs. Level 2	38.440	1	38.440	30.406	.000	.734
		Level 2 vs. Level 3	.014	1	.014	.018	.896	.002
		Level 3 vs. Level 4	18.922	1	18.922	8.284	.015	.430
		Level 4 vs. Level 5	25.671	1	25.671	6.957	.023	.387
		Level 5 vs. Level 6	3.802	1	3.802	1.105	.316	.091
		Level 6 vs. Level 7	4.914	1	4.914	1.414	.259	.114
Error(time)		Level 1 vs. Level 2	13.907	11	1.264			
		Level 2 vs. Level 3	8.350	11	.759			
		Level 3 vs. Level 4	25.128	11	2.284			
		Level 4 vs. Level 5	40.589	11	3.690			
		Level 5 vs. Level 6	37.848	11	3.441			

		Level 6 vs. Level 7	38.236	11	3.476			
shoe * time	Linear	Level 1 vs. Level 2	11.900	1	11.900	2.558	.138	.189
		Level 2 vs. Level 3	.700	1	.700	.395	.542	.035
		Level 3 vs. Level 4	.220	1	.220	.162	.695	.015
		Level 4 vs. Level 5	.667	1	.667	.258	.622	.023
		Level 5 vs. Level 6	.082	1	.082	.011	.918	.001
		Level 6 vs. Level 7	.667	1	.667	.218	.650	.019
	Quadratic	Level 1 vs. Level 2	.911	1	.911	.410	.535	.036
		Level 2 vs. Level 3	.257	1	.257	.568	.467	.049
		Level 3 vs. Level 4	.781	1	.781	.952	.350	.080
		Level 4 vs. Level 5	2.801	1	2.801	1.336	.272	.108
		Level 5 vs. Level 6	6.480	1	6.480	1.236	.290	.101
		Level 6 vs. Level 7	6.722	1	6.722	1.623	.229	.129
Error(shoe* time)	Linear	Level 1 vs. Level 2	51.175	11	4.652			
		Level 2 vs. Level 3	19.495	11	1.772			
		Level 3 vs. Level 4	14.955	11	1.360			
		Level 4 vs. Level 5	28.473	11	2.588			
		Level 5 vs. Level 6	80.328	11	7.303			
		Level 6 vs. Level 7	33.603	11	3.055			

	Quadratic	Level 1 vs. Level 2	24.467	11	2.224			
		Level 2 vs. Level 3	4.975	11	.452			
		Level 3 vs. Level 4	9.024	11	.820			
		Level 4 vs. Level 5	23.059	11	2.096			
		Level 5 vs. Level 6	57.650	11	5.241			
		Level 6 vs. Level 7	45.548	11	4.141			

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	shoe	time	Noncent. Parameter	Observed Power[a]
shoe	Linear		.109	.061
	Quadratic		.907	.141
Error(shoe)	Linear			
	Quadratic			
time		Level 1 vs. Level 2	30.406	.999
		Level 2 vs. Level 3	.018	.052
		Level 3 vs. Level 4	8.284	.746
		Level 4 vs. Level 5	6.957	.671
		Level 5 vs. Level 6	1.105	.161
		Level 6 vs. Level 7	1.414	.193
Error(time)		Level 1 vs. Level 2		
		Level 2 vs. Level 3		
		Level 3 vs. Level 4		
		Level 4 vs. Level 5		
		Level 5 vs. Level 6		
		Level 6 vs. Level 7		
shoe * time	Linear	Level 1 vs. Level 2	2.558	.309
		Level 2 vs. Level 3	.395	.089
		Level 3 vs. Level 4	.162	.066
		Level 4 vs. Level 5	.258	.075
		Level 5 vs. Level 6	.011	.051

		Level 6 vs. Level 7	.218	.071
	Quadratic	Level 1 vs. Level 2	.410	.090
		Level 2 vs. Level 3	.568	.106
		Level 3 vs. Level 4	.952	.145
		Level 4 vs. Level 5	1.336	.185
		Level 5 vs. Level 6	1.236	.174
		Level 6 vs. Level 7	1.623	.214
Error(shoe*time)	Linear	Level 1 vs. Level 2		
		Level 2 vs. Level 3		
		Level 3 vs. Level 4		
		Level 4 vs. Level 5		
		Level 5 vs. Level 6		
		Level 6 vs. Level 7		
	Quadratic	Level 1 vs. Level 2		
		Level 2 vs. Level 3		
		Level 3 vs. Level 4		
		Level 4 vs. Level 5		
		Level 5 vs. Level 6		
		Level 6 vs. Level 7		

a. Computed using alpha = .05

Tests of Between-Subjects Effects

Measure: MEASURE_1

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	7950.694	1	7950.694	2437.025	.000	.996
Error	35.887	11	3.262			

Tests of Between-Subjects Effects

Measure: MEASURE_1

Transformed Variable: Average

Source	Noncent. Parameter	Observed Power[a]
Intercept	2437.025	1.000
Error		

a. Computed using alpha = .05

Estimated Marginal Means

1. Grand Mean

Measure: MEASURE_1

Mean	Std. Error	95% Confidence Interval Lower Bound	Upper Bound
14.861	.301	14.199	15.524

2. shoe

Estimates

Measure: MEASURE_1

shoe	Mean	Std. Error	95% Confidence Interval Lower Bound	Upper Bound
1	14.865	.365	14.061	15.670
2	14.752	.321	14.046	15.459
3	14.965	.318	14.266	15.665

Pairwise Comparisons

Measure: MEASURE_1

(I) shoe	(J) shoe	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	Upper Bound
1	2	.113	.173	1.000	-.374	.600
	3	-.100	.303	1.000	-.955	.755
2	1	-.113	.173	1.000	-.600	.374
	3	-.213	.273	1.000	-.984	.558
3	1	.100	.303	1.000	-.755	.955
	2	.213	.273	1.000	-.558	.984

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Pillai's trace	.077	.416[a]	2.000	10.000	.670	.077
Wilks' lambda	.923	.416[a]	2.000	10.000	.670	.077

Hotelling's trace	.083	.416[a]	2.000	10.000	.670	.077
Roy's largest root	.083	.416[a]	2.000	10.000	.670	.077

Multivariate Tests

	Noncent. Parameter	Observed Power[b]
Pillai's trace	.832	.100
Wilks' lambda	.832	.100
Hotelling's trace	.832	.100
Roy's largest root	.832	.100

Each F tests the multivariate effect of shoe. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.
a. Exact statistic
b. Computed using alpha = .05

3. time

Estimates

Measure: MEASURE_1

time	Mean	Std. Error	95% Confidence Interval Lower Bound	Upper Bound
1	14.917	.319	14.214	15.620
2	13.883	.352	13.110	14.657
3	13.903	.384	13.058	14.748
4	14.628	.338	13.885	15.371
5	15.472	.405	14.580	16.364
6	15.797	.382	14.957	16.637
7	15.428	.368	14.617	16.238

Pairwise Comparisons

Measure: MEASURE_1

(I) time	(J) time	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b] Lower Bound	Upper Bound
1	2	1.033*	.187	.004	.298	1.768
	3	1.014*	.252	.043	.024	2.004
	4	.289	.228	1.000	-.604	1.181

	5	-.556	.355	1.000	-1.948	.837
	6	-.881	.327	.440	-2.164	.403
	7	-.511	.318	1.000	-1.761	.738
2	1	-1.033*	.187	.004	-1.768	-.298
	3	-.019	.145	1.000	-.589	.550
	4	-.744	.230	.168	-1.648	.159
	5	-1.589*	.357	.021	-2.990	-.188
	6	-1.914*	.332	.003	-3.218	-.610
	7	-1.544*	.262	.002	-2.572	-.517
3	1	-1.014*	.252	.043	-2.004	-.024
	2	.019	.145	1.000	-.550	.589
	4	-.725	.252	.315	-1.713	.263
	5	-1.569*	.385	.039	-3.080	-.059
	6	-1.894*	.408	.015	-3.494	-.295
	7	-1.525*	.341	.020	-2.861	-.189
4	1	-.289	.228	1.000	-1.181	.604
	2	.744	.230	.168	-.159	1.648
	3	.725	.252	.315	-.263	1.713
	5	-.844	.320	.485	-2.100	.411
	6	-1.169*	.272	.027	-2.237	-.102
	7	-.800	.366	1.000	-2.237	.637
5	1	.556	.355	1.000	-.837	1.948
	2	1.589*	.357	.021	.188	2.990
	3	1.569*	.385	.039	.059	3.080
	4	.844	.320	.485	-.411	2.100
	6	-.325	.309	1.000	-1.538	.888
	7	.044	.472	1.000	-1.808	1.897
6	1	.881	.327	.440	-.403	2.164
	2	1.914*	.332	.003	.610	3.218
	3	1.894*	.408	.015	.295	3.494
	4	1.169*	.272	.027	.102	2.237
	5	.325	.309	1.000	-.888	1.538
	7	.369	.311	1.000	-.850	1.588
7	1	.511	.318	1.000	-.738	1.761
	2	1.544*	.262	.002	.517	2.572
	3	1.525*	.341	.020	.189	2.861
	4	.800	.366	1.000	-.637	2.237
	5	-.044	.472	1.000	-1.897	1.808

6	-.369	.311	1.000	-1.588	.850

Based on estimated marginal means
*. The mean difference is significant at the .05 level.
b. Adjustment for multiple comparisons: Bonferroni.

Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Pillai's trace	.892	8.275[a]	6.000	6.000	.011	.892
Wilks' lambda	.108	8.275[a]	6.000	6.000	.011	.892
Hotelling's trace	8.275	8.275[a]	6.000	6.000	.011	.892
Roy's largest root	8.275	8.275[a]	6.000	6.000	.011	.892

Multivariate Tests

	Noncent. Parameter	Observed Power[b]
Pillai's trace	49.652	.924
Wilks' lambda	49.652	.924
Hotelling's trace	49.652	.924
Roy's largest root	49.652	.924

Each F tests the multivariate effect of time. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.
a. Exact statistic
b. Computed using alpha = .05

4. shoe * time

Measure: MEASURE_1

shoe	time	Mean	Std. Error	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
1	1	14.717	.352	13.941	15.492
	2	14.275	.529	13.110	15.440
	3	14.183	.423	13.252	15.115
	4	14.708	.499	13.610	15.807
	5	15.583	.380	14.746	16.420
	6	15.550	.685	14.042	17.058

	7	15.042	.543	13.846	16.237
2	1	14.492	.437	13.531	15.453
	2	13.683	.397	12.808	14.558
	3	13.583	.384	12.738	14.429
	4	14.517	.377	13.687	15.347
	5	14.967	.368	14.156	15.777
	6	15.892	.494	14.805	16.979
	7	16.133	.578	14.862	17.404
3	1	15.542	.664	14.080	17.003
	2	13.692	.359	12.902	14.482
	3	13.942	.466	12.917	14.966
	4	14.658	.428	13.715	15.601
	5	15.867	.695	14.338	17.395
	6	15.950	.460	14.938	16.962
	7	15.108	.597	13.794	16.423

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General Linear Model

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Within-Subjects Factors

Measure: MEASURE_1

shoe	time	Dependent Variable
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	2	Tangle_F_A_T2
	3	Tangle_F_A_T3
	4	Tangle_F_A_T4
	5	Tangle_F_A_T5
	6	Tangle_F_A_T6
	7	Tangle_F_A_T7
2	1	@2Tangle_F_A_T1
	2	@2Tangle_F_A_T2
	3	@2Tangle_F_A_T3

	4	@2Tangle_F_A_T4
	5	@2Tangle_F_A_T5
	6	@2Tangle_F_A_T6
	7	@2Tangle_F_A_T7
3	1	@3Tangle_F_A_T1
	2	@3Tangle_F_A_T2
	3	@3Tangle_F_A_T3
	4	@3Tangle_F_A_T4
	5	@3Tangle_F_A_T5
	6	@3Tangle_F_A_T6

Within-Subjects Factors

Measure: MEASURE_1

shoe	time	Dependent Variable
3	7	@3Tangle_F_A_T7

Descriptive Statistics

	Mean	Std. Deviation	N
Tangle_F_A_T1	4.543595341666666	3.034176704313139	12
Tangle_F_A_T2	4.282729349999999	3.542391890039349	12
Tangle_F_A_T3	4.532526375000001	3.707431615367319	12
Tangle_F_A_T4	5.113650016666666	4.244105960781233	12

Tangle_F_A_T5	6.194557741666666	4.558861722738556	12
Tangle_F_A_T6	5.435563691666667	3.298353212384791	12
Tangle_F_A_T7	5.721021325000001	3.792610591691280	12
2Tangle_F_A_T1	4.608260791666667	2.996035062166525	12
2Tangle_F_A_T2	3.468489025000000	3.986899272800888	12
2Tangle_F_A_T3	3.458420950000000	4.424071941953582	12
2Tangle_F_A_T4	4.659820233333333	4.716852871497506	12
2Tangle_F_A_T5	5.354672416666666	3.999472786981626	12
2Tangle_F_A_T6	7.297732224999999	4.018303692412113	12
2Tangle_F_A_T7	6.928019141666668	4.181350596221680	12
3Tangle_F_A_T1	3.270520883333333	2.874909709383579	12
3Tangle_F_A_T2	2.408800775000000	4.084638964137252	12
3Tangle_F_A_T3	2.615891608333334	3.687848276213340	12
3Tangle_F_A_T4	2.900302983333334	3.466168726722594	12
3Tangle_F_A_T5	4.022110708333333	3.133864657780412	12
3Tangle_F_A_T6	4.084560249999999	4.322861596601122	12
3Tangle_F_A_T7	3.553986000000000	3.993808516010178	12

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.
shoe	Pillai's Trace	.252	1.688[b]	2.000	10.000	.234
	Wilks' Lambda	.748	1.688[b]	2.000	10.000	.234
	Hotelling's Trace	.338	1.688[b]	2.000	10.000	.234
	Roy's Largest Root	.338	1.688[b]	2.000	10.000	.234
time	Pillai's Trace	.850	5.651[b]	6.000	6.000	.027
	Wilks' Lambda	.150	5.651[b]	6.000	6.000	.027
	Hotelling's Trace	5.651	5.651[b]	6.000	6.000	.027
	Roy's Largest Root	5.651	5.651[b]	6.000	6.000	.027
shoe * time	Pillai's Trace	.[c]	.	.	.	.
	Wilks' Lambda	.[c]	.	.	.	.
	Hotelling's Trace	.[c]	.	.	.	.
	Roy's Largest Root	.[c]	.	.	.	.

Multivariate Tests[a]

Effect		Partial Eta Squared	Noncent. Parameter	Observed Power[d]
shoe	Pillai's Trace	.252	3.376	.274
	Wilks' Lambda	.252	3.376	.274
	Hotelling's Trace	.252	3.376	.274
	Roy's Largest Root	.252	3.376	.274
time	Pillai's Trace	.850	33.907	.790
	Wilks' Lambda	.850	33.907	.790
	Hotelling's Trace	.850	33.907	.790
	Roy's Largest Root	.850	33.907	.790
shoe * time	Pillai's Trace	.	.	.
	Wilks' Lambda	.	.	.
	Hotelling's Trace	.	.	.
	Roy's Largest Root	.	.	.

a. Design: Intercept
Within Subjects Design: shoe + time + shoe * time

b. Exact statistic

c. Cannot produce multivariate test statistics because of insufficient residual degrees of freedom.
d. Computed using alpha = .05

Mauchly's Test of Sphericity[a]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[b] Greenhouse-Geisser
shoe	.886	1.215	2	.545	.897
time	.024	32.646	20	.047	.506
shoe * time	.000	.	77	.	.337

Mauchly's Test of Sphericity[a]

Measure: MEASURE_1

Within Subjects Effect	Epsilon Huynh-Feldt	Lower-bound
shoe	1.000	.500
time	.721	.167
shoe * time	.558	.083

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.[a]
a. Design: Intercept
Within Subjects Design: shoe + time + shoe * time
b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F
shoe	Sphericity Assumed	191.465	2	95.733	2.372
	Greenhouse-Geisser	191.465	1.795	106.685	2.372
	Huynh-Feldt	191.465	2.000	95.733	2.372
	Lower-bound	191.465	1.000	191.465	2.372
Error(shoe)	Sphericity Assumed	887.756	22	40.353	

	Greenhouse-Geisser	887.756	19.741	44.969	
	Huynh-Feldt	887.756	22.000	40.353	
	Lower-bound	887.756	11.000	80.705	
time	Sphericity Assumed	175.898	6	29.316	9.722
	Greenhouse-Geisser	175.898	3.037	57.922	9.722
	Huynh-Feldt	175.898	4.325	40.669	9.722
	Lower-bound	175.898	1.000	175.898	9.722
Error(time)	Sphericity Assumed	199.018	66	3.015	
	Greenhouse-Geisser	199.018	33.405	5.958	
	Huynh-Feldt	199.018	47.577	4.183	
	Lower-bound	199.018	11.000	18.093	
shoe * time	Sphericity Assumed	59.754	12	4.979	2.519
	Greenhouse-Geisser	59.754	4.045	14.773	2.519
	Huynh-Feldt	59.754	6.691	8.931	2.519
	Lower-bound	59.754	1.000	59.754	2.519
Error(shoe*time)	Sphericity Assumed	260.934	132	1.977	
	Greenhouse-Geisser	260.934	44.492	5.865	
	Huynh-Feldt	260.934	73.599	3.545	
	Lower-bound	260.934	11.000	23.721	

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[a]
shoe	Sphericity Assumed	.117	.177	4.745	.428
	Greenhouse-Geisser	.124	.177	4.258	.402
	Huynh-Feldt	.117	.177	4.745	.428
	Lower-bound	.152	.177	2.372	.291
Error(shoe)	Sphericity Assumed				
	Greenhouse-Geisser				
	Huynh-Feldt				
	Lower-bound				
time	Sphericity Assumed	.000	.469	58.333	1.000
	Greenhouse-Geisser	.000	.469	29.524	.995
	Huynh-Feldt	.000	.469	42.050	1.000
	Lower-bound	.010	.469	9.722	.810
Error(time)	Sphericity Assumed				
	Greenhouse-Geisser				

	Huynh-Feldt				
	Lower-bound				
shoe * time	Sphericity Assumed	.005	.186	30.228	.966
	Greenhouse-Geisser	.054	.186	10.189	.670
	Huynh-Feldt	.024	.186	16.854	.839
	Lower-bound	.141	.186	2.519	.305
Error(shoe*time)	Sphericity Assumed				
	Greenhouse-Geisser				
	Huynh-Feldt				
	Lower-bound				

a. Computed using alpha = .05

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	shoe	time	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
shoe	Linear		20.590	1	20.590	2.795	.123	.203
	Quadratic		6.762	1	6.762	1.624	.229	.129
Error(shoe)	Linear		81.030	11	7.366			
	Quadratic		45.793	11	4.163			
time		Level 1 vs. Level 2	20.473	1	20.473	2.640	.133	.194
		Level 2 vs. Level 3	.799	1	.799	1.097	.317	.091
		Level 3 vs. Level 4	17.089	1	17.089	11.175	.007	.504
		Level 4 vs. Level 5	33.584	1	33.584	11.003	.007	.500
		Level 5 vs. Level 6	6.215	1	6.215	1.053	.327	.087
		Level 6 vs. Level 7	1.512	1	1.512	.223	.646	.020
Error(time)		Level 1 vs. Level 2	85.317	11	7.756			

		Level 2 vs. Level 3	8.010	11	.728			
		Level 3 vs. Level 4	16.822	11	1.529			
		Level 4 vs. Level 5	33.574	11	3.052			
		Level 5 vs. Level 6	64.951	11	5.905			
		Level 6 vs. Level 7	74.621	11	6.784			
shoe * time	Linear	Level 1 vs. Level 2	2.166	1	2.166	.925	.357	.078
		Level 2 vs. Level 3	.011	1	.011	.012	.913	.001
		Level 3 vs. Level 4	.528	1	.528	.488	.499	.042
		Level 4 vs. Level 5	.010	1	.010	.007	.933	.001
		Level 5 vs. Level 6	4.049	1	4.049	.846	.377	.071
		Level 6 vs. Level 7	3.995	1	3.995	.909	.361	.076
	Quadratic	Level 1 vs. Level 2	2.677	1	2.677	.811	.387	.069
		Level 2 vs. Level 3	.455	1	.455	.696	.422	.060
		Level 3 vs. Level 4	4.726	1	4.726	6.877	.024	.385
		Level 4 vs. Level 5	1.322	1	1.322	.281	.607	.025
		Level 5 vs. Level 6	42.002	1	42.002	4.315	.062	.282
		Level 6 vs. Level 7	.489	1	.489	.051	.825	.005
Error(shoe* time)	Linear	Level 1 vs. Level 2	25.758	11	2.342			
		Level 2 vs. Level 3	9.662	11	.878			

		Level 3 vs. Level 4	11.905	11	1.082			
		Level 4 vs. Level 5	14.843	11	1.349			
		Level 5 vs. Level 6	52.655	11	4.787			
		Level 6 vs. Level 7	48.330	11	4.394			
	Quadratic	Level 1 vs. Level 2	36.308	11	3.301			
		Level 2 vs. Level 3	7.189	11	.654			
		Level 3 vs. Level 4	7.561	11	.687			
		Level 4 vs. Level 5	51.758	11	4.705			
		Level 5 vs. Level 6	107.075	11	9.734			
		Level 6 vs. Level 7	104.798	11	9.527			

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	shoe	time	Noncent. Parameter	Observed Power[a]
shoe	Linear		2.795	.333
	Quadratic		1.624	.214
Error(shoe)	Linear			
	Quadratic			
time		Level 1 vs. Level 2	2.640	.317
		Level 2 vs. Level 3	1.097	.160
		Level 3 vs. Level 4	11.175	.860
		Level 4 vs. Level 5	11.003	.855
		Level 5 vs. Level 6	1.053	.155
		Level 6 vs. Level 7	.223	.072
Error(time)		Level 1 vs. Level 2		
		Level 2 vs. Level 3		
		Level 3 vs. Level 4		

		Level 4 vs. Level 5		
		Level 5 vs. Level 6		
		Level 6 vs. Level 7		
shoe * time	Linear	Level 1 vs. Level 2	.925	.142
		Level 2 vs. Level 3	.012	.051
		Level 3 vs. Level 4	.488	.098
		Level 4 vs. Level 5	.007	.051
		Level 5 vs. Level 6	.846	.134
		Level 6 vs. Level 7	.909	.141
	Quadratic	Level 1 vs. Level 2	.811	.131
		Level 2 vs. Level 3	.696	.119
		Level 3 vs. Level 4	6.877	.666
		Level 4 vs. Level 5	.281	.077
		Level 5 vs. Level 6	4.315	.474
		Level 6 vs. Level 7	.051	.055
Error(shoe*time)	Linear	Level 1 vs. Level 2		
		Level 2 vs. Level 3		
		Level 3 vs. Level 4		
		Level 4 vs. Level 5		
		Level 5 vs. Level 6		
		Level 6 vs. Level 7		
	Quadratic	Level 1 vs. Level 2		
		Level 2 vs. Level 3		
		Level 3 vs. Level 4		
		Level 4 vs. Level 5		
		Level 5 vs. Level 6		
		Level 6 vs. Level 7		

a. Computed using alpha = .05

Tests of Between-Subjects Effects

Measure: MEASURE_1

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	728.309	1	728.309	27.063	.000	.711
Error	296.028	11	26.912			

Tests of Between-Subjects Effects

Measure: MEASURE_1

Transformed Variable: Average

Source	Noncent. Parameter	Observed Power[a]
Intercept	27.063	.997
Error		

a. Computed using alpha = .05

Estimated Marginal Means

1. Grand Mean

Measure: MEASURE_1

		95% Confidence Interval	
Mean	Std. Error	Lower Bound	Upper Bound
4.498	.865	2.595	6.401

2. shoe

Estimates

Measure: MEASURE_1

			95% Confidence Interval	
shoe	Mean	Std. Error	Lower Bound	Upper Bound
1	5.118	1.040	2.828	7.407
2	5.111	1.081	2.732	7.490
3	3.265	.976	1.116	5.414

Pairwise Comparisons

Measure: MEASURE_1

					95% Confidence Interval for Difference[a]	
(I) shoe	(J) shoe	Mean Difference (I-J)	Std. Error	Sig.[a]	Lower Bound	Upper Bound
1	2	.007	.817	1.000	-2.296	2.310
	3	1.852	1.108	.368	-1.272	4.977
2	1	-.007	.817	1.000	-2.310	2.296
	3	1.846	.994	.271	-.957	4.648
3	1	-1.852	1.108	.368	-4.977	1.272
	2	-1.846	.994	.271	-4.648	.957

Based on estimated marginal means
a. Adjustment for multiple comparisons: Bonferroni.

Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Pillai's trace	.252	1.688[a]	2.000	10.000	.234	.252
Wilks' lambda	.748	1.688[a]	2.000	10.000	.234	.252
Hotelling's trace	.338	1.688[a]	2.000	10.000	.234	.252
Roy's largest root	.338	1.688[a]	2.000	10.000	.234	.252

Multivariate Tests

	Noncent. Parameter	Observed Power[b]
Pillai's trace	3.376	.274
Wilks' lambda	3.376	.274
Hotelling's trace	3.376	.274
Roy's largest root	3.376	.274

Each F tests the multivariate effect of shoe. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.
a. Exact statistic
b. Computed using alpha = .05

3. time

Estimates

Measure: MEASURE_1

time	Mean	Std. Error	95% Confidence Interval Lower Bound	Upper Bound
1	4.141	.710	2.577	5.704
2	3.387	.933	1.334	5.440
3	3.536	.940	1.467	5.604
4	4.225	.940	2.156	6.294
5	5.190	.950	3.100	7.281
6	5.606	.847	3.742	7.470
7	5.401	.987	3.228	7.574

Pairwise Comparisons

Measure: MEASURE_1

(I) time	(J) time	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b]	
					Lower Bound	Upper Bound
1	2	.754	.464	1.000	-1.067	2.575
	3	.605	.543	1.000	-1.525	2.736
	4	-.084	.545	1.000	-2.222	2.054
	5	-1.050	.544	1.000	-3.184	1.085
	6	-1.465	.581	.594	-3.743	.812
	7	-1.260	.632	1.000	-3.739	1.218
2	1	-.754	.464	1.000	-2.575	1.067
	3	-.149	.142	1.000	-.707	.409
	4	-.838*	.196	.028	-1.609	-.067
	5	-1.804*	.306	.002	-3.005	-.603
	6	-2.219*	.435	.007	-3.927	-.512
	7	-2.014*	.317	.001	-3.256	-.772
3	1	-.605	.543	1.000	-2.736	1.525
	2	.149	.142	1.000	-.409	.707
	4	-.689	.206	.138	-1.498	.120
	5	-1.655*	.335	.009	-2.970	-.340
	6	-2.070*	.477	.025	-3.942	-.199
	7	-1.865*	.307	.002	-3.069	-.661
4	1	.084	.545	1.000	-2.054	2.222
	2	.838*	.196	.028	.067	1.609
	3	.689	.206	.138	-.120	1.498
	5	-.966	.291	.144	-2.108	.176
	6	-1.381	.401	.114	-2.953	.190
	7	-1.176*	.251	.014	-2.159	-.193
5	1	1.050	.544	1.000	-1.085	3.184
	2	1.804*	.306	.002	.603	3.005
	3	1.655*	.335	.009	.340	2.970
	4	.966	.291	.144	-.176	2.108
	6	-.416	.405	1.000	-2.004	1.173
	7	-.211	.314	1.000	-1.443	1.022
6	1	1.465	.581	.594	-.812	3.743
	2	2.219*	.435	.007	.512	3.927
	3	2.070*	.477	.025	.199	3.942

	4	1.381	.401	.114	-.190	2.953
	5	.416	.405	1.000	-1.173	2.004
	7	.205	.434	1.000	-1.498	1.908
7	1	1.260	.632	1.000	-1.218	3.739
	2	2.014*	.317	.001	.772	3.256
	3	1.865*	.307	.002	.661	3.069
	4	1.176*	.251	.014	.193	2.159
	5	.211	.314	1.000	-1.022	1.443
	6	-.205	.434	1.000	-1.908	1.498

Based on estimated marginal means
*. The mean difference is significant at the .05 level.
b. Adjustment for multiple comparisons: Bonferroni.

Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Pillai's trace	.850	5.651[a]	6.000	6.000	.027	.850
Wilks' lambda	.150	5.651[a]	6.000	6.000	.027	.850
Hotelling's trace	5.651	5.651[a]	6.000	6.000	.027	.850
Roy's largest root	5.651	5.651[a]	6.000	6.000	.027	.850

Multivariate Tests

	Noncent. Parameter	Observed Power[b]
Pillai's trace	33.907	.790
Wilks' lambda	33.907	.790
Hotelling's trace	33.907	.790
Roy's largest root	33.907	.790

Each F tests the multivariate effect of time. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.
a. Exact statistic
b. Computed using alpha = .05

4. shoe * time

Measure: MEASURE_1

shoe	time	Mean	Std. Error	95% Confidence Interval

				Lower Bound	Upper Bound
1	1	4.544	.876	2.616	6.471
	2	4.283	1.023	2.032	6.533
	3	4.533	1.070	2.177	6.888
	4	5.114	1.225	2.417	7.810
	5	6.195	1.316	3.298	9.091
	6	5.436	.952	3.340	7.531
	7	5.721	1.095	3.311	8.131
2	1	4.608	.865	2.705	6.512
	2	3.468	1.151	.935	6.002
	3	3.458	1.277	.647	6.269
	4	4.660	1.362	1.663	7.657
	5	5.355	1.155	2.814	7.896
	6	7.298	1.160	4.745	9.851
	7	6.928	1.207	4.271	9.585
3	1	3.271	.830	1.444	5.097
	2	2.409	1.179	-.186	5.004
	3	2.616	1.065	.273	4.959
	4	2.900	1.001	.698	5.103
	5	4.022	.905	2.031	6.013
	6	4.085	1.248	1.338	6.831
	7	3.554	1.153	1.016	6.092

```
GLM MinA_F_A_T1 MinA_F_A_T2 MinA_F_A_T3 MinA_F_A_T4 MinA_F_A_T5
MinA_F_A_T6 MinA_F_A_T7
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@2MinA_F_A_T5 @2MinA_F_A_T6 @2MinA_F_A_T7
   @3MinA_F_A_T1 @3MinA_F_A_T2 @3MinA_F_A_T3 @3MinA_F_A_T4
@3MinA_F_A_T5 @3MinA_F_A_T6 @3MinA_F_A_T7
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  /EMMEANS=TABLES(OVERALL)
  /EMMEANS=TABLES(shoe) COMPARE ADJ(BONFERRONI)
  /EMMEANS=TABLES(time) COMPARE ADJ(BONFERRONI)
  /EMMEANS=TABLES(shoe*time)
  /PRINT=DESCRIPTIVE ETASQ OPOWER
  /CRITERIA=ALPHA(.05)
  /WSDESIGN=shoe time shoe*time.
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General Linear Model

Notes

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Missing Value Handlin	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on all cases with valid data for all variables in the model.

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Within-Subjects Factors

Measure: MEASURE_1

shoe	time	Dependent Variable
1	1	MinA_F_A_T1
	2	MinA_F_A_T2
	3	MinA_F_A_T3
	4	MinA_F_A_T4
	5	MinA_F_A_T5
	6	MinA_F_A_T6
	7	MinA_F_A_T7
2	1	@2MinA_F_A_T1
	2	@2MinA_F_A_T2
	3	@2MinA_F_A_T3
	4	@2MinA_F_A_T4
	5	@2MinA_F_A_T5

	6	@2MinA_F_A_T6
	7	@2MinA_F_A_T7
3	1	@3MinA_F_A_T1
	2	@3MinA_F_A_T2
	3	@3MinA_F_A_T3
	4	@3MinA_F_A_T4
	5	@3MinA_F_A_T5
	6	@3MinA_F_A_T6

Within-Subjects Factors

Measure: MEASURE_1

shoe	time	Dependent Variable
3	7	@3MinA_F_A_T7

Descriptive Statistics

	Mean	Std. Deviation	N
MinA_F_A_T1	-7.082586433333334	3.162984828886145	12
MinA_F_A_T2	-7.280307758333334	3.420140395247107	12
MinA_F_A_T3	-7.231915958333333	3.617005703322881	12
MinA_F_A_T4	-7.136646324999999	3.441262678358437	12

MinA_F_A_T5	-7.270366958333334	3.539535885690493	12
MinA_F_A_T6	-7.256597525000000	4.144576862633792	12
MinA_F_A_T7	-7.466526624999999	4.238549256764313	12
2MinA_F_A_T1	-8.010066808333333	2.874908720906589	12
2MinA_F_A_T2	-8.853201633333331	3.427627277298828	12
2MinA_F_A_T3	-8.757208141666666	3.839203995617882	12
2MinA_F_A_T4	-8.631606925000000	3.916969331302380	12
2MinA_F_A_T5	-8.303847358333334	3.963441372075028	12
2MinA_F_A_T6	-7.870132250000000	3.584413650636528	12
2MinA_F_A_T7	-8.500952591666666	3.875173397064829	12
3MinA_F_A_T1	-8.111335091666670	4.231034062901343	12
3MinA_F_A_T2	-8.449134191666667	4.199438769485299	12
3MinA_F_A_T3	-8.383552466666668	4.332531709212181	12

3MinA_F_A_T4	-8.796949008333334	4.329866422109221	12
3MinA_F_A_T5	-8.456588683333333	4.443873854556936	12
3MinA_F_A_T6	-9.127201575000000	4.793676369372842	12
3MinA_F_A_T7	-8.338134191666667	4.203587143259754	12

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.
shoe	Pillai's Trace	.204	1.284[b]	2.000	10.000	.319
	Wilks' Lambda	.796	1.284[b]	2.000	10.000	.319
	Hotelling's Trace	.257	1.284[b]	2.000	10.000	.319
	Roy's Largest Root	.257	1.284[b]	2.000	10.000	.319
time	Pillai's Trace	.455	.835[b]	6.000	6.000	.584
	Wilks' Lambda	.545	.835[b]	6.000	6.000	.584
	Hotelling's Trace	.835	.835[b]	6.000	6.000	.584
	Roy's Largest Root	.835	.835[b]	6.000	6.000	.584
shoe * time	Pillai's Trace	.[c]	.	.	.	.
	Wilks' Lambda	.[c]	.	.	.	.
	Hotelling's Trace	.[c]	.	.	.	.
	Roy's Largest Root	.[c]	.	.	.	.

Multivariate Tests[a]

Effect		Partial Eta Squared	Noncent. Parameter	Observed Power[d]
shoe	Pillai's Trace	.204	2.568	.217
	Wilks' Lambda	.204	2.568	.217
	Hotelling's Trace	.204	2.568	.217

	Roy's Largest Root	.204	2.568	.217
time	Pillai's Trace	.455	5.012	.160
	Wilks' Lambda	.455	5.012	.160
	Hotelling's Trace	.455	5.012	.160
	Roy's Largest Root	.455	5.012	.160
shoe * time	Pillai's Trace	.	.	.
	Wilks' Lambda	.	.	.
	Hotelling's Trace	.	.	.
	Roy's Largest Root	.	.	.

a. Design: Intercept
 Within Subjects Design: shoe + time + shoe * time
b. Exact statistic
c. Cannot produce multivariate test statistics because of insufficient residual degrees of freedom.
d. Computed using alpha = .05

Mauchly's Test of Sphericity[a]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[b] Greenhouse-Geisser
shoe	.939	.633	2	.729	.942
time	.012	38.651	20	.010	.448
shoe * time	.000	.	77	.	.288

Mauchly's Test of Sphericity[a]

Measure: MEASURE_1

Within Subjects Effect	Epsilon Huynh-Feldt	Lower-bound
shoe	1.000	.500
time	.606	.167
shoe * time	.435	.083

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.[a]
a. Design: Intercept
 Within Subjects Design: shoe + time + shoe * time

b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F
shoe	Sphericity Assumed	84.401	2	42.201	1.351
	Greenhouse-Geisser	84.401	1.884	44.790	1.351
	Huynh-Feldt	84.401	2.000	42.201	1.351
	Lower-bound	84.401	1.000	84.401	1.351
Error(shoe)	Sphericity Assumed	687.315	22	31.242	
	Greenhouse-Geisser	687.315	20.728	33.158	
	Huynh-Feldt	687.315	22.000	31.242	
	Lower-bound	687.315	11.000	62.483	
time	Sphericity Assumed	5.373	6	.896	.844
	Greenhouse-Geisser	5.373	2.687	2.000	.844
	Huynh-Feldt	5.373	3.638	1.477	.844
	Lower-bound	5.373	1.000	5.373	.844
Error(time)	Sphericity Assumed	70.030	66	1.061	
	Greenhouse-Geisser	70.030	29.557	2.369	
	Huynh-Feldt	70.030	40.020	1.750	
	Lower-bound	70.030	11.000	6.366	
shoe * time	Sphericity Assumed	13.815	12	1.151	1.049
	Greenhouse-Geisser	13.815	3.453	4.001	1.049
	Huynh-Feldt	13.815	5.225	2.644	1.049
	Lower-bound	13.815	1.000	13.815	1.049
Error(shoe*time)	Sphericity Assumed	144.874	132	1.098	
	Greenhouse-Geisser	144.874	37.981	3.814	
	Huynh-Feldt	144.874	57.474	2.521	
	Lower-bound	144.874	11.000	13.170	

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[a]
shoe	Sphericity Assumed	.280	.109	2.702	.260
	Greenhouse-Geisser	.280	.109	2.545	.252

	Huynh-Feldt	.280	.109	2.702	.260
	Lower-bound	.270	.109	1.351	.186
Error(shoe)	Sphericity Assumed				
	Greenhouse-Geisser				
	Huynh-Feldt				
	Lower-bound				
time	Sphericity Assumed	.541	.071	5.064	.310
	Greenhouse-Geisser	.470	.071	2.268	.202
	Huynh-Feldt	.497	.071	3.071	.235
	Lower-bound	.378	.071	.844	.134
Error(time)	Sphericity Assumed				
	Greenhouse-Geisser				
	Huynh-Feldt				
	Lower-bound				
shoe * time	Sphericity Assumed	.409	.087	12.587	.585
	Greenhouse-Geisser	.389	.087	3.622	.279
	Huynh-Feldt	.400	.087	5.481	.354
	Lower-bound	.328	.087	1.049	.155
Error(shoe*time)	Sphericity Assumed				
	Greenhouse-Geisser				
	Huynh-Feldt				
	Lower-bound				

a. Computed using alpha = .05

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	shoe	time	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
shoe	Linear		9.782	1	9.782	1.819	.205	.142
	Quadratic		2.275	1	2.275	.641	.440	.055
Error(shoe)	Linear		59.154	11	5.378			
	Quadratic		39.034	11	3.549			
time		Level 1 vs. Level 2	7.603	1	7.603	4.241	.064	.278

		Level 2 vs. Level 3	.176	1	.176	.276	.610	.024
		Level 3 vs. Level 4	.148	1	.148	.169	.689	.015
		Level 4 vs. Level 5	1.142	1	1.142	1.114	.314	.092
		Level 5 vs. Level 6	.199	1	.199	.078	.785	.007
		Level 6 vs. Level 7	.011	1	.011	.005	.947	.000
Error(time)		Level 1 vs. Level 2	19.721	11	1.793			
		Level 2 vs. Level 3	7.029	11	.639			
		Level 3 vs. Level 4	9.629	11	.875			
		Level 4 vs. Level 5	11.275	11	1.025			
		Level 5 vs. Level 6	28.105	11	2.555			
		Level 6 vs. Level 7	25.330	11	2.303			
shoe * time	Linear	Level 1 vs. Level 2	.118	1	.118	.096	.762	.009
		Level 2 vs. Level 3	.002	1	.002	.007	.934	.001
		Level 3 vs. Level 4	1.552	1	1.552	7.341	.020	.400
		Level 4 vs. Level 5	1.349	1	1.349	3.684	.081	.251
		Level 5 vs. Level 6	2.810	1	2.810	.548	.475	.047
		Level 6 vs. Level 7	5.988	1	5.988	2.310	.157	.174
	Quadratic	Level 1 vs. Level 2	2.648	1	2.648	2.996	.111	.214
		Level 2 vs. Level 3	.012	1	.012	.071	.794	.006

		Level 3 vs. Level 4	.648	1	.648	2.067	.178	.158
		Level 4 vs. Level 5	.403	1	.403	.353	.564	.031
		Level 5 vs. Level 6	4.647	1	4.647	1.451	.254	.117
		Level 6 vs. Level 7	6.777	1	6.777	1.334	.273	.108
Error(shoe*time)	Linear	Level 1 vs. Level 2	13.468	11	1.224			
		Level 2 vs. Level 3	2.753	11	.250			
		Level 3 vs. Level 4	2.326	11	.211			
		Level 4 vs. Level 5	4.027	11	.366			
		Level 5 vs. Level 6	56.454	11	5.132			
		Level 6 vs. Level 7	28.513	11	2.592			
	Quadratic	Level 1 vs. Level 2	9.723	11	.884			
		Level 2 vs. Level 3	1.876	11	.171			
		Level 3 vs. Level 4	3.450	11	.314			
		Level 4 vs. Level 5	12.550	11	1.141			
		Level 5 vs. Level 6	35.229	11	3.203			
		Level 6 vs. Level 7	55.880	11	5.080			

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	shoe	time	Noncent. Parameter	Observed Power[a]
shoe	Linear		1.819	.234
	Quadratic		.641	.113

Error(shoe)	Linear			
	Quadratic			
time		Level 1 vs. Level 2	4.241	.468
		Level 2 vs. Level 3	.276	.077
		Level 3 vs. Level 4	.169	.066
		Level 4 vs. Level 5	1.114	.162
		Level 5 vs. Level 6	.078	.058
		Level 6 vs. Level 7	.005	.050
Error(time)		Level 1 vs. Level 2		
		Level 2 vs. Level 3		
		Level 3 vs. Level 4		
		Level 4 vs. Level 5		
		Level 5 vs. Level 6		
		Level 6 vs. Level 7		
shoe * time	Linear	Level 1 vs. Level 2	.096	.059
		Level 2 vs. Level 3	.007	.051
		Level 3 vs. Level 4	7.341	.694
		Level 4 vs. Level 5	3.684	.418
		Level 5 vs. Level 6	.548	.104
		Level 6 vs. Level 7	2.310	.284
	Quadratic	Level 1 vs. Level 2	2.996	.352
		Level 2 vs. Level 3	.071	.057
		Level 3 vs. Level 4	2.067	.260
		Level 4 vs. Level 5	.353	.085
		Level 5 vs. Level 6	1.451	.196
		Level 6 vs. Level 7	1.334	.184
Error(shoe*time)	Linear	Level 1 vs. Level 2		
		Level 2 vs. Level 3		
		Level 3 vs. Level 4		
		Level 4 vs. Level 5		
		Level 5 vs. Level 6		
		Level 6 vs. Level 7		
	Quadratic	Level 1 vs. Level 2		
		Level 2 vs. Level 3		
		Level 3 vs. Level 4		
		Level 4 vs. Level 5		
		Level 5 vs. Level 6		
		Level 6 vs. Level 7		

a. Computed using alpha = .05

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	2340.206	1	2340.206	68.427	.000	.862
Error	376.201	11	34.200			

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Noncent. Parameter	Observed Power[a]
Intercept	68.427	1.000
Error		

a. Computed using alpha = .05

Estimated Marginal Means

1. Grand Mean

Measure: MEASURE_1

Mean	Std. Error	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
-8.063	.975	-10.208	-5.917

2. shoe

Estimates

Measure: MEASURE_1

shoe	Mean	Std. Error	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
1	-7.246	1.032	-9.518	-4.975
2	-8.418	1.013	-10.648	-6.188
3	-8.523	1.226	-11.221	-5.826

Pairwise Comparisons

Measure: MEASURE_1

(I) shoe	(J) shoe	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
					Lower Bound	Upper Bound
1	2	1.172	.760	.455	-.972	3.316
	3	1.277	.947	.614	-1.393	3.947
2	1	-1.172	.760	.455	-3.316	.972
	3	.105	.870	1.000	-2.349	2.559
3	1	-1.277	.947	.614	-3.947	1.393
	2	-.105	.870	1.000	-2.559	2.349

Based on estimated marginal means
a. Adjustment for multiple comparisons: Bonferroni.

Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Pillai's trace	.204	1.284[a]	2.000	10.000	.319	.204
Wilks' lambda	.796	1.284[a]	2.000	10.000	.319	.204
Hotelling's trace	.257	1.284[a]	2.000	10.000	.319	.204
Roy's largest root	.257	1.284[a]	2.000	10.000	.319	.204

Multivariate Tests

	Noncent. Parameter	Observed Power[b]
Pillai's trace	2.568	.217
Wilks' lambda	2.568	.217
Hotelling's trace	2.568	.217
Roy's largest root	2.568	.217

Each F tests the multivariate effect of shoe. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.
a. Exact statistic
b. Computed using alpha = .05

3. time

Estimates

Measure: MEASURE_1

time	Mean	Std. Error	95% Confidence Interval Lower Bound	Upper Bound
1	-7.735	.798	-9.490	-5.979
2	-8.194	.922	-10.223	-6.166
3	-8.124	1.020	-10.368	-5.880
4	-8.188	.991	-10.369	-6.008
5	-8.010	1.053	-10.327	-5.693
6	-8.085	1.025	-10.342	-5.828
7	-8.102	1.077	-10.473	-5.731

Pairwise Comparisons

Measure: MEASURE_1

(I) time	(J) time	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	Upper Bound
1	2	.460	.223	1.000	-.416	1.335
	3	.390	.311	1.000	-.829	1.608
	4	.454	.361	1.000	-.964	1.872
	5	.276	.364	1.000	-1.154	1.705
	6	.350	.330	1.000	-.944	1.644
	7	.367	.366	1.000	-1.068	1.802
2	1	-.460	.223	1.000	-1.335	.416
	3	-.070	.133	1.000	-.593	.453
	4	-.006	.186	1.000	-.735	.724
	5	-.184	.207	1.000	-.995	.627
	6	-.110	.226	1.000	-.998	.779
	7	-.092	.201	1.000	-.883	.698
3	1	-.390	.311	1.000	-1.608	.829
	2	.070	.133	1.000	-.453	.593
	4	.064	.156	1.000	-.548	.676
	5	-.114	.157	1.000	-.732	.504
	6	-.040	.187	1.000	-.774	.695
	7	-.022	.166	1.000	-.672	.627
4	1	-.454	.361	1.000	-1.872	.964
	2	.006	.186	1.000	-.724	.735

	3	-.064	.156	1.000	-.676	.548
	5	-.178	.169	1.000	-.840	.484
	6	-.104	.258	1.000	-1.114	.907
	7	-.087	.213	1.000	-.922	.749
5	1	-.276	.364	1.000	-1.705	1.154
	2	.184	.207	1.000	-.627	.995
	3	.114	.157	1.000	-.504	.732
	4	.178	.169	1.000	-.484	.840
	6	.074	.266	1.000	-.971	1.119
	7	.092	.109	1.000	-.336	.519
6	1	-.350	.330	1.000	-1.644	.944
	2	.110	.226	1.000	-.779	.998
	3	.040	.187	1.000	-.695	.774
	4	.104	.258	1.000	-.907	1.114
	5	-.074	.266	1.000	-1.119	.971
	7	.017	.253	1.000	-.975	1.009
7	1	-.367	.366	1.000	-1.802	1.068
	2	.092	.201	1.000	-.698	.883
	3	.022	.166	1.000	-.627	.672
	4	.087	.213	1.000	-.749	.922
	5	-.092	.109	1.000	-.519	.336
	6	-.017	.253	1.000	-1.009	.975

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Pillai's trace	.455	.835[a]	6.000	6.000	.584	.455
Wilks' lambda	.545	.835[a]	6.000	6.000	.584	.455
Hotelling's trace	.835	.835[a]	6.000	6.000	.584	.455
Roy's largest root	.835	.835[a]	6.000	6.000	.584	.455

Multivariate Tests

	Noncent. Parameter	Observed Power[b]
Pillai's trace	5.012	.160

Wilks' lambda	5.012	.160
Hotelling's trace	5.012	.160
Roy's largest root	5.012	.160

Each F tests the multivariate effect of time. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.
a. Exact statistic
b. Computed using alpha = .05

4. shoe * time

Measure: MEASURE_1

shoe	time	Mean	Std. Error	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
1	1	-7.083	.913	-9.092	-5.073
	2	-7.280	.987	-9.453	-5.107
	3	-7.232	1.044	-9.530	-4.934
	4	-7.137	.993	-9.323	-4.950
	5	-7.270	1.022	-9.519	-5.021
	6	-7.257	1.196	-9.890	-4.623
	7	-7.467	1.224	-10.160	-4.773
2	1	-8.010	.830	-9.837	-6.183
	2	-8.853	.989	-11.031	-6.675
	3	-8.757	1.108	-11.197	-6.318
	4	-8.632	1.131	-11.120	-6.143
	5	-8.304	1.144	-10.822	-5.786
	6	-7.870	1.035	-10.148	-5.593
	7	-8.501	1.119	-10.963	-6.039
3	1	-8.111	1.221	-10.800	-5.423
	2	-8.449	1.212	-11.117	-5.781
	3	-8.384	1.251	-11.136	-5.631
	4	-8.797	1.250	-11.548	-6.046
	5	-8.457	1.283	-11.280	-5.633
	6	-9.127	1.384	-12.173	-6.081
	7	-8.338	1.213	-11.009	-5.667

GLM Tmin_F_A_T1 Tmin_F_A_T2 Tmin_F_A_T3 Tmin_F_A_T4 Tmin_F_A_T5 Tmin_F_A_T6 Tmin_F_A_T7

```
  @2Tmin_F_A_T1 @2Tmin_F_A_T2 @2Tmin_F_A_T3 @2Tmin_F_A_T4
@2Tmin_F_A_T5 @2Tmin_F_A_T6 @2Tmin_F_A_T7
  @3Tmin_F_A_T1 @3Tmin_F_A_T2 @3Tmin_F_A_T3 @3Tmin_F_A_T4
@3Tmin_F_A_T5 @3Tmin_F_A_T6 @3Tmin_F_A_T7
 /WSFACTOR=shoe 3 Polynomial time 7 Repeated
 /METHOD=SSTYPE(3)
 /EMMEANS=TABLES(OVERALL)
 /EMMEANS=TABLES(shoe) COMPARE ADJ(BONFERRONI)
 /EMMEANS=TABLES(time) COMPARE ADJ(BONFERRONI)
 /EMMEANS=TABLES(shoe*time)
 /PRINT=DESCRIPTIVE ETASQ OPOWER
 /CRITERIA=ALPHA(.05)
 /WSDESIGN=shoe time shoe*time.
```

General Linear Model

Notes

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Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on all cases with valid data for all variables in the model.

Syntax	GLM Tmin_F_A_T1 Tmin_F_A_T2 Tmin_F_A_T3 Tmin_F_A_T4 Tmin_F_A_T5 Tmin_F_A_T6 Tmin_F_A_T7 @2Tmin_F_A_T1 @2Tmin_F_A_T2 @2Tmin_F_A_T3 @2Tmin_F_A_T4 @2Tmin_F_A_T5 @2Tmin_F_A_T6 @2Tmin_F_A_T7 @3Tmin_F_A_T1 @3Tmin_F_A_T2 @3Tmin_F_A_T3 @3Tmin_F_A_T4 @3Tmin_F_A_T5 @3Tmin_F_A_T6 @3Tmin_F_A_T7 /WSFACTOR=shoe 3 Polynomial time 7 Repeated /METHOD=SSTYPE(3) /EMMEANS=TABLES(OVERALL) /EMMEANS=TABLES(shoe) COMPARE ADJ(BONFERRONI) /EMMEANS=TABLES(time) COMPARE ADJ(BONFERRONI) /EMMEANS=TABLES(shoe*time)

		/PRINT=DESCRIPTIVE ETASQ OPOWER /CRITERIA=ALPHA(.05) /WSDESIGN=shoe time shoe*time.
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Within-Subjects Factors

Measure: MEASURE_1

shoe	time	Dependent Variable
1	1	Tmin_F_A_T1
	2	Tmin_F_A_T2
	3	Tmin_F_A_T3
	4	Tmin_F_A_T4
	5	Tmin_F_A_T5
	6	Tmin_F_A_T6
	7	Tmin_F_A_T7
2	1	@2Tmin_F_A_T1
	2	@2Tmin_F_A_T2
	3	@2Tmin_F_A_T3
	4	@2Tmin_F_A_T4
	5	@2Tmin_F_A_T5

	6	@2Tmin_F_A_T6
	7	@2Tmin_F_A_T7
3	1	@3Tmin_F_A_T1
	2	@3Tmin_F_A_T2
	3	@3Tmin_F_A_T3
	4	@3Tmin_F_A_T4
	5	@3Tmin_F_A_T5
	6	@3Tmin_F_A_T6

Within-Subjects Factors

Measure: MEASURE_1

shoe	time	Dependent Variable
3	7	@3Tmin_F_A_T7

Descriptive Statistics

	Mean	Std. Deviation	N
Tmin_F_A_T1	16.683333333333334	2.952297513134576	12
Tmin_F_A_T2	16.150000000000002	3.545419580247167	12
Tmin_F_A_T3	16.058333333333334	3.092059723442181	12
Tmin_F_A_T4	16.158333333333330	2.739096842966951	12
Tmin_F_A_T5	17.333333333333336	2.507564313807082	12
Tmin_F_A_T6	16.733333333333334	3.309032633519496	12

Tmin_F_A_T7	17.075000000000000	3.641459497609067	12
2Tmin_F_A_T1	15.266666666666667	2.912772291862586	12
2Tmin_F_A_T2	14.242	2.1534	12
2Tmin_F_A_T3	14.174999999999999	2.553117523912499	12
2Tmin_F_A_T4	15.783333333333331	2.325680089519597	12
2Tmin_F_A_T5	15.974999999999998	2.581798175338617	12
2Tmin_F_A_T6	16.458333333333332	3.052408388420031	12
2Tmin_F_A_T7	17.008333333333336	3.613474362673266	12
3Tmin_F_A_T1	18.108333333333330	7.680489843911275	12
3Tmin_F_A_T2	17.016666666666670	7.717964090158085	12
3Tmin_F_A_T3	17.275000000000002	7.646404383761038	12
3Tmin_F_A_T4	17.492	7.6612	12
3Tmin_F_A_T5	18.800000000000000	7.648648127729381	12
3Tmin_F_A_T6	18.841666666666670	7.470847382061864	12
3Tmin_F_A_T7	18.050	7.6113	12

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.
shoe	Pillai's Trace	.350	2.691[b]	2.000	10.000	.116
	Wilks' Lambda	.650	2.691[b]	2.000	10.000	.116
	Hotelling's Trace	.538	2.691[b]	2.000	10.000	.116
	Roy's Largest Root	.538	2.691[b]	2.000	10.000	.116

time	Pillai's Trace	.800	4.000[b]	6.000	6.000	.058
	Wilks' Lambda	.200	4.000[b]	6.000	6.000	.058
	Hotelling's Trace	4.000	4.000[b]	6.000	6.000	.058
	Roy's Largest Root	4.000	4.000[b]	6.000	6.000	.058
shoe * time	Pillai's Trace	.[c]	.	.	.	.
	Wilks' Lambda	.[c]	.	.	.	.
	Hotelling's Trace	.[c]	.	.	.	.
	Roy's Largest Root	.[c]	.	.	.	.

Multivariate Tests[a]

Effect		Partial Eta Squared	Noncent. Parameter	Observed Power[d]
shoe	Pillai's Trace	.350	5.381	.413
	Wilks' Lambda	.350	5.381	.413
	Hotelling's Trace	.350	5.381	.413
	Roy's Largest Root	.350	5.381	.413
time	Pillai's Trace	.800	24.002	.631
	Wilks' Lambda	.800	24.002	.631
	Hotelling's Trace	.800	24.002	.631
	Roy's Largest Root	.800	24.002	.631
shoe * time	Pillai's Trace	.	.	.
	Wilks' Lambda	.	.	.
	Hotelling's Trace	.	.	.
	Roy's Largest Root	.	.	.

a. Design: Intercept
 Within Subjects Design: shoe + time + shoe * time
b. Exact statistic
c. Cannot produce multivariate test statistics because of insufficient residual degrees of freedom.
d. Computed using alpha = .05

Mauchly's Test of Sphericity[a]

Measure: MEASURE_1

		df	Sig.	Epsilon[b]

Within Subjects Effect	Mauchly's W	Approx. Chi-Square			Greenhouse-Geisser
shoe	.234	14.543	2	.001	.566
time	.120	18.647	20	.575	.601
shoe * time	.000	.	77	.	.360

Mauchly's Test of Sphericity[a]

Measure: MEASURE_1

	Epsilon	
Within Subjects Effect	Huynh-Feldt	Lower-bound
shoe	.587	.500
time	.930	.167
shoe * time	.622	.083

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.[a]

a. Design: Intercept

Within Subjects Design: shoe + time + shoe * time

b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F
shoe	Sphericity Assumed	239.603	2	119.802	1.045
	Greenhouse-Geisser	239.603	1.132	211.623	1.045
	Huynh-Feldt	239.603	1.174	204.058	1.045
	Lower-bound	239.603	1.000	239.603	1.045
Error(shoe)	Sphericity Assumed	2522.114	22	114.642	
	Greenhouse-Geisser	2522.114	12.454	202.507	
	Huynh-Feldt	2522.114	12.916	195.269	
	Lower-bound	2522.114	11.000	229.283	
time	Sphericity Assumed	105.254	6	17.542	7.841
	Greenhouse-Geisser	105.254	3.605	29.200	7.841
	Huynh-Feldt	105.254	5.578	18.868	7.841
	Lower-bound	105.254	1.000	105.254	7.841
Error(time)	Sphericity Assumed	147.651	66	2.237	

	Greenhouse-Geisser	147.651	39.650	3.724	
	Huynh-Feldt	147.651	61.362	2.406	
	Lower-bound	147.651	11.000	13.423	
shoe * time	Sphericity Assumed	31.989	12	2.666	1.270
	Greenhouse-Geisser	31.989	4.322	7.402	1.270
	Huynh-Feldt	31.989	7.467	4.284	1.270
	Lower-bound	31.989	1.000	31.989	1.270
Error(shoe*time)	Sphericity Assumed	277.154	132	2.100	
	Greenhouse-Geisser	277.154	47.541	5.830	
	Huynh-Feldt	277.154	82.133	3.374	
	Lower-bound	277.154	11.000	25.196	

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[a]
shoe	Sphericity Assumed	.369	.087	2.090	.209
	Greenhouse-Geisser	.337	.087	1.183	.162
	Huynh-Feldt	.339	.087	1.227	.165
	Lower-bound	.329	.087	1.045	.155
Error(shoe)	Sphericity Assumed				
	Greenhouse-Geisser				
	Huynh-Feldt				
	Lower-bound				
time	Sphericity Assumed	.000	.416	47.049	1.000
	Greenhouse-Geisser	.000	.416	28.265	.992
	Huynh-Feldt	.000	.416	43.742	1.000
	Lower-bound	.017	.416	7.841	.723
Error(time)	Sphericity Assumed				
	Greenhouse-Geisser				
	Huynh-Feldt				
	Lower-bound				
shoe * time	Sphericity Assumed	.244	.103	15.235	.690
	Greenhouse-Geisser	.294	.103	5.487	.381
	Huynh-Feldt	.273	.103	9.480	.529
	Lower-bound	.284	.103	1.270	.178
Error(shoe*time)	Sphericity Assumed				
	Greenhouse-Geisser				

	Huynh-Feldt				
	Lower-bound				

a. Computed using alpha = .05

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	shoe	time	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
shoe	Linear		10.800	1	10.800	.406	.537	.036
	Quadratic		23.429	1	23.429	3.820	.077	.258
Error(shoe)	Linear		292.838	11	26.622			
	Quadratic		67.464	11	6.133			
time		Level 1 vs. Level 2	28.090	1	28.090	14.060	.003	.561
		Level 2 vs. Level 3	.040	1	.040	.027	.871	.002
		Level 3 vs. Level 4	14.822	1	14.822	4.159	.066	.274
		Level 4 vs. Level 5	28.623	1	28.623	4.150	.066	.274
		Level 5 vs. Level 6	.023	1	.023	.008	.930	.001
		Level 6 vs. Level 7	.040	1	.040	.013	.910	.001
Error(time)		Level 1 vs. Level 2	21.977	11	1.998			
		Level 2 vs. Level 3	16.040	11	1.458			
		Level 3 vs. Level 4	39.207	11	3.564			
		Level 4 vs. Level 5	75.868	11	6.897			
		Level 5 vs. Level 6	30.601	11	2.782			

		Level 6 vs. Level 7	33.153	11	3.014			
shoe * time	Linear	Level 1 vs. Level 2	1.870	1	1.870	.298	.596	.026
		Level 2 vs. Level 3	.735	1	.735	.252	.625	.022
		Level 3 vs. Level 4	.082	1	.082	.024	.880	.002
		Level 4 vs. Level 5	.107	1	.107	.029	.869	.003
		Level 5 vs. Level 6	2.470	1	2.470	.458	.512	.040
		Level 6 vs. Level 7	7.707	1	7.707	3.051	.108	.217
	Quadratic	Level 1 vs. Level 2	.361	1	.361	.328	.578	.029
		Level 2 vs. Level 3	.180	1	.180	.229	.642	.020
		Level 3 vs. Level 4	16.820	1	16.820	10.430	.008	.487
		Level 4 vs. Level 5	8.820	1	8.820	2.200	.166	.167
		Level 5 vs. Level 6	4.651	1	4.651	.990	.341	.083
		Level 6 vs. Level 7	4.805	1	4.805	1.625	.229	.129
Error(shoe*time)	Linear	Level 1 vs. Level 2	69.145	11	6.286			
		Level 2 vs. Level 3	32.025	11	2.911			
		Level 3 vs. Level 4	37.758	11	3.433			
		Level 4 vs. Level 5	41.063	11	3.733			
		Level 5 vs. Level 6	59.305	11	5.391			
		Level 6 vs. Level 7	27.783	11	2.526			

	Quadratic	Level 1 vs. Level 2	12.097	11	1.100			
		Level 2 vs. Level 3	8.640	11	.785			
		Level 3 vs. Level 4	17.740	11	1.613			
		Level 4 vs. Level 5	44.090	11	4.008			
		Level 5 vs. Level 6	51.660	11	4.696			
		Level 6 vs. Level 7	32.532	11	2.957			

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	shoe	time	Noncent. Parameter	Observed Power[a]
shoe	Linear		.406	.090
	Quadratic		3.820	.430
Error(shoe)	Linear			
	Quadratic			
time		Level 1 vs. Level 2	14.060	.926
		Level 2 vs. Level 3	.027	.053
		Level 3 vs. Level 4	4.159	.461
		Level 4 vs. Level 5	4.150	.460
		Level 5 vs. Level 6	.008	.051
		Level 6 vs. Level 7	.013	.051
Error(time)		Level 1 vs. Level 2		
		Level 2 vs. Level 3		
		Level 3 vs. Level 4		
		Level 4 vs. Level 5		
		Level 5 vs. Level 6		
		Level 6 vs. Level 7		
shoe * time	Linear	Level 1 vs. Level 2	.298	.079
		Level 2 vs. Level 3	.252	.075
		Level 3 vs. Level 4	.024	.052
		Level 4 vs. Level 5	.029	.053
		Level 5 vs. Level 6	.458	.095

		Level 6 vs. Level 7	3.051	.358
	Quadratic	Level 1 vs. Level 2	.328	.082
		Level 2 vs. Level 3	.229	.072
		Level 3 vs. Level 4	10.430	.836
		Level 4 vs. Level 5	2.200	.273
		Level 5 vs. Level 6	.990	.149
		Level 6 vs. Level 7	1.625	.214
Error(shoe*time)	Linear	Level 1 vs. Level 2		
		Level 2 vs. Level 3		
		Level 3 vs. Level 4		
		Level 4 vs. Level 5		
		Level 5 vs. Level 6		
		Level 6 vs. Level 7		
	Quadratic	Level 1 vs. Level 2		
		Level 2 vs. Level 3		
		Level 3 vs. Level 4		
		Level 4 vs. Level 5		
		Level 5 vs. Level 6		
		Level 6 vs. Level 7		

a. Computed using alpha = .05

Tests of Between-Subjects Effects

Measure: MEASURE_1

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	10039.086	1	10039.086	267.201	.000	.960
Error	413.285	11	37.571			

Tests of Between-Subjects Effects

Measure: MEASURE_1

Transformed Variable: Average

Source	Noncent. Parameter	Observed Power[a]
Intercept	267.201	1.000
Error		

a. Computed using alpha = .05

Estimated Marginal Means

1. Grand Mean

Measure: MEASURE_1

Mean	Std. Error	95% Confidence Interval Lower Bound	Upper Bound
16.699	1.022	14.451	18.948

2. shoe

Estimates

Measure: MEASURE_1

shoe	Mean	Std. Error	95% Confidence Interval Lower Bound	Upper Bound
1	16.599	.833	14.765	18.433
2	15.558	.719	13.976	17.141
3	17.940	2.156	13.195	22.686

Pairwise Comparisons

Measure: MEASURE_1

(I) shoe	(J) shoe	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	Upper Bound
1	2	1.040	.654	.420	-.804	2.885
	3	-1.342	2.106	1.000	-7.282	4.598
2	1	-1.040	.654	.420	-2.885	.804
	3	-2.382	1.823	.654	-7.523	2.759
3	1	1.342	2.106	1.000	-4.598	7.282
	2	2.382	1.823	.654	-2.759	7.523

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared

Pillai's trace	.350	2.691[a]	2.000	10.000	.116	.350
Wilks' lambda	.650	2.691[a]	2.000	10.000	.116	.350
Hotelling's trace	.538	2.691[a]	2.000	10.000	.116	.350
Roy's largest root	.538	2.691[a]	2.000	10.000	.116	.350

Multivariate Tests

	Noncent. Parameter	Observed Power[b]
Pillai's trace	5.381	.413
Wilks' lambda	5.381	.413
Hotelling's trace	5.381	.413
Roy's largest root	5.381	.413

Each F tests the multivariate effect of shoe. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.
a. Exact statistic
b. Computed using alpha = .05

3. time

Estimates

Measure: MEASURE_1

			95% Confidence Interval	
time	Mean	Std. Error	Lower Bound	Upper Bound
1	16.686	1.042	14.392	18.980
2	15.803	.992	13.619	17.987
3	15.836	1.052	13.522	18.151
4	16.478	.969	14.345	18.610
5	17.369	1.011	15.143	19.595
6	17.344	1.075	14.979	19.710
7	17.378	1.177	14.788	19.968

Pairwise Comparisons

Measure: MEASURE_1

					95% Confidence Interval for Difference[b]	
(I) time	(J) time	Mean Difference (I-J)	Std. Error	Sig.[b]	Lower Bound	Upper Bound

1	2	.883	.236	.067	-.041	1.807
	3	.850	.294	.306	-.302	2.002
	4	.208	.290	1.000	-.931	1.347
	5	-.683	.408	1.000	-2.284	.918
	6	-.658	.426	1.000	-2.328	1.012
	7	-.692	.400	1.000	-2.261	.878
2	1	-.883	.236	.067	-1.807	.041
	3	-.033	.201	1.000	-.823	.756
	4	-.675	.300	.965	-1.852	.502
	5	-1.567[*]	.357	.023	-2.966	-.168
	6	-1.542[*]	.379	.039	-3.029	-.054
	7	-1.575[*]	.359	.023	-2.983	-.167
3	1	-.850	.294	.306	-2.002	.302
	2	.033	.201	1.000	-.756	.823
	4	-.642	.315	1.000	-1.876	.593
	5	-1.533[*]	.372	.035	-2.991	-.075
	6	-1.508	.393	.058	-3.052	.035
	7	-1.542[*]	.392	.050	-3.081	-.002
4	1	-.208	.290	1.000	-1.347	.931
	2	.675	.300	.965	-.502	1.852
	3	.642	.315	1.000	-.593	1.876
	5	-.892	.438	1.000	-2.609	.825
	6	-.867	.400	1.000	-2.437	.703
	7	-.900	.320	.353	-2.154	.354
5	1	.683	.408	1.000	-.918	2.284
	2	1.567[*]	.357	.023	.168	2.966
	3	1.533[*]	.372	.035	.075	2.991
	4	.892	.438	1.000	-.825	2.609
	6	.025	.278	1.000	-1.066	1.116
	7	-.008	.430	1.000	-1.695	1.678
6	1	.658	.426	1.000	-1.012	2.328
	2	1.542[*]	.379	.039	.054	3.029
	3	1.508	.393	.058	-.035	3.052
	4	.867	.400	1.000	-.703	2.437
	5	-.025	.278	1.000	-1.116	1.066
	7	-.033	.289	1.000	-1.168	1.102
7	1	.692	.400	1.000	-.878	2.261
	2	1.575[*]	.359	.023	.167	2.983

	3	1.542*	.392	.050	.002	3.081
	4	.900	.320	.353	-.354	2.154
	5	.008	.430	1.000	-1.678	1.695
	6	.033	.289	1.000	-1.102	1.168

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

b. Adjustment for multiple comparisons: Bonferroni.

Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Pillai's trace	.800	4.000[a]	6.000	6.000	.058	.800
Wilks' lambda	.200	4.000[a]	6.000	6.000	.058	.800
Hotelling's trace	4.000	4.000[a]	6.000	6.000	.058	.800
Roy's largest root	4.000	4.000[a]	6.000	6.000	.058	.800

Multivariate Tests

	Noncent. Parameter	Observed Power[b]
Pillai's trace	24.002	.631
Wilks' lambda	24.002	.631
Hotelling's trace	24.002	.631
Roy's largest root	24.002	.631

Each F tests the multivariate effect of time. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

a. Exact statistic

b. Computed using alpha = .05

4. shoe * time

Measure: MEASURE_1

				95% Confidence Interval	
shoe	time	Mean	Std. Error	Lower Bound	Upper Bound
1	1	16.683	.852	14.808	18.559
	2	16.150	1.023	13.897	18.403
	3	16.058	.893	14.094	18.023

	4	16.158	.791	14.418	17.899
	5	17.333	.724	15.740	18.927
	6	16.733	.955	14.631	18.836
	7	17.075	1.051	14.761	19.389
2	1	15.267	.841	13.416	17.117
	2	14.242	.622	12.873	15.610
	3	14.175	.737	12.553	15.797
	4	15.783	.671	14.306	17.261
	5	15.975	.745	14.335	17.615
	6	16.458	.881	14.519	18.398
	7	17.008	1.043	14.712	19.304
3	1	18.108	2.217	13.228	22.988
	2	17.017	2.228	12.113	21.920
	3	17.275	2.207	12.417	22.133
	4	17.492	2.212	12.624	22.359
	5	18.800	2.208	13.940	23.660
	6	18.842	2.157	14.095	23.588
	7	18.050	2.197	13.214	22.886

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Tangle_S_A_T6
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@2Tangle_S_A_T4 @2Tangle_S_A_T5
    @2Tangle_S_A_T6 @2Tangle_S_A_T7 @3Tangle_S_A_T1 @3Tangle_S_A_T2
@3Tangle_S_A_T3 @3Tangle_S_A_T4
    @3Tangle_S_A_T5 @3Tangle_S_A_T6 @3Tangle_S_A_T7
  /WSFACTOR=shoe 3 Polynomial time 7 Repeated
  /METHOD=SSTYPE(3)
  /EMMEANS=TABLES(OVERALL)
```

```
/EMMEANS=TABLES(shoe) COMPARE ADJ(BONFERRONI)
/EMMEANS=TABLES(time) COMPARE ADJ(BONFERRONI)
/EMMEANS=TABLES(shoe*time)
/PRINT=DESCRIPTIVE ETASQ OPOWER
/CRITERIA=ALPHA(.05)
/WSDESIGN=shoe time shoe*time.
```

General Linear Model

Notes

Output Created		14-MAR-2019 10:37:43
Comments		
Input	Active Dataset	DataSet4
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	12
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on all cases with valid data for all variables in the model.

Syntax	GLM Tangle_S_A_T1 Tangle_S_A_T2 Tangle_S_A_T3 Tangle_S_A_T4 Tangle_S_A_T5 Tangle_S_A_T6 Tangle_S_A_T7 @2Tangle_S_A_T1 @2Tangle_S_A_T2 @2Tangle_S_A_T3 @2Tangle_S_A_T4 @2Tangle_S_A_T5 @2Tangle_S_A_T6 @2Tangle_S_A_T7 @3Tangle_S_A_T1 @3Tangle_S_A_T2 @3Tangle_S_A_T3 @3Tangle_S_A_T4 @3Tangle_S_A_T5 @3Tangle_S_A_T6 @3Tangle_S_A_T7 /WSFACTOR=shoe 3 Polynomial time 7 Repeated /METHOD=SSTYPE(3) /EMMEANS=TABLES(OVERALL) /EMMEANS=TABLES(shoe) COMPARE ADJ(BONFERRONI) /EMMEANS=TABLES(time) COMPARE ADJ(BONFERRONI) /EMMEANS=TABLES(shoe*time)

		/PRINT=DESCRIPTIVE ETASQ OPOWER /CRITERIA=ALPHA(.05) /WSDESIGN=shoe time shoe*time.
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.03

[DataSet4]

Within-Subjects Factors

Measure: MEASURE_1

shoe	time	Dependent Variable
1	1	Tangle_S_A_T1
	2	Tangle_S_A_T2
	3	Tangle_S_A_T3
	4	Tangle_S_A_T4
	5	Tangle_S_A_T5
	6	Tangle_S_A_T6
	7	Tangle_S_A_T7
2	1	@2Tangle_S_A_T1
	2	@2Tangle_S_A_T2
	3	@2Tangle_S_A_T3
	4	@2Tangle_S_A_T4

	5	@2Tangle_S_A_T5
	6	@2Tangle_S_A_T6
	7	@2Tangle_S_A_T7
3	1	@3Tangle_S_A_T1
	2	@3Tangle_S_A_T2
	3	@3Tangle_S_A_T3
	4	@3Tangle_S_A_T4
	5	@3Tangle_S_A_T5
	6	@3Tangle_S_A_T6

Within-Subjects Factors

Measure: MEASURE_1

shoe	time	Dependent Variable
3	7	@3Tangle_S_A_T7

Descriptive Statistics

	Mean	Std. Deviation	N
Tangle_S_A_T1	10.501982225000000	2.591899426842795	12
Tangle_S_A_T2	9.404805550000000	2.464135633821806	12
Tangle_S_A_T3	10.102542300000001	2.456323552578175	12
Tangle_S_A_T4	10.463606325000000	2.615449210061687	12
Tangle_S_A_T5	10.900741341666665	3.347382216137634	12

Tangle_S_A_T6	10.764573008333334	2.115688634740248	12
Tangle_S_A_T7	10.545836000000001	2.878471947063099	12
2Tangle_S_A_T1	10.296672733333333	2.806537532194736	12
2Tangle_S_A_T2	9.497775141666668	2.762824896062257	12
2Tangle_S_A_T3	9.006283133333332	2.952175748133052	12
2Tangle_S_A_T4	9.831788675000002	3.281782020243548	12
2Tangle_S_A_T5	9.965151216666666	3.182507789112218	12
2Tangle_S_A_T6	9.372679000000002	4.051409838918737	12
2Tangle_S_A_T7	10.102127033333336	3.086670852974759	12
3Tangle_S_A_T1	9.072807599999999	3.030219486716514	12
3Tangle_S_A_T2	8.117295841666666	3.006332358339675	12
3Tangle_S_A_T3	7.848752750000000	3.183411661290203	12
3Tangle_S_A_T4	8.152192316666667	3.167205329832825	12
3Tangle_S_A_T5	8.402797900000001	3.289834984657991	12
3Tangle_S_A_T6	9.741924350000000	5.710825532040249	12
3Tangle_S_A_T7	8.002229850000000	3.452996198030245	12

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.
shoe	Pillai's Trace	.435	3.847[b]	2.000	10.000	.058

	Wilks' Lambda	.565	3.847[b]	2.000	10.000	.058
	Hotelling's Trace	.769	3.847[b]	2.000	10.000	.058
	Roy's Largest Root	.769	3.847[b]	2.000	10.000	.058
time	Pillai's Trace	.699	2.324[b]	6.000	6.000	.164
	Wilks' Lambda	.301	2.324[b]	6.000	6.000	.164
	Hotelling's Trace	2.324	2.324[b]	6.000	6.000	.164
	Roy's Largest Root	2.324	2.324[b]	6.000	6.000	.164
shoe * time	Pillai's Trace	.[c]	.	.	.	.
	Wilks' Lambda	.[c]	.	.	.	.
	Hotelling's Trace	.[c]	.	.	.	.
	Roy's Largest Root	.[c]	.	.	.	.

Multivariate Tests[a]

Effect		Partial Eta Squared	Noncent. Parameter	Observed Power[d]
shoe	Pillai's Trace	.435	7.693	.558
	Wilks' Lambda	.435	7.693	.558
	Hotelling's Trace	.435	7.693	.558
	Roy's Largest Root	.435	7.693	.558
time	Pillai's Trace	.699	13.941	.397
	Wilks' Lambda	.699	13.941	.397
	Hotelling's Trace	.699	13.941	.397
	Roy's Largest Root	.699	13.941	.397
shoe * time	Pillai's Trace	.	.	.
	Wilks' Lambda	.	.	.
	Hotelling's Trace	.	.	.
	Roy's Largest Root	.	.	.

a. Design: Intercept
Within Subjects Design: shoe + time + shoe * time

b. Exact statistic

c. Cannot produce multivariate test statistics because of insufficient residual degrees of freedom.

d. Computed using alpha = .05

Mauchly's Test of Sphericity[a]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[b] Greenhouse-Geisser
shoe	.702	3.540	2	.170	.770
time	.001	57.782	20	.000	.358
shoe * time	.000	.	77	.	.184

Mauchly's Test of Sphericity[a]

Measure: MEASURE_1

	Epsilon	
Within Subjects Effect	Huynh-Feldt	Lower-bound
shoe	.872	.500
time	.448	.167
shoe * time	.231	.083

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.[a]

a. Design: Intercept

Within Subjects Design: shoe + time + shoe * time

b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F
shoe	Sphericity Assumed	157.529	2	78.765	3.168
	Greenhouse-Geisser	157.529	1.541	102.249	3.168
	Huynh-Feldt	157.529	1.743	90.377	3.168
	Lower-bound	157.529	1.000	157.529	3.168
Error(shoe)	Sphericity Assumed	546.951	22	24.861	
	Greenhouse-Geisser	546.951	16.947	32.274	
	Huynh-Feldt	546.951	19.173	28.527	
	Lower-bound	546.951	11.000	49.723	
time	Sphericity Assumed	35.674	6	5.946	3.177
	Greenhouse-Geisser	35.674	2.149	16.598	3.177
	Huynh-Feldt	35.674	2.688	13.271	3.177

	Lower-bound	35.674	1.000	35.674	3.177
Error(time)	Sphericity Assumed	123.530	66	1.872	
	Greenhouse-Geisser	123.530	23.642	5.225	
	Huynh-Feldt	123.530	29.569	4.178	
	Lower-bound	123.530	11.000	11.230	
shoe * time	Sphericity Assumed	30.833	12	2.569	.973
	Greenhouse-Geisser	30.833	2.202	14.001	.973
	Huynh-Feldt	30.833	2.776	11.105	.973
	Lower-bound	30.833	1.000	30.833	.973
Error(shoe*time)	Sphericity Assumed	348.437	132	2.640	
	Greenhouse-Geisser	348.437	24.224	14.384	
	Huynh-Feldt	348.437	30.541	11.409	
	Lower-bound	348.437	11.000	31.676	

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[a]
shoe	Sphericity Assumed	.062	.224	6.336	.547
	Greenhouse-Geisser	.078	.224	4.881	.471
	Huynh-Feldt	.071	.224	5.522	.506
	Lower-bound	.103	.224	3.168	.369
Error(shoe)	Sphericity Assumed				
	Greenhouse-Geisser				
	Huynh-Feldt				
	Lower-bound				
time	Sphericity Assumed	.008	.224	19.060	.899
	Greenhouse-Geisser	.057	.224	6.828	.570
	Huynh-Feldt	.043	.224	8.539	.644
	Lower-bound	.102	.224	3.177	.370
Error(time)	Sphericity Assumed				
	Greenhouse-Geisser				
	Huynh-Feldt				
	Lower-bound				
shoe * time	Sphericity Assumed	.478	.081	11.681	.545
	Greenhouse-Geisser	.399	.081	2.144	.206
	Huynh-Feldt	.413	.081	2.703	.232
	Lower-bound	.345	.081	.973	.147

Error(shoe*time)	Sphericity Assumed				
	Greenhouse-Geisser				
	Huynh-Feldt				
	Lower-bound				

a. Computed using alpha = .05

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	shoe	time	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
shoe	Linear		21.810	1	21.810	7.048	.022	.391
	Quadratic		.694	1	.694	.173	.685	.015
Error(shoe)	Linear		34.038	11	3.094			
	Quadratic		44.098	11	4.009			
time		Level 1 vs. Level 2	32.526	1	32.526	13.970	.003	.559
		Level 2 vs. Level 3	.016	1	.016	.037	.852	.003
		Level 3 vs. Level 4	8.881	1	8.881	6.655	.026	.377
		Level 4 vs. Level 5	2.697	1	2.697	5.321	.042	.326
		Level 5 vs. Level 6	1.491	1	1.491	.226	.644	.020
		Level 6 vs. Level 7	6.042	1	6.042	.940	.353	.079
Error(time)		Level 1 vs. Level 2	25.612	11	2.328			
		Level 2 vs. Level 3	4.676	11	.425			
		Level 3 vs. Level 4	14.679	11	1.334			
		Level 4 vs. Level 5	5.575	11	.507			

		Level 5 vs. Level 6	72.580	11	6.598			
		Level 6 vs. Level 7	70.719	11	6.429			
shoe * time	Linear	Level 1 vs. Level 2	.120	1	.120	.069	.798	.006
		Level 2 vs. Level 3	5.602	1	5.602	7.235	.021	.397
		Level 3 vs. Level 4	.020	1	.020	.083	.779	.007
		Level 4 vs. Level 5	.209	1	.209	.220	.648	.020
		Level 5 vs. Level 6	13.059	1	13.059	.480	.503	.042
		Level 6 vs. Level 7	13.880	1	13.880	.766	.400	.065
	Quadratic	Level 1 vs. Level 2	.414	1	.414	.182	.678	.016
		Level 2 vs. Level 3	3.988	1	3.988	7.633	.018	.410
		Level 3 vs. Level 4	1.946	1	1.946	1.962	.189	.151
		Level 4 vs. Level 5	.355	1	.355	.269	.614	.024
		Level 5 vs. Level 6	11.404	1	11.404	3.324	.096	.232
		Level 6 vs. Level 7	23.356	1	23.356	3.079	.107	.219
Error(shoe* time)	Linear	Level 1 vs. Level 2	19.260	11	1.751			
		Level 2 vs. Level 3	8.517	11	.774			
		Level 3 vs. Level 4	2.645	11	.240			
		Level 4 vs. Level 5	10.456	11	.951			
		Level 5 vs. Level 6	299.411	11	27.219			

		Level 6 vs. Level 7	199.399	11	18.127			
	Quadratic	Level 1 vs. Level 2	24.971	11	2.270			
		Level 2 vs. Level 3	5.748	11	.523			
		Level 3 vs. Level 4	10.910	11	.992			
		Level 4 vs. Level 5	14.495	11	1.318			
		Level 5 vs. Level 6	37.743	11	3.431			
		Level 6 vs. Level 7	83.443	11	7.586			

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	shoe	time	Noncent. Parameter	Observed Power[a]
shoe	Linear		7.048	.677
	Quadratic		.173	.067
Error(shoe)	Linear			
	Quadratic			
time		Level 1 vs. Level 2	13.970	.924
		Level 2 vs. Level 3	.037	.054
		Level 3 vs. Level 4	6.655	.652
		Level 4 vs. Level 5	5.321	.557
		Level 5 vs. Level 6	.226	.072
		Level 6 vs. Level 7	.940	.144
Error(time)		Level 1 vs. Level 2		
		Level 2 vs. Level 3		
		Level 3 vs. Level 4		
		Level 4 vs. Level 5		
		Level 5 vs. Level 6		
		Level 6 vs. Level 7		
shoe * time	Linear	Level 1 vs. Level 2	.069	.057
		Level 2 vs. Level 3	7.235	.688
		Level 3 vs. Level 4	.083	.058

		Level 4 vs. Level 5	.220	.071
		Level 5 vs. Level 6	.480	.097
		Level 6 vs. Level 7	.766	.126
	Quadratic	Level 1 vs. Level 2	.182	.068
		Level 2 vs. Level 3	7.633	.711
		Level 3 vs. Level 4	1.962	.249
		Level 4 vs. Level 5	.269	.076
		Level 5 vs. Level 6	3.324	.384
		Level 6 vs. Level 7	3.079	.360
Error(shoe*time)	Linear	Level 1 vs. Level 2		
		Level 2 vs. Level 3		
		Level 3 vs. Level 4		
		Level 4 vs. Level 5		
		Level 5 vs. Level 6		
		Level 6 vs. Level 7		
	Quadratic	Level 1 vs. Level 2		
		Level 2 vs. Level 3		
		Level 3 vs. Level 4		
		Level 4 vs. Level 5		
		Level 5 vs. Level 6		
		Level 6 vs. Level 7		

a. Computed using alpha = .05

Tests of Between-Subjects Effects

Measure: MEASURE_1

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	3268.395	1	3268.395	187.820	.000	.945
Error	191.419	11	17.402			

Tests of Between-Subjects Effects

Measure: MEASURE_1

Transformed Variable: Average

Source	Noncent. Parameter	Observed Power[a]
Intercept	187.820	1.000
Error		

a. Computed using alpha = .05

Estimated Marginal Means

1. Grand Mean

Measure: MEASURE_1

Mean	Std. Error	95% Confidence Interval Lower Bound	Upper Bound
9.528	.695	7.998	11.059

2. shoe

Estimates

Measure: MEASURE_1

shoe	Mean	Std. Error	95% Confidence Interval Lower Bound	Upper Bound
1	10.383	.679	8.888	11.879
2	9.725	.855	7.842	11.607
3	8.477	.921	6.449	10.505

Pairwise Comparisons

Measure: MEASURE_1

(I) shoe	(J) shoe	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	Upper Bound
1	2	.659	.598	.883	-1.029	2.346
	3	1.907	.718	.067	-.119	3.932
2	1	-.659	.598	.883	-2.346	1.029
	3	1.248	.950	.647	-1.431	3.926
3	1	-1.907	.718	.067	-3.932	.119
	2	-1.248	.950	.647	-3.926	1.431

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

Multivariate Tests

Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared

Pillai's trace	.435	3.847[a]	2.000	10.000	.058	.435
Wilks' lambda	.565	3.847[a]	2.000	10.000	.058	.435
Hotelling's trace	.769	3.847[a]	2.000	10.000	.058	.435
Roy's largest root	.769	3.847[a]	2.000	10.000	.058	.435

Multivariate Tests

	Noncent. Parameter	Observed Power[b]
Pillai's trace	7.693	.558
Wilks' lambda	7.693	.558
Hotelling's trace	7.693	.558
Roy's largest root	7.693	.558

Each F tests the multivariate effect of shoe. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.
a. Exact statistic
b. Computed using alpha = .05

3. time

Estimates

Measure: MEASURE_1

time	Mean	Std. Error	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
1	9.957	.685	8.450	11.464
2	9.007	.684	7.501	10.512
3	8.986	.672	7.508	10.464
4	9.483	.701	7.939	11.026
5	9.756	.727	8.155	11.357
6	9.960	.848	8.092	11.827
7	9.550	.753	7.893	11.207

Pairwise Comparisons

Measure: MEASURE_1

(I) time	(J) time	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b] Lower Bound	95% Confidence Interval for Difference[b] Upper Bound

1	2	.951	.254	.069	-.047	1.948
	3	.971*	.242	.043	.021	1.922
	4	.475	.238	1.000	-.460	1.409
	5	.201	.278	1.000	-.890	1.292
	6	-.003	.490	1.000	-1.923	1.918
	7	.407	.220	1.000	-.455	1.269
2	1	-.951	.254	.069	-1.948	.047
	3	.021	.109	1.000	-.406	.447
	4	-.476	.222	1.000	-1.346	.394
	5	-.750	.304	.663	-1.944	.445
	6	-.953	.572	1.000	-3.196	1.289
	7	-.543	.278	1.000	-1.633	.546
3	1	-.971*	.242	.043	-1.922	-.021
	2	-.021	.109	1.000	-.447	.406
	4	-.497	.193	.538	-1.252	.259
	5	-.770	.248	.209	-1.743	.202
	6	-.974	.512	1.000	-2.981	1.033
	7	-.564	.207	.419	-1.378	.250
4	1	-.475	.238	1.000	-1.409	.460
	2	.476	.222	1.000	-.394	1.346
	3	.497	.193	.538	-.259	1.252
	5	-.274	.119	.872	-.739	.192
	6	-.477	.454	1.000	-2.257	1.303
	7	-.068	.226	1.000	-.955	.820
5	1	-.201	.278	1.000	-1.292	.890
	2	.750	.304	.663	-.445	1.944
	3	.770	.248	.209	-.202	1.743
	4	.274	.119	.872	-.192	.739
	6	-.203	.428	1.000	-1.883	1.476
	7	.206	.210	1.000	-.619	1.032
6	1	.003	.490	1.000	-1.918	1.923
	2	.953	.572	1.000	-1.289	3.196
	3	.974	.512	1.000	-1.033	2.981
	4	.477	.454	1.000	-1.303	2.257
	5	.203	.428	1.000	-1.476	1.883
	7	.410	.423	1.000	-1.248	2.067
7	1	-.407	.220	1.000	-1.269	.455
	2	.543	.278	1.000	-.546	1.633

	3	.564	.207	.419	-.250	1.378
	4	.068	.226	1.000	-.820	.955
	5	-.206	.210	1.000	-1.032	.619
	6	-.410	.423	1.000	-2.067	1.248

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

b. Adjustment for multiple comparisons: Bonferroni.

Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Pillai's trace	.699	2.324[a]	6.000	6.000	.164	.699
Wilks' lambda	.301	2.324[a]	6.000	6.000	.164	.699
Hotelling's trace	2.324	2.324[a]	6.000	6.000	.164	.699
Roy's largest root	2.324	2.324[a]	6.000	6.000	.164	.699

Multivariate Tests

	Noncent. Parameter	Observed Power[b]
Pillai's trace	13.941	.397
Wilks' lambda	13.941	.397
Hotelling's trace	13.941	.397
Roy's largest root	13.941	.397

Each F tests the multivariate effect of time. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

a. Exact statistic

b. Computed using alpha = .05

4. shoe * time

Measure: MEASURE_1

shoe	time	Mean	Std. Error	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
1	1	10.502	.748	8.855	12.149
	2	9.405	.711	7.839	10.970

	3	10.103	.709	8.542	11.663
	4	10.464	.755	8.802	12.125
	5	10.901	.966	8.774	13.028
	6	10.765	.611	9.420	12.109
	7	10.546	.831	8.717	12.375
2	1	10.297	.810	8.513	12.080
	2	9.498	.798	7.742	11.253
	3	9.006	.852	7.131	10.882
	4	9.832	.947	7.747	11.917
	5	9.965	.919	7.943	11.987
	6	9.373	1.170	6.799	11.947
	7	10.102	.891	8.141	12.063
3	1	9.073	.875	7.147	10.998
	2	8.117	.868	6.207	10.027
	3	7.849	.919	5.826	9.871
	4	8.152	.914	6.140	10.165
	5	8.403	.950	6.313	10.493
	6	9.742	1.649	6.113	13.370
	7	8.002	.997	5.808	10.196

```
GLM MaxA_S_A_T1 MaxA_S_A_T2 MaxA_S_A_T3 MaxA_S_A_T4 MaxA_S_A_T5
MaxA_S_A_T6 MaxA_S_A_T7
   @2MaxA_S_A_T1 @2MaxA_S_A_T2 @2MaxA_S_A_T3 @2MaxA_S_A_T4
@2MaxA_S_A_T5 @2MaxA_S_A_T6 @2MaxA_S_A_T7
   @3MaxA_S_A_T1 @3MaxA_S_A_T2 @3MaxA_S_A_T3 @3MaxA_S_A_T4
@3MaxA_S_A_T5 @3MaxA_S_A_T6 @3MaxA_S_A_T7
  /WSFACTOR=shoe 3 Polynomial time 7 Repeated
  /METHOD=SSTYPE(3)
  /EMMEANS=TABLES(OVERALL)
  /EMMEANS=TABLES(shoe) COMPARE ADJ(BONFERRONI)
  /EMMEANS=TABLES(time) COMPARE ADJ(BONFERRONI)
  /EMMEANS=TABLES(shoe*time)
  /PRINT=DESCRIPTIVE ETASQ OPOWER
  /CRITERIA=ALPHA(.05)
  /WSDESIGN=shoe time shoe*time.
```

General Linear Model

Notes

Output Created		14-MAR-2019 10:41:55
Comments		
Input	Active Dataset	DataSet4
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	12
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on all cases with valid data for all variables in the model.

Syntax	GLM MaxA_S_A_T1 MaxA_S_A_T2 MaxA_S_A_T3 MaxA_S_A_T4 MaxA_S_A_T5 MaxA_S_A_T6 MaxA_S_A_T7 @2MaxA_S_A_T1 @2MaxA_S_A_T2 @2MaxA_S_A_T3 @2MaxA_S_A_T4 @2MaxA_S_A_T5 @2MaxA_S_A_T6 @2MaxA_S_A_T7 @3MaxA_S_A_T1 @3MaxA_S_A_T2 @3MaxA_S_A_T3 @3MaxA_S_A_T4 @3MaxA_S_A_T5 @3MaxA_S_A_T6 @3MaxA_S_A_T7 /WSFACTOR=shoe 3 Polynomial time 7 Repeated /METHOD=SSTYPE(3) /EMMEANS=TABLES(OVERALL) /EMMEANS=TABLES(shoe) COMPARE ADJ(BONFERRONI) /EMMEANS=TABLES(time) COMPARE ADJ(BONFERRONI) /EMMEANS=TABLES(shoe*time)

		/PRINT=DESCRIPTIVE ETASQ OPOWER /CRITERIA=ALPHA(.05) /WSDESIGN=shoe time shoe*time.
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	Elapsed Time	00:00:00.02

Within-Subjects Factors

Measure: MEASURE_1

shoe	time	Dependent Variable
1	1	MaxA_S_A_T1
	2	MaxA_S_A_T2
	3	MaxA_S_A_T3
	4	MaxA_S_A_T4
	5	MaxA_S_A_T5
	6	MaxA_S_A_T6
	7	MaxA_S_A_T7
2	1	@2MaxA_S_A_T1
	2	@2MaxA_S_A_T2
	3	@2MaxA_S_A_T3
	4	@2MaxA_S_A_T4
	5	@2MaxA_S_A_T5

	6	@2MaxA_S_A_T6
	7	@2MaxA_S_A_T7
3	1	@3MaxA_S_A_T1
	2	@3MaxA_S_A_T2
	3	@3MaxA_S_A_T3
	4	@3MaxA_S_A_T4
	5	@3MaxA_S_A_T5
	6	@3MaxA_S_A_T6

Within-Subjects Factors

Measure: MEASURE_1

shoe	time	Dependent Variable
3	7	@3MaxA_S_A_T7

Descriptive Statistics

	Mean	Std. Deviation	N
MaxA_S_A_T1	24.346375908333332	2.212769127634784	12
MaxA_S_A_T2	23.998462833333328	2.728701104598537	12
MaxA_S_A_T3	24.442740083333334	2.817154229663143	12
MaxA_S_A_T4	24.591566366666665	2.672650370119916	12
MaxA_S_A_T5	25.067753725000003	2.389647466186146	12
MaxA_S_A_T6	24.745906024999996	3.047798107524704	12

MaxA_S_A_T7	24.509601741666668	2.892350486886695	12
2MaxA_S_A_T1	24.174451258333335	2.858062639106018	12
2MaxA_S_A_T2	24.660728233333334	3.379790750392238	12
2MaxA_S_A_T3	24.408500908333334	3.374997954589486	12
2MaxA_S_A_T4	24.638502566666670	3.257297463647971	12
2MaxA_S_A_T5	24.510388633333335	2.985469239020025	12
2MaxA_S_A_T6	23.641120991666664	3.823111354402064	12
2MaxA_S_A_T7	24.262259416666670	3.236474144878792	12
3MaxA_S_A_T1	22.546974958333330	2.826699424663761	12
3MaxA_S_A_T2	22.283021316666666	3.450241991754389	12
3MaxA_S_A_T3	22.310289733333335	3.792905489090229	12
3MaxA_S_A_T4	22.243813975000002	3.723798806392979	12
3MaxA_S_A_T5	22.047716216666664	3.636780095826877	12
3MaxA_S_A_T6	23.422680333333330	5.903986876348712	12
3MaxA_S_A_T7	21.781756641666668	3.982973018432948	12

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.
shoe	Pillai's Trace	.358	2.789[b]	2.000	10.000	.109
	Wilks' Lambda	.642	2.789[b]	2.000	10.000	.109
	Hotelling's Trace	.558	2.789[b]	2.000	10.000	.109
	Roy's Largest Root	.558	2.789[b]	2.000	10.000	.109

time	Pillai's Trace	.711	2.456[b]	6.000	6.000	.149
	Wilks' Lambda	.289	2.456[b]	6.000	6.000	.149
	Hotelling's Trace	2.456	2.456[b]	6.000	6.000	.149
	Roy's Largest Root	2.456	2.456[b]	6.000	6.000	.149
shoe * time	Pillai's Trace	.[c]	.	.	.	.
	Wilks' Lambda	.[c]	.	.	.	.
	Hotelling's Trace	.[c]	.	.	.	.
	Roy's Largest Root	.[c]	.	.	.	.

Multivariate Tests[a]

Effect		Partial Eta Squared	Noncent. Parameter	Observed Power[d]
shoe	Pillai's Trace	.358	5.578	.427
	Wilks' Lambda	.358	5.578	.427
	Hotelling's Trace	.358	5.578	.427
	Roy's Largest Root	.358	5.578	.427
time	Pillai's Trace	.711	14.739	.418
	Wilks' Lambda	.711	14.739	.418
	Hotelling's Trace	.711	14.739	.418
	Roy's Largest Root	.711	14.739	.418
shoe * time	Pillai's Trace	.	.	.
	Wilks' Lambda	.	.	.
	Hotelling's Trace	.	.	.
	Roy's Largest Root	.	.	.

a. Design: Intercept
Within Subjects Design: shoe + time + shoe * time

b. Exact statistic

c. Cannot produce multivariate test statistics because of insufficient residual degrees of freedom.

d. Computed using alpha = .05

Mauchly's Test of Sphericity[a]

Measure: MEASURE_1

			df	Sig.	Epsilon[b]

Within Subjects Effect	Mauchly's W	Approx. Chi-Square			Greenhouse-Geisser
shoe	.861	1.501	2	.472	.878
time	.000	69.585	20	.000	.334
shoe * time	.000	.	77	.	.146

Mauchly's Test of Sphericity[a]

Measure: MEASURE_1

	Epsilon	
Within Subjects Effect	Huynh-Feldt	Lower-bound
shoe	1.000	.500
time	.409	.167
shoe * time	.171	.083

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.[a]

a. Design: Intercept

Within Subjects Design: shoe + time + shoe * time

b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F
shoe	Sphericity Assumed	237.460	2	118.730	3.545
	Greenhouse-Geisser	237.460	1.755	135.276	3.545
	Huynh-Feldt	237.460	2.000	118.730	3.545
	Lower-bound	237.460	1.000	237.460	3.545
Error(shoe)	Sphericity Assumed	736.906	22	33.496	
	Greenhouse-Geisser	736.906	19.309	38.164	
	Huynh-Feldt	736.906	22.000	33.496	
	Lower-bound	736.906	11.000	66.991	
time	Sphericity Assumed	4.494	6	.749	.424
	Greenhouse-Geisser	4.494	2.005	2.241	.424
	Huynh-Feldt	4.494	2.452	1.833	.424
	Lower-bound	4.494	1.000	4.494	.424

Error(time)	Sphericity Assumed	116.467	66	1.765	
	Greenhouse-Geisser	116.467	22.054	5.281	
	Huynh-Feldt	116.467	26.975	4.318	
	Lower-bound	116.467	11.000	10.588	
shoe * time	Sphericity Assumed	31.824	12	2.652	1.139
	Greenhouse-Geisser	31.824	1.750	18.181	1.139
	Huynh-Feldt	31.824	2.055	15.488	1.139
	Lower-bound	31.824	1.000	31.824	1.139
Error(shoe*time)	Sphericity Assumed	307.254	132	2.328	
	Greenhouse-Geisser	307.254	19.255	15.957	
	Huynh-Feldt	307.254	22.602	13.594	
	Lower-bound	307.254	11.000	27.932	

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[a]
shoe	Sphericity Assumed	.046	.244	7.089	.597
	Greenhouse-Geisser	.054	.244	6.222	.556
	Huynh-Feldt	.046	.244	7.089	.597
	Lower-bound	.086	.244	3.545	.405
Error(shoe)	Sphericity Assumed				
	Greenhouse-Geisser				
	Huynh-Feldt				
	Lower-bound				
time	Sphericity Assumed	.860	.037	2.547	.165
	Greenhouse-Geisser	.660	.037	.851	.110
	Huynh-Feldt	.698	.037	1.041	.117
	Lower-bound	.528	.037	.424	.092
Error(time)	Sphericity Assumed				
	Greenhouse-Geisser				
	Huynh-Feldt				
	Lower-bound				
shoe * time	Sphericity Assumed	.334	.094	13.672	.630
	Greenhouse-Geisser	.334	.094	1.994	.210
	Huynh-Feldt	.339	.094	2.341	.228
	Lower-bound	.309	.094	1.139	.164
	Sphericity Assumed				

Error(shoe*time)	Greenhouse-Geisser				
	Huynh-Feldt				
	Lower-bound				

a. Computed using alpha = .05

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	shoe	time	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
shoe	Linear		27.795	1	27.795	6.094	.031	.357
	Quadratic		6.128	1	6.128	1.223	.292	.100
Error(shoe)	Linear		50.170	11	4.561			
	Quadratic		55.102	11	5.009			
time		Level 1 vs. Level 2	.063	1	.063	.027	.873	.002
		Level 2 vs. Level 3	.192	1	.192	.490	.498	.043
		Level 3 vs. Level 4	.390	1	.390	.884	.367	.074
		Level 4 vs. Level 5	.092	1	.092	.188	.673	.017
		Level 5 vs. Level 6	.135	1	.135	.025	.878	.002
		Level 6 vs. Level 7	6.311	1	6.311	.690	.424	.059
Error(time)		Level 1 vs. Level 2	25.812	11	2.347			
		Level 2 vs. Level 3	4.320	11	.393			
		Level 3 vs. Level 4	4.853	11	.441			
		Level 4 vs. Level 5	5.398	11	.491			
		Level 5 vs. Level 6	60.344	11	5.486			

		Level 6 vs. Level 7	100.600	11	9.145			
shoe * time	Linear	Level 1 vs. Level 2	.042	1	.042	.031	.863	.003
		Level 2 vs. Level 3	1.043	1	1.043	1.319	.275	.107
		Level 3 vs. Level 4	.278	1	.278	1.179	.301	.097
		Level 4 vs. Level 5	2.712	1	2.712	4.206	.065	.277
		Level 5 vs. Level 6	17.275	1	17.275	.690	.424	.059
		Level 6 vs. Level 7	11.838	1	11.838	.715	.416	.061
	Quadratic	Level 1 vs. Level 2	5.021	1	5.021	1.854	.201	.144
		Level 2 vs. Level 3	1.905	1	1.905	4.908	.049	.309
		Level 3 vs. Level 4	.285	1	.285	1.031	.332	.086
		Level 4 vs. Level 5	.575	1	.575	1.055	.326	.088
		Level 5 vs. Level 6	15.587	1	15.587	2.900	.117	.209
		Level 6 vs. Level 7	19.463	1	19.463	2.844	.120	.205
Error(shoe*time)	Linear	Level 1 vs. Level 2	14.855	11	1.350			
		Level 2 vs. Level 3	8.699	11	.791			
		Level 3 vs. Level 4	2.594	11	.236			
		Level 4 vs. Level 5	7.092	11	.645			
		Level 5 vs. Level 6	275.222	11	25.020			
		Level 6 vs. Level 7	182.216	11	16.565			

	Quadratic	Level 1 vs. Level 2	29.791	11	2.708			
		Level 2 vs. Level 3	4.270	11	.388			
		Level 3 vs. Level 4	3.044	11	.277			
		Level 4 vs. Level 5	5.999	11	.545			
		Level 5 vs. Level 6	59.132	11	5.376			
		Level 6 vs. Level 7	75.274	11	6.843			

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	shoe	time	Noncent. Parameter	Observed Power[a]
shoe	Linear		6.094	.614
	Quadratic		1.223	.173
Error(shoe)	Linear			
	Quadratic			
time		Level 1 vs. Level 2	.027	.053
		Level 2 vs. Level 3	.490	.098
		Level 3 vs. Level 4	.884	.138
		Level 4 vs. Level 5	.188	.068
		Level 5 vs. Level 6	.025	.052
		Level 6 vs. Level 7	.690	.118
Error(time)		Level 1 vs. Level 2		
		Level 2 vs. Level 3		
		Level 3 vs. Level 4		
		Level 4 vs. Level 5		
		Level 5 vs. Level 6		
		Level 6 vs. Level 7		
shoe * time	Linear	Level 1 vs. Level 2	.031	.053
		Level 2 vs. Level 3	1.319	.183
		Level 3 vs. Level 4	1.179	.168
		Level 4 vs. Level 5	4.206	.465
		Level 5 vs. Level 6	.690	.118

		Level 6 vs. Level 7	.715	.121
	Quadratic	Level 1 vs. Level 2	1.854	.238
		Level 2 vs. Level 3	4.908	.524
		Level 3 vs. Level 4	1.031	.153
		Level 4 vs. Level 5	1.055	.156
		Level 5 vs. Level 6	2.900	.343
		Level 6 vs. Level 7	2.844	.338
Error(shoe*time)	Linear	Level 1 vs. Level 2		
		Level 2 vs. Level 3		
		Level 3 vs. Level 4		
		Level 4 vs. Level 5		
		Level 5 vs. Level 6		
		Level 6 vs. Level 7		
	Quadratic	Level 1 vs. Level 2		
		Level 2 vs. Level 3		
		Level 3 vs. Level 4		
		Level 4 vs. Level 5		
		Level 5 vs. Level 6		
		Level 6 vs. Level 7		

a. Computed using alpha = .05

Tests of Between-Subjects Effects

Measure: MEASURE_1

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	20296.855	1	20296.855	1068.530	.000	.990
Error	208.946	11	18.995			

Tests of Between-Subjects Effects

Measure: MEASURE_1

Transformed Variable: Average

Source	Noncent. Parameter	Observed Power[a]
Intercept	1068.530	1.000
Error		

a. Computed using alpha = .05

Estimated Marginal Means

1. Grand Mean

Measure: MEASURE_1

Mean	Std. Error	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
23.745	.726	22.146	25.343

2. shoe

Estimates

Measure: MEASURE_1

shoe	Mean	Std. Error	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
1	24.529	.740	22.900	26.157
2	24.328	.899	22.350	26.306
3	22.377	1.013	20.148	24.605

Pairwise Comparisons

Measure: MEASURE_1

(I) shoe	(J) shoe	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	95% Confidence Interval for Difference[a] Upper Bound
1	2	.201	.749	1.000	-1.910	2.312
	3	2.152	.872	.094	-.306	4.611
2	1	-.201	.749	1.000	-2.312	1.910
	3	1.951	1.035	.258	-.968	4.871
3	1	-2.152	.872	.094	-4.611	.306
	2	-1.951	1.035	.258	-4.871	.968

Based on estimated marginal means
a. Adjustment for multiple comparisons: Bonferroni.

Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Pillai's trace	.358	2.789[a]	2.000	10.000	.109	.358
Wilks' lambda	.642	2.789[a]	2.000	10.000	.109	.358
Hotelling's trace	.558	2.789[a]	2.000	10.000	.109	.358
Roy's largest root	.558	2.789[a]	2.000	10.000	.109	.358

Multivariate Tests

	Noncent. Parameter	Observed Power[b]
Pillai's trace	5.578	.427
Wilks' lambda	5.578	.427
Hotelling's trace	5.578	.427
Roy's largest root	5.578	.427

Each F tests the multivariate effect of shoe. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.
a. Exact statistic
b. Computed using alpha = .05

3. time

Estimates

Measure: MEASURE_1

time	Mean	Std. Error	95% Confidence Interval Lower Bound	Upper Bound
1	23.689	.647	22.266	25.112
2	23.647	.774	21.943	25.352
3	23.721	.781	22.001	25.440
4	23.825	.744	22.188	25.462
5	23.875	.731	22.266	25.485
6	23.937	.799	22.179	25.694
7	23.518	.796	21.765	25.271

Pairwise Comparisons

Measure: MEASURE_1

(I) time	(J) time	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
					Lower Bound	Upper Bound
1	2	.042	.255	1.000	-.960	1.043
	3	-.031	.263	1.000	-1.062	.999
	4	-.135	.271	1.000	-1.198	.928
	5	-.186	.312	1.000	-1.410	1.038
	6	-.247	.559	1.000	-2.440	1.945
	7	.171	.352	1.000	-1.211	1.554
2	1	-.042	.255	1.000	-1.043	.960
	3	-.073	.104	1.000	-.483	.337
	4	-.177	.129	1.000	-.685	.331
	5	-.228	.221	1.000	-1.095	.640
	6	-.289	.512	1.000	-2.299	1.721
	7	.130	.206	1.000	-.678	.937
3	1	.031	.263	1.000	-.999	1.062
	2	.073	.104	1.000	-.337	.483
	4	-.104	.111	1.000	-.538	.330
	5	-.155	.181	1.000	-.865	.555
	6	-.216	.458	1.000	-2.013	1.581
	7	.203	.193	1.000	-.553	.958
4	1	.135	.271	1.000	-.928	1.198
	2	.177	.129	1.000	-.331	.685
	3	.104	.111	1.000	-.330	.538
	5	-.051	.117	1.000	-.509	.407
	6	-.112	.423	1.000	-1.773	1.549
	7	.307	.149	1.000	-.277	.890
5	1	.186	.312	1.000	-1.038	1.410
	2	.228	.221	1.000	-.640	1.095
	3	.155	.181	1.000	-.555	.865
	4	.051	.117	1.000	-.407	.509
	6	-.061	.390	1.000	-1.593	1.470
	7	.357	.149	.747	-.228	.943
6	1	.247	.559	1.000	-1.945	2.440
	2	.289	.512	1.000	-1.721	2.299
	3	.216	.458	1.000	-1.581	2.013
	4	.112	.423	1.000	-1.549	1.773
	5	.061	.390	1.000	-1.470	1.593

	7	.419	.504	1.000	-1.559	2.396
7	1	-.171	.352	1.000	-1.554	1.211
	2	-.130	.206	1.000	-.937	.678
	3	-.203	.193	1.000	-.958	.553
	4	-.307	.149	1.000	-.890	.277
	5	-.357	.149	.747	-.943	.228
	6	-.419	.504	1.000	-2.396	1.559

Based on estimated marginal means
a. Adjustment for multiple comparisons: Bonferroni.

Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Pillai's trace	.711	2.456[a]	6.000	6.000	.149	.711
Wilks' lambda	.289	2.456[a]	6.000	6.000	.149	.711
Hotelling's trace	2.456	2.456[a]	6.000	6.000	.149	.711
Roy's largest root	2.456	2.456[a]	6.000	6.000	.149	.711

Multivariate Tests

	Noncent. Parameter	Observed Power[b]
Pillai's trace	14.739	.418
Wilks' lambda	14.739	.418
Hotelling's trace	14.739	.418
Roy's largest root	14.739	.418

Each F tests the multivariate effect of time. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.
a. Exact statistic
b. Computed using alpha = .05

4. shoe * time

Measure: MEASURE_1

shoe	time	Mean	Std. Error	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound

1	1	24.346	.639	22.940	25.752
	2	23.998	.788	22.265	25.732
	3	24.443	.813	22.653	26.233
	4	24.592	.772	22.893	26.290
	5	25.068	.690	23.549	26.586
	6	24.746	.880	22.809	26.682
	7	24.510	.835	22.672	26.347
2	1	24.174	.825	22.359	25.990
	2	24.661	.976	22.513	26.808
	3	24.409	.974	22.264	26.553
	4	24.639	.940	22.569	26.708
	5	24.510	.862	22.614	26.407
	6	23.641	1.104	21.212	26.070
	7	24.262	.934	22.206	26.319
3	1	22.547	.816	20.751	24.343
	2	22.283	.996	20.091	24.475
	3	22.310	1.095	19.900	24.720
	4	22.244	1.075	19.878	24.610
	5	22.048	1.050	19.737	24.358
	6	23.423	1.704	19.671	27.174
	7	21.782	1.150	19.251	24.312

```
GLM Tmax_S_A_T1 Tmax_S_A_T2 Tmax_S_A_T3 Tmax_S_A_T4 Tmax_S_A_T5
Tmax_S_A_T6 Tmax_S_A_T7
    @2Tmax_S_A_T1 @2Tmax_S_A_T2 @2Tmax_S_A_T3 @2Tmax_S_A_T4
@2Tmax_S_A_T5 @2Tmax_S_A_T6 @2Tmax_S_A_T7
    @3Tmax_S_A_T1 @3Tmax_S_A_T2 @3Tmax_S_A_T3 @3Tmax_S_A_T4
@3Tmax_S_A_T5 @3Tmax_S_A_T6 @3Tmax_S_A_T7
  /WSFACTOR=shoe 3 Polynomial time 7 Repeated
  /METHOD=SSTYPE(3)
  /EMMEANS=TABLES(OVERALL)
  /EMMEANS=TABLES(shoe) COMPARE ADJ(BONFERRONI)
  /EMMEANS=TABLES(time) COMPARE ADJ(BONFERRONI)
  /EMMEANS=TABLES(shoe*time)
  /PRINT=DESCRIPTIVE ETASQ OPOWER
  /CRITERIA=ALPHA(.05)
  /WSDESIGN=shoe time shoe*time.
```

General Linear Model

Notes

Output Created		14-MAR-2019 10:42:24
Comments		
Input	Active Dataset	DataSet4
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	12
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on all cases with valid data for all variables in the model.

Syntax	GLM Tmax_S_A_T1 Tmax_S_A_T2 Tmax_S_A_T3 Tmax_S_A_T4 Tmax_S_A_T5 Tmax_S_A_T6 Tmax_S_A_T7 @2Tmax_S_A_T1 @2Tmax_S_A_T2 @2Tmax_S_A_T3 @2Tmax_S_A_T4 @2Tmax_S_A_T5 @2Tmax_S_A_T6 @2Tmax_S_A_T7 @3Tmax_S_A_T1 @3Tmax_S_A_T2 @3Tmax_S_A_T3 @3Tmax_S_A_T4 @3Tmax_S_A_T5 @3Tmax_S_A_T6 @3Tmax_S_A_T7 /WSFACTOR=shoe 3 Polynomial time 7 Repeated /METHOD=SSTYPE(3) /EMMEANS=TABLES(OVERALL) /EMMEANS=TABLES(shoe) COMPARE ADJ(BONFERRONI) /EMMEANS=TABLES(time) COMPARE ADJ(BONFERRONI) /EMMEANS=TABLES(shoe*time)

		/PRINT=DESCRIPTIVE ETASQ OPOWER /CRITERIA=ALPHA(.05) /WSDESIGN=shoe time shoe*time.
Resources	Processor Time	00:00:00.02
	Elapsed Time	00:00:00.02

Within-Subjects Factors

Measure: MEASURE_1

shoe	time	Dependent Variable
1	1	Tmax_S_A_T1
	2	Tmax_S_A_T2
	3	Tmax_S_A_T3
	4	Tmax_S_A_T4
	5	Tmax_S_A_T5
	6	Tmax_S_A_T6
	7	Tmax_S_A_T7
2	1	@2Tmax_S_A_T1
	2	@2Tmax_S_A_T2
	3	@2Tmax_S_A_T3
	4	@2Tmax_S_A_T4
	5	@2Tmax_S_A_T5

	6	@2Tmax_S_A_T6
	7	@2Tmax_S_A_T7
3	1	@3Tmax_S_A_T1
	2	@3Tmax_S_A_T2
	3	@3Tmax_S_A_T3
	4	@3Tmax_S_A_T4
	5	@3Tmax_S_A_T5
	6	@3Tmax_S_A_T6

Within-Subjects Factors

Measure: MEASURE_1

shoe	time	Dependent Variable
3	7	@3Tmax_S_A_T7

Descriptive Statistics

	Mean	Std. Deviation	N
Tmax_S_A_T1	21.217	2.2542	12
Tmax_S_A_T2	20.766666666666670	3.061293052210969	12
Tmax_S_A_T3	20.616666666666664	2.480774561350230	12
Tmax_S_A_T4	21.242	2.8943	12
Tmax_S_A_T5	22.158333333333330	2.251649227216408	12
Tmax_S_A_T6	20.942	2.9862	12
Tmax_S_A_T7	21.583333333333332	3.337618457777487	12

2Tmax_S_A_T1	20.900	2.3057	12
2Tmax_S_A_T2	20.058333333333330	1.915230028118309	12
2Tmax_S_A_T3	19.983333333333334	2.070499866450056	12
2Tmax_S_A_T4	20.883333333333333	2.155261356576393	12
2Tmax_S_A_T5	21.491666666666670	2.608189317352465	12
2Tmax_S_A_T6	22.325000000000000	2.489295263541653	12
2Tmax_S_A_T7	22.825000000000000	3.304576716120731	12
3Tmax_S_A_T1	20.925000000000000	2.838733712574868	12
3Tmax_S_A_T2	19.583333333333336	2.073132602579678	12
3Tmax_S_A_T3	20.166666666666668	1.967616617005241	12
3Tmax_S_A_T4	20.650000000000000	2.052714389201858	12
3Tmax_S_A_T5	21.875000000000000	2.445822040653296	12
3Tmax_S_A_T6	21.891666666666666	2.405092450815498	12
3Tmax_S_A_T7	21.533333333333335	2.878867622499998	12

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.
shoe	Pillai's Trace	.041	.216[b]	2.000	10.000	.809
	Wilks' Lambda	.959	.216[b]	2.000	10.000	.809
	Hotelling's Trace	.043	.216[b]	2.000	10.000	.809
	Roy's Largest Root	.043	.216[b]	2.000	10.000	.809
time	Pillai's Trace	.917	11.039[b]	6.000	6.000	.005

	Wilks' Lambda	.083	11.039[b]	6.000	6.000	.005
	Hotelling's Trace	11.039	11.039[b]	6.000	6.000	.005
	Roy's Largest Root	11.039	11.039[b]	6.000	6.000	.005
shoe * time	Pillai's Trace	.[c]	.	.	.	.
	Wilks' Lambda	.[c]	.	.	.	.
	Hotelling's Trace	.[c]	.	.	.	.
	Roy's Largest Root	.[c]	.	.	.	.

Multivariate Tests[a]

Effect		Partial Eta Squared	Noncent. Parameter	Observed Power[d]
shoe	Pillai's Trace	.041	.433	.075
	Wilks' Lambda	.041	.433	.075
	Hotelling's Trace	.041	.433	.075
	Roy's Largest Root	.041	.433	.075
time	Pillai's Trace	.917	66.236	.976
	Wilks' Lambda	.917	66.236	.976
	Hotelling's Trace	.917	66.236	.976
	Roy's Largest Root	.917	66.236	.976
shoe * time	Pillai's Trace	.	.	.
	Wilks' Lambda	.	.	.
	Hotelling's Trace	.	.	.
	Roy's Largest Root	.	.	.

a. Design: Intercept
 Within Subjects Design: shoe + time + shoe * time
b. Exact statistic
c. Cannot produce multivariate test statistics because of insufficient residual degrees of freedom.
d. Computed using alpha = .05

Mauchly's Test of Sphericity[a]

Measure: MEASURE_1

			df	Sig.	Epsilon[b]

Within Subjects Effect	Mauchly's W	Approx. Chi-Square			Greenhouse-Geisser
shoe	.760	2.738	2	.254	.807
time	.052	25.943	20	.193	.650
shoe * time	.000	.	77	.	.330

Mauchly's Test of Sphericity[a]

Measure: MEASURE_1

Within Subjects Effect	Epsilon	
	Huynh-Feldt	Lower-bound
shoe	.925	.500
time	1.000	.167
shoe * time	.540	.083

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.[a]

a. Design: Intercept

Within Subjects Design: shoe + time + shoe * time

b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F
shoe	Sphericity Assumed	4.003	2	2.001	.335
	Greenhouse-Geisser	4.003	1.614	2.481	.335
	Huynh-Feldt	4.003	1.850	2.164	.335
	Lower-bound	4.003	1.000	4.003	.335
Error(shoe)	Sphericity Assumed	131.248	22	5.966	
	Greenhouse-Geisser	131.248	17.749	7.395	
	Huynh-Feldt	131.248	20.347	6.451	
	Lower-bound	131.248	11.000	11.932	
time	Sphericity Assumed	121.865	6	20.311	10.260
	Greenhouse-Geisser	121.865	3.897	31.270	10.260
	Huynh-Feldt	121.865	6.000	20.311	10.260
	Lower-bound	121.865	1.000	121.865	10.260
Error(time)	Sphericity Assumed	130.652	66	1.980	

	Greenhouse-Geisser	130.652	42.869	3.048	
	Huynh-Feldt	130.652	66.000	1.980	
	Lower-bound	130.652	11.000	11.877	
shoe * time	Sphericity Assumed	37.485	12	3.124	1.916
	Greenhouse-Geisser	37.485	3.966	9.453	1.916
	Huynh-Feldt	37.485	6.481	5.784	1.916
	Lower-bound	37.485	1.000	37.485	1.916
Error(shoe*time)	Sphericity Assumed	215.258	132	1.631	
	Greenhouse-Geisser	215.258	43.622	4.935	
	Huynh-Feldt	215.258	71.286	3.020	
	Lower-bound	215.258	11.000	19.569	

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[a]
shoe	Sphericity Assumed	.719	.030	.671	.097
	Greenhouse-Geisser	.674	.030	.541	.092
	Huynh-Feldt	.702	.030	.621	.095
	Lower-bound	.574	.030	.335	.083
Error(shoe)	Sphericity Assumed				
	Greenhouse-Geisser				
	Huynh-Feldt				
	Lower-bound				
time	Sphericity Assumed	.000	.483	61.561	1.000
	Greenhouse-Geisser	.000	.483	39.985	.999
	Huynh-Feldt	.000	.483	61.561	1.000
	Lower-bound	.008	.483	10.260	.830
Error(time)	Sphericity Assumed				
	Greenhouse-Geisser				
	Huynh-Feldt				
	Lower-bound				
shoe * time	Sphericity Assumed	.038	.148	22.986	.890
	Greenhouse-Geisser	.125	.148	7.596	.530
	Huynh-Feldt	.085	.148	12.414	.694
	Lower-bound	.194	.148	1.916	.244
Error(shoe*time)	Sphericity Assumed				
	Greenhouse-Geisser				

Huynh-Feldt					
Lower-bound					

a. Computed using alpha = .05

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	shoe	time	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
shoe	Linear		.442	1	.442	.373	.554	.033
	Quadratic		.130	1	.130	.250	.627	.022
Error(shoe)	Linear		13.031	11	1.185			
	Quadratic		5.719	11	.520			
time		Level 1 vs. Level 2	27.738	1	27.738	10.956	.007	.499
		Level 2 vs. Level 3	.514	1	.514	.637	.442	.055
		Level 3 vs. Level 4	16.134	1	16.134	8.840	.013	.446
		Level 4 vs. Level 5	30.250	1	30.250	8.926	.012	.448
		Level 5 vs. Level 6	.538	1	.538	.151	.705	.014
		Level 6 vs. Level 7	2.454	1	2.454	.624	.446	.054
Error(time)		Level 1 vs. Level 2	27.849	11	2.532			
		Level 2 vs. Level 3	8.870	11	.806			
		Level 3 vs. Level 4	20.076	11	1.825			
		Level 4 vs. Level 5	37.277	11	3.389			
		Level 5 vs. Level 6	39.262	11	3.569			

		Level 6 vs. Level 7	43.279	11	3.934			
shoe * time	Linear	Level 1 vs. Level 2	4.770	1	4.770	1.250	.287	.102
		Level 2 vs. Level 3	3.227	1	3.227	2.107	.175	.161
		Level 3 vs. Level 4	.120	1	.120	.076	.788	.007
		Level 4 vs. Level 5	.570	1	.570	.197	.666	.018
		Level 5 vs. Level 6	9.127	1	9.127	2.418	.148	.180
		Level 6 vs. Level 7	6.000	1	6.000	2.329	.155	.175
	Quadratic	Level 1 vs. Level 2	.023	1	.023	.019	.893	.002
		Level 2 vs. Level 3	.681	1	.681	1.310	.277	.106
		Level 3 vs. Level 4	.957	1	.957	1.142	.308	.094
		Level 4 vs. Level 5	1.711	1	1.711	.560	.470	.048
		Level 5 vs. Level 6	16.436	1	16.436	3.656	.082	.249
		Level 6 vs. Level 7	1.027	1	1.027	.334	.575	.029
Error(shoe*time)	Linear	Level 1 vs. Level 2	41.965	11	3.815			
		Level 2 vs. Level 3	16.843	11	1.531			
		Level 3 vs. Level 4	17.425	11	1.584			
		Level 4 vs. Level 5	31.855	11	2.896			
		Level 5 vs. Level 6	41.523	11	3.775			
		Level 6 vs. Level 7	28.340	11	2.576			

	Quadratic	Level 1 vs. Level 2	13.535	11	1.230			
		Level 2 vs. Level 3	5.716	11	.520			
		Level 3 vs. Level 4	9.218	11	.838			
		Level 4 vs. Level 5	33.597	11	3.054			
		Level 5 vs. Level 6	49.454	11	4.496			
		Level 6 vs. Level 7	33.839	11	3.076			

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	shoe	time	Noncent. Parameter	Observed Power[a]
shoe	Linear		.373	.087
	Quadratic		.250	.074
Error(shoe)	Linear			
	Quadratic			
time		Level 1 vs. Level 2	10.956	.853
		Level 2 vs. Level 3	.637	.113
		Level 3 vs. Level 4	8.840	.772
		Level 4 vs. Level 5	8.926	.776
		Level 5 vs. Level 6	.151	.065
		Level 6 vs. Level 7	.624	.112
Error(time)		Level 1 vs. Level 2		
		Level 2 vs. Level 3		
		Level 3 vs. Level 4		
		Level 4 vs. Level 5		
		Level 5 vs. Level 6		
		Level 6 vs. Level 7		
shoe * time	Linear	Level 1 vs. Level 2	1.250	.176
		Level 2 vs. Level 3	2.107	.264
		Level 3 vs. Level 4	.076	.057
		Level 4 vs. Level 5	.197	.069
		Level 5 vs. Level 6	2.418	.295

		Level 6 vs. Level 7	2.329	.286
	Quadratic	Level 1 vs. Level 2	.019	.052
		Level 2 vs. Level 3	1.310	.182
		Level 3 vs. Level 4	1.142	.165
		Level 4 vs. Level 5	.560	.105
		Level 5 vs. Level 6	3.656	.415
		Level 6 vs. Level 7	.334	.083
Error(shoe*time)	Linear	Level 1 vs. Level 2		
		Level 2 vs. Level 3		
		Level 3 vs. Level 4		
		Level 4 vs. Level 5		
		Level 5 vs. Level 6		
		Level 6 vs. Level 7		
	Quadratic	Level 1 vs. Level 2		
		Level 2 vs. Level 3		
		Level 3 vs. Level 4		
		Level 4 vs. Level 5		
		Level 5 vs. Level 6		
		Level 6 vs. Level 7		

a. Computed using alpha = .05

Tests of Between-Subjects Effects

Measure: MEASURE_1

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	16064.959	1	16064.959	1208.344	.000	.991
Error	146.245	11	13.295			

Tests of Between-Subjects Effects

Measure: MEASURE_1

Transformed Variable: Average

Source	Noncent. Parameter	Observed Power[a]
Intercept	1208.344	1.000
Error		

a. Computed using alpha = .05

Estimated Marginal Means

1. Grand Mean

Measure: MEASURE_1

Mean	Std. Error	95% Confidence Interval Lower Bound	Upper Bound
21.125	.608	19.787	22.462

2. shoe

Estimates

Measure: MEASURE_1

shoe	Mean	Std. Error	95% Confidence Interval Lower Bound	Upper Bound
1	21.218	.732	19.607	22.828
2	21.210	.627	19.830	22.589
3	20.946	.567	19.698	22.195

Pairwise Comparisons

Measure: MEASURE_1

(I) shoe	(J) shoe	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	Upper Bound
1	2	.008	.279	1.000	-.779	.796
	3	.271	.444	1.000	-.982	1.524
2	1	-.008	.279	1.000	-.796	.779
	3	.263	.388	1.000	-.832	1.358
3	1	-.271	.444	1.000	-1.524	.982
	2	-.263	.388	1.000	-1.358	.832

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Pillai's trace	.041	.216[a]	2.000	10.000	.809	.041
Wilks' lambda	.959	.216[a]	2.000	10.000	.809	.041

Hotelling's trace	.043	.216[a]	2.000	10.000	.809	.041
Roy's largest root	.043	.216[a]	2.000	10.000	.809	.041

Multivariate Tests

	Noncent. Parameter	Observed Power[b]
Pillai's trace	.433	.075
Wilks' lambda	.433	.075
Hotelling's trace	.433	.075
Roy's largest root	.433	.075

Each F tests the multivariate effect of shoe. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.
a. Exact statistic
b. Computed using alpha = .05

3. time

Estimates

Measure: MEASURE_1

time	Mean	Std. Error	95% Confidence Interval Lower Bound	Upper Bound
1	21.014	.644	19.597	22.430
2	20.136	.618	18.777	21.496
3	20.256	.597	18.942	21.569
4	20.925	.600	19.604	22.246
5	21.842	.634	20.446	23.237
6	21.719	.641	20.309	23.130
7	21.981	.768	20.289	23.672

Pairwise Comparisons

Measure: MEASURE_1

(I) time	(J) time	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b] Lower Bound	Upper Bound
1	2	.878	.265	.146	-.163	1.918
	3	.758	.299	.582	-.415	1.932

	4	.089	.291	1.000	-1.054	1.231
	5	-.828	.417	1.000	-2.462	.807
	6	-.706	.386	1.000	-2.219	.808
	7	-.967	.432	.987	-2.662	.729
2	1	-.878	.265	.146	-1.918	.163
	3	-.119	.150	1.000	-.707	.468
	4	-.789	.249	.189	-1.767	.189
	5	-1.706*	.362	.013	-3.126	-.285
	6	-1.583*	.311	.007	-2.801	-.365
	7	-1.844*	.266	.001	-2.888	-.801
3	1	-.758	.299	.582	-1.932	.415
	2	.119	.150	1.000	-.468	.707
	4	-.669	.225	.266	-1.553	.214
	5	-1.586*	.336	.013	-2.903	-.269
	6	-1.464*	.361	.040	-2.881	-.047
	7	-1.725*	.363	.013	-3.149	-.301
4	1	-.089	.291	1.000	-1.231	1.054
	2	.789	.249	.189	-.189	1.767
	3	.669	.225	.266	-.214	1.553
	5	-.917	.307	.259	-2.120	.287
	6	-.794	.363	1.000	-2.217	.628
	7	-1.056	.376	.356	-2.529	.418
5	1	.828	.417	1.000	-.807	2.462
	2	1.706*	.362	.013	.285	3.126
	3	1.586*	.336	.013	.269	2.903
	4	.917	.307	.259	-.287	2.120
	6	.122	.315	1.000	-1.113	1.357
	7	-.139	.415	1.000	-1.766	1.488
6	1	.706	.386	1.000	-.808	2.219
	2	1.583*	.311	.007	.365	2.801
	3	1.464*	.361	.040	.047	2.881
	4	.794	.363	1.000	-.628	2.217
	5	-.122	.315	1.000	-1.357	1.113
	7	-.261	.331	1.000	-1.558	1.036
7	1	.967	.432	.987	-.729	2.662
	2	1.844*	.266	.001	.801	2.888
	3	1.725*	.363	.013	.301	3.149
	4	1.056	.376	.356	-.418	2.529

5	.139	.415	1.000	-1.488	1.766
6	.261	.331	1.000	-1.036	1.558

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

b. Adjustment for multiple comparisons: Bonferroni.

Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Pillai's trace	.917	11.039[a]	6.000	6.000	.005	.917
Wilks' lambda	.083	11.039[a]	6.000	6.000	.005	.917
Hotelling's trace	11.039	11.039[a]	6.000	6.000	.005	.917
Roy's largest root	11.039	11.039[a]	6.000	6.000	.005	.917

Multivariate Tests

	Noncent. Parameter	Observed Power[b]
Pillai's trace	66.236	.976
Wilks' lambda	66.236	.976
Hotelling's trace	66.236	.976
Roy's largest root	66.236	.976

Each F tests the multivariate effect of time. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

a. Exact statistic

b. Computed using alpha = .05

4. shoe * time

Measure: MEASURE_1

				95% Confidence Interval	
shoe	time	Mean	Std. Error	Lower Bound	Upper Bound
1	1	21.217	.651	19.784	22.649
	2	20.767	.884	18.822	22.712
	3	20.617	.716	19.040	22.193
	4	21.242	.836	19.403	23.081
	5	22.158	.650	20.728	23.589

	6	20.942	.862	19.044	22.839
	7	21.583	.963	19.463	23.704
2	1	20.900	.666	19.435	22.365
	2	20.058	.553	18.841	21.275
	3	19.983	.598	18.668	21.299
	4	20.883	.622	19.514	22.253
	5	21.492	.753	19.835	23.149
	6	22.325	.719	20.743	23.907
	7	22.825	.954	20.725	24.925
3	1	20.925	.819	19.121	22.729
	2	19.583	.598	18.266	20.901
	3	20.167	.568	18.917	21.417
	4	20.650	.593	19.346	21.954
	5	21.875	.706	20.321	23.429
	6	21.892	.694	20.364	23.420
	7	21.533	.831	19.704	23.362

```
GET DATA
  /TYPE=XLSX
  /FILE='F:\Thesis\Data\Results Graphs\NewCorrelationGraphs1_23.xlsm'
  /SHEET=name 'Tangle_F_A (2)'
  /CELLRANGE=FULL
  /READNAMES=ON
  /DATATYPEMIN PERCENTAGE=95.0
  /HIDDEN IGNORE=YES.
EXECUTE.
DATASET NAME DataSet1 WINDOW=FRONT.
CORRELATIONS
  /VARIABLES=Tangle_F_A MinA_F_A
  /PRINT=TWOTAIL NOSIG
  /MISSING=PAIRWISE.
```

Correlations

Notes

Output Created		14-MAR-2019 10:54:49
Comments		
Input	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>

	Split File	<none>
	N of Rows in Working Data File	252
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each pair of variables are based on all the cases with valid data for that pair.
Syntax		CORRELATIONS /VARIABLES=Tangle_F_A MinA_F_A /PRINT=TWOTAIL NOSIG /MISSING=PAIRWISE.
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.02

[DataSet1]

Correlations

		Tangle_F_A	MinA_F_A
Tangle_F_A	Pearson Correlation	1	.487**
	Sig. (2-tailed)		.000
	N	245	245
MinA_F_A	Pearson Correlation	.487**	1
	Sig. (2-tailed)	.000	
	N	245	245

**. Correlation is significant at the 0.01 level (2-tailed).

APPENDIX C

IRB DOCUMENTS

GEORGIA SOUTHERN UNIVERSITY
OFFICE OF RESEARCH INTEGRITY

Institutional Review Board (IRB)

Application for Research Approval – Expedited/Full Board

For Office Use Only: Protocol ID _______________

Please submit this protocol to IRB@georgiasouthern.edu in a single email; scanned signatures and official Adobe electronic signatures are accepted. Applications may also be submitted via mail to the Georgia Southern University Office of Research Integrity, PO Box 8005.

Principal Investigator	
PI's Name: Sydni Wilhoite	Phone: 912-531-7755
Email: sw06005@georgiasouthern.edu (Note: Georgia Southern email addresses will be used for all correspondence.)	Department: Health & Kinesiology
PI's Primary Campus Location: ☒ Statesboro Campus ☐ Armstrong Campus ☐ Liberty Campus - Hinesville	
☐ Faculty ☐ Doctoral ☐ Specialist ☒ Masters ☐ Undergraduate ☐ Other:	
Georgia Southern Co-Investigator(s)	
Co-I's Name(s): Dr. Li Li (F), Dr. Barry Munkasy (F), Dr. Jessica Mutchler (F) (By each name indicate: F(Faculty), D(Doctoral), S(Specialist), M(Masters), U(Undergraduate), O(Other))	Email: lili@georgiasouthern.edu, bmunkasy@georgiasouthern.edu, jmutchler@georgiasouthern.edu, (Note: Georgia Southern email addresses will be used for all correspondence.)
Personnel and/or Institutions Outside of Georgia Southern University involved in this research:	
	☐ Training Attached ☐ IRB Approval Attached ☐ intent to rely on GSU
	☐ Training Attached ☐ IRB Approval Attached ☐ intent to rely on GSU

Project Information
Title: Kinematic and Kinetic Effects of Different Running Footwear Adaptations
Number of Subjects (Maximum) 15

Funding Source: ☐ Federal	☐ State	☐ Private	☐ Internal GSU	☒ Self-funded/non-funded
Funding Agency/Department:	Grant Number:			
Grant Title: ☐ Same as above	Enter here:			

Compliance Information

Do you or any investigator on this project have a financial interest in the subjects, study outcome, or project sponsor? (A disclosed conflict of interest will not preclude approval. An undisclosed conflict of interest will result in disciplinary action.). ☐ Yes ☒ No

Certifications

I certify that the statements made in this request are accurate and complete, and if I receive IRB approval for this project, I agree to inform the IRB in writing of any emergent problems or proposed procedural changes. I agree not to proceed with the project until the problems have been resolved or the IRB has reviewed and approved the changes. It is the explicit responsibility of the researchers and supervising faculty/staff to ensure the well-being of human participants. At the conclusion of the project I will submit a termination report. I will comply with annual project update requests to maintain approval.

☒ I have read and agree to the certifications of investigator responsibilities located on the last page of this form.

Signature of Primary Investigator ______________________ Date ______________

Signature of Co-Investigator(s) ______________________ Date ______________

By signing this cover page I acknowledge that I have reviewed and approved this protocol for scientific merit, rational and significance. I further acknowledge that I approve the ethical basis for the study. I have read and agree to the certifications of investigator responsibilities located on the last page of this form.

If <u>faculty</u> project, enter department chair's name; if <u>student</u> project, enter research advisor's name: Dr. Li Li

Signature of Department Chair or Research Advisor ______________________ Date ______________

Compliance Information	
Please indicate which of the following will be used in your research: (applications may be submitted simultaneously)	
☒ Human Subjects ☐ Care and Use of Vertebrate Animals (Submit IACUC Application) ☐ Biohazards (Submit IBC Application)	
Please indicate if the following are included in the study (Check all that apply):	
☐ Survey delivered by email to .georgiasouthern.edu addresses ☐ Deception ☐ Prisoners ☐ Children ☐ Individuals with impaired decision making capacity, or economically or educationally disadvantaged persons	☐ Video or Audio Tapes ☐ Human Subjects Incentives ☒ Medical Procedures, including exercise, administering drugs/dietary supplements, and other procedures, or ingestion of any substance
Is your project a research study in which one or more human subjects are prospectively assigned to one or more interventions (which may include placebo or other control) to evaluate the effects of those interventions on health-related biomedical or behavioral outcomes. (If yes, attach Good Clinical Practice CITI training.) See the IRB FAQ for help with the definition above. ☒ Yes ☐ No	

Instructions: Please respond to the following as clearly as possible. The application should include a step by step plan of how you will obtain your subjects, conduct the research, and analyze the data. Make sure the application clearly explains aspects of the methodology that provide protections for your human subjects. Your application should be written to be read and understood by a general audience who does not have prior knowledge of your research and by committee members who may not be expert in your specific field of research. Your reviewers will only have the information you provide in your application. Explain any technical terms, jargon or acronyms.

Personnel
Please list any individuals who will be conducting research on this study. Also, please detail the experience, level of involvement in the process, and the access to information that each may have.
Sydni Wilhoite (primary investigator), Dr. Li Li (investigator), Dr. Jessica Mutchler (investigator), Dr. Barry Munkasy (investigator),

Purpose
Briefly describe in one or two sentences the purpose of your research.

The purpose of this study is to investigate the length of the previously suggested familiarization period for recreationally trained runners to adjust to different types of running shoes. It is hypothesized that the time until stabilization to a consistent gait pattern will differ during treadmill running when comparing each runner, shoe type, and outcome variable (i.e. kinematic, kinetic, and spatiotemporal parameters).
What questions are you trying to answer in this project? Please include your research question in this section. The jurisdiction of the IRB requires that we ensure the appropriateness of research. It is unethical to put participants at risk without the possibility of sound scientific result. For this reason, you should be very clear about how participants and others will benefit from knowledge gained in this project.
Questions of this project include: A. How long does it take for a recreationally trained runner to stabilize their running gait pattern when prompted to run in their habitual shoe? B. How long does it take for a recreationally trained runner to stabilize their running gait pattern when prompted to run in a new shoe? C. What kinematic and kinetic changes will occur at the knee and ankle throughout the duration of the run?
Provide a brief description of how this study fits into the current literature. Have the research procedures been used before? How were similar risks controlled for and documented in the literature? Have your instruments been validated with this audience? Include citations in the description. Do not include dissertation or thesis chapters.
Overtime, degradation of footwear material may lead to injuries and changes in running pattern. It is suggested that runners should change their shoes every 250-500 miles due to the 60% decrease in absorption capacity which can lead to an increase risk of injury.[1] Literature suggests that when minimalist shoes are worn, there are lower impact forces between the runner's foot and the ground.[2] Therefore, runners have adopted the minimalist running shoe in hopes to decrease impact-related injuries. Many studies investigated the biomechanical effects of different types of running shoes on the human body, especially lower extremity neuromusculoskeletal systems. However, a methodological issue with inadequate familiarization time to an introduced footwear may alter the reliability of these study results. Majority of literature has investigated the acute response to running in the participant's atypical footwear.[3-6] Other studies have investigated the long term kinematic and kinetic response to changing footwear.[7-8] However, the commonality between these investigations is the lack of consistency of warm-up time and familiarization period. Previous research has investigated nonconventional treadmill runner's adaptation time to treadmill running to be approximately 8-9 minutes for spatiotemporal characteristics[9], 6 minutes for kinematic variables[10], and 8 seconds for kinetic measurements.[11] Prior research has attempted to address this methodological concern by investigating the time required for habitual shod runners to become familiar with barefoot running. It was suggested that the period for the runner's to become consistent in gait patterns during running occurred between 11 and 20 minutes.[12] However, according to the study, the data were collected at the beginning and end of each ten minute bout. Therefore, the familiarization could have occurred at any point

between 11 and 20 minutes.[12] It has been suggested that data should be recorded more frequently to determine the exact time required for familiarization.[12]

Outcome
Please state what results you expect to achieve. Who will benefit from this study? How will the participants benefit (if at all)? Remember that the participants do not necessarily have to benefit directly. The results of your study may have broadly stated outcomes for a large number of people or society in general.
The expected results are as follows: 1. Individuals wearing their habitual shoes will present stabilized kinematic and kinetic parameters after running on the treadmill for approximately 20 seconds. 2. It will take much longer to see stabilized kinematic and kinetic parameters after switching to a different type of running shoe. 3. There will be a longer stabilizing time associated with greater differences in footwear. Shoe companies and researchers will benefit from this study because it will assist in the methods preparation of future projects.

Describe Your Subjects
Maximum number of participants
20
Briefly describe the study population.
20 recreational runners will be recruited. The participants must be able to run for at least 30 minutes on a treadmill at a self-selected pace.
Applicable inclusion or exclusion requirements (ages, gender requirements, allergies, etc.)
Inclusion criteria includes: 18-45 years of age and no existing lower extremity injuries at the time of testing
How long will each subject be involved in the project? (Number of occasions and duration)
The study will include 3 occasions that have a duration of an hour each day.

Recruitment
Describe how subjects will be recruited. (Attach a copy of recruitment emails, flyers, social media posts, etc.)
Participants will be recruited through Georgia Southern University undergraduate students and from Georgia Southern University faculty. Flyers will be used in the recreational facility, the Hollis, and the Hanner building on campus.

Incentives
Are you compensating your subjects with money, course credit, extra credit, or other incentives? ☐ Yes ☒ No
If yes, indicate how much, how they will be distributed, and describe how you will compensate subjects who withdraw from the project before it ends.
If the professor allows extra credit, students will receive extra credit for participating in the entire study.

Research Procedures and Timeline
Outline step-by-step what will happen to participants in this study (including what kind of experimental manipulations you will use, what kinds of questions or recording of behavior you will use, the location of these interactions). Focus on the interactions you will have with the human subjects. Specify tasks given as attachments to this document.
An initial visit will consist of a health screening, informed consent, and collection of the required anthropometric data (i.e. age, height, weight, segment length, and years of experience). At that time, participants will be excluded from the study if they do not meet the following inclusion criteria: 18-45 years of age, no existing lower extremity injuries at the time of testing, or answered yes to any PAR-Q questions. For each session, retro-reflective marker cluster sets on the pelvis, right and left lateral thighs, right and left lateral legs, and right and left lateral heels will be placed on the participant.[13] The participant will be instructed to perform a 5-10 minute dynamic warm-up in their habitual running shoes to accustom themselves to the tracking clusters, to reduce injury and to reduce muscle cramping throughout the duration of the session. Following the dynamic warm up, 16 retro-reflective anatomical markers will be placed on the left and right iliac crests, greater trochanters, lateral and medial femoral epicondyles, lateral and medial malleoli, and the first and fifth metatarsal heads.[13] A 5-second standing static trial will be recorded; the anatomical markers will then be removed. The participant will be instructed to run at a self-selected pace for 31 minutes in their habitual running shoes, maximalist shoes, or minimalist shoes. Kinematic data will be collected for 10 seconds at 5-minute intervals starting at the 1 minute mark. Marker trajectories will be tracked using a 3-D motion capture system (Bonita 10 cameras; Nexus 2.3.0.88202; Vicon Motion Systems Ltd., Oxford, UK). Following the first session, the participant will be scheduled to return to the lab 24-48 hours later. For the second session, the same testing protocol will be implemented; however, the prolonged run will be performed in a different pair of shoes. To avoid any acute adaptation to the new shoe, the participant will perform each warm up in their habitual running shoe. The third session will follow the same testing protocol as the previous. The testing orders will be counterbalanced.
Describe how legally effective informed consent will be obtained. Attach a copy of the consent form(s).
Upon the participant's initial visit, an informed consent form will be given to the participant to thoroughly read and sign.

If minors are to be used describe procedures used to gain consent of their parent (s), guardian (s), or legal representative (s), and gain assent of the minor.
☒ N/A or Explain:
Describe all study measures and whether they are validated. Attach copies of questionnaires, surveys, and/or interview questions used, labeled accordingly.
Participants will fill out an informed consent and a PAR-Q. The informed consent and PAR-Q are attached.
Describe how you will protect the privacy of study participants.
The participants will be coded (i.e. SW001) to ensure privacy of names and personal information.

Data Analysis
Briefly describe how you will analyze and report the collected data.
The knee and ankle joint will be examined in this study. The 3-D leg and ankle joints kinematic and kinetics will be assessed for every 10 seconds of data collected. Visual 3D (Visual 3D, Version: 6.00.27, C-Motion Inc., Germantown, MD) will be used for data analysis. A 3 (shoes) x 7 (time points) repeated measures ANOVA will be utilized to determine the differences in gait kinematics and kinetics across 3 different shoe conditions (i.e., habitual shoes, New Balance maximalist shoes, New Balance minimalist shoes). Statistical significance will be set at $p < 0.05$. All statistical analysis will be completed using SPSS/PASW version 22.0.
What will you do with the results of your study (e.g. contributing to generalizable knowledge, publishing sharing at a conference, etc.)?
Not only will these results contribute to methodological procedures for future studies, but I plan to share these results at future conferences.
Include an explanation of how will the data be maintained after the study is complete. Specify where and how it will be stored (room number, password protected file, etc.)
Informed consent forms and the participant's PAR-Q will be stored in a locked file cabinet located in Dr. Li Li's office for 5 years following the termination of the study.
Student researchers must specify which faculty or staff member will be responsible for records after you have left the university.
Dr. Li Li will be responsible for study records upon my graduation.
Anticipated destruction date or method used to render it anonymous for future use. ☒ Destroyed 3 Years after conclusion of research (minimum required for all PIs) ☒ Other timeframe (min 3 years): 5 years ☐ Method used to render it anonymous for future use:

Special Conditions

Risk
Even minor discomfort in answering questions on a survey may pose some risk to subjects. Carefully consider how the subjects will react and address ANY potential risks.
Is there greater than minimal risk from physical, mental, or social discomfort? ☐ Yes ☒ No
If yes, describe the risks and the steps taken to minimize them. Justify the risk undertaken by outlining any benefits that might result from the study, both on a participant and societal level
If no, <u>Do not simply state that no risk exists</u>. If risk is no greater than risk associated with daily life experiences, state risk in these terms.
A risk associated with this study includes the possibility of muscle cramping from the prolonged run. To attenuate this risk, an adequate warm up will be provided to ensure that the participant is ready for the exercise. Another risk includes the possibility of falling on the treadmill. To mitigate this risk, the treadmill has a safety latch that is attached to the participant and will automatically stop the treadmill if ever detached from the treadmill.
Will you be carrying out procedures or asking questions that might disturb your subjects emotionally or produce stress or anxiety? If yes, describe your plans for providing appropriate resources for subjects.
No, the study includes 30 minutes of running. A requirement to be included in the study is to be comfortable running for at least 30 minutes on a treadmill.

Research Involving Minors
Will minors be involved in your research? ☐ Yes ☒ No
If yes, describe how the details of your study will be communicated to parents/guardians. Please provide both <u>parental consent</u> letters and <u>child assent</u> letters (or processes for children too young to read).
Will the research take part in a school (elementary, middle, or high school)? ☐ Yes ☒ No

If yes, describe how permission will be obtained from school officials/teachers, and indicate whether the study will be a part of the normal curriculum/school process.
☐ Part of the normal curriculum/school process ☐ Not part of the normal curriculum/school process

Deception
Will you use deception in your research? ☒ No Deception ☐ Passive Deception ☐ Active Deception
If yes, describe the deception and how the subject will be debriefed. Include a copy of any debriefing materials. Make sure the debriefing process is listed in your timeline in the Procedures section.
Address the rationale for using deception.
Be sure to review the deception disclaimer language required in the informed consent. Note: All research in which active deception will be used is required to be reviewed by the full Institutional Review Board. Passive deception may receive expedited review.

Medical Procedures
Does your research procedures involve any of the following procedures: ☒ Low expenditures of physical effort unlikely to lead to physical injury ☐ High expenditures of physical effort that could lead to physical injury ☐ Ingesting, injecting, or absorbing any substances into the body or through the skin ☐ Inserting any objects into bodies through orifices or otherwise ☐ Handling of blood or other bodily fluids ☐ Other Medical Procedures ☐ No Medical Procedures Involved
Describe your procedures, including safeguards. If appropriate, briefly describe the necessity for employing a medical procedure in this study. Be sure to review the medical disclaimer language required in the informed consent.

There is a safety clip attached to the treadmill to prevent injuries from falling. Under emergency circumstances, there is an AED located in the biomechanics lab and a phone will be easily accessible to contact emergency services.
Describe a medical emergency plan if the research involves any physical risk beyond the most minimal kind. The medical research plan should include, but not necessarily be limited to: emergency equipment appropriate for the risks involved, first rescuer actions to address the most likely physical risk of the protocol, further actions necessary for the likely risks.

Reminder: No research can be undertaken until your proposal has been approved by the IRB.

WATERS COLLEGE OF HEALTH PROFESSIONS

DEPARTMENT OF HEALTH SCIENCES AND KINESIOLOGY

Informed Consent

You are being invited to participant in the **Kinematic and Kinetic Effects of Different Running Footwear Adaptations** study. The primary investigator is Sydni Wilhoite and is currently a Master student at Georgia Southern University. You may contact her with any questions at (912)531-7755 or sw06005@georgiasouthern.edu. This research is being conducted to further assist in the future methodological procedures of running biomechanics testing. The purpose of the project is to investigate the length of the familiarization period for recreationally trained runners to adjust to different types of running shoes.

You are being invited to participate in this study because you are a recreationally trained runner who participates in at least 10 miles of running weekly within the age of 18 and 45. Additionally, you are comfortable with running at least 31 minutes on a treadmill and have no lower extremity injury at the time of testing. You will not be able to participate the experiment if you have answered “Yes” to any of the PAR-Q questions. If you agree to participate in this study, you will be asked to attend 3 one hour testing sessions. For each session, you will be provided with an adequate warm up and asked to run for 31 minutes on an instrumented treadmill. The session will consist of running in your habitual running shoes, a maximalist shoe and/or a minimalist shoe, both of which provided by the lab. The investigators will record your kinematic and kinetic performance of gait.

The potential risk assumed during the testing is no greater than the risk associated with daily life experiences. However, there is a minimal risk of physical injury while performing this experiment. There is a risk of falling during the treadmill running; therefore, a safety clip will be attached to you at all times and will immediately stop the treadmill if ever detached from the treadmill. There is a risk of muscle cramping; therefore, an adequate and appropriate warm up will be give before the start of the test. You understand that medical care is available in the event of injury resulting from research but that neither financial compensation nor free medical treatment is provided. Should medical care be required, you may contact Health Services at (912)478-5641.

There is no deception involved in this study. As the participant, you will likely receive no direct benefit; however, the results will be provided upon request. You will not receive any compensation for this study, and you will not be responsible for any additional cost for this study. The benefits of this project will contribute to the running and industry and researchers methodologies for biomechanical running testing.

Informed consent forms and the participant’s PAR-Q will be maintained in a locked file cabinet located in the Faculty Advisor’s office for 5 years following the termination of the study. Coded data from this study may be placed in a publically available repository for study validation and further research. You will not be identified by name in the data set or any reports using information obtained from this study, and your confidentiality as a participant in this study will remain secure. In certain conditions, it is our ethical responsibility to report situations of child or elder abuse, child or elder neglect, or any life-threatening situation to appropriate authorities. However, we are not seeking this type of information in our study nor will you be asked questions about these issues.

Your participation in this study is completely voluntary and you may end your participation at any time by telling the primary investigator, Sydni Wilhoite. You understand that you do not have to answer any questions that you do not want to answer. You may withdraw from the study at any time and without penalty. The investigator may in her absolute discretion terminate the investigation at any time.

You must be 18 years of age or older to consent to participate in this research study. If you have questions about this study, please contact Sydni Wilhoite at (912) 531-7755 or the researcher's faculty advisor, Dr. Li Li at (912) 478-8015. For questions concerning your rights as a research participant, contact Georgia Southern University Office of Research Services and Sponsored Programs at 912-478-5465 and/or irb@georgiasouthern.edu. If you consent to participate in this research study and to the terms above, please sign our name and indicate the date below.

You will be given a copy of this consent form to keep for your records. This project has been reviewed and approved by the GSU Institutional Review Board under tracking number H_18321_.

Principal Investigator
Sydni Wilhoite
(912)-531-7755
sw06005@georgiasouthern.edu

Faculty Advisor
Li Li, Ph.D.
0107B Hollis Building
(912) 478-8015
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Other Investigators:
Barry Munkasy, Ph.D.
0107D Hollis Building
(912)478-0985
bmunkasy@georgiasouthern.edu

Jessica Mutchler, Ph.D.
1119C Hollis Building
(912) 478-7400
jmutchler@georgiasouthern.ed

Participant Signature Date

I, the undersigned, verify that the above informed consent procedure has been followed.

Investigator Signature Date

Physical Activity Readiness
Questionnaire - PAR-Q
(revised 2002)

PAR-Q & YOU

(A Questionnaire for People Aged 15 to 69)

Regular physical activity is fun and healthy, and increasingly more people are starting to become more active every day. Being more active is very safe for most people. However, some people should check with their doctor before they start becoming much more physically active.

If you are planning to become much more physically active than you are now, start by answering the seven questions in the box below. If you are between the ages of 15 and 69, the PAR-Q will tell you if you should check with your doctor before you start. If you are over 69 years of age, and you are not used to being very active, check with your doctor.

Common sense is your best guide when you answer these questions. Please read the questions carefully and answer each one honestly: check YES or NO.

YES	NO	
☐	☐	1. Has your doctor ever said that you have a heart condition and that you should only do physical activity recommended by a doctor?
☐	☐	2. Do you feel pain in your chest when you do physical activity?
☐	☐	3. In the past month, have you had chest pain when you were not doing physical activity?
☐	☐	4. Do you lose your balance because of dizziness or do you ever lose consciousness?
☐	☐	5. Do you have a bone or joint problem (for example, back, knee or hip) that could be made worse by a change in your physical activity?
☐	☐	6. Is your doctor currently prescribing drugs (for example, water pills) for your blood pressure or heart condition?
☐	☐	7. Do you know of any other reason why you should not do physical activity?

If you answered

YES to one or more questions

Talk with your doctor by phone or in person BEFORE you start becoming much more physically active or BEFORE you have a fitness appraisal. Tell your doctor about the PAR-Q and which questions you answered YES.

- You may be able to do any activity you want — as long as you start slowly and build up gradually. Or, you may need to restrict your activities to those which are safe for you. Talk with your doctor about the kinds of activities you wish to participate in and follow his/her advice.
- Find out which community programs are safe and helpful for you.

NO to all questions

If you answered NO honestly to all PAR-Q questions, you can be reasonably sure that you can:

- start becoming much more physically active – begin slowly and build up gradually. This is the safest and easiest way to go.
- take part in a fitness appraisal – this is an excellent way to determine your basic fitness so that you can plan the best way for you to live actively. It is also highly recommended that you have your blood pressure evaluated. If your reading is over 144/94, talk with your doctor before you start becoming much more physically active.

DELAY BECOMING MUCH MORE ACTIVE:

- if you are not feeling well because of a temporary illness such as a cold or a fever – wait until you feel better; or
- if you are or may be pregnant – talk to your doctor before you start becoming more active.

PLEASE NOTE: If your health changes so that you then answer YES to any of the above questions, tell your fitness or health professional. Ask whether you should change your physical activity plan.

Informed Use of the PAR-Q: The Canadian Society for Exercise Physiology, Health Canada, and their agents assume no liability for persons who undertake physical activity, and if in doubt after completing this questionnaire, consult your doctor prior to physical activity.

NOTE: If the PAR-Q is being given to a person before he or she participates in a physical activity program or a fitness appraisal, this section may be used for legal or administrative purposes.

"I have read, understood and completed this questionnaire. Any questions I had were answered to my full satisfaction."

NAME ____

SIGNATURE ____ DATE ____________________

CALLING ALL RUNNERS!!!!

THESIS VOLUNTEERS NEEDED TO PARTICIPATE IN TREADMILL WORKOUT!!!!

Seeking recreationally trained runners to participate in a graduate thesis study! The purpose of this study is to investigate the length of time it takes a runner to adjust to different types of shoes.

- 3, one hour sessions separated by **24-48** hours
- Given an adequate warm-up and then asked to run 31 minutes on a treadmill.
- 3 types of shoes, 1 type per session:
  - habitual (your own) running shoe
  - a maximalist shoe (provided)
  - a minimalist shoe (provided)

Participants must...

- 18-45 years old
- Recreationally trained runners
- Run at least 10 miles per week
- Run 31 minutes comfortably without stopping
- No current lower extremity injuries
- No heart conditions

Hanner Fieldhouse
Biomechanics Lab
Contact [redacted]oite
Research Assistant
(912)-531-7755
Email: sw06005@
georgiasouthern.edu

GEORGIA

WATERS COLLEGE
OF HEALTH PROFESSIONS