THE EFFECT OF HEAD TURN VELOCITY ON CROSS-COUPLED STIMULATION DURING CENTRIFUGATION

by

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ABSTRACT

Artificial Gravity (AG) has been suggested as a potential countermeasure to the deleterious physiologic effects of long-duration space flight. Short-radius centrifugation (SRC) provides a practical means of producing AG, though perceptual side-effects may potentially limit its operational feasibility. Head-turns in the rotating environment of SRC produce Cross-coupled Stimulation (CCS), which the subject perceives as a tumbling sensation. Acutely, the CCS tumbling sensation is nauseagenic, though adaptation has been shown to diminish this detriment over time. The force environment of CCS suggests that the head-turn velocity plays a role in determining the stimulus magnitude, though the degree to which has not been characterized. In order for SRC to be an operationally viable alternative for AG, it must be shown that the motion sickness symptoms can be controlled without sacrificing adaptation. Modulation of head turn velocity has been suggested as a means to that end.

A total of 23 subjects were subjected to right quadrant head-turns of 8 different velocities while spinning at 19 and 23 RPMs in the rotating environment of SRC. The perceptual effects were characterized with subjective and objective metrics, investigating the acute differences between velocities as well as the chronic effects on adaptation. The following key results were obtained:

1. A threshold of HT Velocity exists above which an asymptotic perceptual response is observed, and below which the resulting perceptual response diminishes at a logarithmically increasing rate.
2. The effects of HT Velocity are independent of HT direction, with differing head-turn directions produce contextually specific stimuli.
3. HT velocity modulation could provide a practical means of incremental adaptation.

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1.0 Background

Even before manned space flight was practical, scientists speculated about the possible effects of microgravity on the human body. Books and magazines regaled readers with fanciful ideas of man being destined to live a strictly terrestrial life, as the physiologic challenges would be impossible to counter. It was suggested that the eye would deform to a perfect sphere in microgravity, as there would be no gravity to retain its slightly flattened "natural" shape, and the human would be functionally blind. It was thought that the lack of gravity or "natural" pressure on our bodies would cause uncontrolled fluid hemorrhage. Worst of all, it was suggested that the "fluid shifts in the brain", coupled with the "bleakness and emptiness of space" would "drive any would-be spacefarer to madness."[41]. Fortunately the skeptics were only partially right about the risks of microgravity, though it's interesting to note that they were only off by a matter of degree in many cases.

Since the earliest days of manned space flight, the potentially debilitating physiologic risks of microgravity have been demonstrated time and again. Upon entry into the microgravity environment, the astronaut undergoes a cephalad fluid shift, owing to the absence of a gravity-induced hydrostatic pressure gradient. This fluid shift overloads the sino-aortic baro-recptors, signaling a decrease in intravascular fluid volume, ultimately fluid depleting the subject [7]. The microgravity environment itself has been suggested to diminish the responsiveness of the autonomic nervous system entirely, the system responsible for maintain cardiovascular homeostasis [7]. Further, the absence of gravity diminishes the axial skeletal loading the astronaut would otherwise be subjected to on Earth. The lack of loading accelerates bone resorption, with the excess calcium and phosphates purged over time in the urine [7, 9]. Finally, the decreased exertion associated with microgravity ensures that the axial and lower limb muscles suffer significant disuse atrophy during spaceflight [7].

These changes can in a sense be termed "adaptive" for space flight, as these changes themselves pose no significant risk to the astronaut, provided the astronaut remain in the microgravity environment. These changes only become "maladaptive" in the context of the return to a 1G environment. Upon return to earth, Astronauts consistently show significant physiologic impairments. They're often orthostatically intolerant, owing to fluid depletion and autonomic attenuation. Their bones and muscles are significantly atrophied, to a degree roughly proportional to the duration of continuous exposure to microgravity.

These problems certainly don't represent a comprehensive picture of the physiologic dangers of spaceflight. It has also been suggested that the microgravity environment diminishes immune function [7]. Further, there's some evidence to suggest that there may be an increased risk of cardiac arrhythmias in space, though it's unclear what the exact precipitant may be. Thus far NASA has taken a piecemeal approach to countermeasures for these problems, in that the paradigm has essentially involved a separate solution for each problem.

To date, NASA has prioritized the use of largely exercise and pharmaceutical based countermeasures for the major problems of space flight. The data on the efficacy of these options to date has been less than convincing. The current exercise protocols show suggest significant improvements over the control of "no exercise", but the results thus far have yet to show that exercise alone can completely counter the bone and muscle loss of space flight [7, 16, 55]. For bone loss, NASA is further investigating the use of bisphosphonates, though their efficacy has yet to be conclusively established [7, 9]. More importantly though, this piecemeal approach to countermeasure development requires that the microgravity maladaptation effect is known and understood. It is unlikely that all such physiologic problems have been discovered, and the ones that have been identified are far from being completely understood. There is no suggested remedy for the possible immune deficiency for example, as the etiology is not understood (though speculated to be due to microgravity [7]. Also, the fluid shift effects can't be completely countered. The fluid loss can certainly be treated, but the cephalad fluid shift itself cannot be reversed with any of the current countermeasures. What is needed is a comprehensive countermeasure for all of the maladaptive physiologic effects of microgravity, known or unknown. The best medicine may be to simply provide a gravity environment essentially equivalent to Earth gravity. It stands to reason that such a therapy would be beneficial, as it would plausibly render all potential hazards of microgravity, known or unknown, insignificant.

Artificial gravity can potentially be produced by several means [62], however the most practical methods involve human centrifugation. The subject would theoretically be spun at the end of a centrifuge arm, oriented with the arm in line with the axial skeleton. The centripetal acceleration produced would provide a force similar to that of gravity, and proportional to that observed on Earth. Such a countermeasure could potentially counteract the vast majority of the microgravity related problems, with the added benefit of providing a single, parsimonious, solution. Though the benefits of centrifugation are potentially significant, the spinning environment also poses some unique problems which need to be overcome before centrifugation can be considered operational.

1.1 Force environment

The notion of artificial gravity through centrifugation has been around since the earliest days of rocketry. The concept of the rotating space station was introduced in the 1928 by Herman Potocnik, which he originally termed the "Habitat Wheel" [48]. Werner Von Braun also created concept designs in the early 1950's, each of which called for massive space stations with circular rotating habitation tori. The inhabitants of these stations would live and ambulate on the external wall of the torus, providing an axial loading comparable to gravity. This environment was suggested for the same advantageous reasons as emphasized in this paper: it provides a single parsimonious solution to unknown, and known, deleterious effects of microgravity. Such giant rotating platforms can be classified as "long arm/radius centrifuges" (LRC), though the length of the arm is simply a relative term. In contrast, "short arm/radius centrifuges" (SRC) have been used as early as the 18^{th} century, as part of specialized clinical practice [33].

They key difference between SRC and LRC in producing artificial gravity has to do with the magnitude of the novel forces associated with the rotating environment. One such effect was that named after the French mathematician Gaspard Gustave de Coriolis (1792-1843), who discovered that when bodies moved (radially) in a rotating frame, a compensatory acceleration or deceleration could be observed. Coriolis proposed this principle in the context of weather phenomena, but the same principle can be applied to centrifugation. As shown in Figure 2, radial movement in a rotating space station would produce a Coriolis acceleration:

$$a_C = -2\omega \times v \qquad (1)$$

ω = angular vdocityof system

v = velocityof a particlein thesystem

So in Figure 2, the subject climbing the ladder in a constant velocity rotating environment would experience Coriolis acceleration proportional to the velocity in which he climbs the ladder. His body would be pressed against the ladder as he climbed toward the central hub. If one were to increase the angular rate of the torus, the subject would experience a larger differential of acceleration/deceleration as he moved radially. This is, in principle, the critical distinction between the Coriolis environment of the LRC vs. SRC.

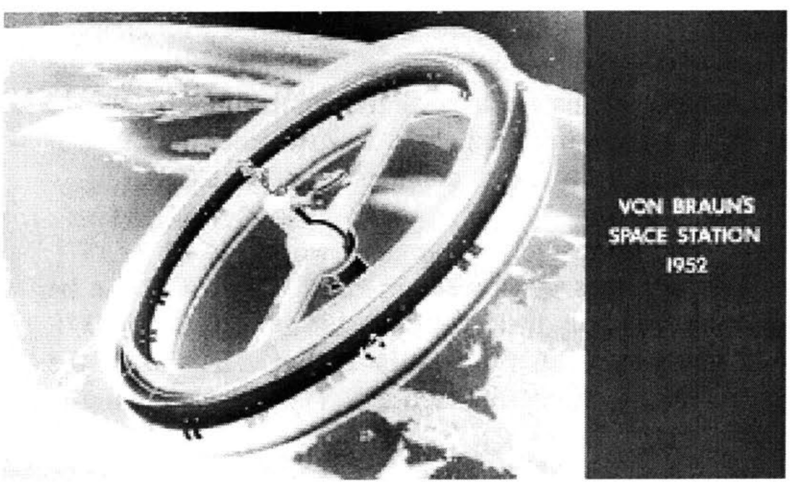


Figure 1: Von-Braun rotating space station design.

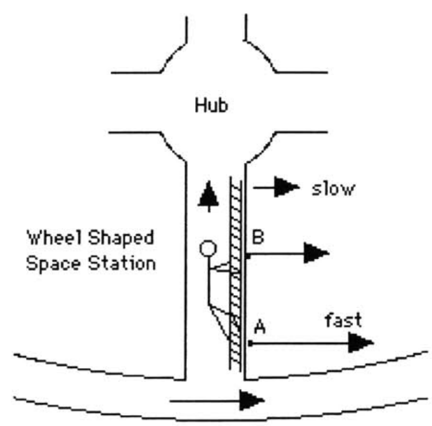


Figure 2: Coriolis effect in a rotating space station.

Centrifugation produces artificial gravity proportional to the rotational rate of the torus and the radial distance from the center:

$$A_C = r\omega^2 \tag{2}$$

ω = angular vdocityof system

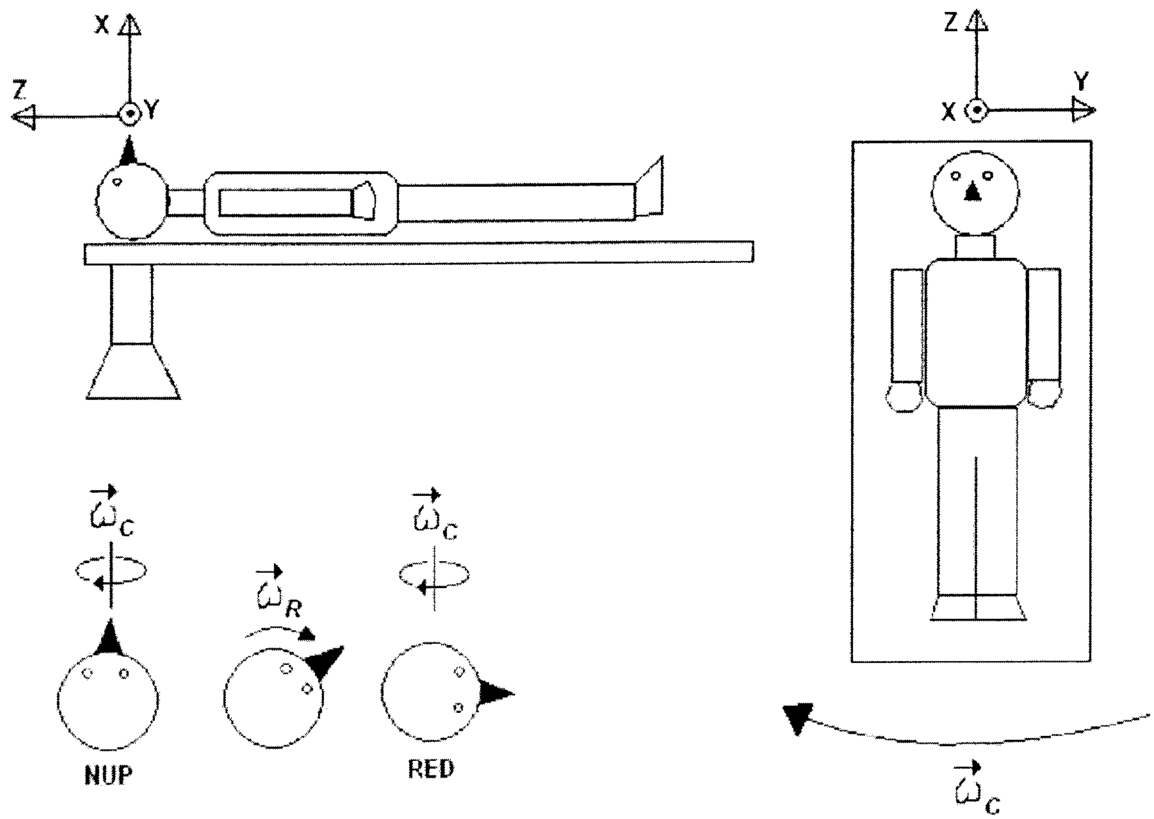
r = radialdistancefromcenterof rotation

Thus, one can increase the centripetal acceleration of a system by either increasing the length of the centrifuge moment arm or by increasing the angular velocity of the system. A LRC relies on a long moment arm while a SRC instead favors a high angular velocity.

As previously explained, the Coriolis acceleration is proportional to the radial velocity of the particle in the rotating system, and the angular velocity of the rotating environment. Further, the magnitude of centripetal acceleration is dependent on angular velocity and the particle's radial position. In the LRC picture, the "particle" could be imagined to be an astronaut traversing the radial arm to the central node. In a SRC however, the astronaut may occupy the entire centrifuge arm, with the resulting Coriolis and centripetal accelerations being applied as a gradient over the length of the subject's body. This gradient can pose significant perceptual and physiologic challenges ranging from motion coordination, perceptual disturbance, and even orthostatic challenge [7]. While these issues are all relevant, this paper will focus on the perceptual disturbances in the rotating environment of centrifugation.

Another novel force stimulus can occur due to movement in the rotating environment. While the Coriolis force is a result of movement along the moment arm, Cross-coupled Acceleration (CCA) occurs when a particle is rotated about an axis other than that of the centrifuge rotation. For instance, rotation about the axis of the centrifuge arm would produce CCA. Thus, were an astronaut to turn his head about an axis other than that of centrifuge rotation, his head would be subjected to Cross-coupled Stimulus (CCS).

The CCA has been modeled and analyzed extensively in previous works [1, 49, 17, 47], so for the purposes of this paper those analyses will be summarized. The CCA can be modeled via rotation matrices [1], or more simply modeled in vector representation [17]. The total head acceleration can be represented as a derivation of the velocities of the components of the system, with reference to inertial space. The relevant angular velocities on the centrifuge are as follows:



$\vec{\omega}_R$ = Head angular velocity relative to centrifuge.

$\vec{\omega}_C$ = Centrifuge angular velocity relative to inertial space.

$\vec{\omega}_H$ = Head angular velocity relative to inertial space.

$\vec{e}_Z$ = Unit vector about "z"-axis.

$\vec{e}_X$ = Unit vector about "x"-axis.

Figure 3: Diagram of CCA vectors.

The forces can be derived from the above velocities, as shown in a previous work [17]. This derivation produces the following expression for total head acceleration produced by a head-turn in the rotating environment.

$$\dot{\vec{\omega}}_H = \dot{\omega}_R \vec{e}_Z + (\vec{\omega}_C \times \vec{\omega}_R) \tag{3}$$

Simply put, the total acceleration applied to the head is the sum of the angular acceleration of the head relative to the centrifuge (essentially equivalent to what one would experience during a head-turn in a non-rotating environment), and the cross-product of the centrifuge angular velocity and the head angular velocity. The cross-product component of the acceleration is the CCA. This relationship implies that the CCS intensity can be regulated via modulation of either the centrifuge angular velocity or the head-turn angular velocity. Visualizing this cross-product, one would imagine that the perceived force would be a combination of pitching and rolling sensations, about the Y and X axes respectively.

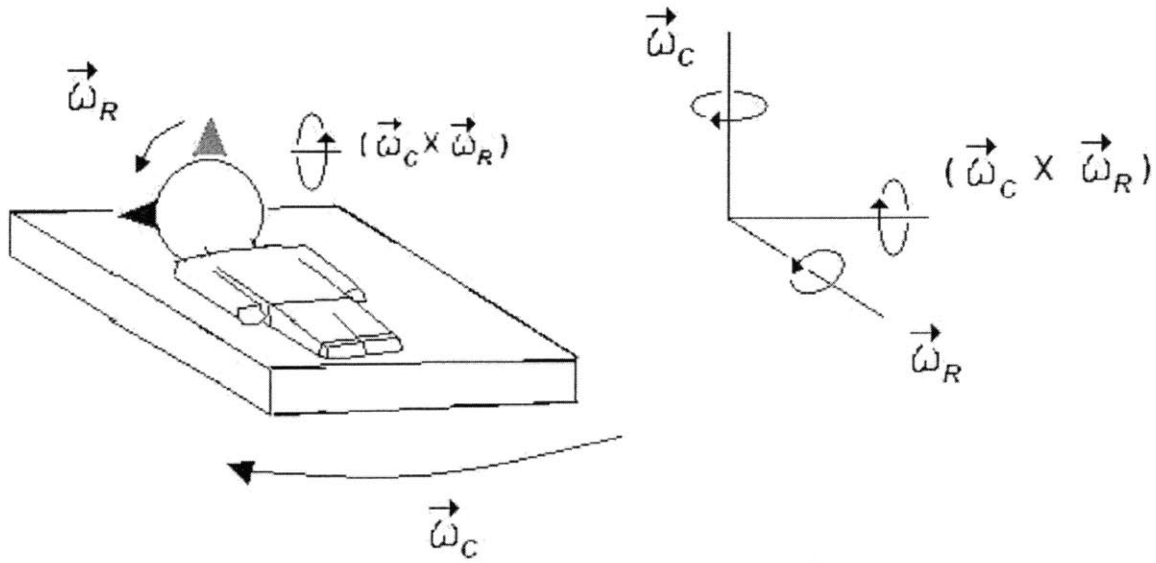


Figure 4: CCS Vector Diagram

1.2 Vestibular Function

The vestibular system is the primary balance system of the human body. Located bilaterally, buried in the petrous portion of the temporal bone, it consists of two organs for motion perception: the otoliths and the semicircular canals, which detect linear and angular acceleration respectively. The vestibular system is supplemented by a number of accessory motion and balance sensors. Meissner and Pacinian corpuscles in the skin detect stretch, pressure, and vibration, contributing to a suite of haptic sensors found throughout the body. Proprioceptive information is gathered via muscle spindles, golgi tendon organs, and other afferent sensory systems. Finally, eyesight contributes significantly to balance and motion sensation as well. Of all of these systems, the vestibular system is by far the dominant system, as demonstrated by the significant impairments observed in vestibular-impaired subjects [32].

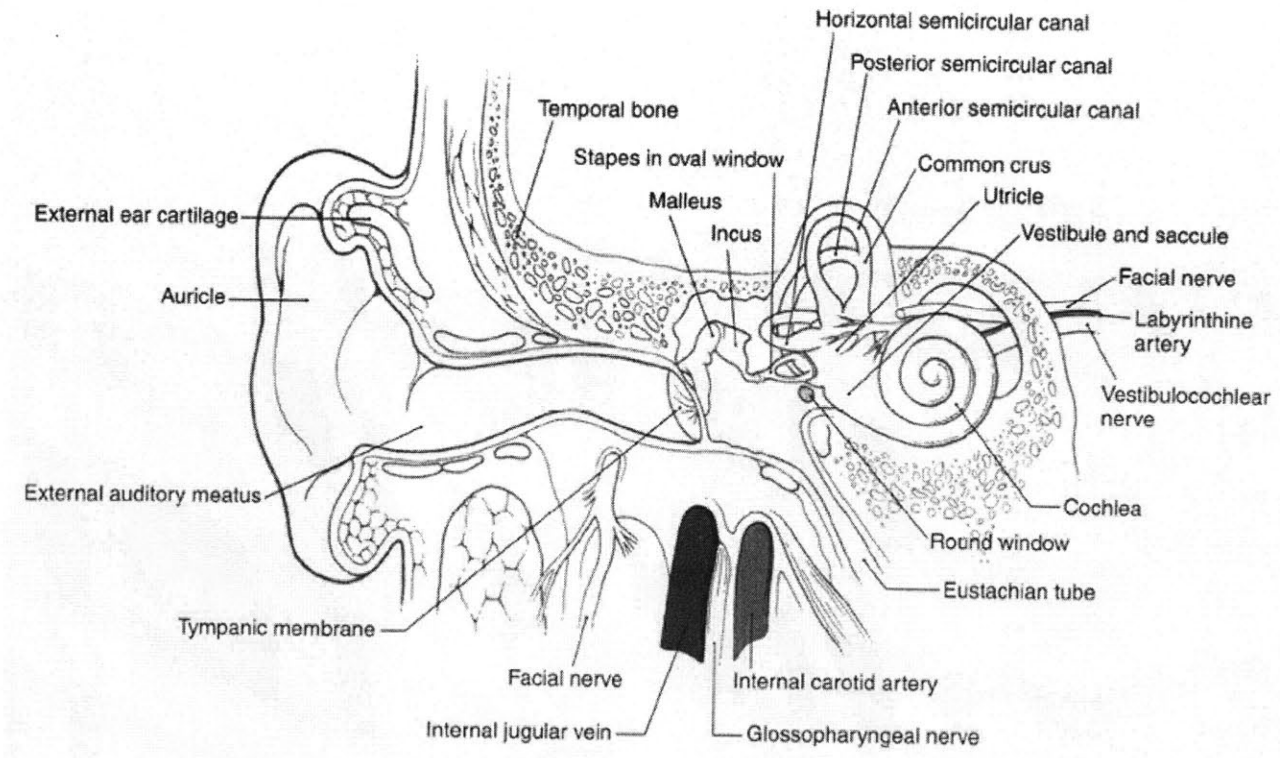


Figure 5: Anatomic diagram of the inner ear [14].

There are three SCC's, oriented essentially orthogonally to each other, providing the ability to distinguish movement in all three axes. The canals themselves consist of an external bony labyrinth surrounding an internal membranous labyrinth. The membranous labyrinth is surrounded by Na+-rich perilymph and is filled with K+-rich endolymph. The ampulla of each canal holds the cupula, the sensory effector of the system. The cupula is a gelatinous organ attached to the membranous canal, and serves the purpose of mechanical signal transduction. The cupula is imbedded with cilia projecting from underlying hair cells, which interface with ganglia ultimately leading to a direct connection with the vestibular nerve (VIII). Upon angular rotation, the endolymph initially retains its position with respect to inertial space, while the canal, and cupula, are rotated. The inertia of the fluid causes deflection of the cupula, proportional to the magnitude of angular acceleration. This cupular deflection causes the cilia to bend, initiating the influx of K+ which triggers an action potential, ultimately effecting an increase in firing rate of the vestibular nerve proportional to the stimulus magnitude. Whether this stimulation excites or diminishes the hair cell's firing rate is direction-specific. The hair cells have a morphologic selectivity which favors a single direction, based on the location of the cell's kinocilium, a modified stereocilia with no transduction capacity.

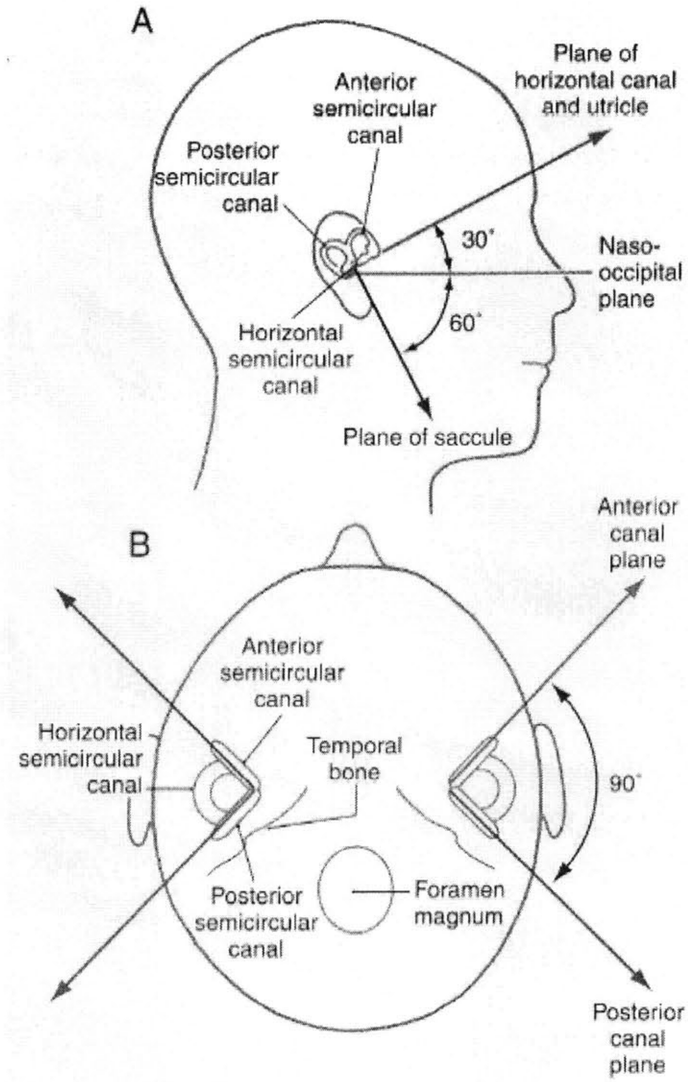


Figure 6: The canals are oriented essentially orthogonally [14].

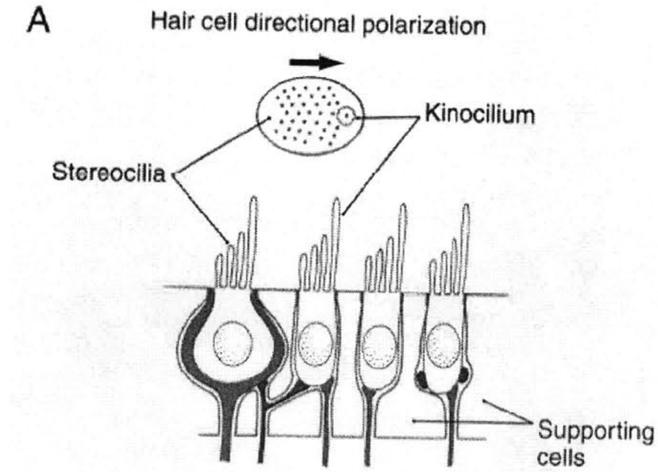


Figure 7: Diagram of Hair Cells directional operational bias [14].

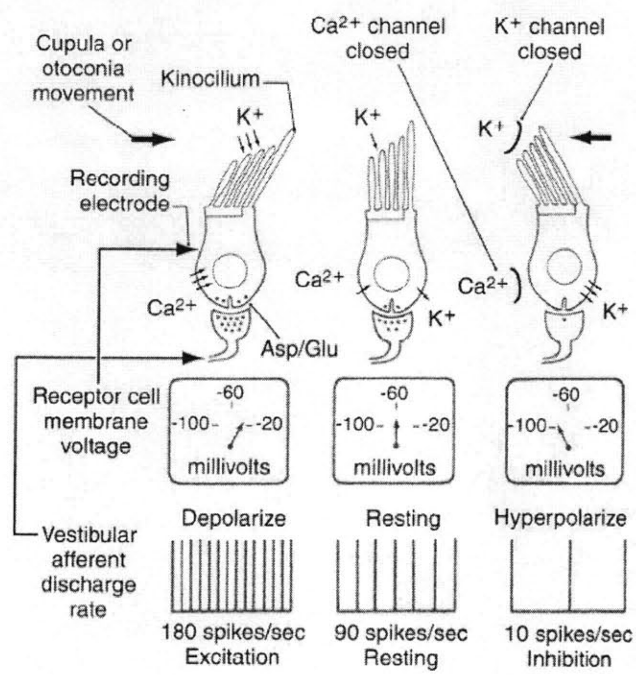


Figure 8: Hair Cell signal transduction mechaniam [14].

An important functional point needs to be made about the SCC's. The SCC's can be described as an overdamped system, in that the elastic restoring force of the cupula will eventually assure that a constant angular velocity will not be detected after a period of a few seconds. Once the cupula is in its restored position, only a change in angular velocity will cause displacement, and thus a change in CN VIII firing rate. Experimentally, this means that a constant angular rotation will only be detected for a short time, until the cupula restores, at which time the vestibular system perceives rotational stability in inertial space. Only *changes* in angular velocity are detected with consistent fidelity by the SCC's.

The otoliths share functional homology with the SCC's, in that they also represent a functional end-organ for the transformation of mechanical forces to neural signals by virtue of a hair cell interface with CNVIII. The otoliths are unique however in that they respond to linear/translational accelerations, rather than the angular accelerations of the SCC's. Located in the Utricle and Saccule of the inner ear, the otoliths contain a gelatinous membrane imbedded with otoconia and stereocilia from underlying hair cells. These hair cells exhibit the same direction-specific morphology present in the SCC, but due to their distribution about the otolith membrane can provide more directional resolution than the essentially binary SCC's. As shown in Figure 10, the hair cells are distributed in such a way as to preserve "radial" functional sensitivity. This radial distribution is essentially reflected about the striola, with the hair cells on immediate opposite sides of the striola having roughly oppositional polarity.

The critical point to make about the otolith organs is that they respond to the net gravito-inertial force vector (GIF). The otoliths cannot distinguish gravity from linear acceleration, but rather reports the total linear acceleration environment the subject is experiencing.

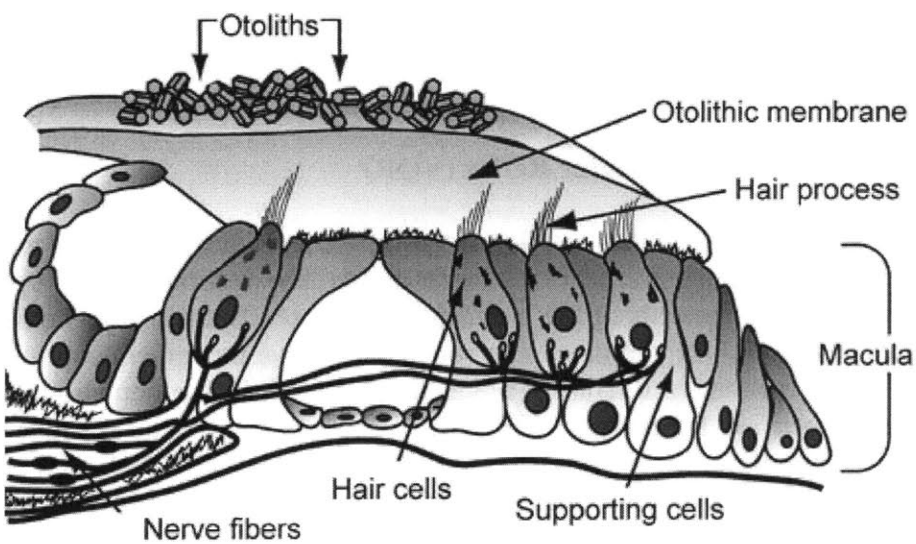


Figure 9: Otolith organ structure [32].

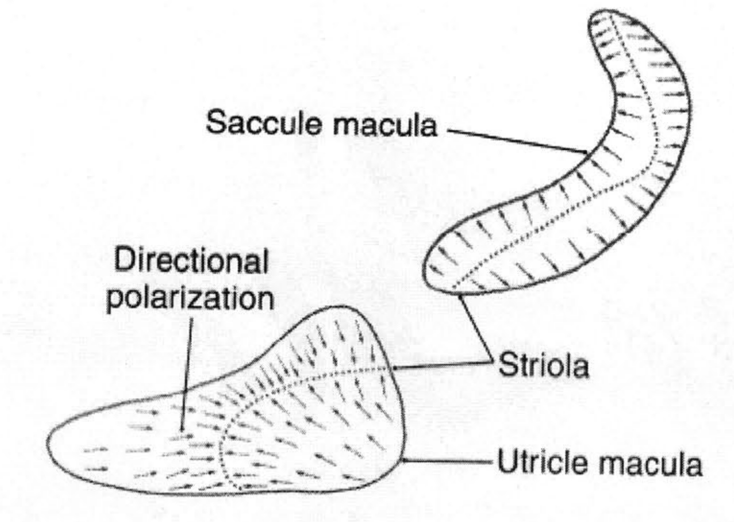


Figure 10: Otolith hair cell directional sensitivity distribution [32].

The afferent signals from the SCC's and the Otoliths is transduced along CN VIII to the vestibular nucleus of the Pons, in the brainstem. From there, the signal is recurrently routed to several locations in the central nervous system (CNS). This information ultimately contributes to the conscious perception of balance and orientation, as well as the unconscious coordination of various motor functions, including the control of compensatory eye movements.

1.2.1 Vestibulo-Ocular Reflex (VOR)

The Vestibulo-Ocular Reflex (VOR) is a localized reflex arc which serves to maintain proper eye alignment in conjunction with vestibular input. The vestibular nerve synapses directly with the vestibular nucleus of the brainstem, which sends a recurrent connection to the motor control centers of the brainstem responsible for eye movement control. This is a low-level reflex, primarily operating independent of cortical modulation, though cortical inputs can override the reflex. The reflex produces two types of movements: compensatory and orienting, with angular (AVOR) and linear (LVOR) components. Compensatory VOR eye movements are those in responses to head movements, with AVOR compensating for rotation and LVOR for translation. Orienting VOR movements are a special subset of VOR movements involving ocular counter-rolling, to partially compensate for head tilt by attempting to stay aligned with the GIF vector.

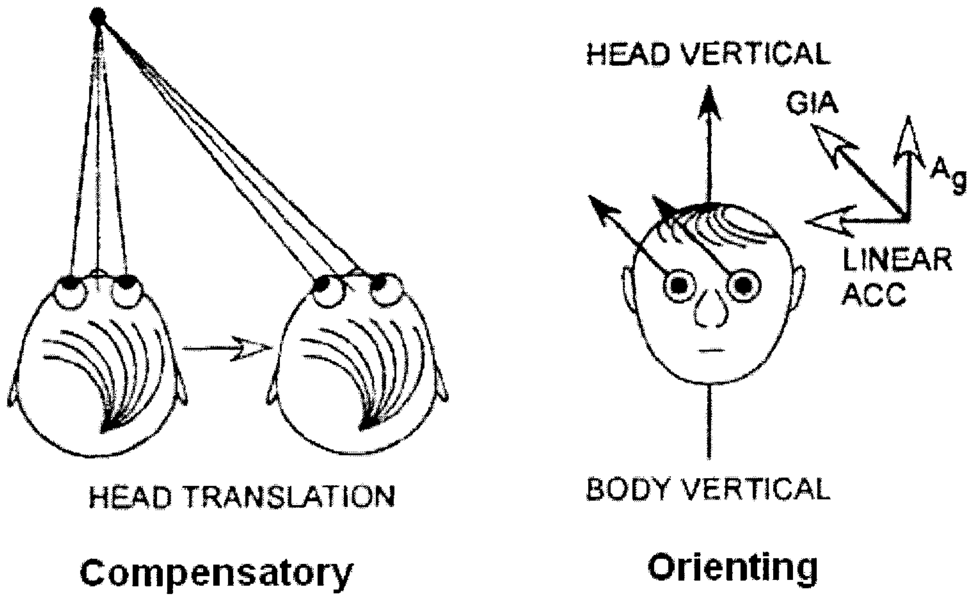


Figure 11: Types of LVOR [32].

In a rotating environment, the compensatory movements of the AVOR are the more significant eye movements. Due to the overdamped nature of the SCC's, sustained angular velocity is no longer detected after a period of several seconds. A previously mentioned, the signal decays primarily due to the restoring force of the cupula. The time requirement for the signal decay can be described logarithmically as a time constant, tau:

$$S = Ae^{\left(\frac{-t}{\tau}\right)} \qquad (4)$$

S = recorded signal amplitude

A = baseline signal amplitude

t = time (sec)

τ = time constant

Thus, time constant represents the amount of time required for a vestibular signal to decay to e^-1 (~37%) of its original peak value. This time constant can be measured experimentally as a marker of neurologic adaptation, which will be discussed later in this report. Experimentally, the AVOR will show activity upon initiation of rotation, but will attenuate along with the vestibular signal in a constant-velocity rotating frame. Should the angular velocity change, the AVOR will resume in an amount proportional to the change in angular rate.

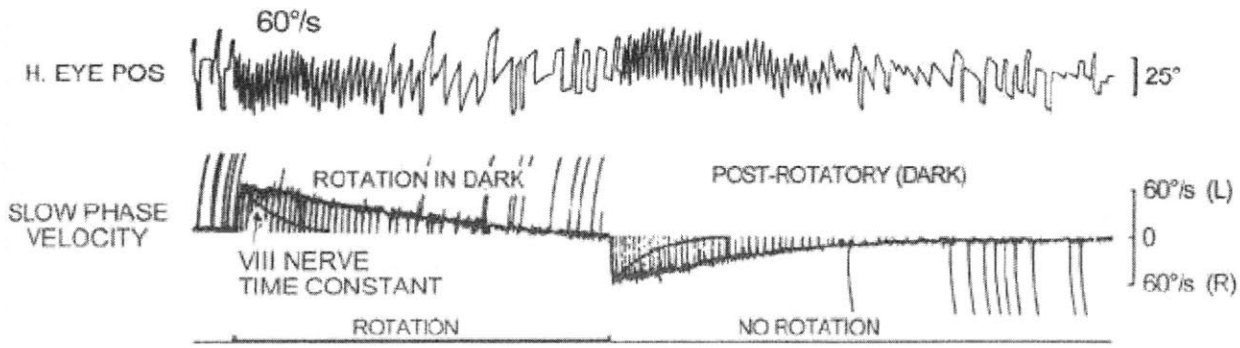


Figure 12: Sample VOR Trace showing nystagmus pattern and temporal decay of signal strength.

There's a unique character to the eye movements observed from a constant angular velocity input. The compensatory AVOR will initiate ocular muscle controls which compensate for the constant rotation, effectively counter-rotating the eyes essentially proportional to the perceived angular velocity in what is termed a "pusuit" eye movement. However, the anatomic limit to eye movements obviously prevents the eye from rotating 360 degrees to match the head rotation. Upon approaching the anatomic rotational limit of the eye movement, a saccadic movement is initiated in the opposite direction "resetting" the eye for the subsequent pursuit movement. For sustained rotations, the characteristic nystagmus pattern is observed, a repeating pair of pursuit and saccade movements. The pursuits represent a slower velocity than the ballistic saccades, so the pursuit velocity is termed the "slow-phase velocity" (SPV) vs. the "fast-phase velocity" (FPV) of the saccade. The nystagmus pattern is shown in Figure 14.

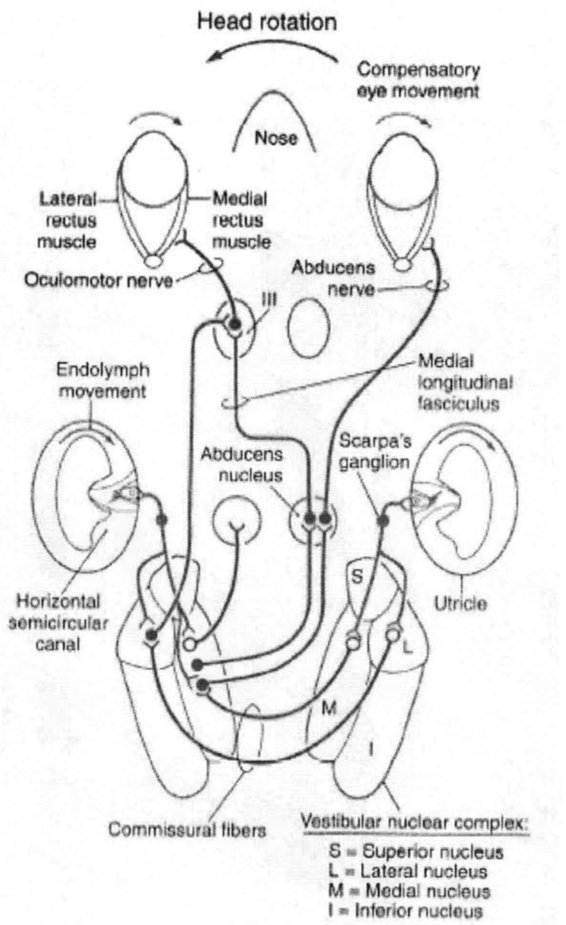


Figure 13: Neural circuitry of VOR control [14].

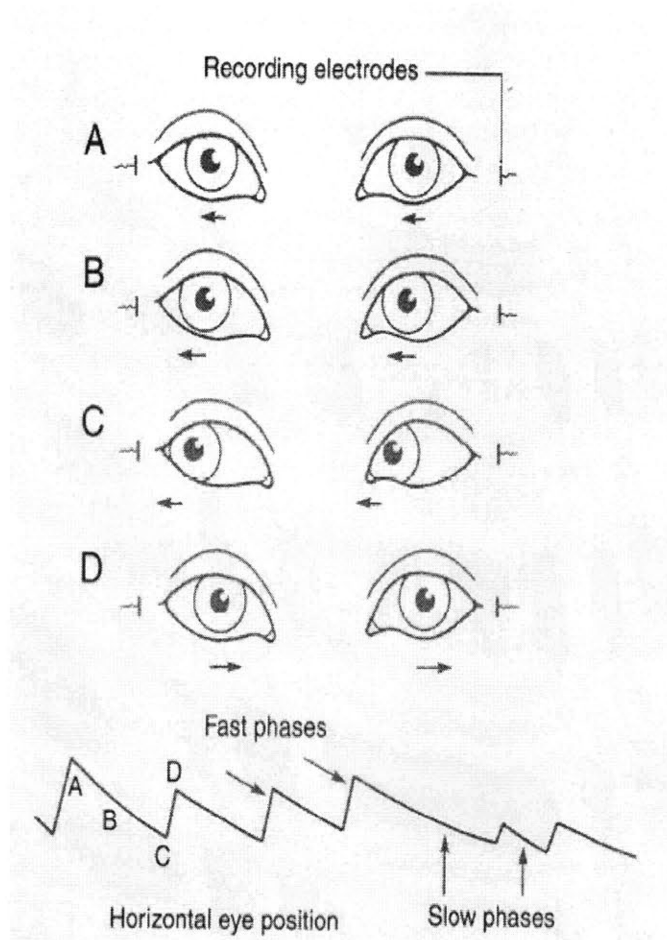


Figure 14: Eye-movements seen in typical nystagmus pattern [14].

For the purposes of this paper, only the dynamics of the AVOR will be studied, as the majority of the perceived translation will be in the plane of the centrifuge rotation, resulting in primarily torsional eye movements which are difficult to observe and record.

1.2.2 Vestibular Neural Control

Between the vestibular organs and the oculomotor centers, there are two synapses, representing a three-neuron reflex arc. There are multiple synapses and neurons involved in conscious, cortical, vestibular processing. These synapses provide a potential point of external signal modulation, be it amplification or attenuation. "Adaptation" is a term which describes the long-term changes in gain or response dynamics of a system as a result of some feedback control mechanism, usually presumed to be long term potentiation (LTP) or long-term depression (LTD) [32]. Simply put, LTP and LTD simply describe a form of neural "reward" or "punishment" to modulate the correct gain "behavior" respectively, with the obvious analogy to psychological conditioning. Adaptation can neurally amplify or suppress a signal to bring about a purposeful change in system behavior. Adaptation can result in a new neural "context", with rapid switching between neural contexts being possible, to meet the unique demands of dual environments [32].

In contrast, habituation is the acute neural attenuation or suppression of a signal undergoing repeated or consistent stimulation. This process simply decreases the sensitivity of the system, acutely. This is not a feedback-controlled change in that it is not correcting an "error", but rather is diminishing the magnitude of signal stimulus. Habituation is usually reversed once the signal is removed, while adaptation results in a new neural context which may be retained indefinitely.

The VOR is a comparatively simple system through which to study adaptation and habituation, as it's a three-neuron reflex arc. The gain of the VOR is plastic, subject to essentially constant updating through feedback control mechanisms. For example, it has been shown that VOR is subject to context specificity, with rapid context switching possible, as observed when a subject's gain changes depending on whether or not a subject is wearing his eyeglasses [32]. VOR gain in particular has been shown to be modulated in the cerebellum, a portion of the brain specialized for motor learning. The change in VOR gain can be considered a rough surrogate marker for adaptation and habituation, with the caveat that the system is likely also subject to unknown influences outside the known controls of this experiment.

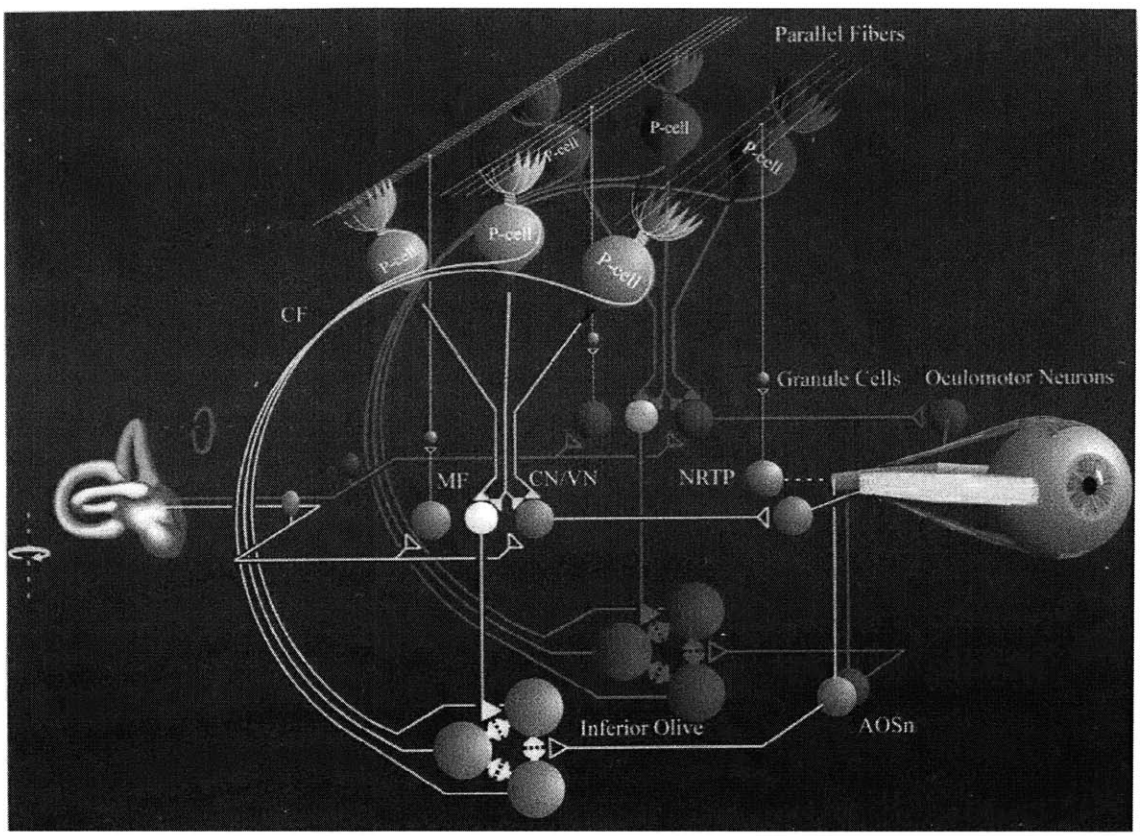


Figure 15: The three neuron reflex arc of the VOR is subject to modulation by the cerebellum, ultimately via the influence of the P-cells, the cerebellar efferents [32].

In the context of eye movements in the rotating environment, one might expect adaptation to effect a diminishment in the SPV of the observed nystagmus. An acute diminishment would be indicative of a measure of habituation, while a more chronic change could reflect adaptation. Its important to note that the two effects could not be completely isolated experimentally in any practical way, as the two effects are closely coupled in the acute time frame of hours to days.

1.2.3 Motion Sickness

If centrifugation is to be proven a viable operational countermeasure to physiologic deconditioning in microgravity, it must be shown that subjects can adapt to and work in the rotating environment with minimal impairment. As discussed, the rotating environment produces a set of potentially provocative vestibular stimuli. CCS has been shown to be particularly provocative, inducing what many subjects describe as a tumbling sensation. While an acutely provocative vestibular stimuli, such as CCS, could pose a short-term problem in the form of disorientation or dizziness, the longer term effects of repeated or prolonged exposure are much more concerning.

Motion sickness is traditionally defined as a set of signs and symptoms produced by a condition of sensory distress caused by motion, either real or perceived. Several theoretical models have been proposed to explain the pathogenesis of motion sickness. However, current opinion seems to overwhelmingly favor a single model which describes motion sickness as a result of sensory conflict or, more significantly, neural mismatch [52].

The term "conflict theory" has been ambiguously attributed two differing definitions in the literature. The older definition explains that motion sickness is a result of conflicting signals from differing sensory modalities. For example, this theory would attribute motion sickness genesis to disagreement between visual and vestibular information, as seen in microgravity. However, this interpretation has been widely rejected in favor of a more precise definition. The current theory holds that the "conflict" is not necessarily between sensory modalities, but rather between anticipated and observed sensory information. The second definition is widely accepted, as it not only attempts to explain motion sickness genesis, but also allows for the explanation of the phenomenon of adaptation to apparent sensory conflict in the classical sense.

The neural mismatch model was proposed in an attempt to qualitatively model motion sickness genesis and adaptation in a single system [52]. This model explains that the conflict can be functionally represented as a "difference" value between the "expected" and "observed" dynamics of the system. Should the difference magnitude exceed some threshold, then a motion sickness response will likely ensue. Since this difference magnitude is dependent on the "expected" dynamics, and given adaptation to provocative stimuli has been observed, the model infers that the "expected" dynamics show plasticity. Further, since context-specific adaptation has been observed [32], the model assumes that this plasticity produces several parallel "context templates" of expected sensory information. Finally, the model infers that there has to be a selection mechanism by which a template is chosen that best suits the current operating environment described by the incoming sensory information. The model assumes that this selection mechanism is aided by "efference copy", explaining the apparent resistance of volitional motion to motion sickness genesis.

The model made several assumptions regarding the strength of the mismatch signal. It was assumed that the strength of the mismatch signal varied directly with the magnitude of the discrepancy between modalities, the total number of modalities in conflict (e.g. vision, SCC's, Otoliths, proprioceptive, etc.), and the relative novelty of the sensory picture (i.e. a lack of existing adaptation). These assumptions were all based on observed clinical research, and for the most part have been deemed plausible.

While Reason's model makes a logical case for the interrelation of neural models ("templates"), neural mismatch, motion sickness, and adaptation, it does little to quantify the overall dynamics of the system. Reason's model was later expanded by Oman [42], and expressed as an analog to a control system based on observer theory, where the observer provides the "expected" state vectors of the system. With the actual and expected state vectors, one can compute Reason's "difference". A key feature of Oman's model is that it assumes that a minimal amount of conflict is present in virtually every movement, volitional or otherwise. This is attributed to noise and imprecision in the sensory modalities, thus the comparative system of conflict resolution is required for normal function. In this context, motion sickness can be thought of not as an abnormal/unique process, but rather a "difference threshold" beyond which a suite of symptoms are produced. Via this model, difference magnitudes can now be relatively measured to infer the thresholds of motion sickness onset, as well as the relative adaptation vicariously through the modulation of the motion sickness threshold. Oman's model also identified and described a fast and a slow response whose integration produce a now characteristic "power law" response of nausea magnitude. This model also allows for the integration of other stimuli into this unified nausea pathway, painting the picture of a single nausea threshold for which there are many combined inputs.

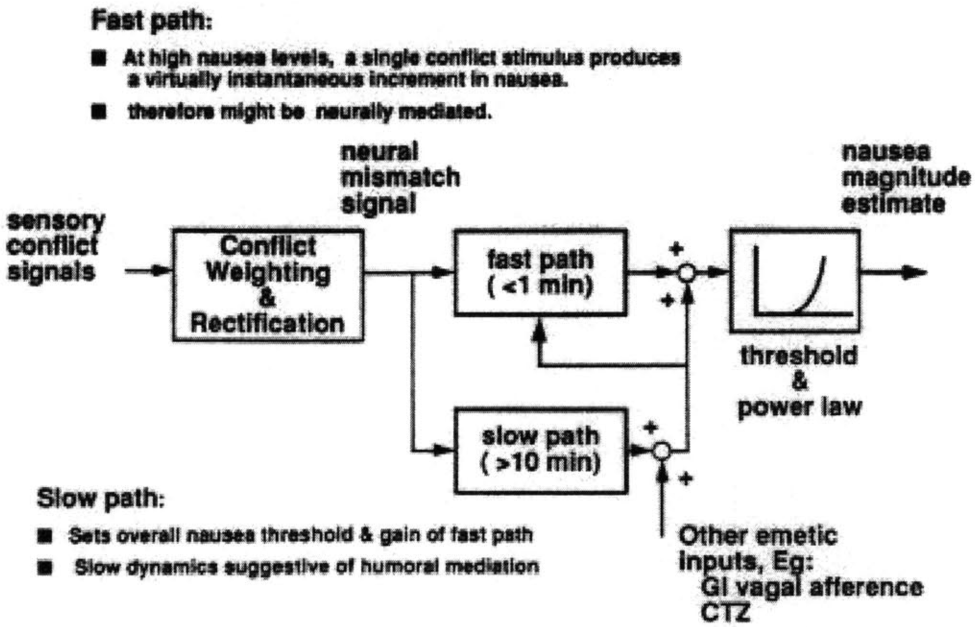


Figure 16: Contributors to the slow and fast paths of the Oman sensory conflict model [42].

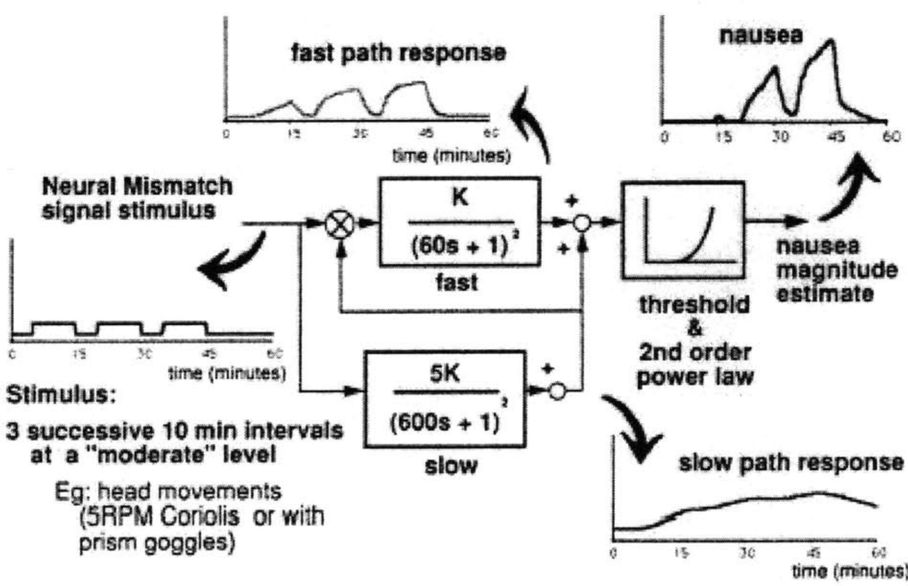


Figure 17: The combined response dynamics of the two pathways of the Oman model [42].

Overall the Reason and Oman models explain how different stimuli produce the fundamentally similar conflicts that ultimately relate to the symptoms. In the context of the rotating environment, head movements out of the plane of rotation will produce an unexpected/abnormal tumbling sensation which will likely produce a measure of neural mismatch for the naïve subject. This neural mismatch, prolonged or repeated over a short interval, will produce a "slow phase" buildup toward motion sickness symptom progression, exacerbated acutely by "fast phase" impulses. Given enough exposure, a naïve subject will almost certainly experience some degree of motion sickness.

Motion sickness could be detrimental to mission performance, particularly during mission-critical operations such as spacewalks, maneuvering, or emergencies. If the motion sickness induced by operating in the rotating environment cannot be tempered, then centrifugation may prove to be an impractical countermeasure.

1.3 Perceptual environment of Centrifugation

The major physiologic drawback in the use of short-radius centrifugation for AG pertains specifically to the CCS resulting from doing head-turns in the rotating environment. The resulting CCS produces a potentially disturbing sensation of tumbling or abnormal motion to the subject, and often resulting in significant levels of motion sickness. The perceived tumbling and motion sickness susceptibility can be attenuated with exposure [1, 49, 17], this process being attributed to adaptation. It has been shown that centrifuge speed and head turn angle can be modulated incrementally to effect maximal adaptation while minimizing motion sickness [1, 49, 17]. It has yet to be demonstrated however that stimulus intensity, and thus incremental adaptation, is possible by modulating head turn velocity. This experiment explores whether incremental adaptation is possible via head turn velocity modulation. It explores the effects of varying head turn velocity on tumbling sensation, motion sickness, VOR characteristics, and perceived body tilt.

It has previously been suggested that the CCS magnitude of a yaw head movement during SRC can be approximated as a function of the head turn *angular displacement* and centrifuge velocity [1, 27, 49, 47]. This relationship is typically expressed exclusively for the hypothetical "pitch canal" due to the observed dominance of the pitch sensation during and immediately following the yaw head movement [27, 49, 17]. This expression for CCS magnitude has been represented:

$$CCS_{Pitch} \approx \omega_c . \sin(\psi_{\max}) \tag{4}$$

$$CCS_{Roll} \approx \omega_c . \cos(\psi_{\max}) \tag{5}$$

This expression was derived by integrating the expression for the angular acceleration of the head-turn [1, 27], thus expressing the head turn angular displacement as the critical factor in terms of stimulus magnitude. This expression would seem to exclude an effect of head-turn velocity on the *perceived* vestibular velocity stimulus, assuming the dynamics of the vestibular system interpreted the CCS exactly. However, as pointed out in previous work [49], the *perceived* CCS intensity may deviate significantly from the actual stimulus magnitude for head turns of abnormally high or low velocities. Further, in the original paper in which this equation was first reported [27], it was explained that the strict angle dependence translated directly to perception only when applied to what can be described as "impulse" head movements, or head movements which last for "less than 3 seconds" or "[significantly] shorter than the time constant of integration of the [semicircular] canals". This caveat is based on the findings that the SCC response dynamics deviate significantly at extremely high and extremely low stimulus frequencies [18].

To illustrate this problem from a purely logical perspective, consider the following example. A previous study determined that the average reported stimulus intensity of a head turn to 80 degrees was approximately 10, and that observed at 40 degrees was roughly 5 [49]. In this example, doubling the head turn angular displacement essentially doubled the mean perceived intensity. It was also shown in this example that two sequential 40-degree head turns didn't exceed a perceived intensity of 5 [49]. This begs the question: why doesn't two 40 degree head turns produce the same perceived intensity as a single 80 degree head turn? The intuitive answer is that the two 40 degree head turns were *discretely* distributed over a sufficiently long period of time to allow the initial head turn's signal to decay before the second turn was initiated. There must therefore exist an optimum *continuous* head turn velocity which is sufficiently slow as to limit the perceived signal intensity of a single 80 degree head turn to 5, via the same signal decay mechanism. Such an observation suggests that the above expression for CCS magnitude, based on head-turn angle and not velocity, does not equate to the *perceived* stimulus magnitude of the system.

It is likely that the receptor dynamics themselves contribute to the observed incongruity between the CCS magnitude and perception. If one considers the SCC in isolation, the system can be shown to have a measurable threshold of detectible angular velocity impulse (or angular acceleration). The stiffness of and restoring force generated by the cupula itself, to a large extent, determines this threshold [32]. Further, the cupular deflection mechanically initiates the hair cell activation, with a higher magnitude of deflection producing a stronger afferent signal. Thus, if one were to model cupular deflection as a function of angular acceleration, the output signal could be estimated by the resulting deflection. This has been done to an extent in a previous work [18], using the following model:

$$\text{Angular Acceleration} \rightarrow \boxed{\frac{(1+\tau_L s)\tau_A s}{(1+\tau_1 s)(1+\tau_2 s)(1+\tau_A s)}} \rightarrow \text{Vestibular Response}$$

τ_A = Adaptation Time Constant

τ_L = Phase Lead Time Constant

τ_1 = Viscous damping/elastic restoring force (Π / Δ)

τ_2 = Inertia/viscous damping (Θ / Π)

This is not a pure cupular deflection model, but a general response model which translates the angular acceleration input to the resulting nervous response as recorded in the vestibular nerve [18]. The values of the time constants were experimentally determined, producing the following transfer function which was modeled for this paper:

$$\frac{(1+.049s)80s}{(1+5.7s)(1+.003s)(1+80s)}$$

This transfer function was applied to several test conditions of simulated head turns. As shown in equation (3), the CCA is proportional to the head turn angular velocity. Assuming the centrifuge angular velocity is fixed, the magnitude of CCA can be modeled based on a head-turn angular velocity trace over time. In order to simulate as "natural" a velocity, and thus acceleration, pattern as possible, acceleration trapezoids were generated and input into the model, approximating the CCA generated by a uni-modal velocity profile, similar to that used in previous works [19, 24].

If the force picture of equations (5) and (6) directly relates to vestibular output as claimed [1, 49, 17], then changes in the velocity profile or head turn duration should produce no noticeable effect. Thus, to compare the effects of velocity on simulated the outputs of two head turns, the head displacements will be maintained. This is done by ensuring equivalent area under the curve (AUC) of each velocity profiles.

As shown in the following figure, there is little difference in the predicted profiles or peak nerve firing rate for two velocity profiles of equivalent head displacement (AUC) when the head turn duration varies by less than a second.

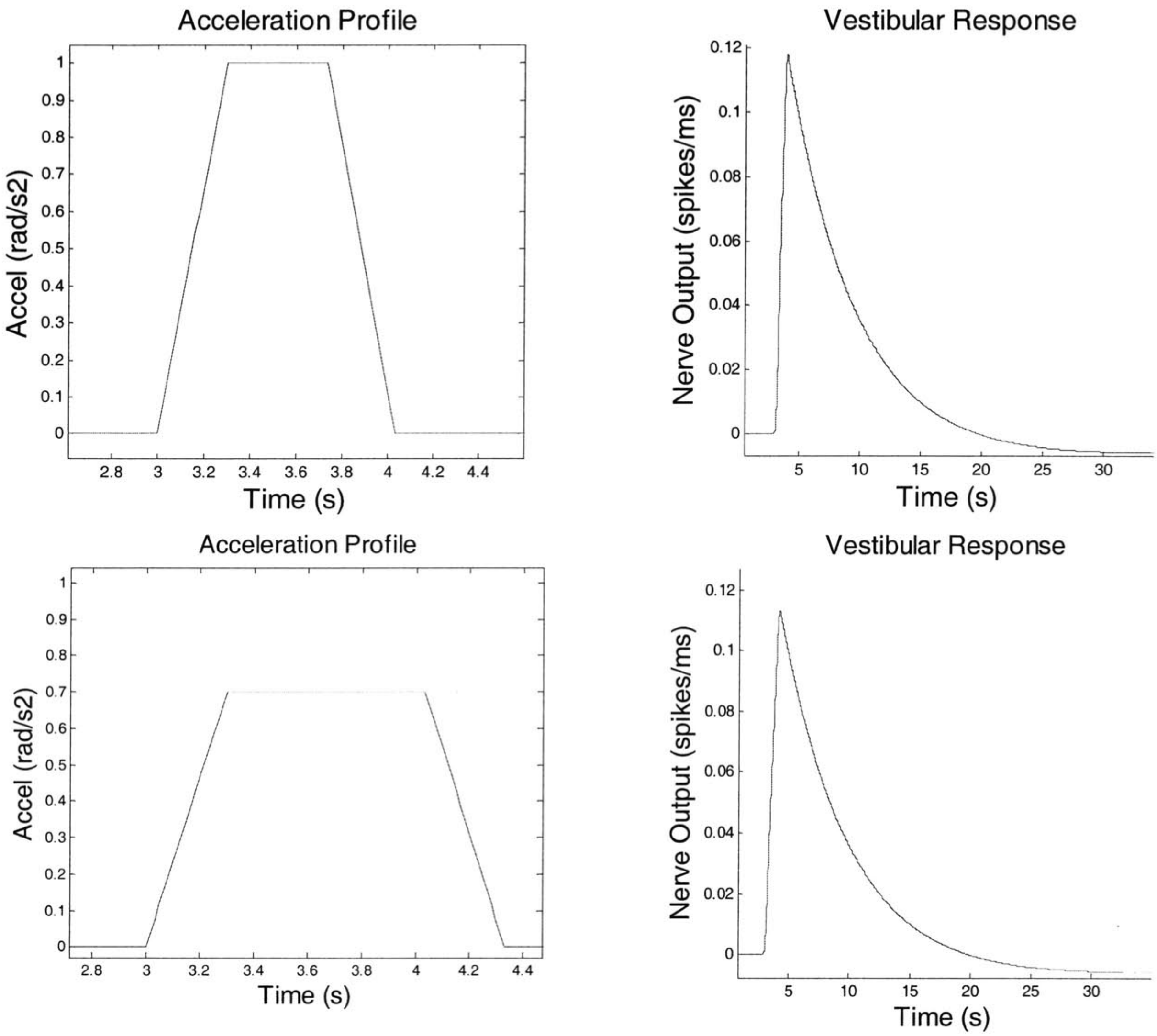


Figure 18: Two different acceleration profiles representing velocity profiles of equivalent AUC (* = .7, velocity ~ acceleration due to equation (3) *) produce similar vestibular responses. The head turn durations are 1 second (top) and 1.3 seconds (bottom), with peak accelerations of 1 rad/s2 and .7 rad/s2 respectively. These profiles produce peak firing rates of 0.120 and 0.115 spikes/ms respectively.

For purposes of comparison, the trapezoids in the above figure vary by peak acceleration and head turn duration. The responses of the two inputs produce essentially similar output firing rate profiles, with only a very minor diminishment in the peak firing rate in the second case. This diminishment of peak firing rate, while small, foreshadows a much larger effect when the head turn duration is further elongated.

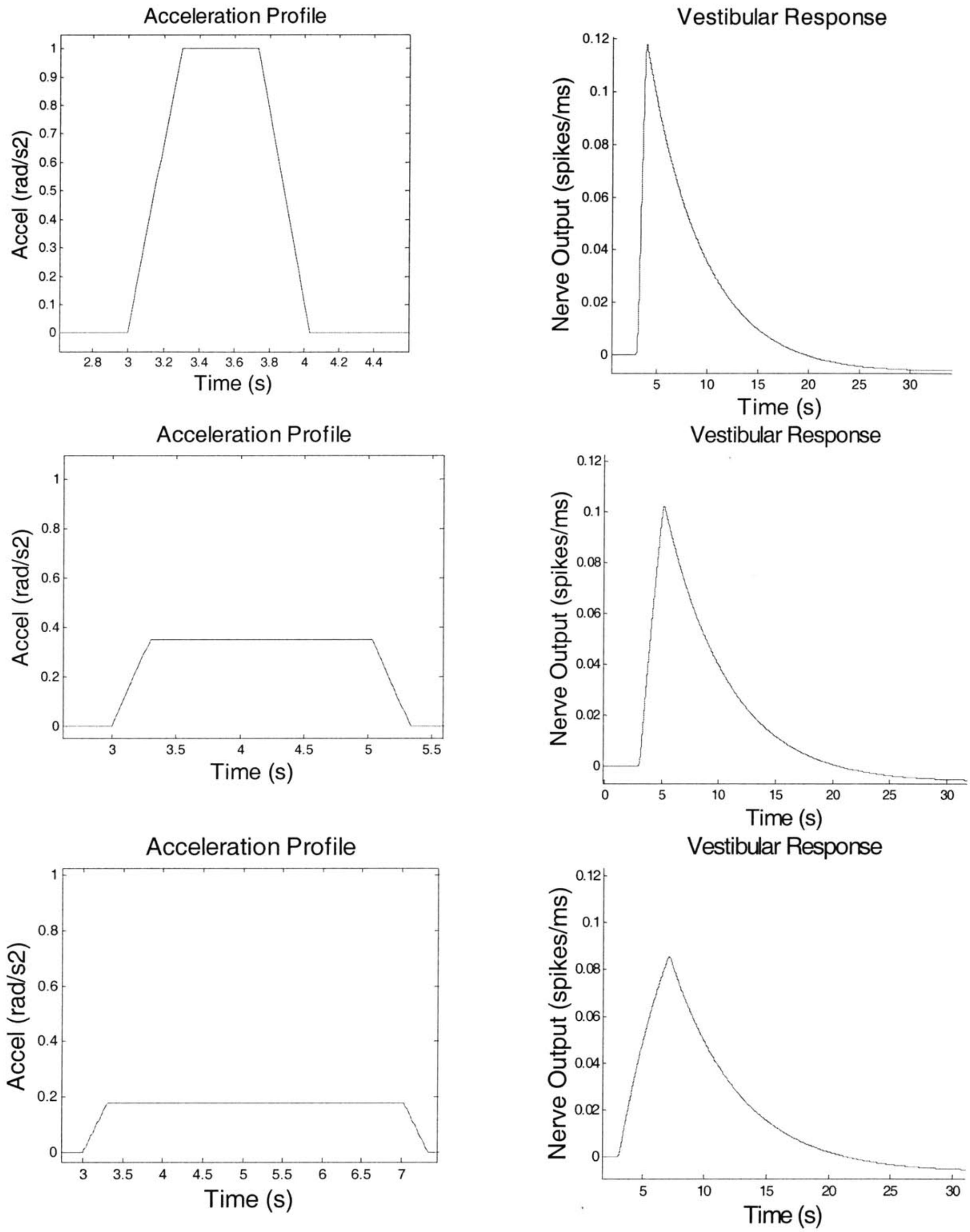


Figure 19: Two acceleration profiles of equivalent velocity AUC (equivalent head displacement). The head turn durations are 1 second (top), 2.3 seconds (middle), and 4.3 seconds (bottom), with peak accelerations of 1 rad /s2, 0.35 rad/s2, and 0.175 rad/s2 respectively. These profiles produce peak firing rates of 0.120, 0.105, and 0.085 spikes/ms respectively.

The simulation seems to indicate that as the head-turn duration increases, the CCS response diminishes for head turns of the same total displacement. How exactly this effect will relate to perception is unclear, as the nerve firing rate is subject to neural feedback control which this model does not account for. However, strictly from the perspective of the vestibular nerve firing rate, it seems clear that the forces demonstrated in equations (5) and (6) do not provide a good model for the vestibular response to CCA. It has been suggested that the peak vestibular response could be thought to correlate with the maximum cupular deflection [18], as the cupular deflection produces the observed firing rate. This would suggest that the diminishment of peak firing rate with increased duration head turns would produce a lesser maximum deflection.

Further, previous research has established that an absolute semicircular canal sensitivity threshold exists, below which any motion will be undetectable by the canals. This minimum sensitivity threshold has been reported to be roughly 2-2.5 degrees/second [46], but the exact threshold is not as important as is the relevance that a threshold exists at all. Using the previously established equation for pitch stimulus, the theoretical impulse head velocity corresponding to "no perceived stimulus" can be computed. However, it's critical to note that the subject may report "no perceived stimulus" at a higher head turn velocity, due to individual biases, insensitivity, or confusion in the unique environment of the centrifuge.

$$CCS_{Pitch} \approx \omega_c . \sin(\psi_{\max})$$

or

$$CCS_{Pitch} \approx 114° / s * \sin(60°) \approx 99° / s$$

As shown in the above example, using equation (4), a 60 deg. head turn at 19RPM (114 deg/s) corresponds to a CCS of 99 deg/s in the pitch plane, assuming the head turn velocity is "sufficiently high". However, a head turn of 1.25 deg approaches the semicircular canal's absolute sensitivity threshold, using the established equation.

$$CCS_{Pitch} \approx 114° / s * \sin(1.25°) \approx 2° / s$$

While a head turn angular displacement limit of 1.25 degrees would be operationally too restrictive to be practical, it suggests that, in our example, a 60 deg head turn could go essentially undetected if completed in 1.25 deg increments with a sufficient time delay between increments. More to the point, the same could be said for a sufficiently slow *continuous* head turn. At extremely low head turn velocities the perceived CCS intensity would diverge from that predicted by head angular displacement alone, with the perceived stimulus intensity varying directly with the head turn velocity.

Given there exists a "dead-zone" for the cupula, a threshold of motion below which no motion will be perceived, if a slower head turn results in less overall cupula deflection, then its plausible that a disproportionate amount of the resulting CCS will go undetected for a slower head turn than a faster head turn. Simply put, if one performs slower and slower head turns, the cupula will spend progressively more time in the "dead zone", producing a weaker and weaker response to the CCS, until reaching a point of sufficiently slow head turn which will produce no perceivable response to the CCS at all. Such a scenario would explain the simulation results discussed previously, as well as the presence of canal thresholds.

The results of this experiment seem to support this possibility, with several subjects reporting HT's which produced no perceptible tumbling or otherwise abnormal sensation, though this will be discussed in detail later. While this possibility would be certainly subject to individual differences in sensitivity of perception, this suggests that a relationship between head-turn velocity and CCS intensity needs to be defined for head turns which are **longer than ~3 seconds** [27], or more to the point, a model of *perceived* CCS needs to be defined. Further, as CCS intensity and motion sickness intensity have been shown to be directly related [49], the relationship between head turn velocity and motion sickness intensity can also be defined experimentally. It further stands to reason that an adaptation protocol can be developed via the modulation of head turn velocity given either fixed or variable head turn angles and centrifuge velocities. Before an adaptation protocol can be established however, the precise relationship of head turn velocity to CCS intensity must be explored.

1.3.1 Perceptual Adaptation

Another possible cause of incongruity between the actual CCS magnitude and the perceived CCS intensity can potentially be explained by examining the points of signal modulation of the system. As previously mentioned, the CCS acts on the hair cells to trigger a chemically transduced signal mechanism which modulates the action potential firing rate of the vestibular nerve (VIII). From there the signal traverses CN VIII to several CNS destinations. It is thought that VOR adaptation occurs at one or more of these CNS locations, suggesting that any incongruity of CCS intensity and compensatory VOR gain control could be centrally located. Conscious perception likely adapts via a mechanism similar to VOR adaptation [32]. Perceptual adaptation has been shown experimentally [1, 49, 17], with the obvious functional homology: the CNS-controlled tempering of CCS perception, similar to tempering of VOR gain.

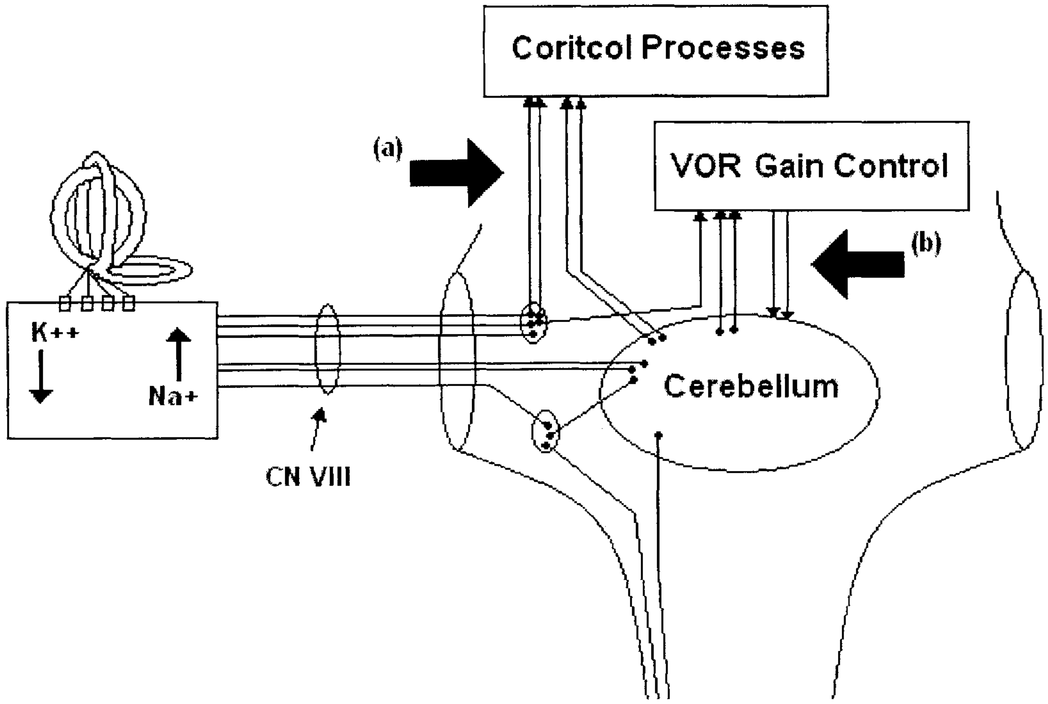


Figure 20: The CCS signals are interpreted by the SCC's, inducing a chemical signal transduction mechanism. The signal interfaces with the vestibular and vestibulo-spinal nuclei, and also the cerebellum. Points (a) and (b) are the proposed feedback control points for the cortical/perceptual and VOR systems respectively [32, 14, 29]. Known neural pathways are shown (thin lines/arrows). Proposed feedback pathways not explicitly shown.

This is not to say that any reduction in CCS is due solely to adaptation. This is simply to say that *CCS magnitude does not precisely translate to CCS perception*, so to model perception with an absolute mathematical expression may be misleading.

1.3.2 Perception of Coriolis Force

For the purposes of this experiment, it was critical that the CCA be studied in relative isolation. For this reason, the subject was studied with their head at a fixed position along the centrifuge long-axis, minimizing any potential Coriolis effect. However, the rotating environment does produce an effect on perceived linear acceleration, detected by the otoliths, which could not be completely eliminated. As mentioned previously, the otoliths cannot distinguish gravity from any other inertial force vector, instead interpreting the sum of the total linear accelerations. This is illustrated in the figure below.

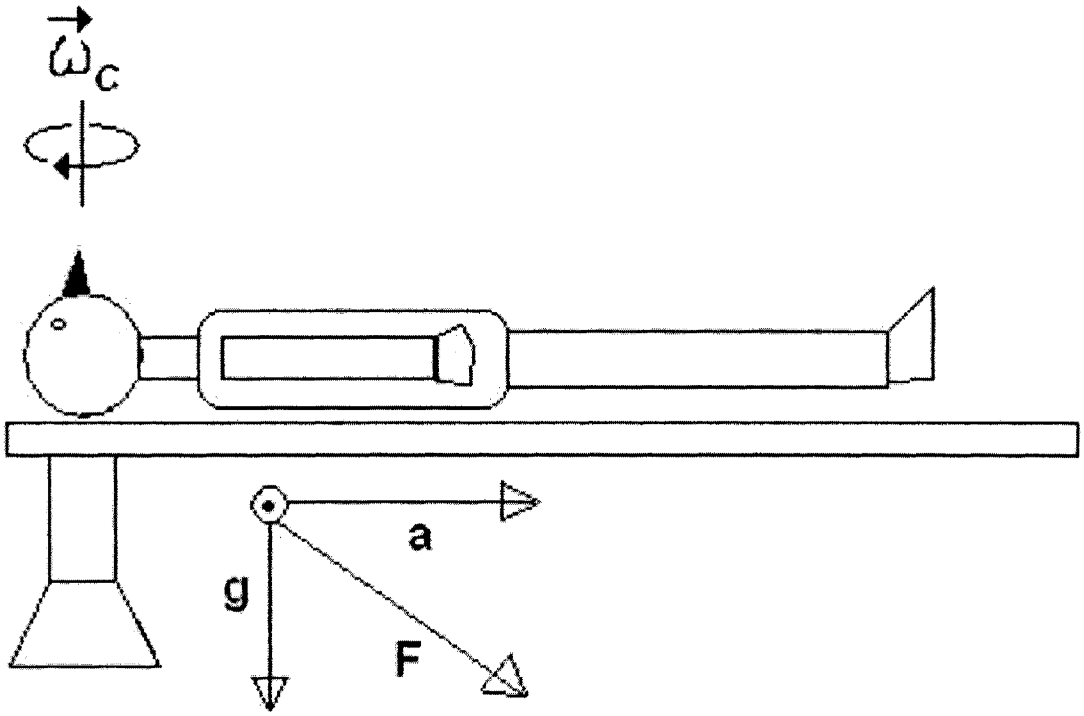


Figure 21: centripetal acceleration (a) and gravity acceleration (g) sum to produce the perceived GIF vector (F).

This effect has been explored in previous works, and has been shown to be relative to the angular velocity of the centrifuge [49, 17]. For this reason, the centrifuge speed was constant for the relevant portions of this experiment, allowing for the assumption that any confounding linear acceleration effect would be constant. However, this certainly doesn't eliminate the otoliths from consideration in the response. It's very likely that the otoliths contribute to the CCS [17], and they likely contribute to the development of motion sickness symptoms [10].

2.0 Hypotheses

1. For a given centrifuge velocity and head turn angle, the perceived CCS intensity will decrease as the head turn duration significantly exceeds the cupular restoration time constant (~ 4-6 seconds).

2. For a given centrifuge velocity and head turn angle, the motion sickness increment will increase with increasing head turn velocity.

3. The head turn velocity effect is independent of head turn direction ("to nose-up" vs. "to right ear down").

4. Head turn velocity modulation would provide another sufficient mechanism for incremental adaptation to cross-coupled stimulus, minimizing motion sickness compared to a profile using constant head turn velocities.

3.0 Experimental Design

3.1 Analytic Design

In order to determine the relationship of head turn velocity to CCS intensity, head turn velocity was the primary independent variable in this experiment. There were 8 total head turn velocities, all of which were tested at the same head turn displacement angle and centrifuge angular velocity. For practical reasons, the centrifuge velocity was maintained at 19RPM and the head turn displacement was maintained at 60 degrees for all subjects. These values were chosen as to provide a smaller amount of total CCS than that provided at higher angles or RPMs, increasing the probability of observing the diminished effect of extremely low head turn velocity and possibly the velocity corresponding to essentially imperceptible stimulus. Limiting the stimulus magnitude was also expected to diminish the motion sickness effects somewhat, increasing the probability that a subject will complete the experiment but possibly limiting the analysis due to fewer or inconsistent reported incremental changes in motion sickness levels.

The second independent variable was head turn direction. It has been shown that head turn direction, to nose-up (NUP) vs. to right ear-down (RED), are essentially contextually separate stimuli, both in terms of stimulus intensity and context-specific adaptation [32, 22, 25]. For this reason, head-turn directions must be analyzed separately. Head turn velocities were paired by head turn direction (RED vs. NUP) to allow for scaling of the subjective magnitudes of the two head turns without the possible confound of habituation induced by intervening head turns. Having each turn paired allows for the most direct comparison of head turn direction.

The experiment involved 22 subjects, representing a single group. Each subject was subjected to the same sequence of head turns over a period of two consecutive days to explore the possibility of differences in adaptation to different head velocities, using subjective tumbling intensity as the primary metric. The design was similar to those previously executed in the Man Vehicle Lab, as illustrated below:

	Day 1						Day 2					
Phase	Training	pre	Pre	**Stim**	Post	post	Training	pre	Pre	**Stim**	Post	post
Number of HT	8	6	6	**32**	6	6	8	6	6	**32**	6	6
HT duration (seconds)	**See below**	1.0	1.0	**See below**	1.0	1.0	**See below**	1.0	1.0	**See below**	1.0	1.0
Centrifuge velocity (RPMs)	0	0	23	**19**	23	0	0	0	23	**19**	23	0
Head angle (degrees)	60	80	80	**60**	80	80	60	80	80	**60**	80	80

Table 1: Experiment phases

The head turn durations (and thus velocities) of the stimulus phase were specifically chosen for statistical purposes. It is critical that the effect of head turn velocity be illustrated over a wide range, as it was unclear exactly where the critical points in the response curve would be. The points were chosen by incrementing the head turns by the product of the previous head turn and its square root, providing an essentially consistent interval for comparison. The head turn velocities ranged from 75 deg/s to 3.6 deg/s, the latter of which was thought to be twice the predicted velocity corresponding to zero perceived stimulus observed from preliminary experimentation. The head turn velocities and durations used in this experiment are listed below:

HT Duration (s)	.8	1.6	3.2	4.1	6.6	8.3	10.5	16.8
HT Velocity (deg/s)	75.0	37.5	18.8	14.6	9.1	7.2	5.7	3.6

Table 2: Head turn durations and mean velocities

The head turn velocities represented a range which overlaps and extends beyond the previously observed lower velocity boundary used in previous studies [*]. There are no previous SRC studies to the author's knowledge which examined the effects of head turns below ~20 deg/s. This above range was chosen as it provides necessary resolution of what is anticipated to be the "threshold" where the perceived stimulus begins to deviate from the actual stimulus magnitude, 2-6 seconds duration, and where the perceived stimulus is significantly attenuated compared to the calculated stimulus, roughly 13 - 16 seconds duration.

The head turn sequences accounted for the possible effect of order on the results. Simply put, it was important to ensure that the sequence was not "weighted" with fast or slow head turns toward the beginning or the end of the sequence. For example, its conceivable that faster head turn's would induce more habituation, thus putting a disproportionate amount of fast head turn's early in the sequence could artificially diminish the observed stimulus of the slower head turn's. The order of the head turns is designed as to minimize any such effect. To best account for the effects of habituation, the "Stim" phase was segregated into two repetitions of 16 total turns (8 pairs of turns per repetition), with the order of the second group being the inverse of the first group.

Repetition #1:

HT #:	1+2	3+4	5+6	7+8	9+10	11+12	13+14	15+16
HT Duration (s)	4.1	8.3	.8	16.8	6.6	3.2	1.6	10.5
HT Velocity (deg/s)	14.6	7.2	75.0	3.6	9.1	18.8	37.5	5.7

Repetition #2:

HT #:	17+18	19+20	21+22	23+24	25+26	27+28	29+30	31+32
HT Duration (s)	10.5	1.6	3.2	6.6	16.8	.8	8.3	4.1
HT Velocity (deg/s)	5.7	37.5	18.8	9.1	3.6	75.0	7.2	14.6

Table 3 and 4: Head turn repetitions

The final order of the complete "Stim" phase is illustrated below:

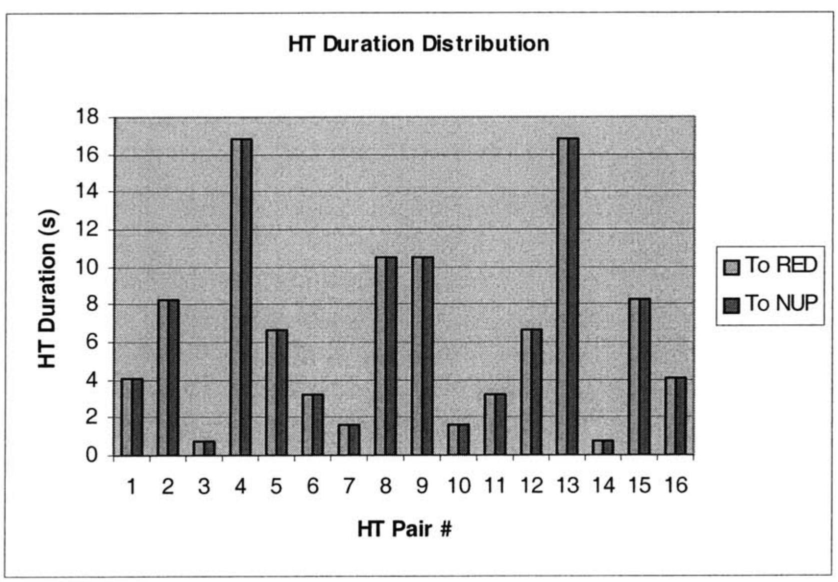


Figure 22: Stimulus phase complete HT order by duration.

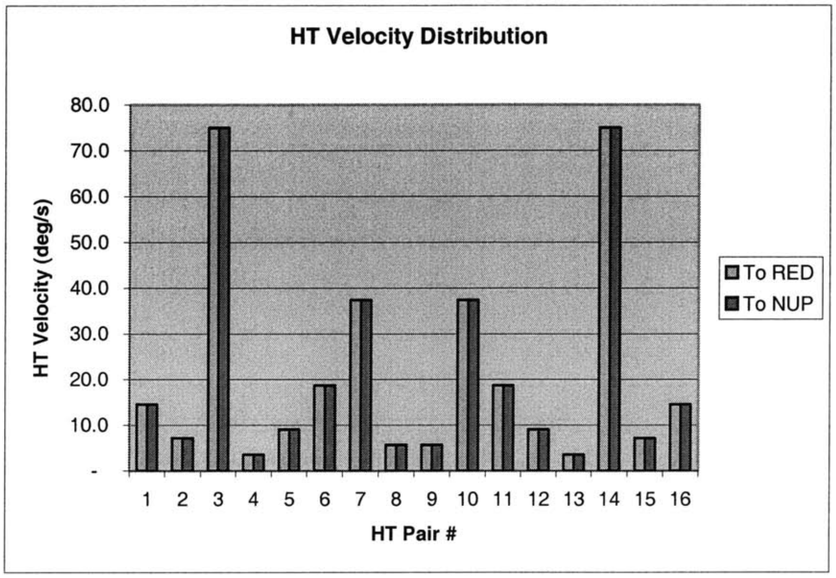


Figure 23: Stimulus phase complete HT order by Velocity.

The division into two repetitions, and the symmetry of the head turn order about the middle (mirrored between head turn pairs 8 and 9 above), is critical to ensure that each head turn duration has the same average effect of order (often termed "age"). For example, if a fast head turn were first, it would also be positioned last so that its average age is (1+16)/2 = 17/2. The fourth head turn would thus also come thirteenth, making its average age (4+13)/2 = 17/2, and the eighth would also come ninth, etc. This is necessary in order to account for the effects of habituation. For instance, if one were to determine the effect of a given head turn duration on tumbling intensity, it's critical that each head turn have the same average age to prevent one head turn from skewing the results. If a given head turn speed was always lumped in the beginning, then it could reasonably be expected to undergo less habituation that a head turn speed which is exclusively grouped at the end of the sequence. With this symmetric ordering by age, habituation can be precisely accounted for.

Similar to habituation, a measurement of MS increment would also benefit from such a distribution of head turn velocities. MS responses usually show an inverse pattern to that of habituation in that it shows a steady accumulation throughout the experiment rather than the steady diminishment of sensation seen with habituation (not to imply that they are mechanistically related). It is conceivable that a more provocative stimulus early in the experiment could thus bias later measurements. This possible effect would be minimized when one measures the MS "increment" rather than the actual reported value, though the effect is still present to a degree in both cases. By evenly distributing the head turn speeds the effect can be minimized, similar to the effects of habituation.

3.2 Operational Design

The experiment was performed on the MVL's short-radius centrifuge, the same used in several previous works [1, 49, 17]. The centrifuge rotates about the vertical axis, with the subject laying supine with his/her head positioned over the axis of rotation. The subject's head is positioned inside a plastic helmet which rotates about the body axis, providing an essentially normal range of motion for a voluntary head turn. An adjustable footplate ensures that the subject's feet are firmly stabilized, allowing the subject to feel as though they were "standing" in artificial gravity while the centrifuge is spinning. The centrifuge itself is powered by an electric motor, which is controlled remotely by an operator in the adjacent room. The centrifuge speed was maintained at a phase-dependent constant rate via a computerized feedback control mechanism (Figure 24).

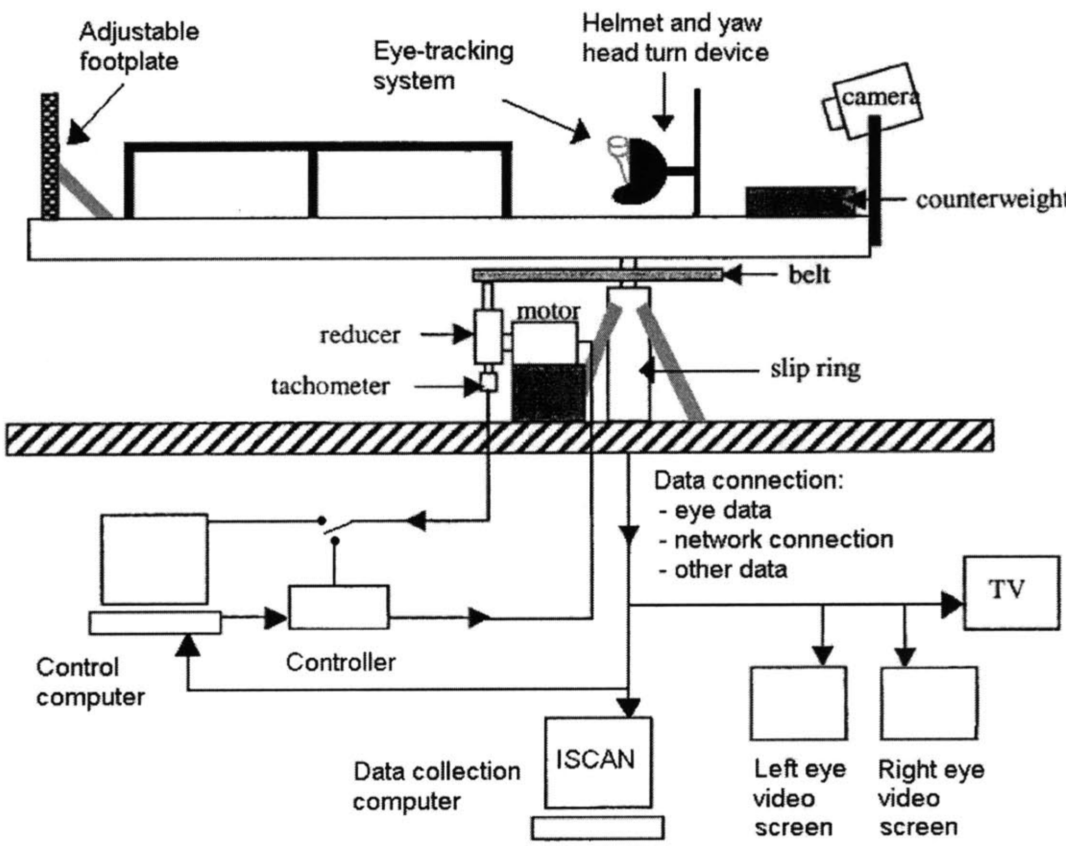


Figure 24: Schematic of centrifuge motor, control, and data collection system [49].

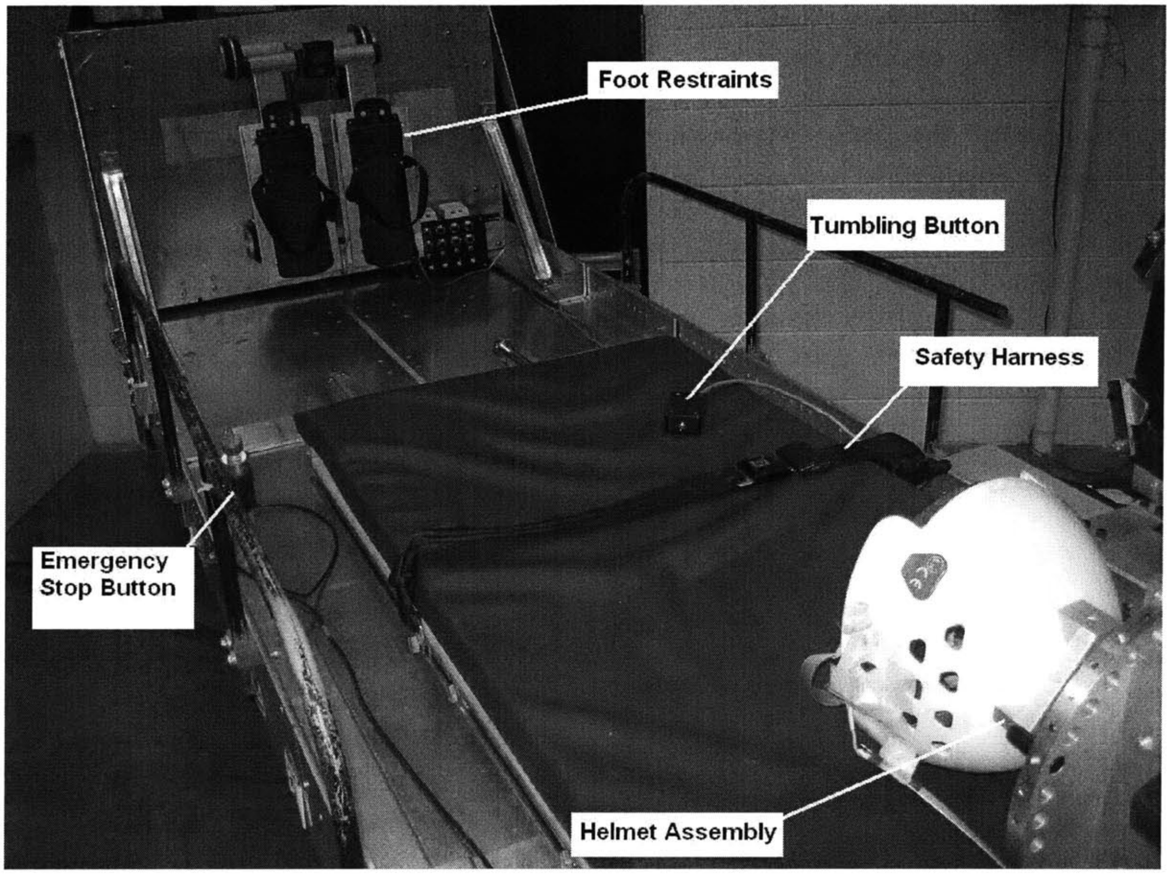


Figure 25: Actual experimental apparatus.

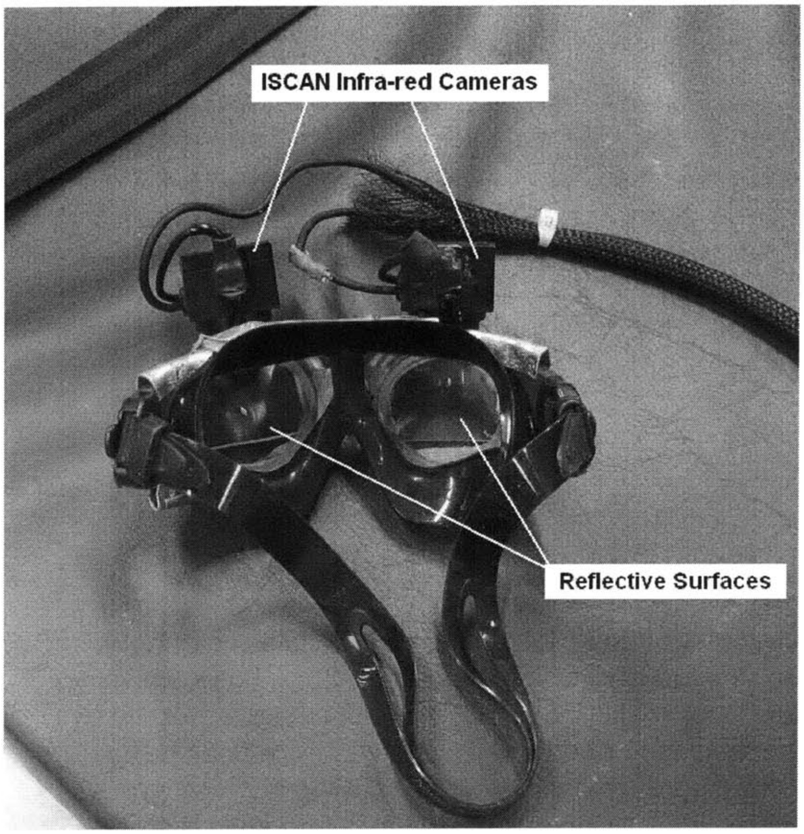


Figure 26: The Infra-red goggles used for collecting the eye-position data.

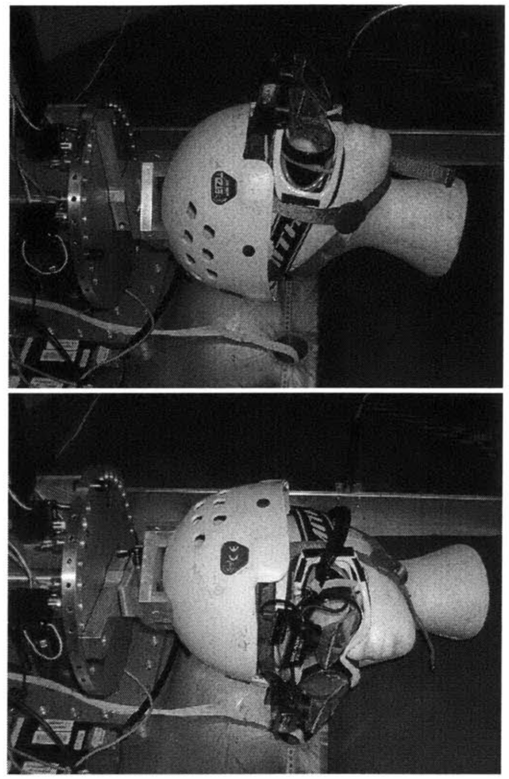


Figure 27: Helmet assembly with range-limiter [49]. Positions are NUP (top) and RED (bottom).

For the purposes of recording pupil position, the subjects wore a specialized set of goggles with IR cameras mounted (Figure 26). An LED positioned beside the camera illuminated the sclera of the eye, producing an area of contrast by which the darker pupil could be tracked by the IR cameras. The cameras were calibrated by having the subject focus on points of an illuminated calibration cross (Figure 28), which was positioned at such a distance as to ensure 10 degrees of angular displacement of the pupil.

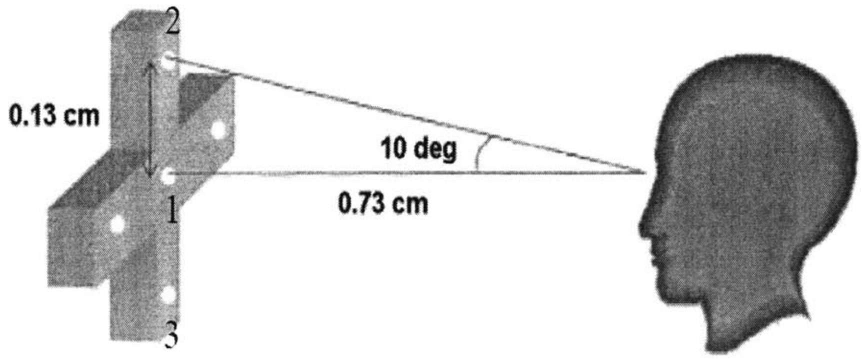


Figure 28: IR goggle calibration procedure [49].

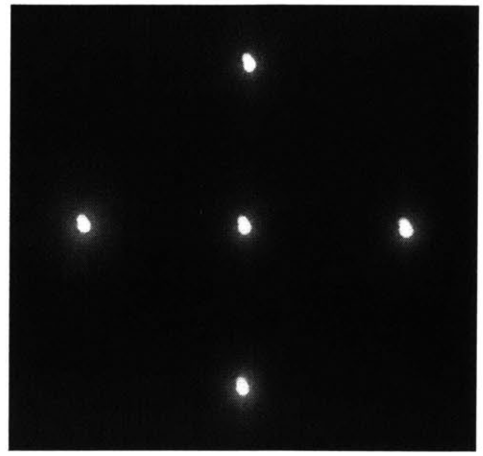


Figure 29: Subject's perspective of the calibration cross.

The mechanism for controlling the maximum head turn angle is well established [1, 49, 17]. The range of the subject's head turn was mechanically restricted to 60 degrees via metal pins in the turn path (Figure 27). The principle operational issue for this experiment was ensuring the accurate regulation of the subject's head-turn velocity. For the purposes of this experiment, it was critical that the subjects consistently meet strict velocity criteria with a reasonable measure of accuracy. It was also important that the subject maintain smooth head turns throughout, as will be explained in the velocity profile analysis.

Several options were considered to ensure the subject matched the target velocity, including methods involving voluntary control or involuntary mechanical assistance. Mechanical assistance was rejected in the interest of the subject's safety and comfort, as well as the desire to ensure the subject was under purely voluntary control of the head turn. Passive, involuntary, control of the subject's head turn velocity could potentially influence perception or motion sickness development [10], so a voluntary method was eventually chosen. Previous experiments used magnets placed at intervals along the head-turn path, providing a small force inconsistency as the subject traversed it, ideally providing fixed reference points for the subject to gauge their velocity by [1]. This method could potentially produce a pulsatile head turn velocity profile, thus the use of magnets was not suited to this experiment. Ultimately, a training-based method was chosen, with the understanding that accuracy of head-turn velocity would potentially suffer as a result. The subject was relied upon to turn his/her head smoothly in time with a sequence of auditory beeps played with varying tempo, projected by the operator's control computer. In order to attain acceptable accuracy, each subject underwent an extensive training period. The initial training period occurred before any recordings were made, with the subject lying on a stationary centrifuge. This training period is reflected in Table 1 under the heading "Training" phase. The subject was exposed to all of the beep sequences in a randomized order, and the subject practiced matching the head-movements to the projected cadence. Each sequence consisted of the same 8 beeps in ascending pitch order, but with varying tempo. This training continued until the subject demonstrated a reasonable ability to hit the target velocities, as judged via the operator's observation. Further, before each head turn in the stimulus phase, the subject was provided two "preview" sequences of beeps matching the tempo of the upcoming head-turn sequence. This allowed the subject to better calibrate his/her mental timing without actually doing a head movement. The subject heard a synthesized voice command counting the subject down to the start of the head turn, "three, two, one" followed by 8 beeps in the correct cadence. The actual trials while spinning were identical to the practice trials perfected while stationary. Finally, the subject was instructed to prioritize "smoothness over accuracy", meaning that it was more important to avoid a pulsatile velocity profile than to match the target velocity perfectly. There was no feedback as to the subject's performance during a given turn, as feedback would likely cause an irregular velocity profile from the subject's constant corrections. The average total time a subject was spinning on the centrifuge was ~35 minutes, but no subject exceeded 45 minutes.

The data collected was similar to that for previous experiments [1, 49, 17]. Subjective data was collected in the form of:

1. Tumbling intensity: This is a numeric value intended to approximate the subject's "magnitude of perceived tumbling". This can be interpreted as tumbling speed, or relative "intensity" of stimulus. The numbering system was intentionally anchored at "10", by instructing the subject that the very first head-turn while spinning should be given the relative value of "10", with each subsequent head-turn being linearly related to that anchor point (i.e. twice as intense = "20", half as intense = "5").

2. Tumbling duration: This is a numeric value corresponding to duration in seconds in which a button is depressed by the subject. The subject is instructed to press and hold the button for the duration of the tumbling sensation.

3. Motion sickness intensity: This is a numeric value on an absolute scale from 0-20, with intervals based on symptom development. The subject was instructed to consider the following values:

0 =	No motion sickness
1-5 =	Steadily worsening symptoms of headache, diaphoresis, or stomach awareness, but no nausea.
6-10 =	Steadily worsening mild nausea, with or without headache, diaphoresis, or other symptoms.
11-15 =	Significant nausea, with or without other symptoms.
16-19 =	Severe nausea, with or without other symptoms.
20 =	Severe nausea with risk of imminent emesis.

Table 4: Motion sickness scale.

The subjects were instructed to report the motion sickness felt *after* the tumbling sensation concluded, not during the tumbling sensation.

The subjects' MS level was monitored for the dual purposes of experimental analysis of symptom progression, as well as the prevention of severe symptom development. The subjects were repeatedly questioned about the subjective nature of their symptoms, to ensure proper adherence to the MS scale.

4. Subjective body tilt: This is a numeric value corresponding to the subject's position on a fictional "clock face" (Figure 30). The subject was instructed to be as precise as possible, and they should not feel limited to multiples of 5, or integer values.

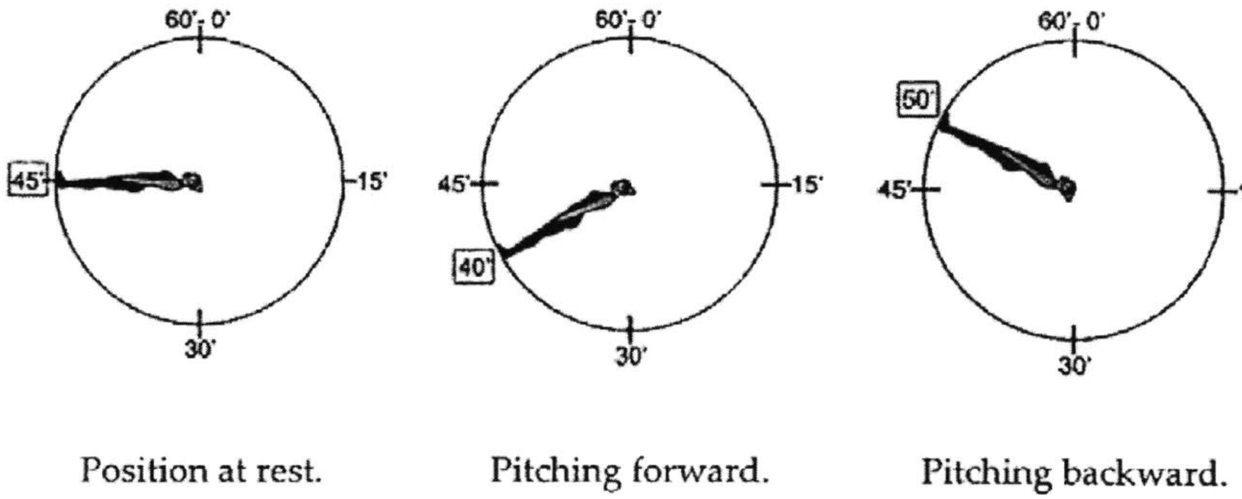


Figure 30: Subjective body tilt reference diagram [5].

Objective data was collected in the form of:

1. Head position: The head position was recorded via a potentiometer fixed to the helmet's axis of rotation (Figure 27). This data was recorded at a 60Hz sampling rate, as a component of the ISCAN recording.

2. Centrifuge velocity: The centrifuge velocity was maintained and verified via the computerized centrifuge motor control program.

3. Eye position: Eye position recordings were made via the ISCAN software package used in previous experiments [49, 17], and explained later in this report.

3.3 Analysis Tools

Much of the analysis was conducted using existing methods that have been used in previous works [1, 49, 17]. An adequate mechanism for analysis of the head turn velocity however had yet to be demonstrated. For this reason, analysis tools were developed which address the major issues previously raised [49]. There are no previous works (to this author's knowledge) that have examined head turn velocity during centrifugation exclusively. One previous work attempted to look at head turn velocity as a secondary objective, but was unable to adequately examine it due to experimental design incompatibilities [49]. The smaller head angles used in that experiment produced a much lower signal/noise ratio in the potentiometer data, invalidating much of the results. Further, previous works have not explored head turn durations approaching the threshold range of ~3 seconds [27], essentially masking the impact of head turn velocity by virtue of limited range. Finally, no analysis of velocity profile during centrifugation exists in the current literature.

Several tools have been developed to automate the analysis of head turn velocities. The first program automatically itemizes the head turns to identify the start and stop positions of each head turn based on potentiometer data, but allows for manual adjustment when necessary. The algorithm works by analyzing a moving data window, measuring the relative values of adjacent data points. If the values increase above a threshold value within the window, then a head turn is identified at the start of the increase. The potentiometer data was displayed graphically, and allowed manual adjustment. Each head turn was manually examined for verification of correct head-turn identification. Manual adjustments were required on 1 in 30 head turns on average. The sample output is provided below (note: the arrows denote the automatically detected beginnings and ends of the head turns). From this data, the average head-turn velocity was computed by dividing the HT range (60 degrees) by the HT duration obtained from the start and stop points.

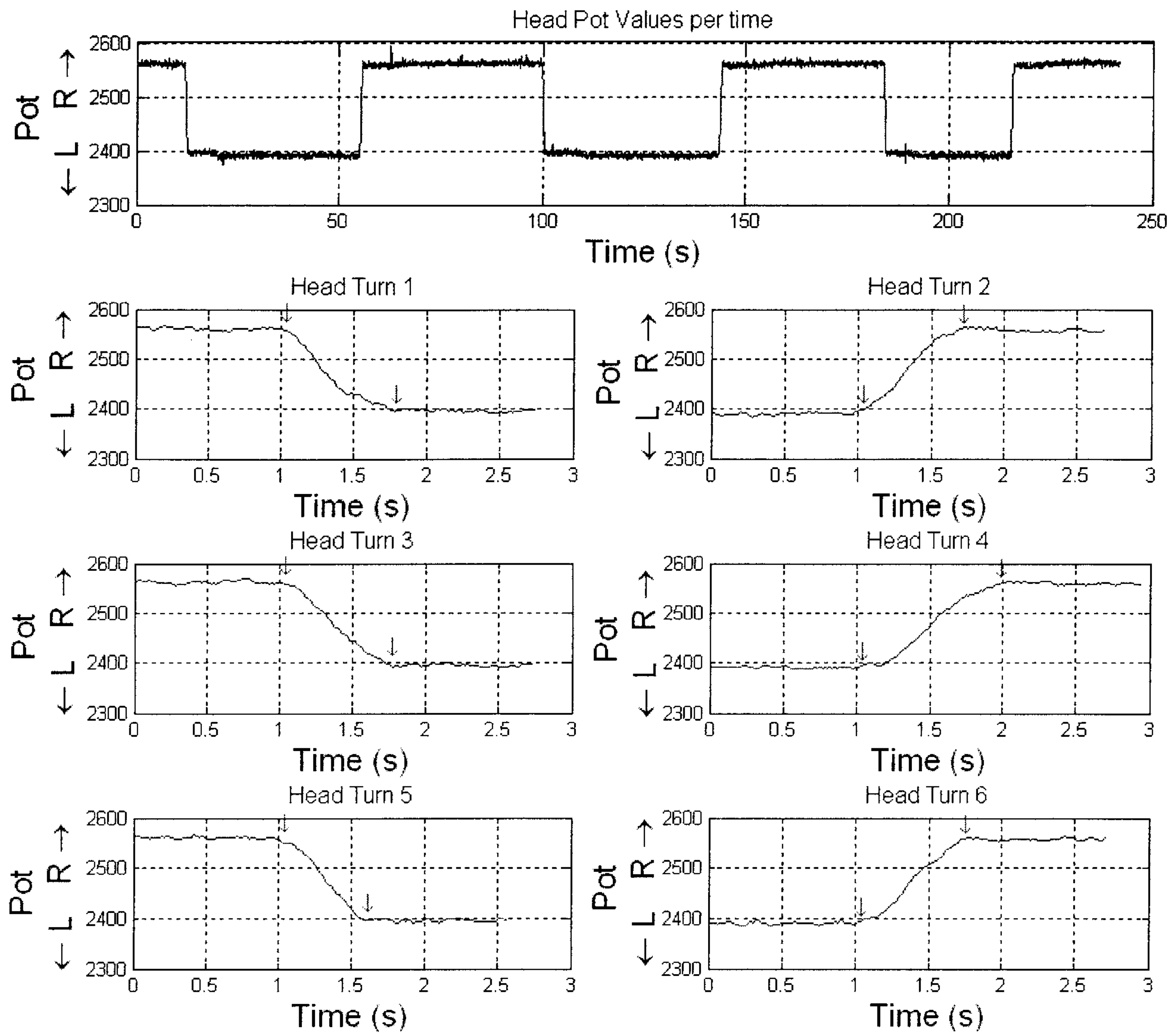


Figure 31: Sample head position data. Red arrows indicate head-turn start and stop points as determined by the algorithm. Note turn #4 requires manual modification of its start point.

A second program was developed which allowed for the evaluation of the peak HT velocity, as well as qualitative analysis of the velocity profile to ensure that the movement was smooth and consistent. The program differentiated the HT potentiometer data, producing a HT velocity curve which was smoothed via a "moving average" with a window length corresponding to ~60ms of data. From this smoothed velocity profile, the peak HT velocity was extracted (Figure 32). Each HT velocity profile was also qualitatively analyzed to ensure that there were no significant irregularities.

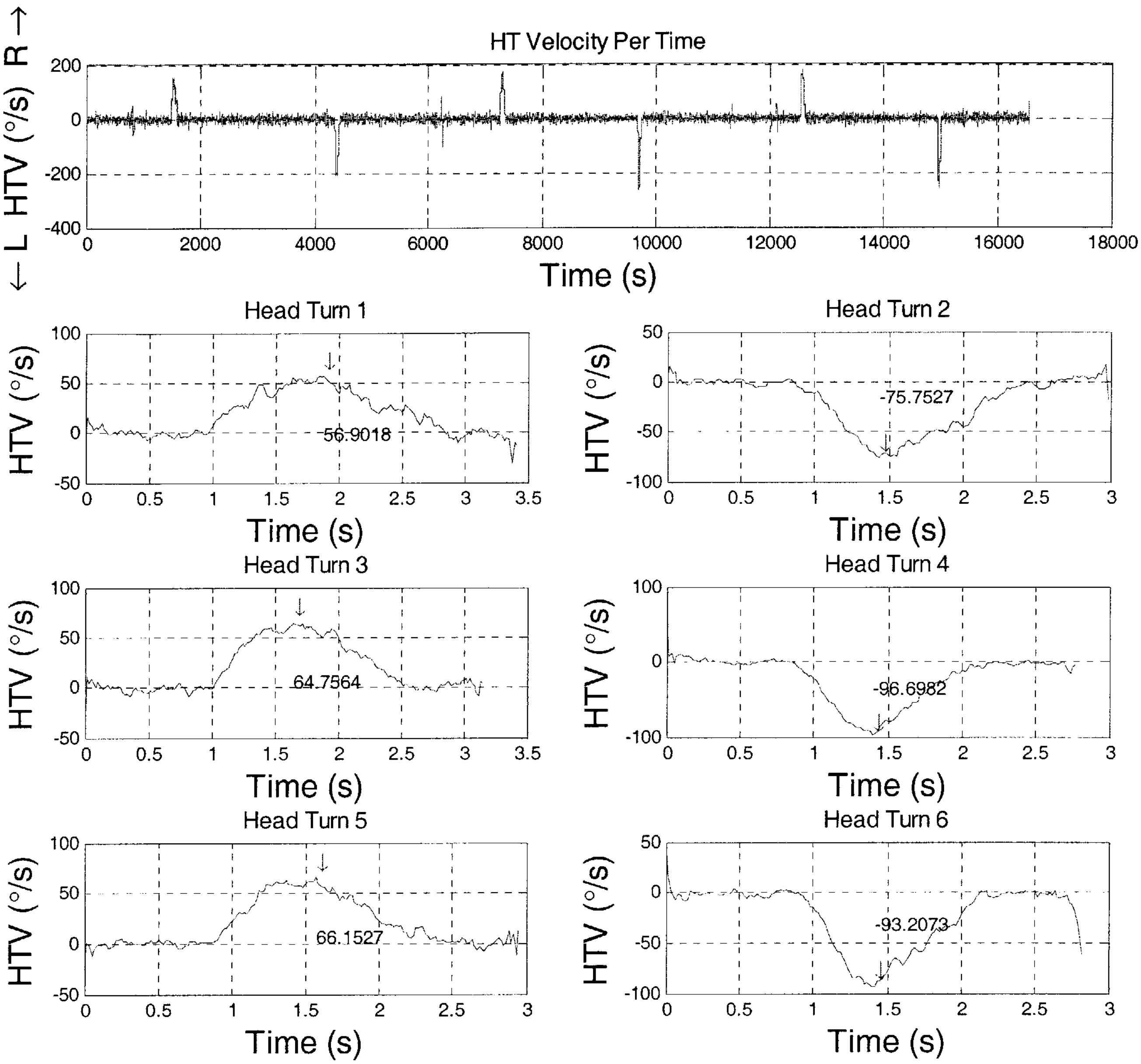


Figure 32: Sample head turn velocity profiles. The red arrow indicates the peak velocity of the head turn, accompanied by the numeric velocity value. The arrows are offset slightly above and to the right as not to obscure the peak.

The above analysis programs provide all of the relevant quantitative head-velocity data for a given head-turn, including average head turn velocity, head turn peak velocity, and HT range (60 degrees).

Eye position data was collected via the ISCAN infra-red pupil tracking system used in previous works [49, 17]. As mentioned previously, the system works by reflecting infra-red light off of the surface of the eye and detecting pupil contrast with a specialized camera. The eye position data comes as a set of coordinates collected at a 60Hz sampling rate. This position data is output in two forms, the raw position data and the calibrated (relative data). The raw data represents an absolute coordinate offset, assuming the eye image were essentially flat, whereas the calibrated data reports the position offsets relative to a set neutral point, also taking into account the curvature of the eye. The calibration values are established via the previously discussed calibration procedure each subject undergoes before any data collection occurs.

Once the eye position data was been collected, the data was processed via a proprietary program developed at MIT, used in previous works [49, 17]. The function of this software has been described in detail previously [49], so only a basic explanation will be provided here. The software takes the calibrated eye position data, filters it to remove signal noise, differentiates it before filtering it again, and finally analyses the resulting velocity profile to automatically identify the fast and slow phases of the observed nystagmus.

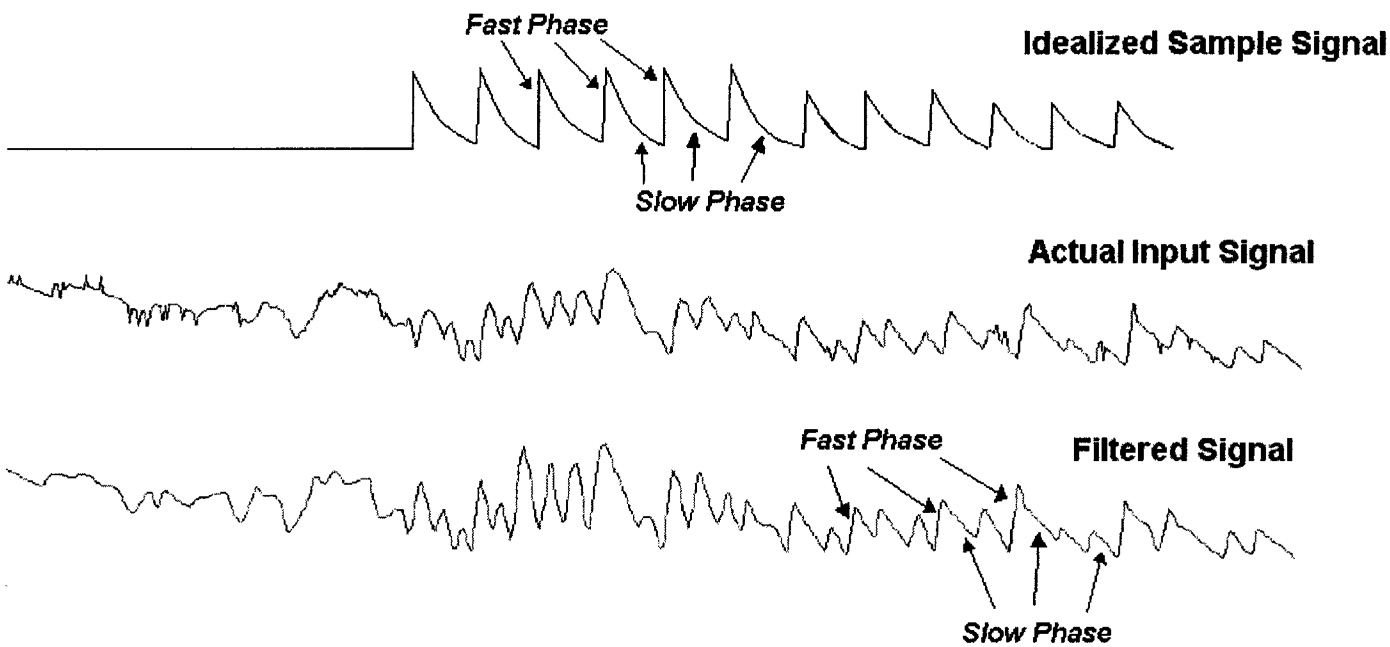


Figure 33: Eye position signal with characteristic nystagmus pattern. Slow phase and fast phase examples are indicated.

The character of the slow phase signal of the nystagmus is the primary objective metric for this experiment. As mentioned previously, the slow phase signal approximates the corresponding vestibular stimulus response. Simply put, if the stimulus on the vestibular system is that of a pitching sensation, then one would expect the VOR to produce eye movements proportional to the stimulus magnitude. As mentioned previously, this response is anticipated to diminish with habituation and adaptation, and it is this relative degree of attenuation the eye velocity analysis will ideally infer. The analysis software's next function is to graphically display the curve of the changing SPV (as the nystagmus decays). A line is ultimately fit to the curve, to approximate the time constant of SPV decay. This time constant is the primary data point used for approximation of VOR adaptation [1,32,49,17,5,2].

3.4 Potential Problems

As mentioned in previous works [49], the eye tracking results have proven somewhat unreliable in the past. There is still some question as to whether the peak velocities in particular are valid, given the initial values for many of the head turns are automatically truncated as they are interpreted as noise. For example, if a head turn induces a sufficiently large CCS stimulus magnitude, the compensatory eye movements will show a SPV which is too high to be characterized at a 60Hz sampling rate. This is illustrated in the figure below.

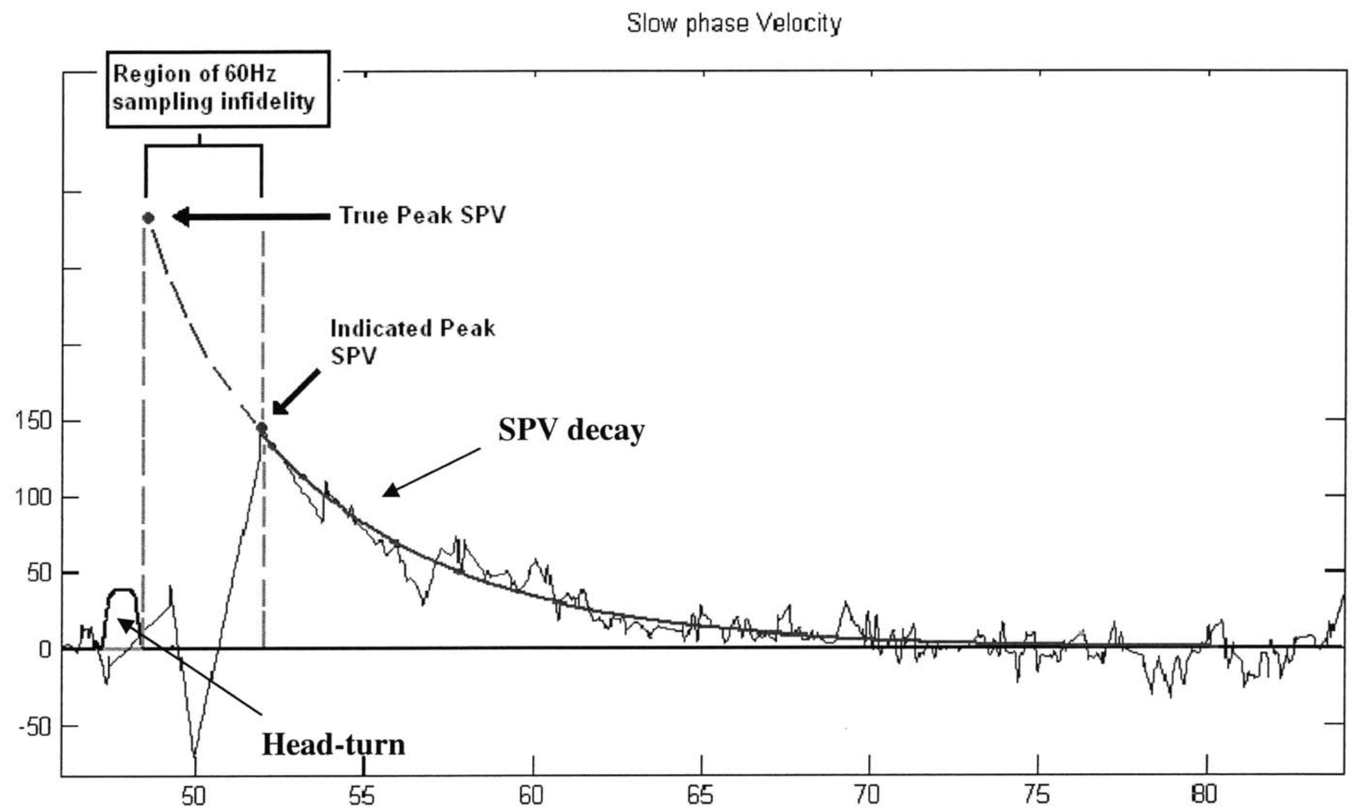


Figure 34: Eye-movement trace of the SPV decay from a single head turn. The head-turn was subject to a high CCS magnitude, resulting in a region of sampling infidelity at the beginning of the head turn, due to the 60Hz sampling rate. Note the indicated peak SPV is far less than the true peak SPV.

It isn't until the SPV decays significantly that the software is able to evaluate the nystagmus pattern correctly. The time constant output should not be affected by this, but it certainly renders any analysis of peak SPV unreliable. For slower head turns this problem is less apparent, as the peak SPV may not reach the threshold beyond which a 60 Hz sampling rate becomes the limiting factor.

Another potential problem with the eye data in this experiment is that it may not be practical to examine the slow-phase velocities of extremely slow head turns. If the CCS intensity can be tempered by modulating head turn velocity, as suggested in the hypothesis, then it's likely that the VOR will show a minimal compensatory response, which will be reflected in the magnitude of the SPV peaks. It is unclear that the SPV data of such a shallow peak, as that produced by slower head turns, can be consistently distinguished from background noise. For instance, in Figure 35 the HT of 16s duration allows for an accurate peak SPV determination due to its smaller overall amplitude (reflecting a smaller maximum nystagmus beat frequency), but suffers a less-accurate decay slope approximation due to fewer data-points sampled. In comparison, the faster 1.5s duration HT allows for a better approximation of the decay slope, but suffers the peak SPV inaccuracy previously mentioned. The experimental design focused on eliminating the peak SPV sampling infidelity issue by minimizing the total CCS applied via limiting the centrifuge rate to 19RPM's. This approach runs the risk of exacerbating the slope estimation inaccuracy however. These problems will be addressed further in the data analysis section.

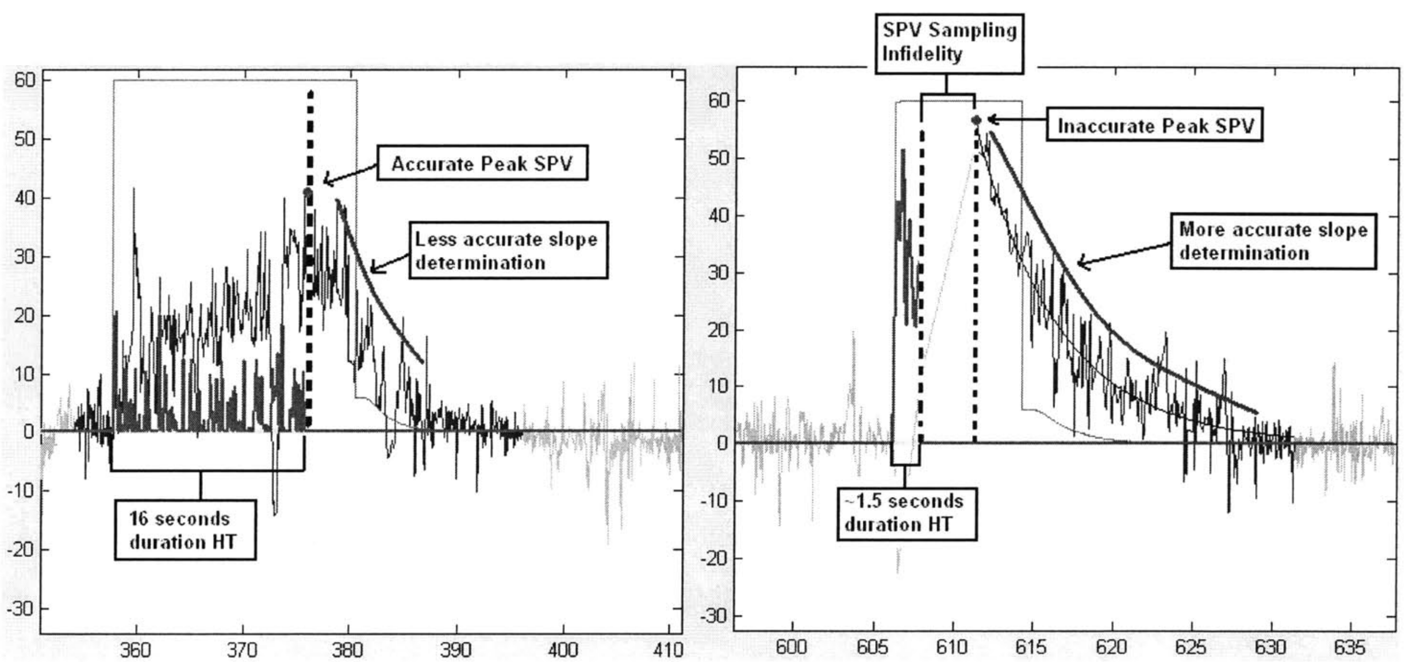


Figure 35: Comparison of 16s duration HT and 1.5s duration HT analyses. The former is more subject to inaccurate slope determination, while the latter is subject to inaccurate peak SPV estimation.

Further, if the head turn duration exceeds the actual physiologic time constants of the system, it is unclear what the calculated "time constant" will actually represent. This problem is magnified with increasing head turn duration. For some subjects, there was essentially no clear pattern of nystagmus for any of the slower head turns (~12-16 seconds duration). Ultimately, for longer-duration head turns, it may not be possible to get an accurate estimate of the time constant of SPV decay. This will be explored further and will be addressed in the results section.

Another potential problem has to do with the use of the average head-turn velocity for our analysis. The average head-turn velocity is an acceptable measure to use, provided that the head-turn is relatively smooth. However, it's possible that any sharp peaks in velocity could potentially skew the resultant intensity measure. To reduce this effect, the subjects were extensively trained to maintain smooth head movements, and the resultant velocity profiles were closely scrutinized and rejected when necessary. The peak head turn velocity was also evaluated, but was not the primary measure used in the analyses. Bimodal profiles, or other potentially problematic peaks were rejected. Most subjects had no difficulties performing a smooth head-turn, though one subject was ultimately rejected for this reason. The peak velocity was used as a basic surrogate marker for HT profile consistency. It was assumed that an excessively erratic HT velocity profile would be reflected in the lack of correlation with the average velocity. This was verified in the previously rejected HT profiles, as they showed peak velocities greatly exceeding that which would normally be expected based on the average velocity data.

Also, should the subjects fail to match the designed head turn velocity by a wide margin (+/- 20% for example), then there could be an over/under-representation of faster or slower head turn velocities. For example, should the subject tend to be significantly faster over a range of head turn velocities there may be a stronger effect of habituation than the design can compensate for, resulting in an artificial diminishment of their sensitivity to the slower head turns. To counter this, training was significant beforehand, and the subject's performance was monitored by the experimenter with corrective instructions given between head turns.

Finally, the potentiometer data itself was somewhat noisy. While this was not a major problem for the determination of the average velocity, generating the velocity profile required significant filtering. Given the velocity profile was only evaluated qualitatively for purposes of either accepting or rejecting the corresponding average velocity, this is not likely to be a major problem.

4.0 Results

As mentioned previously, the primary metrics collected were tumbling intensity (INT), tumbling duration (DUR), subjective body tilt (TILT), motion sickness (MS), and the time constant (TAU) and peak slow-phase velocity (SPV) of VOR-induced eye-movements. The different metrics were first subjected to Generalized Linear Model (GLM) ANOVA-based analysis to determine significant effects. The model tested for an effect of head-turn velocity (VEL) and head-turn direction (HT_DIR), and also examined if the effect changed within a day (REP) or across the two experimental days (DAY). Significant effects were further explored with Hierarchical Mixed Regression analysis where appropriate.

For the purposes of analysis, certain elements were subject to normalization about each subject's *geometric* mean, via logarithmic transformation. The rationale for this normalization is to provide a stable baseline for comparison of effects between subjects, despite differing stimulus sensitivity between subjects. For example, it was observed in the results that one subject might report a higher intensity number for a given stimuli than another subject. This could either be due to differing sensitivity to the stimulus, or it could simply be an inherent inaccuracy in the largely subjective perceptual scales used. Regardless, provided the subject gave consistent relative ratings, normalizing all of the data about the subject's geometric mean would compensate for this difference, reporting only the *relative magnitude difference* between stimuli. Such normalization was applied when necessary, and is further explained below.

Unless specifically stated otherwise, all of the following analyses will be restricted to experiment Phase 4, corresponding to 19RPM's of centrifugation and varying head-turn (HT) velocity.

4.1 Subjective Measures

INTENSITY

The data taken for tumbling intensity relied upon the subject matching the prescribed head-turn velocity (HTV) with reasonable accuracy. GLM/ANOVA based analysis requires that the independent variables, velocity in this case, be discrete categories. Thus, in order to treat the actual HTV in this way, it must be shown that the actual HTV correlates with the design HTV with reasonable fidelity.

As discussed at length previously in this report, the actual HTV can be represented in terms of *average* and *peak* HTV. Ideally, the two measures should be correlated, with a lack of correlation likely reflecting a discontinuous or insufficiently smooth head turn. The correlation of average and peak HTV is examined below.

Variable	Estimate	Standardized Error
INTERCEPT	13.73	0.264
AVERAGEHTV	**1.019**	0.007

Table 5: HM Linear Regression of HT Peak Velocity to AVG HT Velocity (Appendix Table 1).

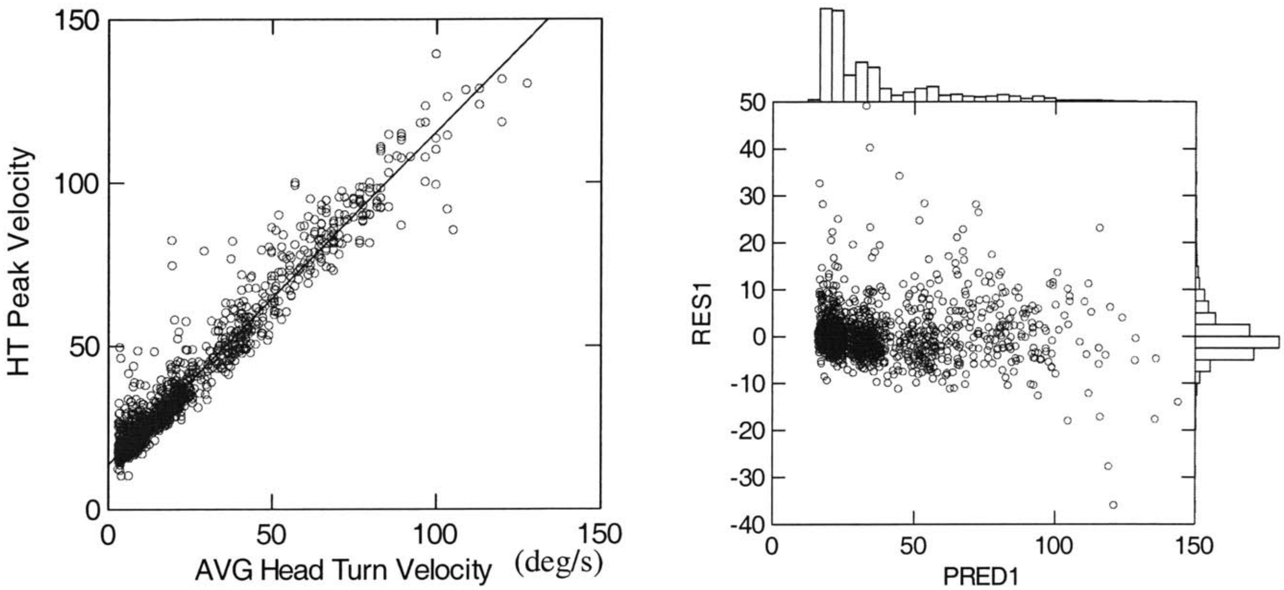


Figure 36: HT Peak Velocity to Average Velocity (deg/s) correlation. The correlation plot (left); linear regression residual distribution (right).

As can be seen in Figure 36, the vast majority of data points show that peak velocity and average velocity are well correlated, with few exception outliers. The linear regression shows a correlation estimate of 1.019, meaning that HT Peak velocity increases 1.019 deg/s for every 1 deg/s increase in Average HTV. While the regression shows that the two measures are significantly different from a perfect correlation (the estimate is slightly less than three standard errors from 1), for the purposes of this experiment this is an essentially linear correlation, as the goal of this experiment is not to precisely determine the response of perfectly coordinated head-turns, but rather to get an operational understanding of head-turns performed under realistic human control. Peak velocity fluctuations are expected and controlled for to an extent, via the previously mentioned elimination of grossly aberrant velocity profiles from consideration. For this reason, the peak velocity will not be considered as a factor for GLM/ANOVA analysis, but rather the average velocity will be considered the primary determinant. Unless specifically stated, any reference to *actual* HTV will thus refer to *average* HTV.

Further, for the purposes of GLM/ANOVA analysis, a discrete approximation of the actual (average) HT velocity must be used. In order to justify the use of the *design* HT velocities as a surrogate for the actual HT velocities, another correlation analysis was performed.

Variable	Estimate	Standardized Error
INTERCEPT	2.47	0.412
DESIGNHTV	**0.934**	0.008

Table 6: HM Linear Regression analysis of AVG HT Velocity and Design HT Velocity (Appendix Table 2).

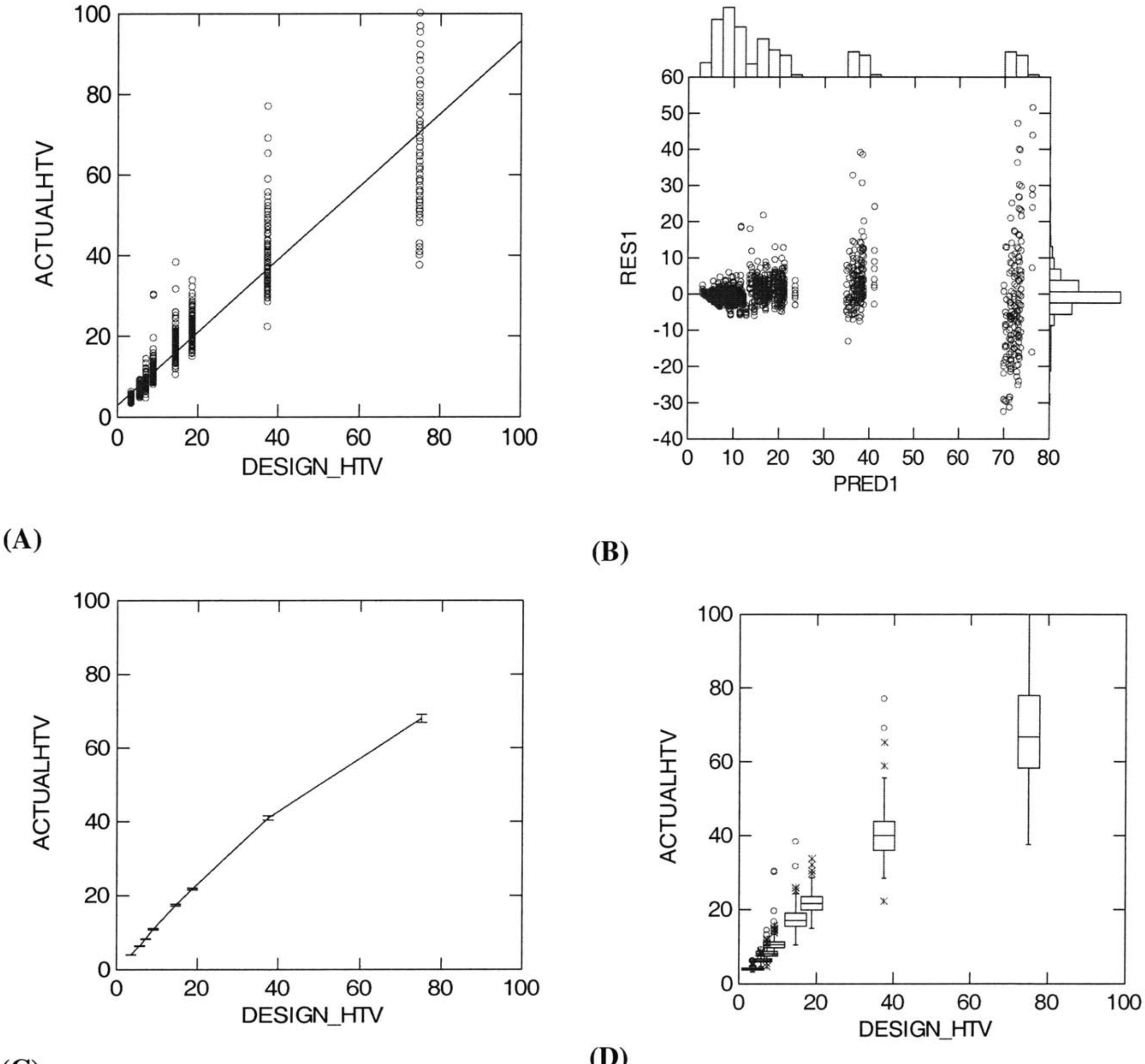


Figure 37: Correlation of average experimental HTV to proscribed design HTV. The correlation plot (A); linear regression residual distribution (B); the simplified line plot (C); box plot (D). All velocities in deg/s.

As shown in Figure 37C, the subjects were able to match all but the highest head-turn velocities with reasonable accuracy. Head-turns exceeding 60-degrees per second saw a small undershooting of prescribed velocity. This is reflected in the regression analysis, which showed a significant estimate of 0.934, meaning that the actual HTV increase 0.934 deg/s for every 1 deg/s increase in design HTV. The residual distribution for the analysis shows heteroscedasticity due to this non-linearity of responses. This effect was expected, as explained previously, as the subjects were instructed to turn their head as fast as they "comfortably" could. This variability is not anticipated to be problematic, as there is a large amount of existing data on intensity ratings at high head-turn velocities showing no appreciable effect of variation at velocities >40 deg/s [49]. This point becomes clear in examination of the effect of velocity changes above 40 deg/s on tumbling intensity, tumbling duration, SPV (Figure 40, Figure 51, Figure 62 respectively), where large changes in velocity produce relatively small differences in the measured effect. For these reasons, the design HT velocities will be used as a rectilinear approximation of average HT velocity for purposes of GLM analysis.

For the purpose of ascertaining the relative magnitude change between velocities, the intensity data was normalized by subject as described above. When the subject's intensity data is normalized across days, with both head-turn directions included in the geometric mean, the initial GLM/ANOVA analysis produces the following effects regarding HT_DIR:

Source	SS	df	MS	F	P
HT_DIR	15.517	1	15.517	47.385	**<0.001**
HT_DIR*REP	0.325	1	0.325	9.94	**0.008**

Table 7: GLM/ANOVA of Intensity normalized irrespective of HT direction (Appendix Table 3).

There is a clear effect of HT_DIR as well as a cross effect of HT_DIR and REP in the above analysis.

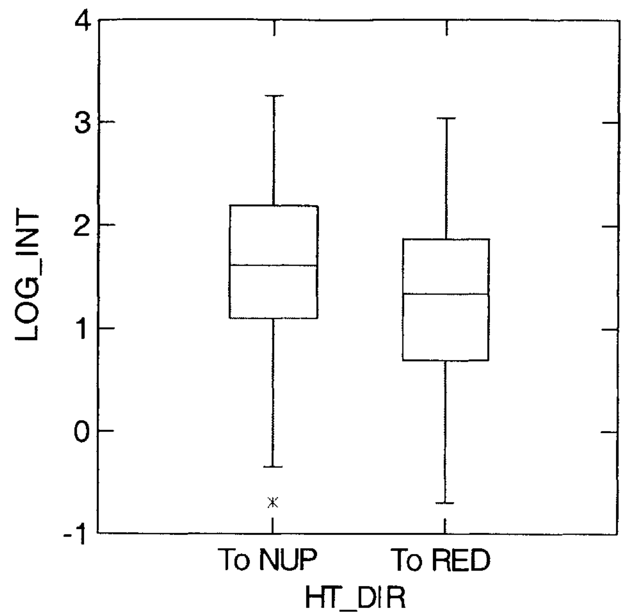


Figure 38: Effect of HT direction on intensity.

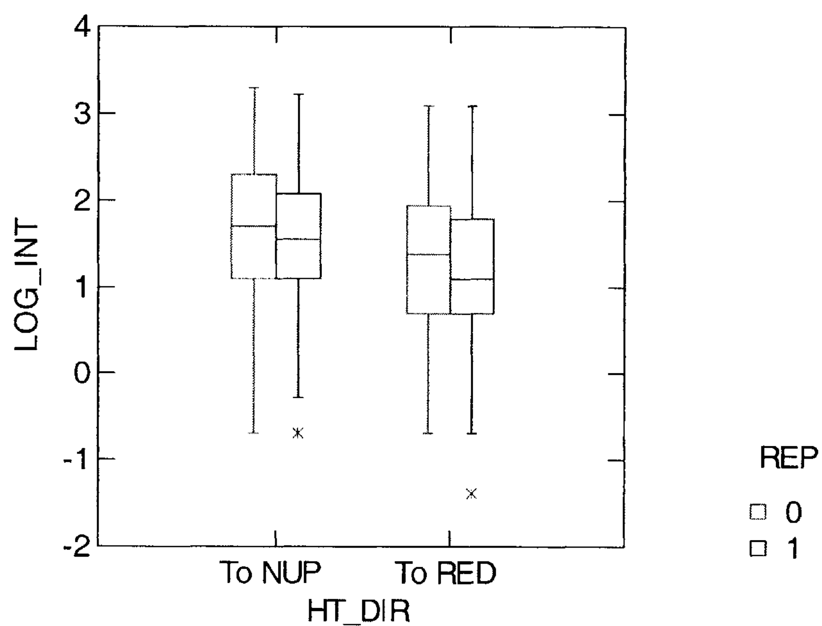


Figure 39: Cross-effect of HT direction and repetition on intensity.

Figure 38 above shows that HT direction "to RED", shows lower intensity values than HT direction "to NUP". Previous works have also shown this effect, with turns to NUP being considerably more intense than those to RED, during clockwise rotation [1, 49, 17]. The cross-effect in Figure 39 suggests that the intensity difference between the two HT directions diminishes with repetition, implying that head-turns to NUP diminish at a different rate than turns to RED. This diminishment is consistent with the process of habituation, implying that the to NUP head turns habituate independently of turns to RED. This finding seems to reinforce the assumption that the two directions are best treated as separate, independent stimuli.

The effect of HT_DIR has been clearly illustrated in previous works [1, 49, 17], and it has been suggested that the two different head-turn directions provide largely different stimulus contexts in terms of perception and adaptation generation. For this reason, in order to extrapolate the generalized effect of velocity on perceived intensity, it's necessary to control for the effect of HT_DIR. For this reason, all further GLM/ANOVA analyses will refer to the "directional" geometric mean, as the normalization was applied to each direction individually. Having done this, it is expected that there will no longer be an effect of HT_DIR due solely to the difference in stimulus character between the two directions.

The further effects can be shown in the analysis below, where the intensity was normalized with respect to HT_DIR:

Source	SS	df	MS	F	P	G-G	H-F
VEL	49.636	7	7.091	32.311	**<.001**	0	**<0.001**
VEL*DAY	1.647	7	0.235	2.579	**0.019**	0.064	**0.036**
VEL*DAY*REP	0.644	7	0.092	1.991	0.066	0.119	0.082
VEL*HT_DIR	0.612	7	0.087	2.405	**0.027**	0.076	**0.046**
VEL*REP	1.064	7	0.152	2.562	**0.019**	0.078	**0.054**
DAY	17.533	1	17.533	8.221	**0.014**	.	.
REP	2.971	1	2.971	6.786	**0.023**	.	.

Table 8: GLM/ANOVA of Intensity normalized by HT direction (Appendix Table 4).

Not shown above, there was no effect of HT_DIR on intensity, due to the normalization procedure used. The results above show an effect of VEL, DAY, and REP foremost.

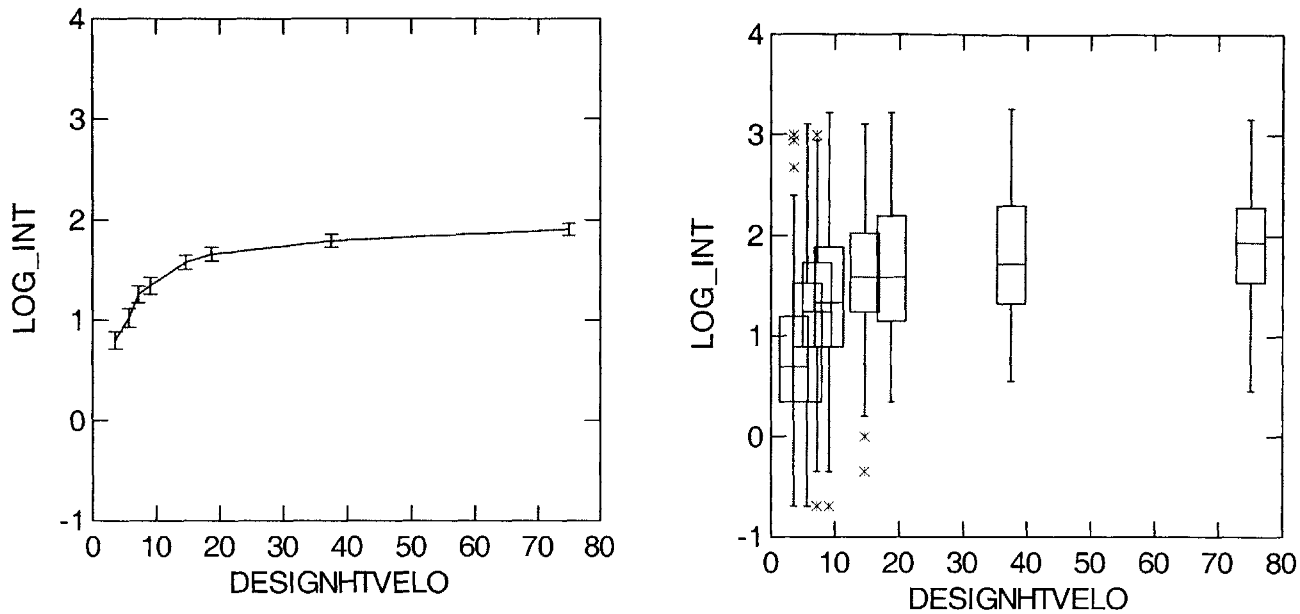


Figure 40: Effect of HTV (deg/s) on intensity. The correlation plot (left); boxplot showing variances (right).

Figure 40 shows the effect of velocity on the normalized intensity level reported by the subjects. This effect would seem to imply that the perceived intensity is essentially constant, showing a very slow decay, at velocities above 20-30 degrees per second, but drops off precipitously as the head-turn velocity drops below 15-20 degrees per second.

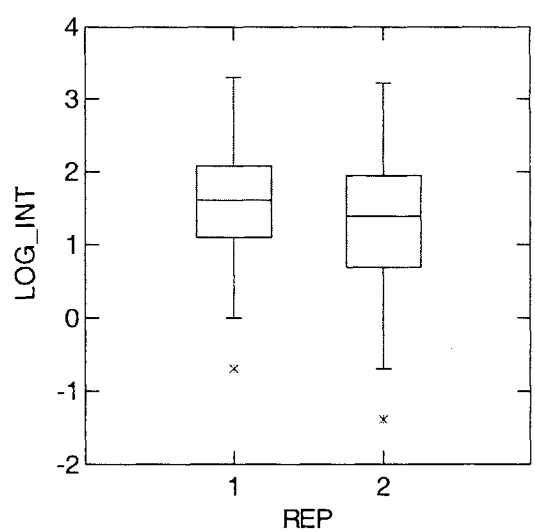


Figure 41: Effect of repetition on intensity.

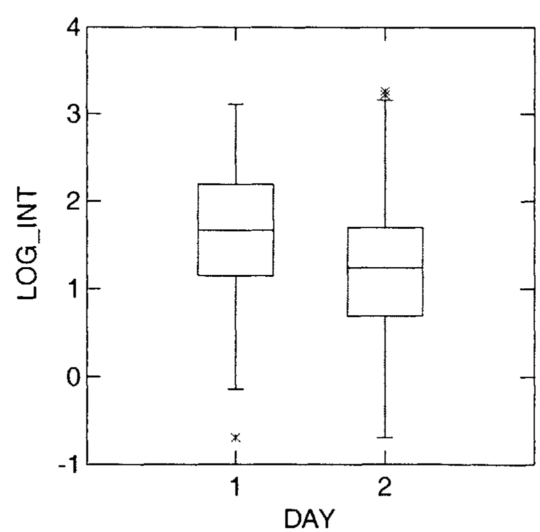


Figure 42: Effect of day on intensity.

Figure 41 above shows a trend toward intensity diminution with stimulus exposure within a day. This would correlate with the previously observed trend of habituation seen in previous experiments [1, 49, 17, 5]. Figure 42 shows a similar effect measured between days, rather than within a day, correlating with the previously observed effects of adaptation.

When the three cross-effects are plotted, the trends seem to show that the convergence occurs only at the extremely low-intensity, low-HTV ranges. This would seem to indicate that as the head-turns approach the sensitivity threshold of the SCC's, the subject may not have the sensitivity to distinguish any stimulus intensity difference between conditions. Essentially, the intensity of both conditions converge to an intensity of "0" at extremely low head turns, producing the apparent cross-effect in the analysis.

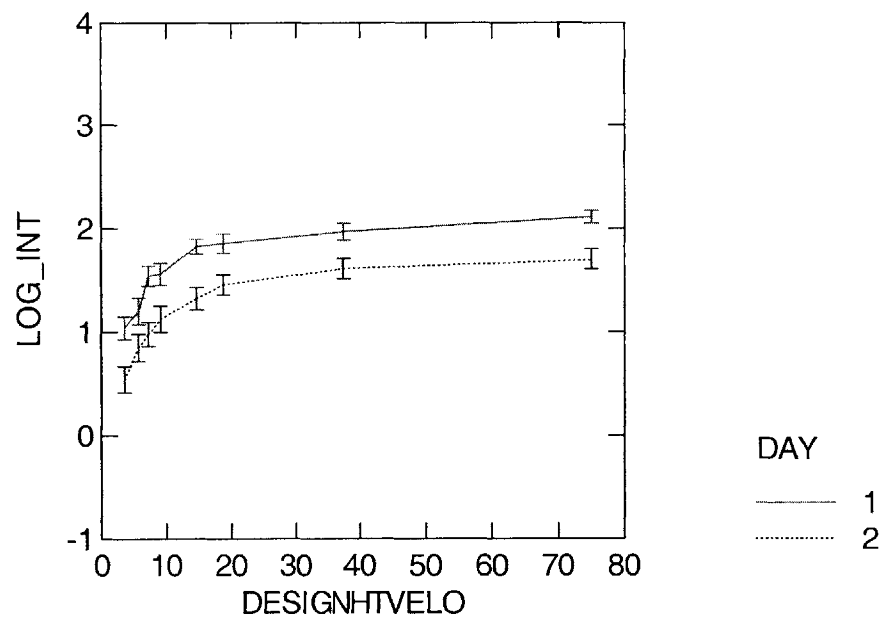


Figure 43: Cross-effect of VEL (deg/s) and DAY.

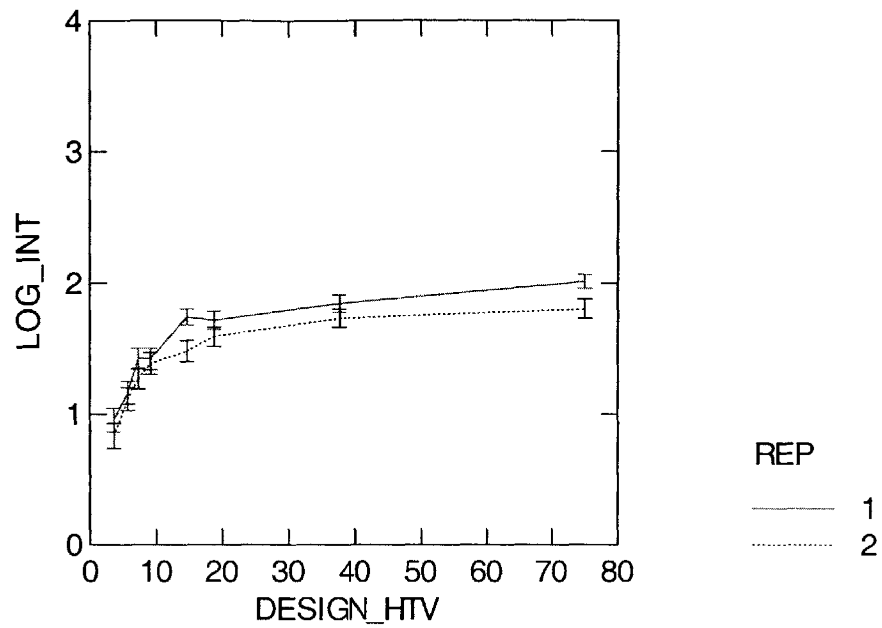


Figure 44: Cross-effect of VEL (deg/s) and REP.

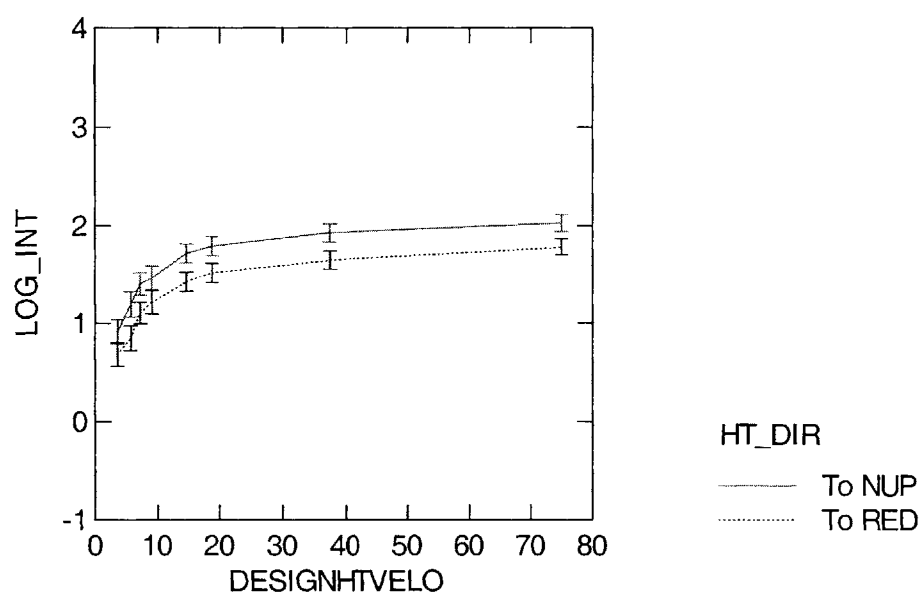


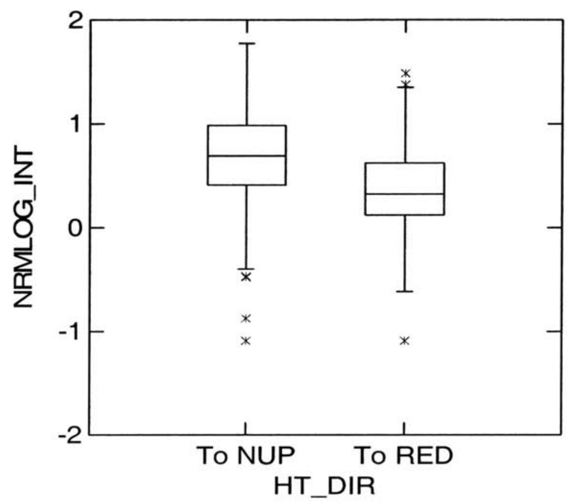
Figure 45: Cross-effect of VEL (deg/s) and HT direction.

Figure 43 and Figure 44 show a lack of convergence, of DAY and REP respectively, for HTV of greater than roughly 15 degrees per second. At much lower velocities the data seems to show a convergent pattern, likely attributable to the effect described above. Figure 45 shows the intensity data by head turn direction, with the resulting two intensity lines being predictably parallel. Yet a cross-effect was found at very low velocities, again likely attributable to the effect described above.

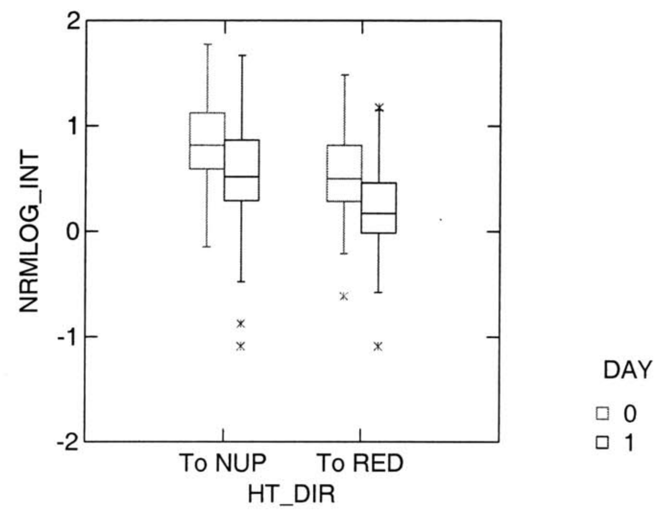
The last question to address regarding tumbling intensity pertains to how effectively the STIM phase induces adaptation to the higher stimulus intensity environment of the PRE and POST phases (phase 3 and 5 respectively). As described previously, the design HT velocity was constant for all HT's in these phases, so no velocity effects will be studied. The comparison of phase 3 and 5 simply provide a means of measuring the amount of habituation and adaptation induced in phase 4. GLM/ANOVA analysis was run on the Intensity data normalized irrespective of HT Direction for phases 3 and 5, and the results are listed below.

Source	SS	Df	MS	F	P	G-G	H-F
HT_DIR	44.04	1	44.04	51.7	**<.001**	.	.
HT_DIR*DAY	0.561	1	0.561	8.008	**0.01**	.	.
HT_DIR*DAY*SEX	0.479	1	0.479	6.838	**0.016**	.	.
HT_DIR*PHASE	2.165	1	2.165	10.687	**0.004**	.	.
HT_DIR*PHASE*REP	0.682	2	0.341	4.655	**0.015**	0.026	**0.022**
HT_DIR*REP	0.427	2	0.213	4.106	**0.024**	0.039	**0.035**

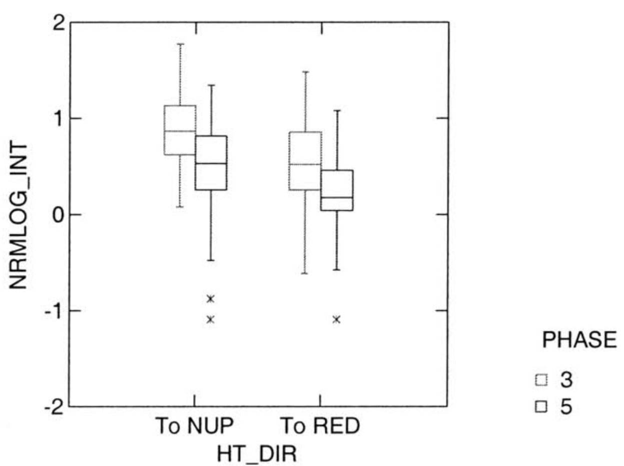
Table 9: GLM/ANOVA analysis of intensity for phases 3 and 5 normalized irrespective of HT direction (Appendix Table 5).



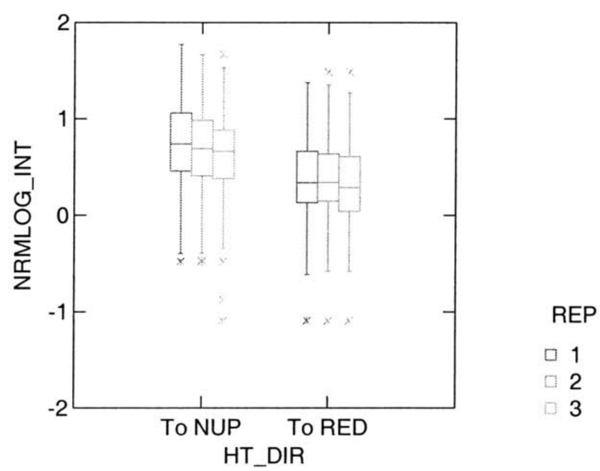
(A)



(B)



(C)



(D)

Figure 46: Illustrated results of GLM/ANOVA analysis of phase 3 and 5 of Intensity. (A) Effect of HT Direction on Intensity, (B) HT Direction x Day on Intensity, (C) HT Direction x Phase on Intensity, (D) HT Direction x REP on Intensity.

Figure 46 shows several significant effects of HT direction on Intensity. The effect of Direction (Figure 46A) reinforces our previous assertion of context specificity of turns to NUP vs. to RED. The effects of Day and Phase (Figure 46B and Figure 46C) illustrate the effects of adaptation and habituation respectively. Within a phase, we see further habituation from one head-turn "repetition" (REP) to the next, with a difference of effect by HT Direction (Figure 46D). In short, these figures illustrate context-specificity, habituation, and adaptation differences by HT Direction.

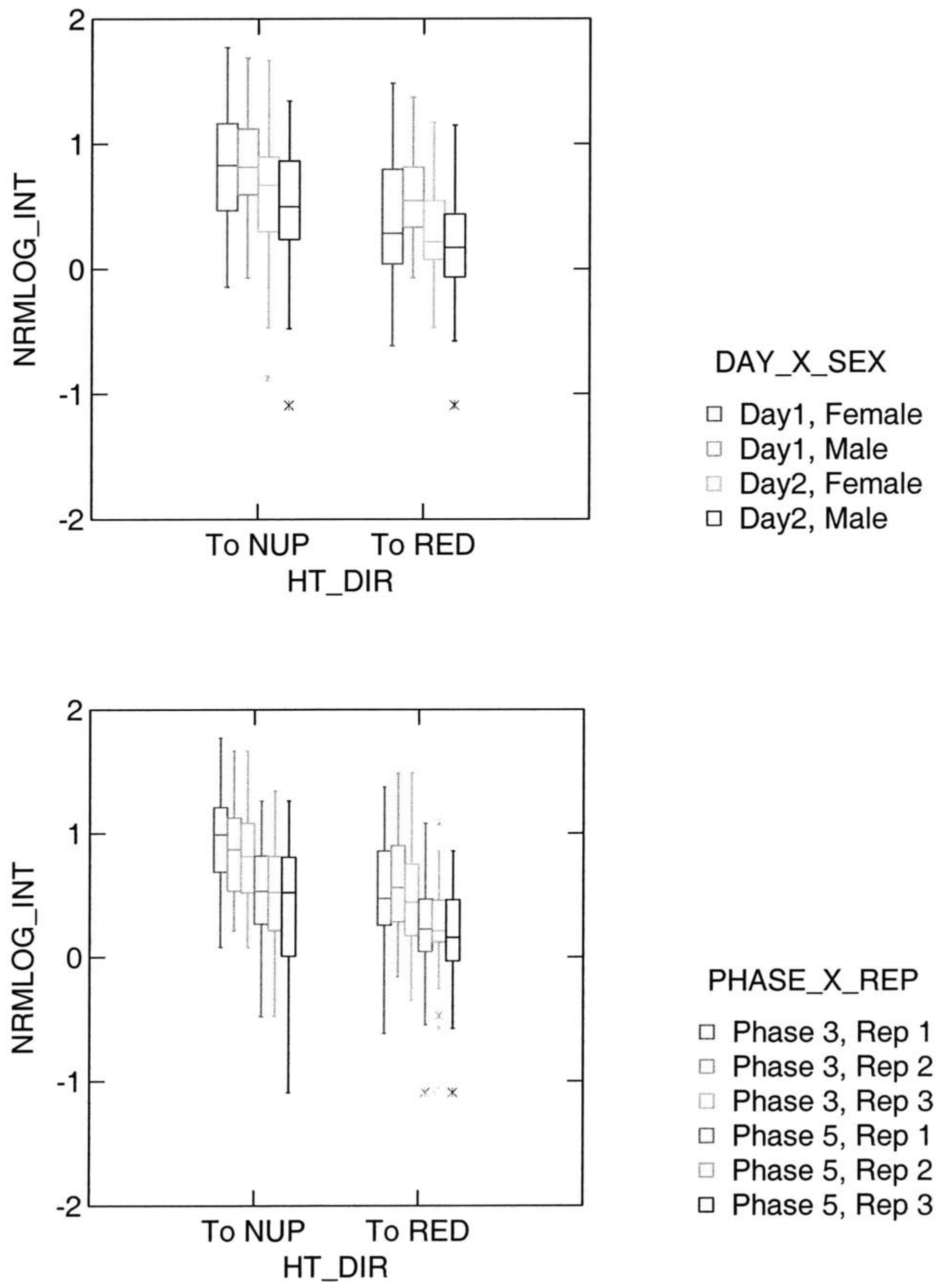


Figure 47: Illustrated results of GLM/ANOVA analysis of phase 3 and 5 of Intensity. (top) HT Direction x DAY x Sex on Intensity, (bottom) HT Direction x Phase x Rep on Intensity.

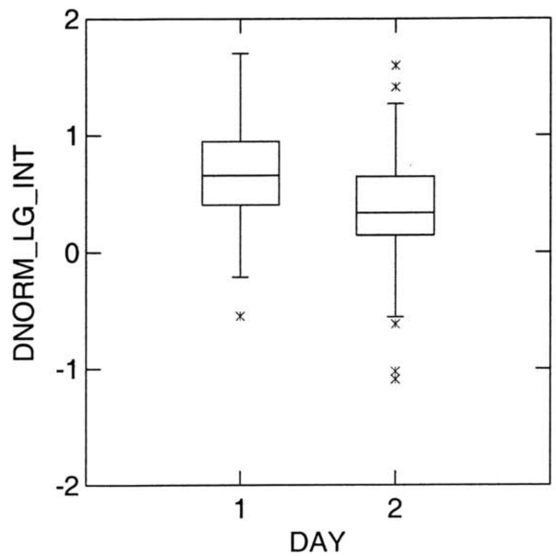
Figure 47 shows an effect of Sex in determination of the amount of adaptation by HT Direction (Figure 47 top). This effect seems to hinge on the puzzling fact that the Female subjects showed on average very little difference in intensity between days for turns to RED. It is doubtful that this effect is meaningful, though this experiment was not designed in such a way to explore this possible effect more fully. One likely explanation could reveal a potential problem with the experimental procedure. The subjects were instructed to report a "10" Intensity level for the first head turn, with all subsequent HT's weighed in comparison to that first HT. It was noted that some of the subjects deviated significantly from that first "10" baseline for all subsequent HT's, despite prompting and clarification by the experimenter. For example, the experimenter noted that some subjects would dutifully report "10" for the first HT, then "20" for the second, then "18", "16", "15", etc, as though they were using the highest intensity of "20" as their new baseline. This would make for a relatively "under-weight" first HT, compared to all subsequent HT's. This baseline "10" HT was the first HT of phase 3, and was to RED, so this effect would likely be more prominent in an analysis of the "to RED" direction by phase. The purpose of the normalization previously discussed was in part to ameliorate this effect, though a small effect could still be seen when analyzing by Phase and/or Rep.

It's likely that this "anchoring" at 10 is responsible for the cross-effects seen in Figure 47, as the plots seem to show an abnormally low value for the first HT in the "To RED" direction. Again, why the female subjects showed this effect to a larger extent is beyond the scope of this experiment to explain.

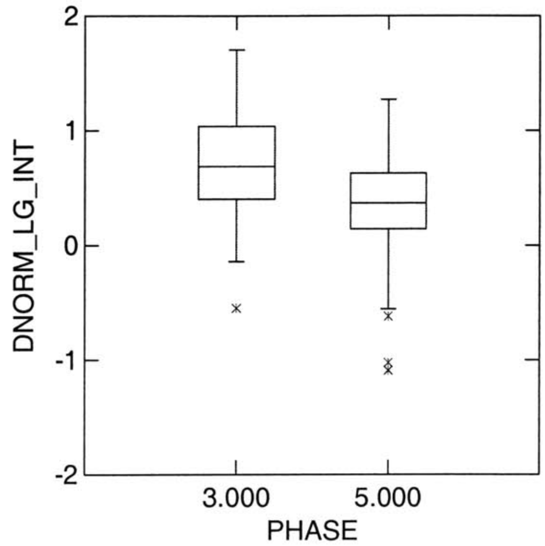
Source	SS	df	MS	F	P	G-G	H-F
DAY	29.403	1	29.403	24.791	**<0.001**	.	.
PHASE	55.839	1	55.839	19.15	**<0.001**	.	.
REP	2.098	2	1.049	9.416	**<0.001**	0.002	**<0.001**

Table 10: GLM/ANOVA analysis of Intensity data for phases 3 and 5 normalized by HT Direction (Appendix Table 6).

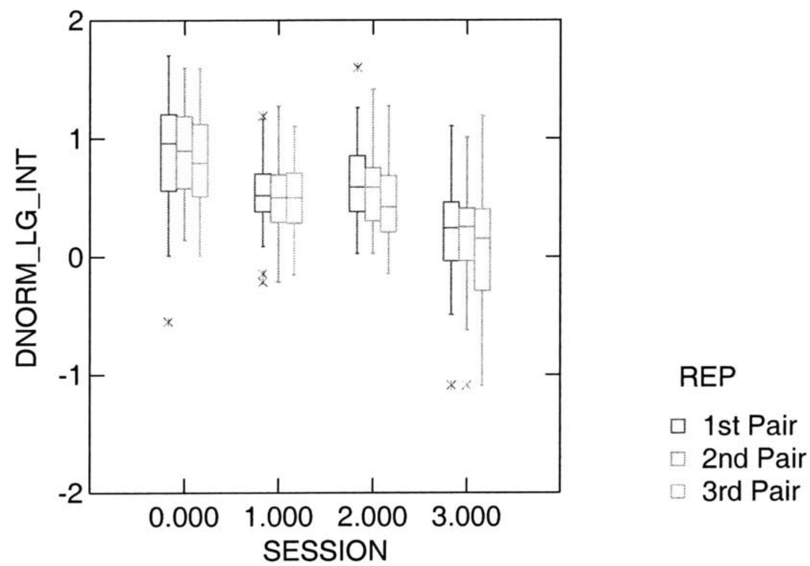
As there was a significant effect of HT Direction, the data was normalized by direction for the remainder of the analysis. The results of this show the expected effects of Day, Phase, and REP.



(A)



(B)



(C)

Figure 48: Illustrated results of GLM/ANOVA analysis of phase 3 and 5 of Intensity. (A) Effect of Day on Intensity, (B) of Phase on Intensity, (C) of Day, Phase, and Rep on Intensity.

Figure 48A again shows the expected effect of adaptation, irrespective of HT direction. Figure 48B shows the effects of habituation by phase, though Figure 48C shows the entire picture rather eloquently. For the purposes of this figure, "session" refers to the absolute order of the stimulus. Session 0 corresponds to day 1: phase 3, session 1 corresponds to day 1: phase 5, etc. This figure clearly shows the effect of Intensity decrease within a day (habituation) and between days (adaptation).

TUMBLING DURATION

The duration of tumbling sensation was collected via the subject's pressing and holding the tumbling button, as previously described. This metric has been used in previous works [1, 49, 17, 5], however, for this experiment the data needed to be adjusted based on the duration of the actual head-turn. The subject was instructed to hold the button from the beginning of the head turn until the perceived stimulus decayed. Based on the CCS dynamics discussed previously, the subject would experience a "buildup of stimulus" throughout the head turn. The cupular restoring force is constantly opposing this buildup over the duration of the HT, so in order to measure the characteristic logarithmic stimulus decay, the measurement must be taken only after the head turn is complete. Thus, in order to evaluate the duration of the actual perceptual decay of the tumbling sensation, the duration of the head turn must be subtracted from the total duration value. This was done for each value, creating a new metric representing the tumbling duration post HT (DURPHT).

Similar to the analysis of HTV, it must be shown that the measured head turn duration, taken from potentiometer measurements, correlates with the prescribed head turn duration. If this correlation holds, the prescribed head-turn duration can be used as a discrete independent variable for GLM/ANOVA analysis. This relationship could potentially be inferred from the previous illustration that the average HT velocity correlates with the design HT velocity (Figure 37), but the correlation duration is also shown as it represents a more limited data set.

The collection of accurate duration information requires that the subject is compliant and follows directions carefully. Some subjects had difficulty consistently operating the tumbling button correctly. If the subject failed to record the durations correctly for five or more head turns, they were not considered in this duration analysis. A total of 15 subjects were ultimately analyzed for head turn duration effects, and their duration correlation plot is shown in Appendix Figure 1.

Variable	Estimate	Standardized Error
INTERCEPT	-0.02	0.08
DESIGN_HTD	**0.907**	0.006

Table 11: HM Linear Regression analysis of Actual HT Duration and Design HT Duration (Appendix Table 7).

The correlation of actual duration to design duration is similar to that of Figure 37, suffering the same non-linearity effect at high HT velocities. This rectilinear approximation is accepted for the same reasons as stated previously for use in GLM/ANOVA analysis.

Similar to the analysis of tumbling intensity, tumbling DURPHT was normalized to each subject's geometric mean. This normalization accounts for differing sensitivities to the stimuli between subjects. The first normalization was irrespective to HT direction, and the results were as follows:

Source	SS	df	MS	F	P
HT_DIR	18.528	1	18.528	38.323	**<0.001**
HT_DIR*DAY	1.842	1	1.842	11.931	**0.004**

Table 12: GLM/ANOVA analysis of perceived stimulus duration-post-head-turn normalized irrespective of HT direction (Appendix Table 8).

There is a clear effect of HT_DIR as well as a cross effect of HT_DIR and DAY in the above analysis.

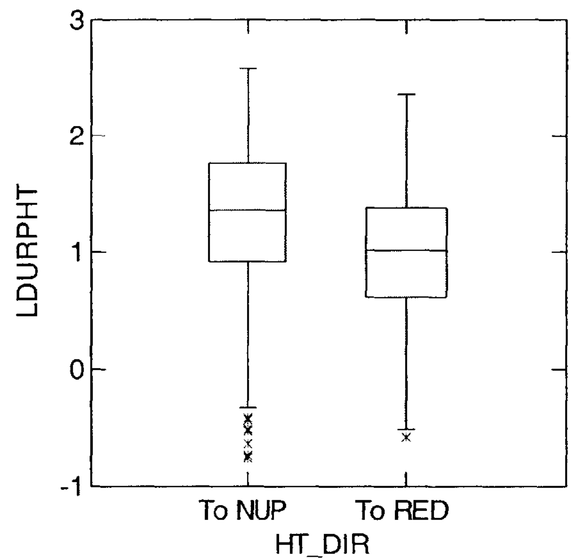


Figure 49: Effect of HT direction on Duration (s) post-head-turn.

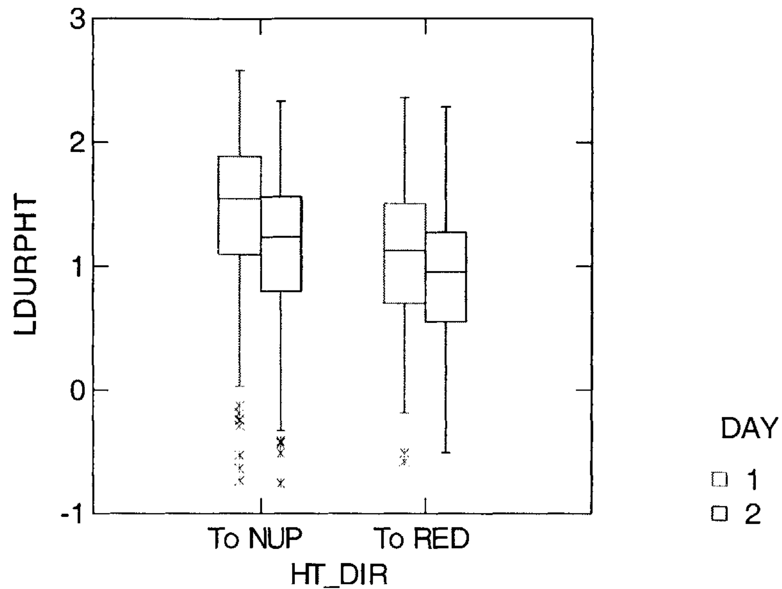


Figure 50: Cross-effect of HT direction and Day on Duration-post-head-turn (s).

Figure 49 above shows that HT direction “to RED”, shows lower duration values than HT direction “to NUP”. The cross-effect in Figure 50 suggests that the duration difference between the two HT directions diminishes between days, implying that head-turns to NUP diminish in tumbling duration more between days than turns to RED. This process is similar to what's been previously found for adaptation to stimulus intensity in previous works [1, 49, 17, 5], suggesting that tumbling intensity and tumbling DURPHT are correlated to a degree (Figure 38 and Figure 39), with the exception being that tumbling intensity shows a cross with HT direction and repetition (habituation) while tumbling DURPHT shows HT direction cross with Day (adaptation).

As explained previously, it's necessary to control for the effect of HT_DIR to determine the effects of velocity. For this reason, the normalization was applied to each direction individually. Again, it is expected that there will no longer be an effect of HT_DIR due solely to the difference in stimulus character between the two directions.

The further effects can be shown in the analysis below, where the intensity was normalized with respect to HT_DIR:

Source	SS	df	MS	F	P	G-G	H-F
VEL	28.182	7	4.026	16.151	**<0.001**	<0.001	**<0.001**
VEL*HT_DIR	2.957	7	0.422	4.88	**<0.001**	0.001	**<0.001**
DAY	9.456	1	9.456	7.401	**0.017**	.	.

Table 13: GLM/ANOVA analysis of DURPHT normalized by HT Direction (Appendix Table 9).

Not shown above, there was no effect of HT_DIR on DURPHT, due to the normalization procedure used. The results above show an effect of VEL and DAY foremost.

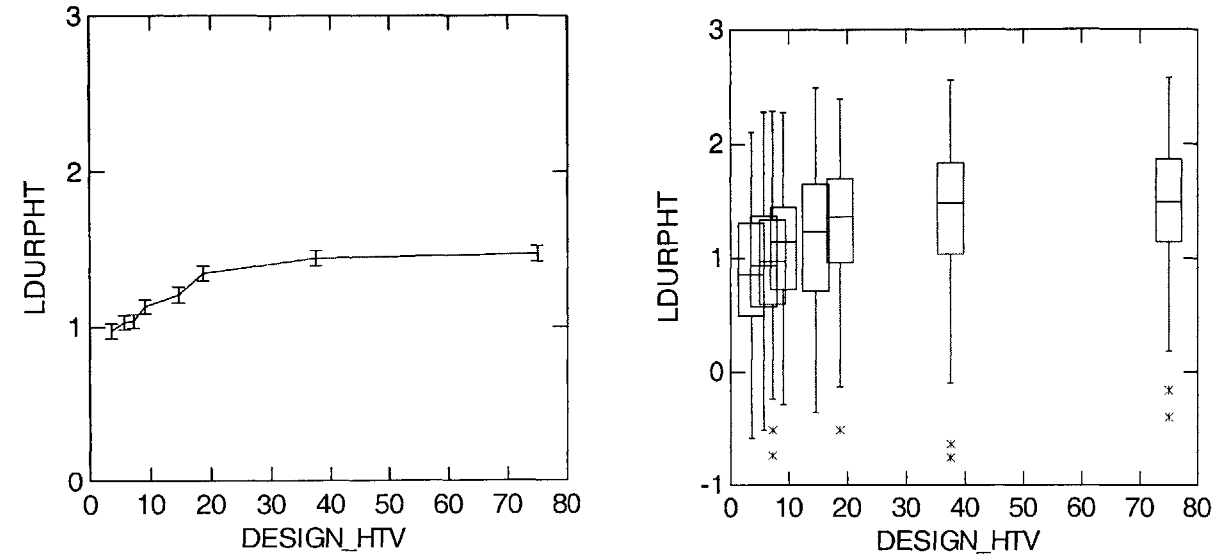


Figure 51: Effect of HT Velocity (deg/s) on DURPHT (s). The correlation plot (left); boxplot showing variances (right).

Figure 51 shows the effect of HT velocity on the DURPHT. There is an obvious similarity with the effect of velocity on Intensity (Figure 40), suggesting that the tumbling duration and intensity are correlated. This relationship is somewhat intuitive from the standpoint of SCC sensitivity and logarithmic decay, explained previously. It stands to reason that a sufficiently small stimulus will produce a small intensity which rapidly decays below the threshold of detection, whereas a sufficiently larger stimulus will produce a more intense perceptual response and take longer to decay below the detection threshold of the SCC. Thus, it's intuitive that tumbling intensity and duration should be correlated.

However, Figure 51 shows that at the extremely slow-velocity range, the duration doesn't diminish as rapidly as the intensity. This is likely a function of response time, in that there's a small time delay between the subject's detection of stimulus decay and button release. This "cognitive delay" effect was demonstrated by 6/15 of the subjects who still registered a delayed release after the head-turn completed even though they reported feeling no stimulus at all for the lowest head-turn velocities. Thus the true relationship could likely be more similar to that of Intensity, but the means of Duration data collection imposes an artificial absolute lower limit.

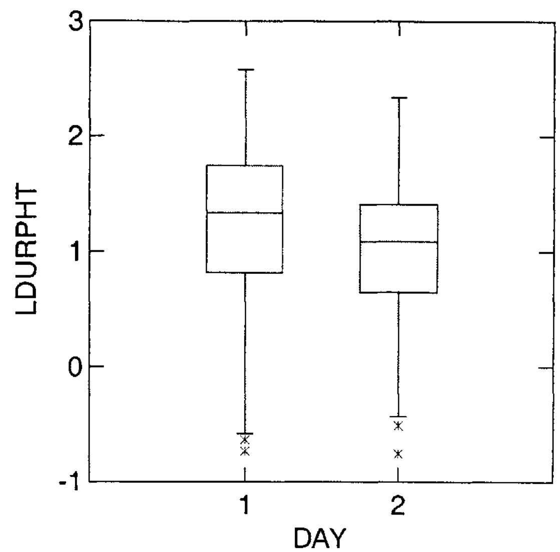


Figure 52: Effect of Day on DURPHT (s).

Figure 52 shows the effect of Day on the DURPHT. Similar to Intensity, a diminution of tumbling duration was observed between days, implying that tumbling duration attenuates as a function of adaptation. This further supports the correlation of Duration with Intensity.

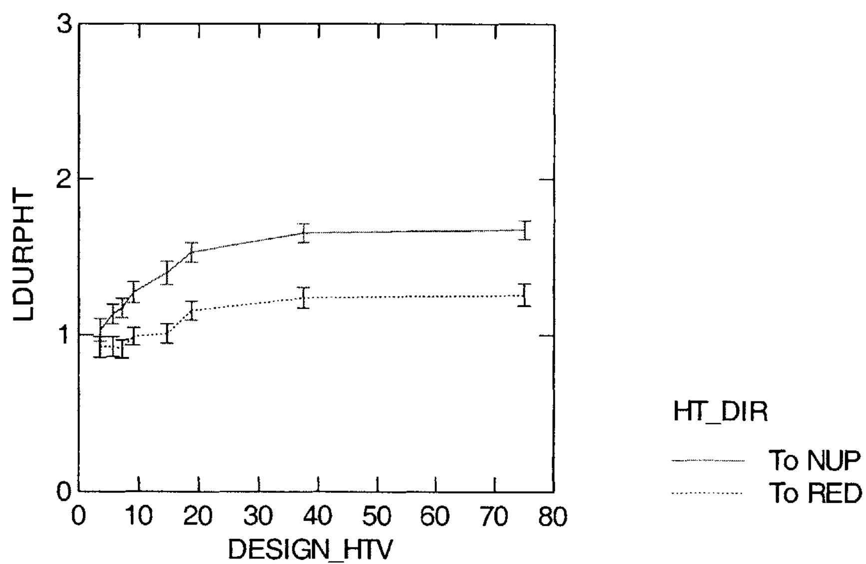


Figure 53: Cross-effect of HT Velocity (deg/s) and HT Direction on DURPHT (s).

The only observed cross-effect was between Velocity and HT Direction, as shown in Figure 53. The above plot suggests that there is a significant cross-effect, as the turns to

NUP generally show a longer tumbling duration, but durations for the turns to NUP and to RED seem to converge at extremely low velocities. This effect parallels what is observed for tumbling intensity.

As with Intensity, the final analysis of tumbling Duration involves the comparison of phases 3 and 5 between days, to explore the potential effects of habituation and adaptation. The GLM/ANOVA analysis of the duration data normalized irrespective of HT direction for phases 3 and 5 are as follows:

Source	SS	df	MS	F	P	G-G	H-F
HT_DIR	36.878	1	36.878	67.929	**<0.001**	.	.
HT_DIR*PHASE	3.276	1	3.276	12.796	**0.003**	.	.

Table 14: GLM/ANOVA of Tumbling Duration data for phases 3 and 5 normalized irrespective of HT Direction (Appendix Table 10).

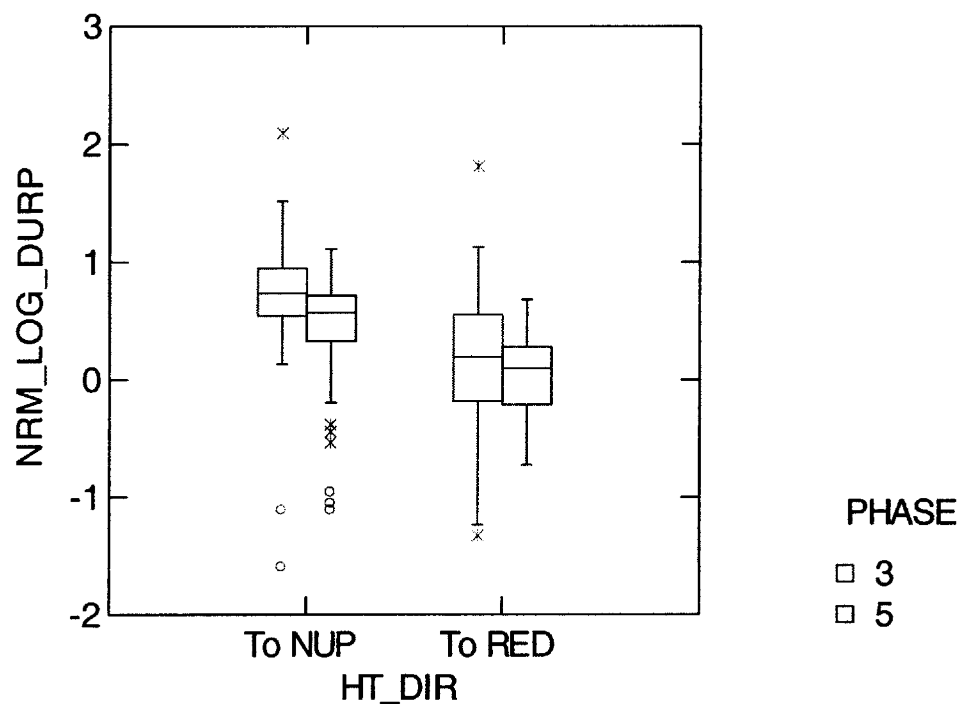


Figure 54: Cross-effect of HT Direction and Phase on the tumbling Duration (s).

Figure 54 illustrates the cross-effects of Phase on the effect of HT Direction on tumbling Duration. There is a clear difference between directions in terms of tumbling duration, with the "to NUP" HT's being significantly longer in duration. Further, the turns to NUP seem to habituate more than the turns to RED, as indicated by the larger effect of Phase. Both of these effects were anticipated, as they are homologous to the effects seen with Tumbling Intensity.

As there was an effect of HT direction, the remaining GLM/ANOVA analysis of phase 3 and 5 uses data values normalized by HT direction, controlling for the asymmetric effect.

Source	SS	df	MS	F	P	G-G	H-F
DAY	11.505	1	11.505	12.353	**0.004**	.	.
PHASE	16.977	1	16.977	10.523	**0.006**	.	.

Table 15: GLM/ANOVA of Tumbling Duration data for phases 3 and 5 normalized by HT direction (Appendix Table 11).

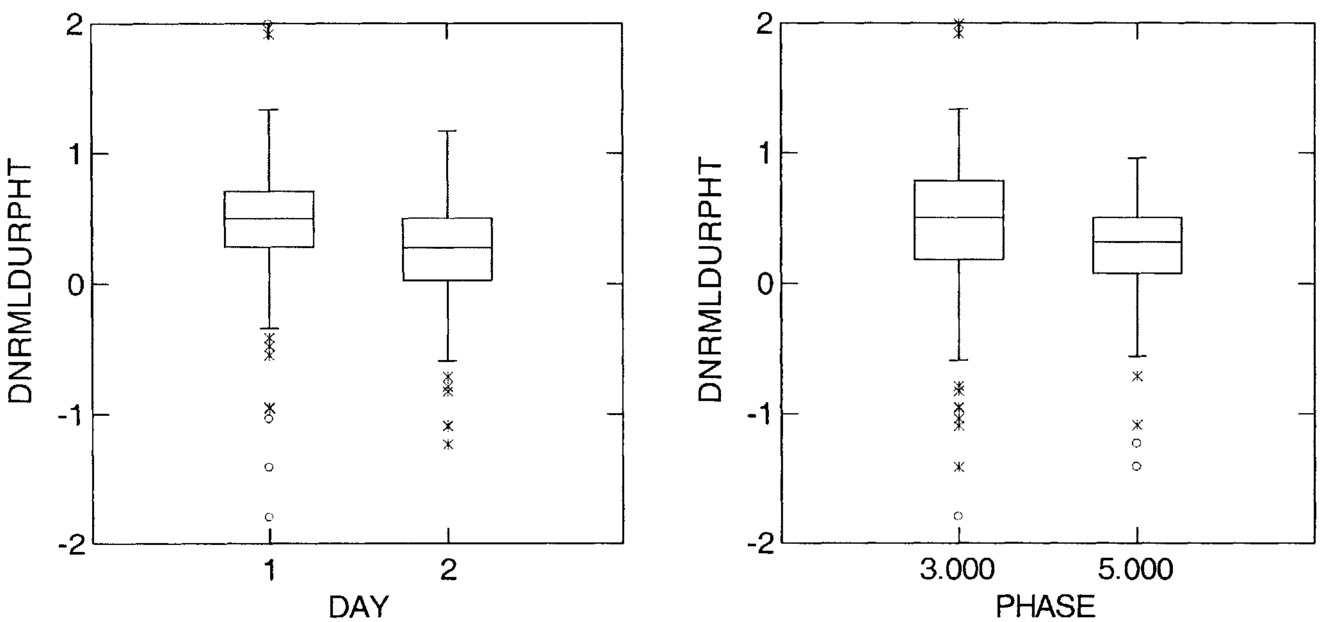


Figure 55: Effects of Day and Phase on Tumbling Duration (s).

Figure 55 shows a clear effect of Day and Phase, again reflecting adaptation and habituation of Tumbling Duration, analogous to that seen for Tumbling Intensity.

BODY TILT

The subject's perceived body tilt (TILT) was collected at the end of each trial, after the tumbling sensation had ceased. As mentioned, the data was collected as though the subject's body was the minute-hand on a clock-face, meaning that virtually all responses would be between 30 and 60, corresponding to "standing" and "standing on your head" respectively (as the subjects were instructed). For clarity, these values were converted to degrees for analysis (30 minutes = 0 degrees, 45 minutes = 90 degrees, and 60 minutes = 180 degrees).

Similar to tumbling sensation, subjects were expected to demonstrate differing sensitivity in terms of body tilt response. In order to accurately compare the effect of velocity, the data was again normalized by subject. Further, several subjects showed no body tilt variation at all, presumably because they weren't sensitive enough to detect an effect. For this reason, only 13/23 subjects were evaluated for effects of body tilt, with the remaining subjects omitted if they showed significant deviation from horizontal on fewer than 5 trials on either day.

The correlation of velocities was again performed to ensure the correct use of discrete approximations of velocity by GLM/ANOVA, given the smaller dataset.

Variable	Estimate	Standardized Error
INTERCEPT	2.614	0.427
DESIGNHTV	**0.932**	0.01

Table 16: HM Linear Regression analysis of AVG HT Velocity and Design HT Velocity (Appendix Table 12).

The velocity correlation shown in Appendix Figure 2 is similar to that in Figure 37, showing sufficient correlation to justify the use of design HT velocities in the GLM/ANOVA analysis.

The results of the GLM/ANOVA are as follows:

Source	SS	df	MS	F	P
HT_DIR	1.847	1	1.847	15.037	**0.003**
HT_DIR*DAY*REP	0.065	1	0.065	4.523	0.057

Table 17: GLM/ANOVA analysis of HT Direction on TILT (Appendix Table 13).

There is an effect of HT_DIR as well as a potential cross effect of HT_DIR, DAY, and REP in the above analysis.

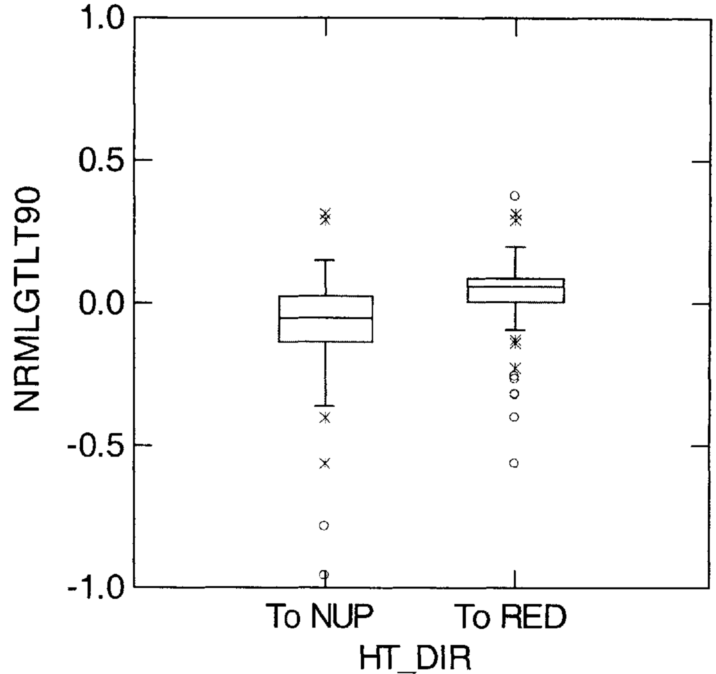


Figure 56: The effect of HT Direction on perceived Tilt (deg).

Figure 56 shows that there is a slight effect of HT direction on body tilt, with turns to NUP showing more downward deflection, and turns to RED showing less downward deflection (or less and more upward deflection respectively). This would seem to support the assertion that the two stimuli are perceptually different, and that the two contexts could potentially be subject to different adaptation dynamics.

The potential cross-effect of HT_DIR * DAY * REP was examined and found to be questionable, likely due to the same perceptual ambiguity of extremely small stimuli, as mentioned previously. The plot was omitted for brevity.

As explained in previous sections, the TILT data was normalized by HT direction to best analyze the velocity data. The GLM/ANOVA results for phase 4 showed no further significant effects of body tilt on the subject population (Appendix Table 14).

Analysis of phases 3 and 5 showed the following results:

Source	SS	df	MS	F	P	G-G	H-F
HT_DIR	2.002	1	2.002	25.456	**<0.001**	.	.

Table 18: GLM/ANOVA of Body Tilt data for phase 3 and 5 normalized irrespective of HT Direction (Appendix Table 15).

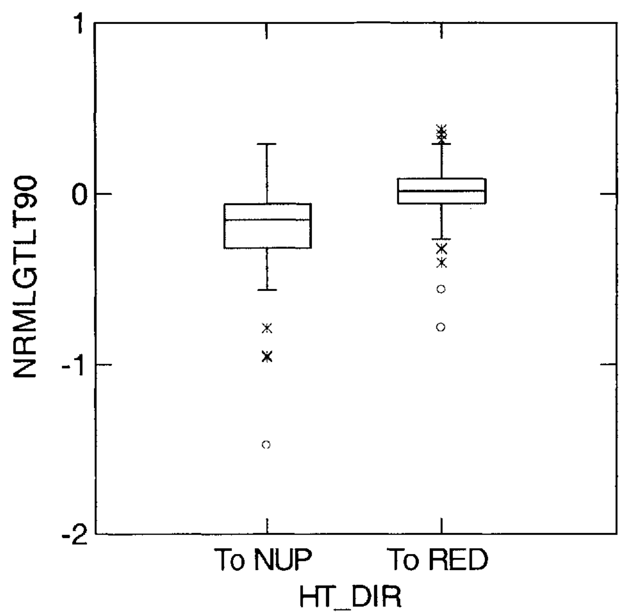


Figure 57: Effect of HT Direction on body Tilt (deg) for phases 3 and 5.

The analysis of phases 3 and 5 support that of phase 4, with turns to NUP showing more downward deflection than turns to RED. Given the effect of direction, the remaining GLM/ANOVA analysis was performed on phase 3 and 5 data normalized by HT Direction.

Source	SS	df	MS	F	P	G-G	H-F
DAY*REP	0.216	2	0.108	5.543	0.011	0.024	0.017

Table 19: GLM/ANOVA of Body Tilt data for phase 3 and 5 normalized by HT Direction (Appendix Table 16).

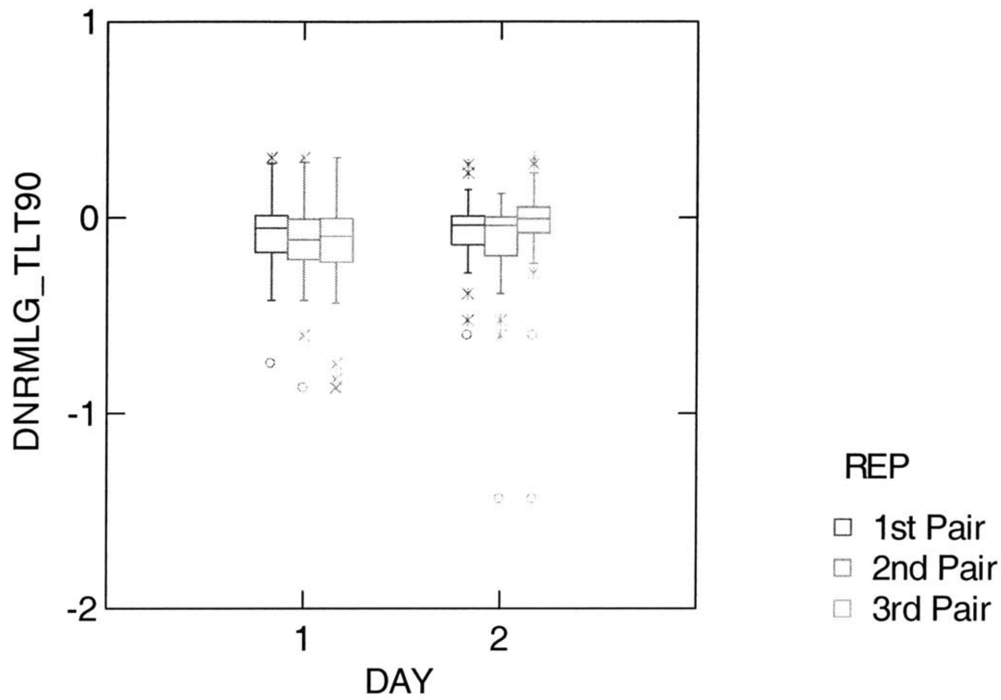


Figure 58: Effect of Day and Rep on Body Tilt (deg) for phases 3 and 5.

Figure 58 suggests that the body tilt habituates more significantly on Day 2 than Day 1, as the body tilt values approach "0" with increasing repetitions on Day 2. The data for Day 1 superficially suggests that the body tilt *increases* with repetition, though the trend is very slight, and this effect is likely an artifact of the small sample size. As no effect of REP alone was found, it's likely that the effect of body tilt didn't habituate appreciably within a day, making the cross-effect likely an artifact.

MOTION SICKNESS

A total of 26 subjects participated in the experiment, with 3/26 withdrawing from the experiment after fewer than 10 HT's, citing discomfort or motion sickness as the primary cause for withdrawal. Of the 23 subjects who completed the experiment, only 3/23 subjects showed MS scores ≥ 3 for any head-turn, representing at most only mild stomach awareness with little or no nausea. Due to this paucity of data, no statistical analysis was completed regarding the effect of HTV or other variables on motion sickness levels.

Previous works have shown more consistent motion sickness generation while performing similar HT ranges at the same or similar centrifuge velocities [49, 17]. These previous studies showed a higher percentage of subjects withdraw due to motion sickness. The primary difference between previous studies and the present study, is that the previous studies maintained HT velocities of between 40 and 90 deg/s, while this study obviously utilized much slower HT velocities.

Superficially, this would seem to indicate that by limiting the head-turn velocity, the subjects experienced less motion sickness on average, producing insignificant symptom numbers and far fewer dropouts than previously seen. While this is a plausible explanation, this conclusion can't be supported on the absence of effect data alone. Future studies could explore this possibility further by comparing two or more subject populations directly, with fast and slow average HT velocities respectively.

4.2 Objective Measures

The peak slow-phase velocity (SPV) and time constant of decay (TAU) of nystagmus eye movements were determined for each head-turn during the experiment. This recording relied on the subject's eyes being open throughout the head turn, closing only after the sensation decayed. A minimum amount of blinking could be compensated for, as well as a minimum amount of incidental movement by the subject. Some subjects were incapable of keeping their eyes open sufficiently long for the recording, and thus their data was not included in the analysis. If a subject closed their eyes on five or more head-turns, their data was excluded from analysis. In total, 15/23 subjects produced reliable eye movement recordings from which SPV and TAU could be extracted.

Again, given the smaller subject sample size, the velocity correlation was run to ensure that the discrete approximation of actual HT velocity could be used in GLM/ANOVA analysis.

Variable	Estimate	Standardized Error
INTERCEPT	2.7	0.44
DESIGN_HTV	**0.902**	0.009

Table 20: HM Linear Regression analysis of AVG HT Velocity and Design HT Velocity (Appendix Table 17).

The correlation shown in Appendix Figure 3 is similar to that of the entire sample population (Figure 37), thus it is concluded that the design HT velocity can be used in place of the actual average velocities.

PEAK SPV

The peak slow-phase velocity was recorded for each head-turn, extrapolated from the calibrated eye movement data produced by the ISCAN software. Given the nystagmus movements are compensatory to perceived motion, in accordance with the definition of VOR, it is arguable that the peak SPV would correlate with CCS intensity. Also, given the logarithmic relationship between SPV and time (equation 4), it's plausible that the peak SPV would diminish logarithmically as head-turn duration increases. In short, slower head-turns might be expected to produce a logarithmically smaller peak HT velocity. Analysis of competing correlation plots shows a more normally distributed set of residuals when the natural-log (LN) of the SPV is taken (Figure 59). For this reason, the natural log of the SPV data will be used for GLM/ANOVA analysis.

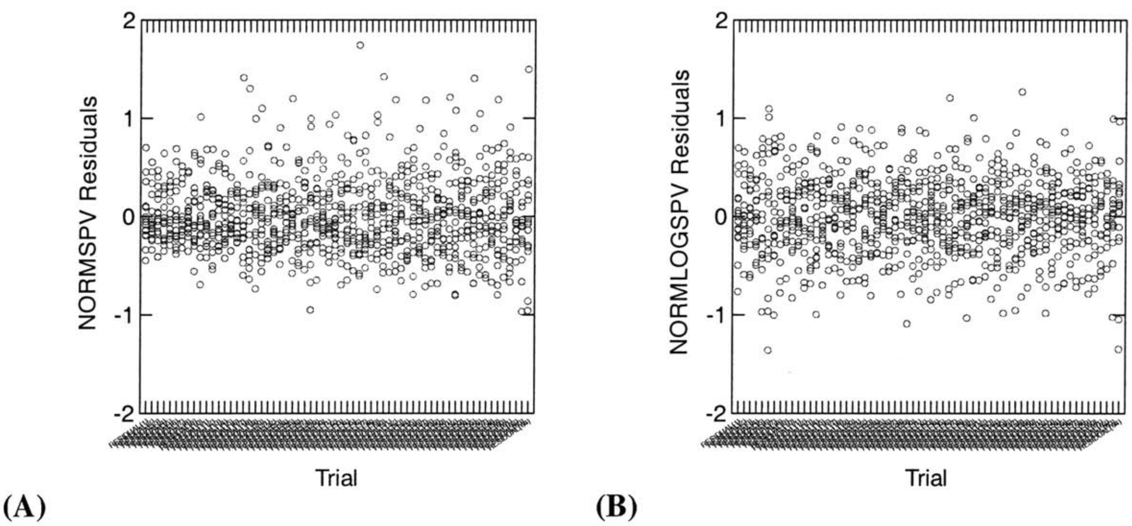


Figure 59: GLM/ANOVA residuals comparison. (A) Residuals of SPV analysis of data normalized irrespective of direction. Plot shows non-normal distribution with significant heteroscedasticity. (B) Residuals of analysis of LN(SPV) data normalized irrespective of direction. Plot shows a more normal distribution with no heteroscedasticity.

One confounding issue with the peak SPV measurement however, which was explained previously, is that at higher stimulus intensities the nystagmus frequency is sufficiently high to prevent an accurate peak measurement. It is therefore anticipated that there may be irregularity in the data at higher velocity head turns. This effect should be minimized for phase 4 compared to that seen in previous works however [49], as the centrifuge velocity was maintained at 19 RPM's, producing a smaller overall CCS than that of previous works.

Finally, the primary focus of this experiment is not to determine an absolute SPV for a given head-turn speed, but rather to determine the relative effect of head-turn velocity and other conditions on SPV. For this reason, the data will be normalized by subject similar to the previous subjective metrics.

The discrete dataset was analyzed via GLM/ANOVA analysis with the following results:

Source	SS	df	MS	F	P
HT_DIR	0.452	1	0.452	0.612	0.448
HT_DIR*DAY	1.541	1	1.541	5.481	**0.036**

Table 21: GLM/ANOVA results of LN(SPV) normalized irrespective of HT Direction (Appendix Table 18).

Surprisingly, there was no significant effect of HT Direction, but there was a significant cross-effect of HT Direction and Day.

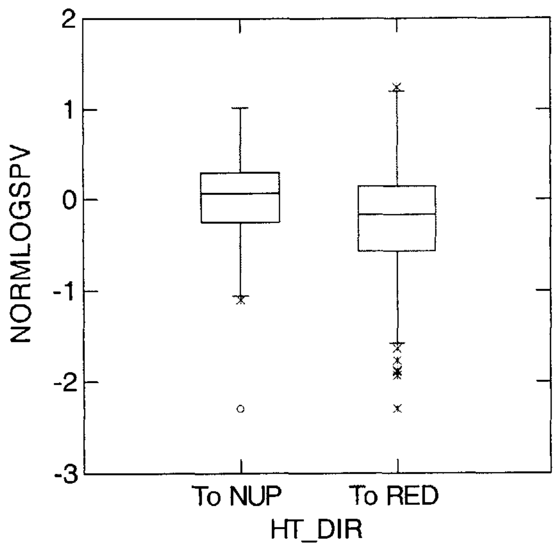


Figure 60: The insignificant effect of HT Direction on the LN(SPV) (deg/s).

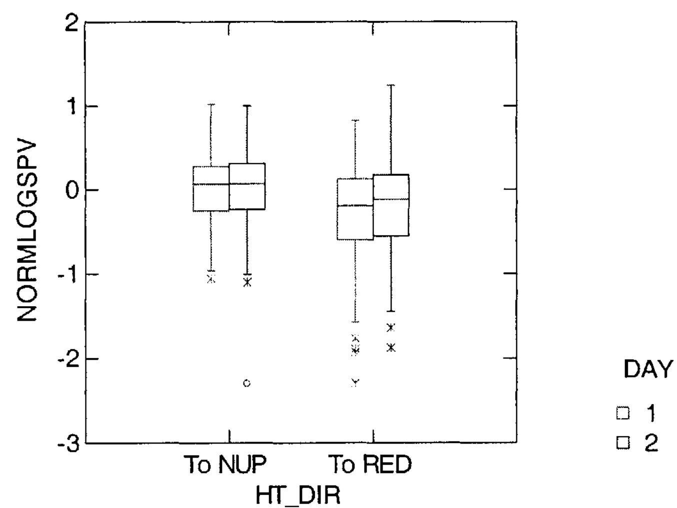


Figure 61: The cross-effect of HT Direction and Day on the LN(SPV) (deg/s).

The lack of an effect of HT Direction implies that the difference in directional intensity previously observed does not correlate to a difference in SPV. This may further imply that the actual CCS magnitude difference of the two stimuli is not necessarily the driving force in what makes head-turns "to NUP" seemingly more intense than turns "to RED". While a trend is seen in the SPV favoring a higher SPV for turns "to NUP", the effect is not significant (Figure 60). An alternative explanation is that the SPV of higher velocity HT's "to NUP" suffered a disproportionately larger systematic measurement error, due to the sampling rate effect previously described.

The cross-effect of HT Direction and Day appears to be minimal but significant, showing a larger effect of Day for turns "to RED" than turns "to NUP". However, given there is no significant effect of DAY(Table 22), and given the questionable data fidelity at high velocities, its unclear that this is a meaningful result.

As there was no significant effect of HT Direction, the remainder of the GLM/ANOVA analysis was completed on the dataset normalized irrespective of HT Direction.

Source	SS	Df	MS	F	P	G-G	H-F
VEL	11.341	7	1.62	9.989	**<0.001**	0	**<0.001**
VEL*HT_DIR	3.888	7	0.555	3.749	**0.001**	0.023	**0.012**

Table 22: GLM/ANOVA analysis of LN(SPV) (deg/s) normalized irrespective of head-turn direction (Appendix Table 19).

The primary effects of this analysis were that of HT Velocity and the cross-effect of HT Velocity and HT Direction.

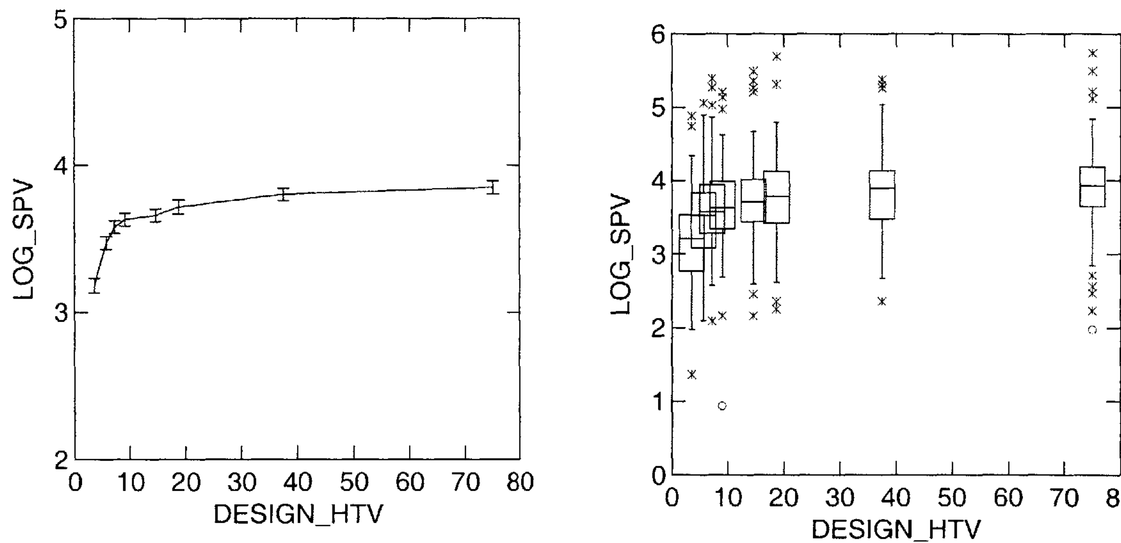


Figure 62: Effect of HT Velocity on the LN(SPV). The correlation plot (left); boxplot showing variances (right). All Velocities in deg/s.

The effect of HT Velocity on the LN of the SPV is strikingly similar to that of HT Velocity on Tumbling Intensity (Figure 38). This strongly supports the assertion that CCS intensity is reflected in a correlated response of SPV and Tumbling Intensity. A visual comparison of plots of the Tumbling Intensity and LN SPV illustrates this relationship (Figure 63).

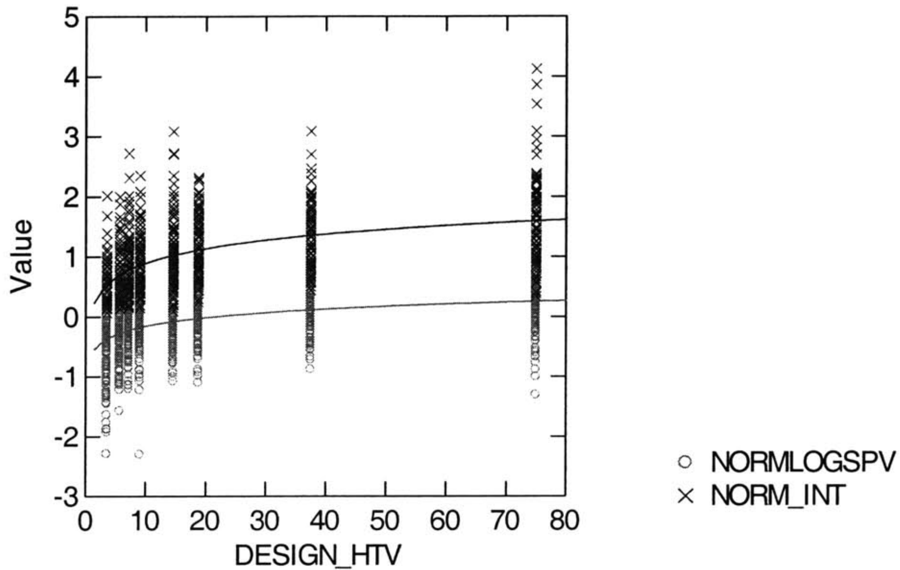


Figure 63: LN(SPV) and Tumbling Intensity as a function of HT Velocity. All Velocities in deg/s.

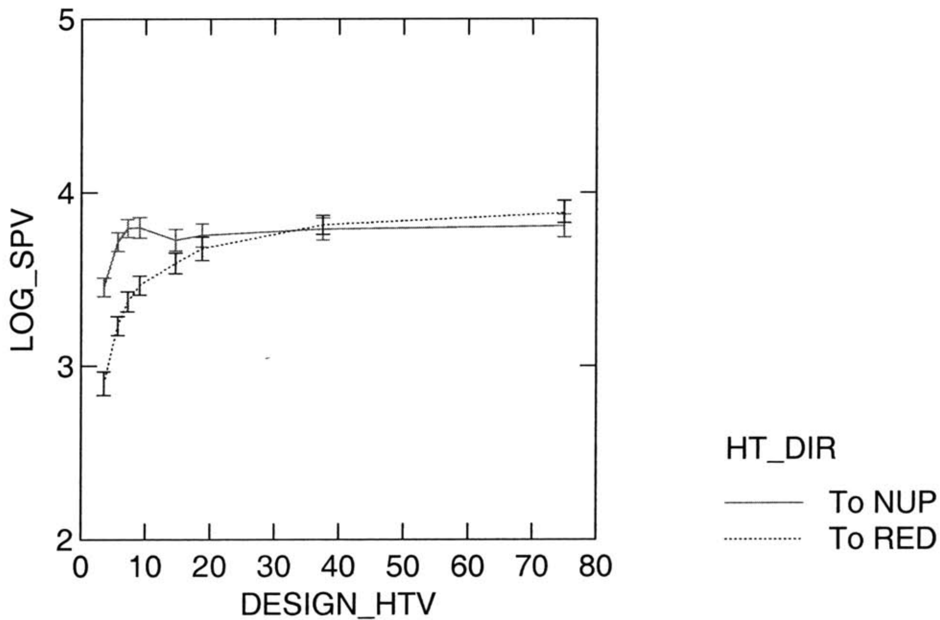


Figure 64: Cross-effect of HT Velocity and HT Direction on LN(SPV) normalized irrespective of direction. All Velocities in deg/s.

The cross-effect shown in Figure 64 is potentially telling, in that there appears to be a significant effect of HT Direction at low velocities, but the effect diminishes at higher velocities. The pattern shows an abrupt change as HT Velocity exceeds 15-20 degrees per second. This could potentially indicate the problem previously alluded to, regarding the inability to accurately measure the peak SPV at high CCS magnitudes. If the SPV measurements for high-velocity head-turns were systematically underestimated for turns "to NUP", then the lines would be expected to intersect as seen in Figure 64. This could also explain why the expected effect of HT Direction was found to be insignificant.

Analysis of phases 3 and 5 would be expected to suffer a more significant peak SPV inaccuracy, as the centrifuge angular velocity is significantly higher than that for phase 4. This higher velocity would produce much larger CCS magnitudes on average, producing more sampling problems in the beginning of each recording, and a resulting systematic under-estimation of peak SPV. The analysis of the data for phases 3 and 5 are as follows:

Source	SS	Df	MS	F	P	G-G	H-F
PHASE	2.33	1	2.33	7.67	**0.016**	.	.

Table 23: GLM/ANOVA analysis of phase 3 and 5 data for Peak SPV normalized irrespective of HT Direction (Appendix Table 20).

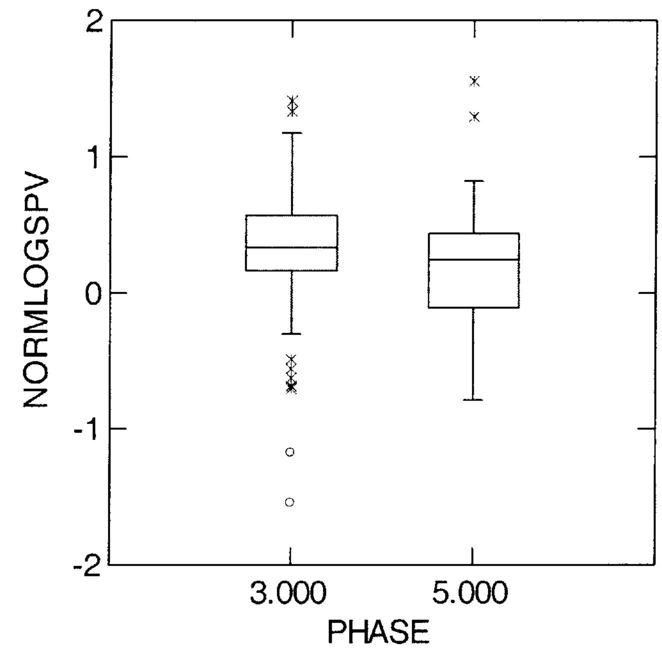


Figure 65: Effect of Phase on the SPV (deg/s) of phase 3 and 5.

Figure 65 shows an effect of Phase, demonstrating the anticipated habituation in SPV we would expect to see, however there was no effect of HT Direction or Day. This is likely due to the sampling issue previously described, but this claim cannot be supported without further work.

TAU

The time constant, TAU, was determined via a sequential measurement of the decay of the SPV produced from the CCS. As previously explained, the time constant represents the amount of time for a signal, in this case SPV, to logarithmically decay to a set fraction of its original signal strength. The measurement of TAU can be determined regardless of the accuracy of peak SPV determination, so this analysis should not be subject to the same ambiguity seen in the peak SPV analysis. The dataset used is the same population of 15/23 subjects used in the peak SPV analysis, so the same assumption can be made about correlation of average to design velocities for use in GLM/ANOVA analysis. However, analysis of residuals of GLM analyses suggests that a logarithmic interpretation of TAU would be inappropriate (plots omitted for brevity). As with SPV, the primary purpose of this analysis is not to determine an accurate TAU but rather to show the relative effect of Velocity and other conditions on TAU. For this reason, the data will be normalized by subject, similar to the previous metrics.

Analysis showed no significant effect of direction on the normalized TAU (Appendix Table 21). Thus, the remaining GLM/ANOVA analysis will be performed on TAU data normalized irrespective of HT Direction.

Source	SS	df	MS	F	P	G-G	H-F
VEL*DAY	1.134	7	0.162	3.891	0.001	0.006	0.001
VEL*DAY*SEX	0.703	7	0.1	2.412	0.026	0.056	0.026
VEL*HT_DIR	0.935	7	0.134	2.837	0.010	0.04	0.018
VEL*HT_DIR*REP	0.832	7	0.119	2.096	0.052	0.118	0.091
VEL*HT_DIR*REP*SEX	0.936	7	0.134	2.359	0.029	0.088	0.062
VEL*REP	1.417	7	0.202	5.784	<0.001	0.001	<0.001
DAY	0.892	1	0.892	4.554	**0.052**	.	.
REP	2.041	1	2.041	53.771	**<0.001**	.	.

Table 24: GLM/ANOVA analysis of TAU normalized irrespective of HT Direction (Appendix Table 22).

The primary effects of this analysis were that of REP and DAY, with cross-effects of Velocity with DAY, REP, HT Direction, and DAY * SEX. Two further marginal cross-effects were eliminated from consideration based on their corrected (H-F) significance values.

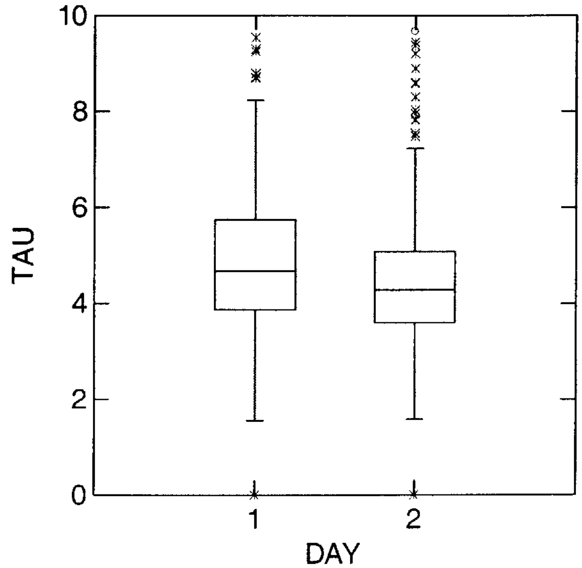


Figure 66: Effect of DAY on TAU (s)

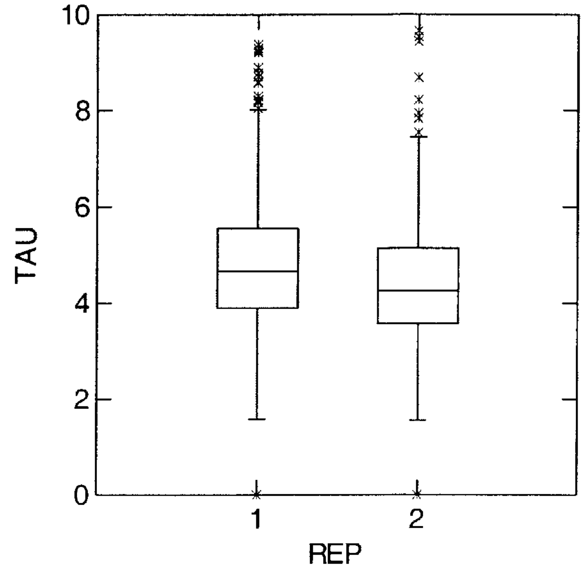


Figure 67: Effect of REP on TAU (s).

Figure 66 and Figure 67 presumably illustrate the effects of adaptation between days and habituation within a day, respectively. It has previously been shown that the time constant attenuates in both conditions, so these results are expected [1, 49, 17, 5]. However, while significant, the magnitude of effect appears somewhat small. This could potentially be due to the overall low CCS magnitude applied over the stimulus phase, as a result of using slower HT velocities than previous experiments.

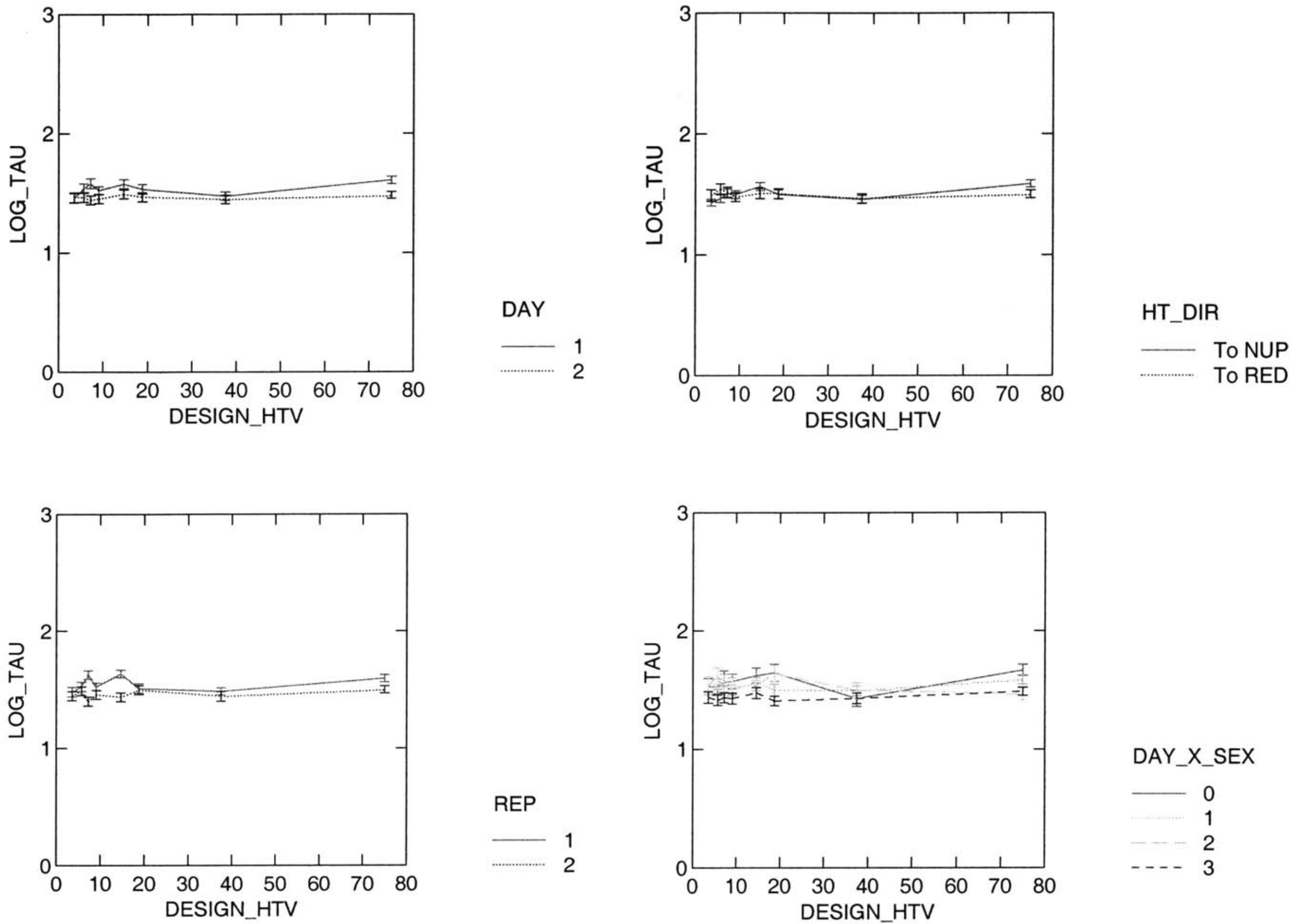


Figure 68: Cross-effects of TAU. (UL) VEL*DAY; (UR) VEL* HT Direction; (LL) VEL * REP; (LR) VEL*DAY*SEX. The effects are all based on TAU data normalized irrespective of HT Direction. All Velocities in deg/s, TAU in seconds.

The cross-effects shown in Figure 68 all seem to be due to the same confounding issue. When these effects are plotted, the trends seem to show that the convergence occurs only at the extremely low-HTV ranges. As the head-turns approach the sensitivity threshold of the SCC's, the subject may not have the sensitivity to produce a sufficient number of VOR-induced nystagmus "beats" to calculate an accurate TAU from. This effect was illustrated in Figure 35. This is essentially a limitation of the analysis tools, which could be addressed in future experiments. It is unclear that the cross-effects of Figure 68 are meaningful, without a more accurate estimate of TAU at low-HTV's.

GLM/ANOVA Analysis of the TAU data for phases 3 and 5 was as follows:

Source	SS	df	MS	F	P	G-G	H-F
DAY	0.372	1	0.372	4.932	**0.045**	.	.
DAY*PHASE	0.198	1	0.198	6.931	**0.021**	.	.
PHASE	1.472	1	1.472	12.065	**0.004**	.	.

Table 25: GLM/ANOVA of TAU for phases 3 and 5 normalized irrespective of HT Direction (Appendix Table 23).

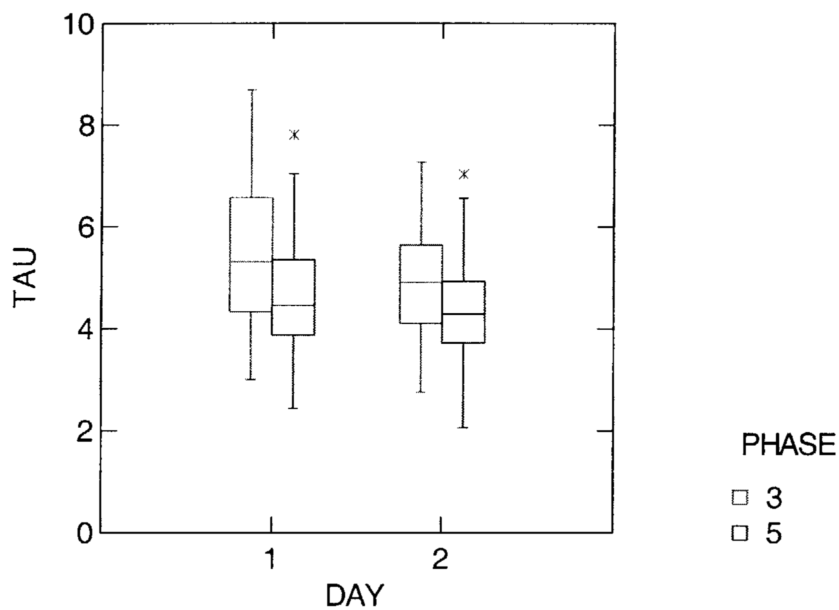


Figure 69: Effect of DAY and Phase on TAU (s) for phases 3 and 5.

As seen in the analysis of Phase 4, the significant effects of Day and Phase clearly reflect adaptation and habituation respectively. The cross-effect shown in Figure 69 likely reflects a larger relative amount of habituation on Day 1 versus Day 2. This would agree with previous works which have similarly demonstrated that the majority of the observed habituation occurs on the first experimental day.

5.0 Discussion

Hypothesis #1: *For a given centrifuge velocity and head turn angle, the perceived CCS intensity will decrease as the head turn duration significantly exceeds the cupular restoration time constant (~ 4-6 seconds).*

This effect was demonstrated across several metrics. Tumbling Intensity, Tumbling Duration, and Peak SPV showed a similar pattern (Figure 40, Figure 51, and Figure 64 respectively). All three show a flat asymptotic response for HT's above ~15-20 deg/s, with a rapid decay for HT's below ~15 deg/s. This would seem to indicate that a threshold exists, below which there is a significant change in perceptual response to CCS.

This data does not indicate that this threshold exists strictly at the 15-20 deg/s HT point, but rather is the product of the HT Velocity and the centrifuge Velocity. For this subject group, for the 19RPM condition of phase 4, that threshold was approximately 15-20 deg/s HT's. While the precise value of the threshold can be expected to be variable, the presence of the threshold is a virtual certainty, as it is most likely a reflection of the overdamped nature of the SCC's.

The significance of this finding should not be minimized, as it indicates that the physiologic effects of CCS on the vestibular system cannot be modeled strictly in terms of the force environment. The dynamics of the sensor itself must also be considered if an accurate model of perception is to be developed. With that said, equations 4 and 5 must be considered inadequate in terms of modeling vestibular output during CCS, as they don't account for the effects of lower stimulus ranges. These lower stimulus ranges could be the most operationally significant ranges, as will be discussed below.

Hypothesis #2: *For a given centrifuge velocity and head turn angle, the motion sickness increment will increase with increasing head turn velocity.*

This hypothesis could not be directly supported by the data, as there was insufficient motion sickness observed to analyze. This lack of symptoms suggests that the total stimulus magnitude applied was too low to reveal enough data points to illustrate a clear trend. The lower stimulus magnitudes were necessary however to illustrate the perceptual threshold of Tumbling Intensity, Duration, and Peak SPV however, so the lack of motion sickness data is not itself a significant problem.

While the lack of Motion Sickness data may superficially seem to be a negative result, when compared to previous similar studies [1, 49, 17, 5], the observed lack of Motion Sickness symptoms could be indicative of the very effect the study was trying to reveal. Only 3/26 subjects dropped out due to motion sickness, and only 1/23 of those who completed the experiment showed any "nausea" at all (M.S. > 6). These numbers are far lower than that of previous experiments [1, 49, 17, 5]. Given that it has been shown that the CCS magnitude relates directly to motion sickness development [49], this would imply that the total stimulus magnitude received by the subjects of this experiment was significantly less than that of similar experiments where HT Velocity was always between 40-100 deg/s, at the same centrifuge angular velocity.

The lack of motion sickness development thus indirectly supports the assertion that motion sickness development can be tempered by minimizing HT velocity, via producing a smaller *perceptual* response to the same total CCS magnitude.

Hypothesis #3: *The head turn velocity effect is independent of head turn direction ("to nose-up" vs. "to right ear down").*

The effects of HT Velocity discussed above apply to both HT Directions independently, with the HT Directions often showing separate dynamics in terms of magnitude of perceptual effect, and magnitude and rate of habituation and adaptation. In essence, these differing dynamics imply that the two HT directions behave as two unique perceptual contexts. Tumbling Intensity and Duration show effects of HT Direction, and Peak SPV likely doesn't show an effect of HT Direction simply due to the previously mentioned measurement imprecision at high CCS magnitude of turns to NUP (Figure 64). Tumbling Intensity, Tumbling Duration, and Peak SPV all show significant effects of Velocity, and all three show a significant cross effect of Velocity and HT Direction as well. This combination of effects supports that assertion that the two Directions represent different stimulus contexts, but that both contexts converge to "zero perceptual effect" at extremely low HT Velocities.

If the two directions truly are unique contexts, this would operationally imply that the HT Velocity of each HT Direction would need to be independently regulated to maintain a constant perceptual response. Equations 4 and 5 indicate that HT direction is irrelevant to the force environment of CCS, however this experiment shows that the *perceptual* environments of the two directions are very different, and thus the perceptual response to HT Velocity is also different by HT Direction.

Hypothesis #4: *Head turn velocity modulation would provide another sufficient mechanism for incremental adaptation to cross-coupled stimulus, minimizing motion sickness compared to a profile using constant head turn velocities.*

The data supports the assertion that minimizing HT Velocity will minimize the perception of Tumbling Intensity, Duration, and Peak SPV. Given the direct relationship of Tumbling Intensity to Motion Sickness increment previously shown [49], it is not unreasonable to suggest that one can control Motion Sickness symptom development via minimizing HT Velocity in a rotating environment. Further, the cross-effects of HT Velocity with Day and with Repetition support the assertion of HT Velocity-dependent control of Tumbling Intensity adaptation and habituation respectively.

In simpler terms, minimizing HT Velocity certainly minimizes Tumbling Intensity adaptation and habituation, and very likely minimizes motion sickness as well. These findings suggest that an incremental adaptation profile can be developed which minimizes motion sickness. Traditionally, incremental adaptation has been achieved though the modulation of centrifuge velocity or HT angle [49, 17]. The finding of HT Velocity modulation is thus operationally significant as it not only suggests another means of incremental adaptation, but also presents a method of adaptation which can be easily self-modulated by the subject.

For example, if one wanted to simultaneously adapt multiple subjects to the rotating environment, the most efficient means could arguably be to construct a single large centrifuge, on which several occupants would ride simultaneously. Modulating the centrifuge velocity would be inefficient, as all subjects would have to operate at a level of the most-sensitive subject, slowing the adaptation of the less-sensitive subjects. Modulating head-turn angle could be difficult without some means of actively controlling and modifying the allowable range, as the subject's may not be able to accurately judge their HT range without constant position feedback of some kind. Modulating HT Velocity on the other hand is the ideal solution, as the subject has constant feedback during the HT in the form of their own tumbling intensity. If the HT feels too intense for comfort, the subject need only to slow their head turns down until it reaches a comfortable level.

While the assertion that incremental adaptation via HT Velocity control is supported by the data, this claim cannot be definitively made without a direct comparison of the motion sickness development of two groups subjected to the same CCS magnitude (same centrifuge velocity and HT angle), varying only by the HT Velocities. However, the results of this experiment certainly imply that minimizing HT Velocity will minimize Tumbling Intensity and thus temper motion sickness development and allow for incremental adaptation.

Finally, analysis of the effects on perceived Body Tilt and Tau for the most part supports the previous findings of CCS effects. The most noteworthy points of the Body Tilt were demonstrated by the effects of HT Direction, and adaptation, as indicated by the cross-effect of Direction and Day. Both findings have been demonstrated in previous studies, and serve to further the argument of context specificity to HT Direction. There was no effect of velocity, though it has been previously shown that Body Tilt is primarily dependent specifically on centrifuge velocity, rather than the total CCS magnitude [49].

The measured decay time constant Tau also didn't show an effect of Velocity, save for the likely artifactual effects described previously (Figure 68). This lack of velocity-dependence is predictable, as the measured time-constant of the system does not vary acutely with stimulus intensity, but rather it varies on a longer time-scale as a result of repeated stimuli [32]. This is illustrated by the effects of Day and Rep/Phase, which reflect Adaptation and Habituation respectively. Overall, the effects of Body Tilt and Tau are largely in agreement with the previously described scenario of Velocity-dependent modulation of tumbling perception.

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7.0 Appendix

Appendix A: Analysis Supplement

Variable	Estimate	Standardized Error	Z	P
INTERCEPT	13.73	0.264	52.055	<.001
DESIGNHTV	1.019	0.007	155.677	<.001

Appendix Table 1: HM Linear Regression of HT Peak Velocity to AVG HT Velocity (Table 5).

Variable	Estimate	Standardized Error	Z	P
INTERCEPT	2.47	0.412	5.994	<0.001
DESIGNHTV	**0.934**	0.008	115.215	<0.001

Appendix Table 2: HM Linear Regression analysis of AVG HT Velocity and Design HT Velocity (Table 6).

Source	SS	df	MS	F	P
HT_DIR	15.517	1	15.517	47.385	**<0.001**
HT_DIR*DAY	0.312	1	0.312	2.823	0.119
HT_DIR*DAY*REP	0.002	1	0.002	0.09	0.769
HT_DIR*DAY*REP*SEX	0.002	1	0.002	0.075	0.789
HT_DIR*DAY*SEX	0.344	1	0.344	3.107	0.103
HT_DIR*REP	0.325	1	0.325	9.94	**0.008**
HT_DIR*REP*SEX	0.048	1	0.048	1.459	0.25
HT_DIR*SEX	0.026	1	0.026	0.078	0.785

Appendix Table 3: GLM/ANOVA of Intensity normalized irrespective of HT direction (Table 7).

Source	SS	df	MS	F	P	G-G	H-F
VEL	49.636	7	7.091	32.311	**<.001**	0	**<0.001**
VEL*DAY	1.647	7	0.235	2.579	**0.019**	0.064	**0.036**
VEL*DAY*REP	0.644	7	0.092	1.991	0.066	0.119	0.082
VEL*DAY*REP*SEX	0.407	7	0.058	1.257	0.281	0.302	0.29
VEL*DAY*SEX	0.511	7	0.073	0.801	0.589	0.509	0.552
VEL*HT_DIR	0.612	7	0.087	2.405	**0.027**	0.076	**0.046**
VEL*HT_DIR*DAY	0.153	7	0.022	0.936	0.483	0.447	0.475
VEL*HT_DIR*DAY*REP	0.249	7	0.036	1.54	0.165	0.211	0.179
VEL*HT_DIR*DAY*REP*SEX	0.05	7	0.007	0.31	0.948	0.855	0.928
VEL*HT_DIR*DAY*SEX	0.156	7	0.022	0.954	0.47	0.437	0.463
VEL*HT_DIR*REP	0.089	7	0.013	0.699	0.672	0.588	0.655
VEL*HT_DIR*REP*SEX	0.14	7	0.02	1.099	0.371	0.367	0.372
VEL*HT_DIR*SEX	0.109	7	0.016	0.429	0.882	0.752	0.83
VEL*REP	1.064	7	0.152	2.562	**0.019**	0.078	**0.054**
VEL*REP*SEX	0.742	7	0.106	1.785	0.101	0.175	0.151
VEL*SEX	1.66	7	0.237	1.08	0.383	0.35	0.36
DAY	17.533	1	17.533	8.221	**0.014**	.	.
DAY*REP	0.948	1	0.948	3.162	0.101	.	.
DAY*REP*SEX	0	1	0	0	0.995	.	.
DAY*SEX	6.529	1	6.529	3.062	0.106	.	.
SEX	0.332	1	0.332	1.002	0.337		
REP*SEX	0.331	1	0.331	0.756	0.402	.	.
REP	2.971	1	2.971	6.786	**0.023**	.	.

Appendix Table 4: GLM/ANOVA of Intensity normalized by HT direction (Table 8).

Source	SS	df	MS	F	P	G-G	H-F
HT_DIR	44.04	1	44.04	51.7	**<.001**	.	.
HT_DIR*DAY	0.561	1	0.561	8.008	**0.01**	.	.
HT_DIR*DAY*PHASE	0.044	1	0.044	0.466	0.502	.	.
HT_DIR*DAY*PHASE*REP	0.004	2	0.002	0.054	0.948	0.933	0.948
HT_DIR*DAY*PHASE*REP*SEX	0.134	2	0.067	1.649	0.204	0.208	0.204
HT_DIR*DAY*PHASE*SEX	0.026	1	0.026	0.279	0.603	.	.
HT_DIR*DAY*REP	0.026	2	0.013	0.508	0.606	0.573	0.594
HT_DIR*DAY*REP*SEX	0.128	2	0.064	2.482	0.096	0.107	0.1
HT_DIR*DAY*SEX	0.479	1	0.479	6.838	**0.016**	.	.
HT_DIR*PHASE	2.165	1	2.165	10.687	**0.004**	.	.
HT_DIR*PHASE*REP	0.682	2	0.341	4.655	**0.015**	0.026	**0.022**
HT_DIR*PHASE*REP*SEX	0.123	2	0.061	0.837	0.44	0.41	0.42
HT_DIR*PHASE*SEX	0.103	1	0.103	0.508	0.484	.	.
HT_DIR*REP	0.427	2	0.213	4.106	**0.024**	0.039	**0.035**
HT_DIR*REP*SEX	0.036	2	0.018	0.344	0.711	0.636	0.657
HT_DIR*SEX	1.023	1	1.023	1.201	0.286	.	.

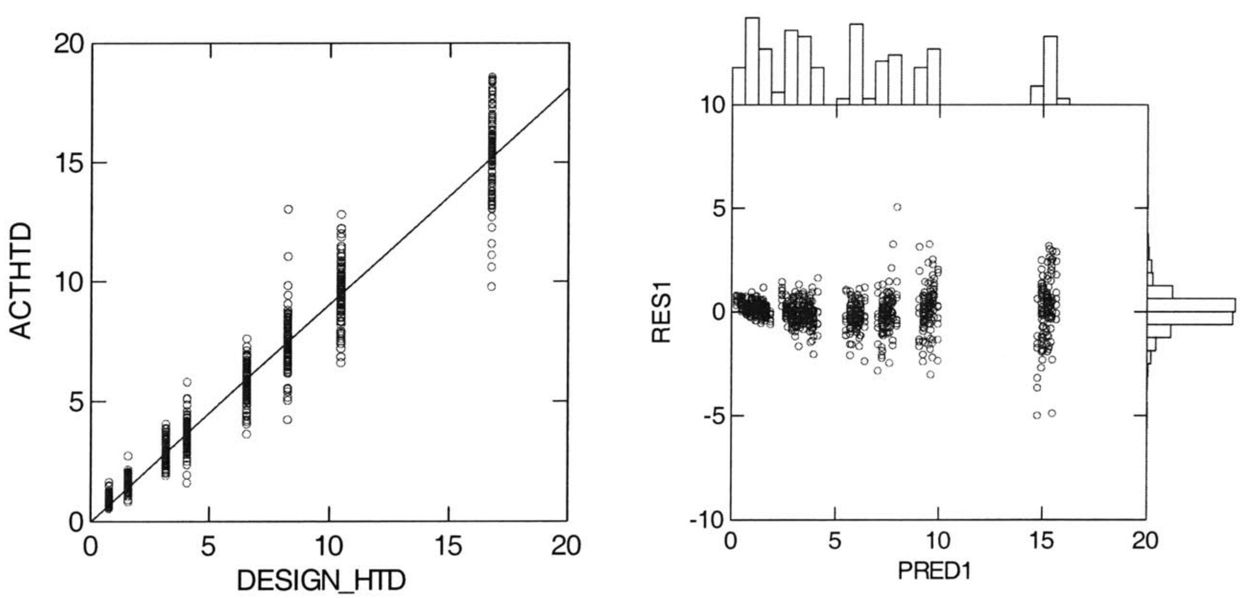
Appendix Table 5: GLM/ANOVA analysis of intensity for phases 3 and 5 normalized irrespective of HT direction (Table 9).

Source	SS	df	MS	F	P	G-G	H-F
DAY	29.403	1	29.403	24.791	**<0.001**	.	.
DAY*SEX	3.594	1	3.594	3.03	0.096	.	.
DAY*PHASE	1.74	1	1.74	3.469	0.077	.	.
DAY*PHASE*REP	0.187	2	0.094	1.479	0.239	0.241	0.242
DAY*PHASE*REP*SEX	0.051	2	0.026	0.405	0.67	0.59	0.608
DAY*PHASE*SEX	0.005	1	0.005	0.009	0.924	.	.
DAY*REP	0.364	2	0.182	2.148	0.129	0.135	0.129
DAY*REP*SEX	0.234	2	0.117	1.382	0.262	0.262	0.262
PHASE	55.839	1	55.839	19.15	**<0.001**	.	.
PHASE*REP	0.256	2	0.128	1.482	0.239	0.241	0.241
PHASE*REP*SEX	0.001	2	0.001	0.008	0.992	0.97	0.978
PHASE*SEX	0.02	1	0.02	0.007	0.935	.	.
REP	2.098	2	1.049	9.416	**<0.001**	0.002	**<0.001**
REP*SEX	0.083	2	0.041	0.372	0.691	0.626	0.647
SEX	0.189	1	0.189	0.03	0.863		

Appendix Table 6:GLM/ANOVA analysis of Intensity data for phase 3 and 5 normalized by HT Direction (Table 10).

Variable	Estimate	Standardized Error	Z	P
INTERCEPT	-0.02	0.08	-0.246	0.806
DESIGN_HTD	**0.907**	0.006	162.657	<0.001

Appendix Table 7: HM Linear Regression analysis of Actual HT Duration and Design HT Duration (Table 11).



Appendix Figure 1: Actual HT Duration to Design HT Duration correlation. The correlation plot (left); linear regression residual distribution (right).

Source	SS	df	MS	F	P
HT_DIR	18.528	1	18.528	38.323	**<0.001**
HT_DIR*DAY	1.842	1	1.842	11.931	**0.004**
HT_DIR*DAY*REP	0.064	1	0.064	0.372	0.553
HT_DIR*DAY*REP*SEX	0.078	1	0.078	0.452	0.513
HT_DIR*DAY*SEX	0.237	1	0.237	1.533	0.238
HT_DIR*REP	0.255	1	0.255	1.119	0.309
HT_DIR*REP*SEX	0.097	1	0.097	0.427	0.525
HT_DIR*SEX	0.077	1	0.077	0.16	0.696

Appendix Table 8: GLM/ANOVA analysis of perceived stimulus duration-post-head-turn normalized irrespective of HT direction (Table 12).

Source	SS	df	MS	F	P	G-G	H-F
VEL	28.182	7	4.026	16.151	**<0.001**	0	**<0.001**
VEL*DAY	1.212	7	0.173	1.503	0.176	0.198	0.176
VEL*DAY*REP	0.764	7	0.109	1.01	0.429	0.411	0.427
VEL*DAY*REP*SEX	0.571	7	0.082	0.755	0.626	0.559	0.616
VEL*DAY*SEX	0.478	7	0.068	0.593	0.76	0.714	0.76
VEL*HT_DIR	2.957	7	0.422	4.88	**<0.001**	0.001	**<0.001**
VEL*HT_DIR*DAY	0.325	7	0.046	0.537	0.804	0.711	0.793
VEL*HT_DIR*DAY*REP	0.417	7	0.06	0.725	0.651	0.594	0.651
VEL*HT_DIR*DAY*REP*SEX	0.163	7	0.023	0.283	0.959	0.905	0.959
VEL*HT_DIR*DAY*SEX	0.146	7	0.021	0.24	0.974	0.916	0.969
VEL*HT_DIR*REP	0.379	7	0.054	0.578	0.772	0.706	0.772
VEL*HT_DIR*REP*SEX	0.659	7	0.094	1.006	0.432	0.419	0.432
VEL*HT_DIR*SEX	0.742	7	0.106	1.224	0.298	0.311	0.298
VEL*REP	1.208	7	0.173	1.767	0.104	0.151	0.113
VEL*REP*SEX	1.305	7	0.186	1.909	0.077	0.124	0.086
VEL*SEX	0.839	7	0.12	0.481	0.846	0.654	0.706
DAY	9.456	1	9.456	7.401	**0.017**	.	.
DAY*REP	0.011	1	0.011	0.089	0.77	.	.
DAY*REP*SEX	0.169	1	0.169	1.337	0.268	.	.
DAY*SEX	0.014	1	0.014	0.011	0.919	.	.
SEX	0.004	1	0.004	0.033	0.859		
REP*SEX	0.388	1	0.388	0.864	0.37	.	.
REP	0.435	1	0.435	0.97	0.343	.	.

Appendix Table 9: GLM/ANOVA analysis of DURPHT normalized by HT Direction (Table 13).

Source	SS	df	MS	F	P	G-G	H-F
HT_DIR	36.878	1	36.878	67.929	**<0.001**	.	.
HT_DIR*DAY	0.12	1	0.12	0.891	0.362	.	.
HT_DIR*DAY*PHASE	0.866	1	0.866	2.006	0.18	.	.
HT_DIR*DAY*PHASE*REP	0.027	2	0.013	0.052	0.949	0.941	0.949
HT_DIR*DAY*PHASE*REP*SEX	0.435	2	0.217	0.84	0.443	0.437	0.443
HT_DIR*DAY*PHASE*SEX	0.605	1	0.605	1.4	0.258	.	.
HT_DIR*DAY*REP	0.352	2	0.176	0.733	0.49	0.467	0.49
HT_DIR*DAY*REP*SEX	0.005	2	0.002	0.01	0.99	0.979	0.99
HT_DIR*DAY*SEX	0	1	0	0.002	0.966	.	.
HT_DIR*PHASE	3.276	1	3.276	12.796	**0.003**	.	.
HT_DIR*PHASE*REP	0.121	2	0.06	0.214	0.808	0.802	0.808
HT_DIR*PHASE*REP*SEX	0.325	2	0.162	0.576	0.569	0.564	0.569
HT_DIR*PHASE*SEX	0.735	1	0.735	2.871	0.114	.	.
HT_DIR*REP	0.274	2	0.137	0.396	0.677	0.623	0.658
HT_DIR*REP*SEX	0.058	2	0.029	0.084	0.919	0.872	0.904
HT_DIR*SEX	0.357	1	0.357	0.657	0.432	.	.

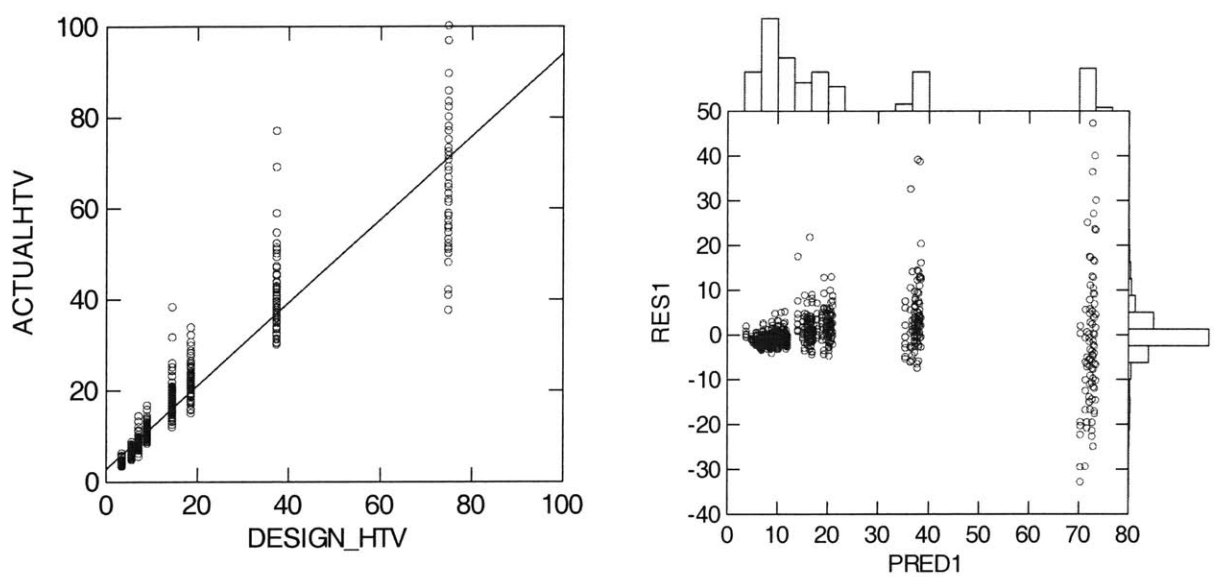
Appendix Table 10:GLM/ANOVA of Tumbling Duration data for phases 3 and 5 normalized irrespective of HT Direction (Table 14).

Source	SS	df	MS	F	P	G-G	H-F
DAY	11.505	1	11.505	12.353	**0.004**	.	.
DAY*PHASE	2.096	1	2.096	2.78	0.119	.	.
DAY*PHASE*REP	0.066	2	0.033	0.089	0.915	0.911	0.915
DAY*PHASE*REP*SEX	0.181	2	0.09	0.242	0.787	0.78	0.787
DAY*PHASE*SEX	0.167	1	0.167	0.221	0.646	.	.
DAY*REP	0.319	2	0.16	0.757	0.479	0.467	0.479
DAY*REP*SEX	0.843	2	0.421	1.999	0.156	0.161	0.156
DAY*SEX	0.427	1	0.427	0.458	0.51	.	.
PHASE	16.977	1	16.977	10.523	**0.006**	.	.
PHASE*REP	0.991	2	0.495	1.621	0.217	0.22	0.217
PHASE*REP*SEX	0.524	2	0.262	0.858	0.436	0.428	0.436
PHASE*SEX	3.867	1	3.867	2.397	0.146	.	.
REP	0.397	2	0.199	0.386	0.683	0.636	0.673
REP*SEX	0.179	2	0.089	0.174	0.841	0.792	0.831
SEX	1.629	1	1.629	1.077	0.318		

Appendix Table 11: GLM/ANOVA of Tumbling Duration data for phases 3 and 5 normalized by HT direction (Table 15).

Variable	Estimate	Standardized Error	Z	P
INTERCEPT	2.614	0.427	6.116	<0.001
DESIGNHTV	**0.932**	0.01	92.995	<0.001

Appendix Table 12: HM Linear Regression analysis of AVG HT Velocity and Design HT Velocity (Table 16).



Appendix Figure 2: Velocity correlation for body tilt population. The correlation plot (left); linear regression residual distribution (right).

Source	SS	df	MS	F	P
HT_DIR	1.847	1	1.847	15.037	**0.003**
HT_DIR*DAY	0.009	1	0.009	0.783	0.395
HT_DIR*DAY*REP	0.065	1	0.065	4.523	0.057
HT_DIR*DAY*REP*SEX	0.023	1	0.023	1.569	0.236
HT_DIR*DAY*SEX	0.028	1	0.028	2.395	0.15
HT_DIR*REP	0	1	0	0.015	0.905
HT_DIR*REP*SEX	0.001	1	0.001	0.103	0.754
HT_DIR*SEX	0	1	0	0.003	0.957

Appendix Table 13: GLM/ANOVA analysis of HT Direction on TILT (Table 17).

Source	SS	df	MS	F	P	G-G	H-F
VEL	0.188	7	0.027	1.444	0.2	0.242	0.216
VEL*DAY	0.073	7	0.01	0.726	0.65	0.548	0.603
VEL*DAY*REP	0.113	7	0.016	1.211	0.307	0.321	0.318
VEL*DAY*REP*SEX	0.194	7	0.028	2.079	0.056	0.123	0.09
VEL*DAY*SEX	0.045	7	0.006	0.446	0.87	0.728	0.81
VEL*HT_DIR	0.142	7	0.02	1.017	0.426	0.391	0.407
VEL*HT_DIR*DAY	0.108	7	0.015	1.813	0.097	0.158	0.122
VEL*HT_DIR*DAY*REP	0.099	7	0.014	1.815	0.096	0.147	0.102
VEL*HT_DIR*DAY*REP*SEX	0.049	7	0.007	0.893	0.516	0.472	0.512
VEL*HT_DIR*DAY*SEX	0.092	7	0.013	1.544	0.165	0.217	0.188
VEL*HT_DIR*REP	0.08	7	0.011	1.09	0.378	0.364	0.373
VEL*HT_DIR*REP*SEX	0.087	7	0.012	1.187	0.32	0.329	0.33
VEL*HT_DIR*SEX	0.161	7	0.023	1.158	0.337	0.338	0.342
VEL*REP	0.156	7	0.022	1.65	0.134	0.198	0.17
VEL*REP*SEX	0.161	7	0.023	1.697	0.122	0.188	0.159
VEL*SEX	0.142	7	0.02	1.091	0.377	0.37	0.377
DAY	0.252	1	0.252	2.91	0.116	.	.
DAY*REP	0	1	0	0.003	0.96	.	.
DAY*REP*SEX	0.037	1	0.037	1.344	0.271	.	.
DAY*SEX	0.163	1	0.163	1.886	0.197	.	.
SEX	0.049	1	0.049	1.86	0.2		
REP*SEX	0	1	0	0.017	0.898	.	.
REP	0.011	1	0.011	0.924	0.357	.	.

Appendix Table 14: GLM/ANOVA analysis of TILT normalized by HT Direction.

Source	SS	df	MS	F	P	G-G	H-F
HT_DIR	2.002	1	2.002	25.456	**<0.001**	.	.
HT_DIR*DAY	0.018	1	0.018	0.542	0.477	.	.
HT_DIR*DAY*PHASE	0.015	1	0.015	0.443	0.519	.	.
HT_DIR*DAY*PHASE*REP	0.015	2	0.007	0.827	0.45	0.446	0.45
HT_DIR*DAY*PHASE*REP*SEX	0.02	2	0.01	1.123	0.343	0.342	0.343
HT_DIR*DAY*PHASE*SEX	0.105	1	0.105	3.08	0.107	.	.
HT_DIR*DAY*REP	0.003	2	0.001	0.074	0.929	0.871	0.907
HT_DIR*DAY*REP*SEX	0.02	2	0.01	0.574	0.571	0.52	0.55
HT_DIR*DAY*SEX	0.004	1	0.004	0.116	0.74	.	.
HT_DIR*PHASE	0.088	1	0.088	3.953	0.072	.	.
HT_DIR*PHASE*REP	0.017	2	0.008	1.479	0.25	0.251	0.25
HT_DIR*PHASE*REP*SEX	0.031	2	0.016	2.749	0.086	0.092	0.086
HT_DIR*PHASE*SEX	0.045	1	0.045	2.006	0.184	.	.
HT_DIR*REP	0.011	2	0.006	0.323	0.727	0.646	0.684
HT_DIR*REP*SEX	0.111	2	0.055	3.182	0.061	0.085	0.074
HT_DIR*SEX	0.041	1	0.041	0.523	0.484	.	.

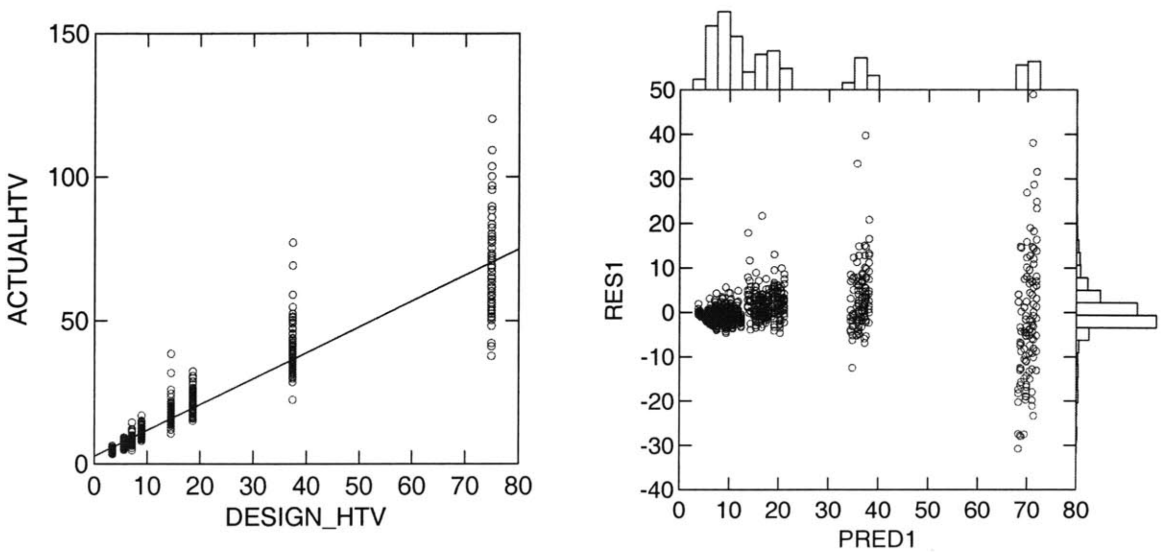
Appendix Table 15: GLM/ANOVA of Body Tilt data for phase 3 and 5 normalized irrespective of HT Direction (Table 18).

Source	SS	df	MS	F	P	G-G	H-F
DAY*SEX	0.154	1	0.154	2.499	0.142	.	.
DAY*REP*SEX	0.086	2	0.043	2.222	0.132	0.152	0.143
DAY*REP	0.216	2	0.108	5.543	0.011	0.024	0.017
DAY*PHASE*SEX	0.022	1	0.022	4.124	0.067	.	.
DAY*PHASE*REP*SEX	0.012	2	0.006	0.824	0.452	0.444	0.452
DAY*PHASE*REP	0.043	2	0.021	2.877	0.078	0.083	0.078
DAY*PHASE	0.002	1	0.002	0.403	0.538	.	.
DAY	0.197	1	0.197	3.196	0.101	.	.
PHASE	0.041	1	0.041	0.324	0.581	.	.
PHASE*REP	0.004	2	0.002	0.143	0.867	0.837	0.867
PHASE*REP*SEX	0.024	2	0.012	0.793	0.465	0.449	0.465
PHASE*SEX	0.07	1	0.07	0.544	0.476	.	.
REP	0.066	2	0.033	1.208	0.318	0.316	0.318
REP*SEX	0.009	2	0.005	0.17	0.845	0.824	0.845
SEX	0.159	1	0.159	1.328	0.274		

Appendix Table 16: GLM/ANOVA of Body Tilt data for phase 3 and 5 normalized by HT Direction (Table 19).

Variable	Estimate	Standardized Error	Z	P
INTERCEPT	2.7	0.44	6.134	<0.001
DESIGN_HTV	**0.902**	0.009	100.89	<0.001

Appendix Table 17: HM Linear Regression analysis of AVG HT Velocity and Design HT Velocity (Table 20).



Appendix Figure 3: Correlation plot of actual to design HT velocity of the subject population with acceptable eye-movement recordings. The correlation plot (left); linear regression residual distribution (right).

Source	SS	df	MS	F	P
HT_DIR	0.452	1	0.452	0.612	0.448
HT_DIR*DAY	1.541	1	1.541	5.481	**0.036**
HT_DIR*DAY*REP	0.053	1	0.053	0.382	0.547
HT_DIR*DAY*REP*SEX	0.351	1	0.351	2.525	0.136
HT_DIR*DAY*SEX	0.98	1	0.98	3.483	0.085
HT_DIR*REP	0.066	1	0.066	0.266	0.615
HT_DIR*REP*SEX	0.004	1	0.004	0.015	0.904
HT_DIR*SEX	2.032	1	2.032	2.755	0.121

Appendix Table 18: GLM/ANOVA results of LN(SPV) normalized irrespective of HT Direction (Table 21).

Source	SS	Df	MS	F	P	G-G	H-F
VEL	11.341	7	1.62	9.989	**<0.001**	0	**<0.001**
VEL*DAY	0.335	7	0.048	0.538	0.804	0.716	0.8
VEL*DAY*REP	0.258	7	0.037	0.467	0.856	0.784	0.856
VEL*DAY*REP*SEX	0.295	7	0.042	0.534	0.807	0.734	0.807
VEL*DAY*SEX	0.226	7	0.032	0.363	0.921	0.841	0.919
VEL*HT_DIR	3.888	7	0.555	3.749	**0.001**	0.023	**0.012**
VEL*HT_DIR*DAY	0.306	7	0.044	0.667	0.699	0.647	0.699
VEL*HT_DIR*DAY*REP	0.405	7	0.058	0.66	0.705	0.642	0.705
VEL*HT_DIR*DAY*REP*SEX	0.398	7	0.057	0.649	0.714	0.65	0.714
VEL*HT_DIR*DAY*SEX	0.404	7	0.058	0.883	0.524	0.496	0.524
VEL*HT_DIR*REP	0.386	7	0.055	0.828	0.567	0.51	0.553
VEL*HT_DIR*REP*SEX	0.671	7	0.096	1.441	0.199	0.236	0.209
VEL*HT_DIR*SEX	0.26	7	0.037	0.251	0.971	0.838	0.895
VEL*REP	1.073	7	0.153	1.745	0.108	0.157	0.121
VEL*REP*SEX	0.824	7	0.118	1.34	0.241	0.269	0.249
VEL*SEX	0.184	7	0.026	0.162	0.992	0.899	0.944
DAY	1.3	1	1.3	0.339	0.57	.	.
DAY*REP	0.002	1	0.002	0.016	0.9	.	.
DAY*REP*SEX	0.008	1	0.008	0.074	0.79	.	.
DAY*SEX	0.799	1	0.799	0.208	0.656	.	.
SEX	0.001	1	0.001	0.028	0.871		
REP*SEX	0.262	1	0.262	0.654	0.433	.	.
REP	0.131	1	0.131	0.328	0.577	.	.

Appendix Table 19: GLM/ANOVA analysis of LN(SPV) normalized irrespective of head-turn direction (Table 22).

Source	SS	df	MS	F	P	G-G	H-F
HT_DIR	0.54	1	0.54	0.808	0.385	.	.
HT_DIR*DAY	0.323	1	0.323	1.784	0.205	.	.
HT_DIR*DAY*PHASE	0.077	1	0.077	0.582	0.459	.	.
HT_DIR*DAY*PHASE*REP	0.085	2	0.042	1.166	0.327	0.326	0.327
HT_DIR*DAY*PHASE*REP*SEX	0.138	2	0.069	1.894	0.171	0.173	0.171
HT_DIR*DAY*PHASE*SEX	0.073	1	0.073	0.546	0.473	.	.
HT_DIR*DAY*REP	0.192	2	0.096	1.561	0.229	0.233	0.229
HT_DIR*DAY*REP*SEX	0.006	2	0.003	0.049	0.953	0.929	0.953
HT_DIR*DAY*SEX	0.541	1	0.541	2.988	0.108	.	.
HT_DIR*PHASE	0.089	1	0.089	0.935	0.351	.	.
HT_DIR*PHASE*REP	0.131	2	0.065	1.314	0.286	0.285	0.286
HT_DIR*PHASE*REP*SEX	0.058	2	0.029	0.579	0.567	0.542	0.567
HT_DIR*PHASE*SEX	0.03	1	0.03	0.313	0.585	.	.
HT_DIR*REP	0.103	2	0.052	0.845	0.441	0.438	0.441
HT_DIR*REP*SEX	0.037	2	0.019	0.307	0.738	0.731	0.738
HT_DIR*SEX	0.118	1	0.118	0.177	0.681	.	.
DAY	2.001	1	2.001	1.256	0.283	.	.
DAY*PHASE	0.041	1	0.041	0.376	0.551	.	.
DAY*PHASE*REP	0.082	2	0.041	0.576	0.569	0.561	0.569
DAY*PHASE*REP*SEX	0.006	2	0.003	0.041	0.96	0.954	0.96
DAY*PHASE*SEX	0.004	1	0.004	0.035	0.855	.	.
DAY*REP	0.13	2	0.065	0.86	0.435	0.407	0.422
DAY*REP*SEX	0.049	2	0.025	0.325	0.725	0.66	0.696
DAY*SEX	0.978	1	0.978	0.614	0.447	.	.
PHASE	2.33	1	2.33	7.67	**0.016**	.	.
PHASE*REP	0.153	2	0.077	0.945	0.402	0.394	0.402
PHASE*REP*SEX	0.027	2	0.013	0.165	0.849	0.827	0.849
PHASE*SEX	0.041	1	0.041	0.136	0.718	.	.
REP	0.172	2	0.086	1.44	0.255	0.257	0.256
REP*SEX	0.115	2	0.058	0.965	0.394	0.374	0.386
SEX	0.004	1	0.004	0.028	0.871		

Appendix Table 20: GLM/ANOVA analysis of phase 3 and 5 data for Peak SPV normalized irrespective of HT Direction (Table 23).

Source	SS	Df	MS	F	P
HT_DIR	0.062	1	0.062	0.127	0.728
HT_DIR*DAY	0.011	1	0.011	0.168	0.689
HT_DIR*DAY*REP	0.031	1	0.031	0.78	0.393
HT_DIR*DAY*REP*SEX	0.108	1	0.108	2.745	0.121
HT_DIR*DAY*SEX	0.034	1	0.034	0.528	0.48
HT_DIR*REP	0.144	1	0.144	1.165	0.3
HT_DIR*REP*SEX	0.08	1	0.08	0.647	0.436
HT_DIR*SEX	0.305	1	0.305	0.622	0.444

Appendix Table 21: GLM/ANOVA analysis of TAU normalized irrespective of HT Direction.

Source	SS	df	MS	F	P	G-G	H-F
VEL	0.565	7	0.081	1.436	0.2	0.24	0.217
VEL*DAY	1.134	7	0.162	3.891	0.001	0.006	0.001
VEL*DAY*REP	0.22	7	0.031	0.976	0.454	0.434	0.454
VEL*DAY*REP*SEX	0.172	7	0.025	0.764	0.619	0.566	0.619
VEL*DAY*SEX	0.703	7	0.1	2.412	0.026	0.056	0.026
VEL*HT_DIR	0.935	7	0.134	2.837	0.010	0.04	0.018
VEL*HT_DIR*DAY	0.45	7	0.064	1.602	0.145	0.2	0.175
VEL*HT_DIR*DAY*REP	0.394	7	0.056	1.774	0.102	0.138	0.102
VEL*HT_DIR*DAY*REP*SEX	0.086	7	0.012	0.385	0.909	0.841	0.909
VEL*HT_DIR*DAY*SEX	0.205	7	0.029	0.73	0.647	0.55	0.598
VEL*HT_DIR*REP	0.832	7	0.119	2.096	0.052	0.118	0.091
VEL*HT_DIR*REP*SEX	0.936	7	0.134	2.359	0.029	0.088	0.062
VEL*HT_DIR*SEX	0.098	7	0.014	0.296	0.954	0.86	0.926
VEL*REP	1.417	7	0.202	5.784	<0.001	0.001	<0.001
VEL*REP*SEX	0.279	7	0.04	1.139	0.346	0.349	0.347
VEL*SEX	0.667	7	0.095	1.695	0.12	0.172	0.14
DAY	0.892	1	0.892	4.554	**0.052**	.	.
DAY*REP	0.086	1	0.086	2.313	0.152	.	.
DAY*REP*SEX	0	1	0	0.012	0.913	.	.
DAY*SEX	0.058	1	0.058	0.299	0.594	.	.
SEX	0.109	1	0.109	1.705	0.214		
REP*SEX	0.046	1	0.046	1.211	0.291	.	.
REP	2.041	1	2.041	53.771	**<0.001**	.	.

Appendix Table 22: GLM/ANOVA analysis of TAU normalized irrespective of HT Direction (Table 24).

Source	SS	df	MS	F	P	G-G	H-F
DAY	0.372	1	0.372	4.932	**0.045**	.	.
DAY*PHASE	0.198	1	0.198	6.931	**0.021**	.	.
DAY*PHASE*REP	0.024	2	0.012	0.535	0.592	0.544	0.573
DAY*PHASE*REP*SEX	0.001	2	0.001	0.023	0.977	0.949	0.968
DAY*PHASE*SEX	0.142	1	0.142	4.983	0.074	.	.
DAY*REP	0.012	2	0.006	0.175	0.84	0.804	0.84
DAY*REP*SEX	0.056	2	0.028	0.846	0.441	0.425	0.441
DAY*SEX	0.012	1	0.012	0.154	0.701	.	.
HT_DIR	0.001	1	0.001	0.003	0.955	.	.
HT_DIR*DAY	0	1	0	0.007	0.933	.	.
HT_DIR*DAY*PHASE	0.036	1	0.036	1.22	0.289	.	.
HT_DIR*DAY*PHASE*REP	0.045	2	0.022	1.023	0.374	0.369	0.374
HT_DIR*DAY*PHASE*REP*SEX	0.009	2	0.005	0.206	0.816	0.796	0.816
HT_DIR*DAY*PHASE*SEX	0.005	1	0.005	0.166	0.69	.	.
HT_DIR*DAY*REP	0.068	2	0.034	1.263	0.3	0.29	0.294
HT_DIR*DAY*REP*SEX	0.016	2	0.008	0.296	0.746	0.651	0.681
HT_DIR*DAY*SEX	0	1	0	0.001	0.975	.	.
HT_DIR*PHASE	0.019	1	0.019	0.498	0.493	.	.
HT_DIR*PHASE*REP	0.001	2	0	0.017	0.983	0.977	0.983
HT_DIR*PHASE*REP*SEX	0.01	2	0.005	0.268	0.767	0.747	0.767
HT_DIR*PHASE*SEX	0.163	1	0.163	4.207	0.061	.	.
HT_DIR*REP	0.04	2	0.02	0.581	0.566	0.559	0.566
HT_DIR*REP*SEX	0.253	2	0.126	3.666	0.064	0.042	0.04
HT_DIR*SEX	0.44	1	0.44	2.223	0.16	.	.
PHASE	1.472	1	1.472	12.065	**0.004**	.	.
PHASE*REP	0.056	2	0.028	0.706	0.503	0.474	0.497
PHASE*REP*SEX	0.056	2	0.028	0.713	0.499	0.471	0.494
PHASE*SEX	0.038	1	0.038	0.308	0.588	.	.
REP	0.182	2	0.091	4.039	0.065	0.038	0.065
REP*SEX	0.035	2	0.017	0.771	0.473	0.454	0.473
SEX	0.086	1	0.086	0.561	0.467		

Appendix Table 23: GLM/ANOVA of TAU for phases 3 and 5 normalized irrespective of HT Direction (Table 25).

Appendix B: Matlab Code

```
function Beep_generator(head_turn_times)

% head_turn_order =
[4,4,2,2,8,8,5,5,1,1,7,7,3,3,6,6,6,6,3,3,7,7,1,1,5,5,8,8,2,2,4,4];
% head_turn_times =
[6.6,6.6,3.2,3.2,16.8,16.8,8.3,8.3,1.6,1.6,13.3,13.3,4.1,4.1,10.5,10.5,10,.5,10
.5,4.1,4.1,13.3,13.3,1.6,1.6,8.3,8.3,16.8,16.8,3.2,3.2,6.6,6.6];

% old_head_turn_times = [1, 2, 8, 1.4, 4, .7, 2.8, 5.6, 2, 1, 1.4, 8, .7, 4,
5.6, 2.8];

Fe = 11025;
y = (1:10000);

f1 = 440*(2^(1/12));            %Do
z1 = 5*sin(2*pi*y*f1/Fe);

f2 = 440*(2^(3/12));            %Re
z2 = 5*sin(2*pi*y*f2/Fe);

f3 = 440*(2^(5/12));            %Mi
z3 = 5*sin(2*pi*y*f3/Fe);

f4 = 440*(2^(6/12));            %Fa
z4 = 5*sin(2*pi*y*f4/Fe);

f5 = 440*(2^(8/12));            %So
z5 = 5*sin(2*pi*y*f5/Fe);

f6 = 440*(2^(10/12));           %La
z6 = 5*sin(2*pi*y*f6/Fe);

f7 = 440*(2^(12/12));           %Ti
z7 = 5*sin(2*pi*y*f7/Fe);

f8 = 440*(2^(13/12));           %Do
z8 = 5*sin(2*pi*y*f8/Fe);

% [One, Fs, bits] = wavread('C:\Documents and Settings\Scott\My
Documents\AG_Lab\Thesis\1.wav');
% [Two, Fs, bits] = wavread('C:\Documents and Settings\Scott\My
Documents\AG_Lab\Thesis\2.wav');
% [Three, Fs, bits] = wavread('C:\Documents and Settings\Scott\My
Documents\AG_Lab\Thesis\3.wav');

[One, Freq1, bits1] = wavread('1.wav');
[Two, Freq2, bits2] = wavread('2.wav');
[Three, Freq3, bits3] = wavread('3.wav');


% for n=1:length(head_turn_times)
for n=1:120    % This just runs an arbitrary amount of time for now.

%     msg = ['Next HT: ', sprintf('%f', head_turn_times(n)), ' seconds.
(ENTER)'];
%     response = input(msg,'s');

%     sprintf('Next HT: %f seconds.', head_turn_times(n))

    msg = ['Enter time (.8, 1, 1.6, 3.2, 4.1, 6.6, 8.3, 10.5, 16.8): '];
```

```
    input_time_char = input(msg,'s');

    %now convert the input time to the equivalent numeric value.  Cast
    %doesn't work well, as it converts to the numeric equivalent of the
    %character's code.
    loop = 0;
    while (loop == 0)
        loop = 1;
        if(isequal(input_time_char,'6.6'))
            input_time = 6.6;
        elseif(isequal(input_time_char,'3.2'))
            input_time = 3.2;
        elseif(isequal(input_time_char,'16.8'))
            input_time = 16.8;
        elseif(isequal(input_time_char,'8.3'))
            input_time = 8.3;
        elseif(isequal(input_time_char,'1.6'))
            input_time = 1.6;
        elseif(isequal(input_time_char,'.8'))
            input_time = .8;
        elseif(isequal(input_time_char,'4.1'))
            input_time = 4.1;
        elseif(isequal(input_time_char,'10.5'))
            input_time = 10.5;
        elseif(isequal(input_time_char,'1'))
            input_time = 1;
        else
%             sprintf('Invalid time input.');
            loop = 0;
            msg2 = ['Invalid Time.\nEnter time (.8, 1, 1.6, 3.2, 4.1, 6.6, 8.3,
10.5, 16.8): '];
            input_time_char = input(msg2,'s');
        end
    end


%     time_lapse = head_turn_times(n);
    time_lapse = input_time;

    interval = (1/8) * time_lapse;
    countdown_interval = 1;  %there should be 1 second between "three, two,
one, ..."
    zend = min(10000,round(Fe*interval/4));
    z1b = z1(1:zend);
    z2b = z2(1:zend);
    z3b = z3(1:zend);
    z4b = z4(1:zend);
    z5b = z5(1:zend);
    z6b = z6(1:zend);
    z7b = z7(1:zend);
    z8b = z8(1:zend);

    msg = ['Practice = 1   Realdeal = (ENTER): '];
    flagmode = input(msg,'s');

    while(isequal(flagmode,'1'))

        %here's the 1.5 second delay to make sure the processor can keep
        %up with all of the demands of the system.
        t1 = clock;
        while etime(clock,t1) < (1.5)
        end
```

```
    % Here we play the actual beeps.
    t1 = clock;
    wavplay(z1b,Fe);
    while etime(clock,t1) < interval
    end

    t2 = clock;
    wavplay(z2b,Fe);
    while etime(clock,t2) < interval
    end

    t3 = clock;
    wavplay(z3b,Fe);
    while etime(clock,t3) < interval
    end

    t4 = clock;
    wavplay(z4b,Fe);
    while etime(clock,t4) < interval
    end

    t5 = clock;
    wavplay(z5b,Fe);
    while etime(clock,t5) < interval
    end

    t6 = clock;
    wavplay(z6b,Fe);
    while etime(clock,t6) < interval
    end

    t7 = clock;
    wavplay(z7b,Fe);
    while etime(clock,t7) < interval
    end

    t8 = clock;
    wavplay(z8b,Fe);
    while etime(clock,t8) < interval
    end

    msg = ['Practice = 1   Realdeal = (ENTER): '];
    flagmode = input(msg,'s');
end

%here's the 1.5 second delay to make sure the processor can keep
%up with all of the demands of the system.
t1 = clock;
while etime(clock,t1) < (1.5)
end

% Here we do the countdown
ta = clock;
wavplay(Three,Freq3);
while etime(clock,ta) < countdown_interval
end

tb = clock;
wavplay(Two,Freq2);
while etime(clock,tb) < countdown_interval
end

tc = clock;
```

```
    wavplay(One,Freq1);
    while etime(clock,tc) < countdown_interval
    end

    % Here we play the actual beeps.
    t1 = clock;
    wavplay(z1b,Fe);
    while etime(clock,t1) < interval
    end

    t2 = clock;
    wavplay(z2b,Fe);
    while etime(clock,t2) < interval
    end

    t3 = clock;
    wavplay(z3b,Fe);
    while etime(clock,t3) < interval
    end

    t4 = clock;
    wavplay(z4b,Fe);
    while etime(clock,t4) < interval
    end

    t5 = clock;
    wavplay(z5b,Fe);
    while etime(clock,t5) < interval
    end

    t6 = clock;
    wavplay(z6b,Fe);
    while etime(clock,t6) < interval
    end

    t7 = clock;
    wavplay(z7b,Fe);
    while etime(clock,t7) < interval
    end

    t8 = clock;
    wavplay(z8b,Fe);
    while etime(clock,t8) < interval
    end

%     etime(clock, t1)

end
```

```
function AvgVelocityArray = getAvgHTVels(tumb_button_vector, head_pot_vector,
HTRangeDegrees, SamplingRateHertz, NUPabs, REDabs, noisecoefficient,
outputfilename)

%**************************************************************************
% Preconditions:
%
% load('C:\Documents and Settings\Scott\My
Documents\AG_Lab\Thesis\Subjects\[name]\ProcessedMatlabs\T_TY_D1A_run03_LV.mat'
)
%
% getAvgHTVels(tumb_button_vector, head_pot_vector, 60, 60, 2560, 2725, 5,
'Tanya_Y_D1_run03_temp_excel.xls')
%
% 6.6,3.2,16.8,8.3,1.6,13.3,4.1,10.5,4.1,13.3,1.6,8.3,16.8,3.2,6.6
%
%**************************************************************************

%Constants
arrowheight = 30;  %units of potentiometer, height of start/stop pointer off
the line
velarrowheight = 15;  %units of degrees, height of peak velocity pointer off
the line
arrowmarker = '\color{red}\downarrow';
window_pos_size = [100 100 900 800];
peak_size = 60;  %this is the size "difference" of the peaks to scrub out
peakvelocitytailskip = 8;   %this is the number of indices to skip in
evaluating the peak velocity
                            %so that we don't inadvertantly use the
                            %"tails".

savetempfile = 0; %This turns tempfile outputting OFF = 0, ON = 1
saveexcelfile = 1; %This saves the ouptut into an excel file of the filename in
the function header.
velocity_plots = 1;  %This turns velocity headturn plots OFF = 0, ON = 1
velocity_smooth_frame = 25;  %This is the length of the frame for the moving
average used in the velocity plots.

head_pot_filtered = head_pot_vector;  %make a copy to actually filter.

%Before we can work with the head-pot data, we need to filter the really
%obvious spikes out of it.  We do that by running a basic moving comparison
%eliminating any point that's beyond 50 points from the previous.  We could
%also do a standard deviation, but I'm worried about that monkeying with
%the head turns.  This really should just be a very gross filtering.

for w = 60:(length(head_pot_filtered))
    if( (abs(head_pot_filtered(w) - head_pot_filtered(w-1))) > peak_size)
        head_pot_filtered(w) = head_pot_filtered(w-1);
    end
end

%Now we do a more traditional moving-average smoothing.  I wanted to get
%rid of the huge spikes first manually, so they're not incorporated into
%the moving average.  With a span of 5, a spike could significantly alter
%the average.  IMPORTANT:  This allows me to adjust my "noisecoefficient"
%down to roughly 5, so that I increase the specificity of the head-turn
%bound detection (i.e. it doesn't cut the HT short as it would if the value
% were 15).
head_pot_filtered = smooth (head_pot_filtered, 5, 'moving');

%**************************************************************************
```

```
% Pseudocode:
%
% 1)  ID HT button presses (required)
% 2)  get pot data points for corresponding HT
% 3)  get avg velocity, and differentiate to view the velocity profile.
%
%
ButtonPressed = [0];  % This holds the absolute indices of the HT starts
HTBegin = [0];
HTEnd = [0];
Errorflag = [0];
startPos = 0;  % 1 = LED, 2 = NUP

baseline = median(tumb_button_vector(1:60));

for n = 2:length(tumb_button_vector)
   if(tumb_button_vector(n) > (tumb_button_vector(n-1) + 450))
       if(ButtonPressed(1) == 0)
           ButtonPressed = [n];
       else
           ButtonPressed = [ButtonPressed, n];
       end
   end
end

% IMPORTANT - the buttonpressed point doesn't always exactly find the
% correct start point of the head turn if they press the button too soon.
% In that case, we need to adjust the button-pressed point to account for
% when they "actually" started moving their head.  We do this similar to
% the way we identify the actual end point of the head turn.  We use the
% same threshold for noise coefficient.

% TODO LATER - anchored at the buttonpressed point, we look +/- one second
% and see if we can find the point where the next point is +/- beyond the
% noise threshold.  Call that the new buttonpressed index.

    % Problem - This could be problematic, as a very slow HT may not exceed
    % the noise ratio from sample to sample.  Maybe its best to eyeball
    % this one and adjust the data set directly for each dataset.



%Now we have a vector "ButtonPressed" with the start points of all
%headturn indices. So now, for each element in that array we evaluate the
%potentiometer data for that reference and define the headturn stop index.

for n = 1:length(ButtonPressed)
    baseline = median (head_pot_filtered((ButtonPressed(n) -
SamplingRateHertz):ButtonPressed(n)));

%     if((REDabs > baseline + noisecoefficient) | (REDabs < baseline -
noisecoefficient))
%         Errorflag (n) = 1;

    %Now I need to determine if the baseline is for NUP or RED or what.
    if((baseline < (REDabs + noisecoefficient)) & (baseline > (REDabs -
noisecoefficient)))
        startPos = 2;  % RED
    elseif((baseline < (NUPabs + noisecoefficient)) & (baseline > (NUPabs -
noisecoefficient)))
        startPos = 1;  % NUP
    else
```

```
        startPos = 0;
    end

    % So we have our baseline, and we have our direction, so now we just
    % step through the potentiometer data until we hit a point where the
    % current index's data is within the noise range of the absolute value
    % of either NUP or RED, depending on the direction of the turn.

    m = ButtonPressed(n);
    found = 0;

    if(startPos ~= 0)
        while((found == 0) & (m<length(head_pot_filtered)))
            m = m+1;
            if(startPos == 2)

                if((head_pot_filtered(m) < (NUPabs + noisecoefficient)) &
(head_pot_filtered(m) > (NUPabs - noisecoefficient)))
                    found = 1;
                    HTEnd(n) = m;
                end

            elseif(startPos == 1)

                if((head_pot_filtered(m) < (REDabs + noisecoefficient)) &
(head_pot_filtered(m) > (REDabs - noisecoefficient)))
                    found = 1;
                    HTEnd(n) = m;
                end
            end
        end
    end

end

HTBegin = ButtonPressed;


%Now we have an array with all our HT Beginning indices as well as our
%HT Ending indices.  So we can now just subtract the numbers to get the
%number of indices per turn, and divide that by the sampling rate to get
%the time duration for the head turn.

HTSampleNumbers = [0];

if(length(HTBegin) == length(HTEnd))
    for(n = 1:length(HTBegin))
        if(HTSampleNumbers(1) == 0)
            HTSampleNumbers(n) = HTEnd(n) - HTBegin(n);
        else
            HTSampleNumbers = [HTSampleNumbers, HTEnd(n) - HTBegin(n)];
        end
    end
end

HTTimes = HTSampleNumbers;

for(n = 1:length(HTSampleNumbers))
    HTTimes(n) = (HTSampleNumbers(n)/SamplingRateHertz);
end

%Now, we divide the HT degrees by the HT time to get the average HT
%velocity.
```

```
AvgHTVelocity = HTTimes;

for(n=1:length(HTTimes))
    AvgHTVelocity(n) = HTRangeDegrees/HTTimes(n);
end


%Finally, we get the peak head turn velocity, and the index of that peak.
% diff_graph = diff(turn_plot)./diff(turn_plot_time)';
% diff_graph_smooth = smooth(diff_graph, velocity_smooth_frame, 'moving');
% translate = abs(NUPabs-REDabs)/HTRangeDegrees;  %translate pot to degrees, to
give X units of pot per degree.
% plot(turn_plot_time(1:(length(turn_plot_time)-1)),
(diff_graph_smooth/translate));


%***********************************************************************
% DEBUG OUTPUTS
HTBegin
HTEnd
AvgHTVelocity
HTTimes
HTSampleNumbers
%***********************************************************************


%Now I want to output the analysis into an Excel file, if so flagged.
if(saveexcelfile == 1)


    fid_excel = fopen(outputfilename, 'w');
    fprintf(fid_excel, 'HT\tHT Duration\tHT Avg Vel\tHT Peak Vel\tHT Angle\n');

    for i=1:length(HTBegin)
        fprintf(fid_excel, '%u\t %8.2f\t %8.2f\t %8.2f\t %8.2f\n', i,
HTTimes(i), AvgHTVelocity(i), 0, HTRangeDegrees);
    end
    fclose(fid_excel);
end

%***********************************************************************
% Now that I've done all the work to generate the actual numbers, I can
% output the data into a bunch of fancy schmancy graphs to allow for better
% visualization of the accuracy of the algorithm's selections.
%
%***********************************************************************

o = 1;
while (o < length(HTBegin))
%Process HT graphs in groups of 6

    pos_figure = figure('Position', window_pos_size);
    subplot(4,2,1:2);
    total_plot_time =
0:(1/SamplingRateHertz):((1/SamplingRateHertz)*(length(head_pot_filtered)-1));
    plot (total_plot_time, head_pot_filtered);
    xlabel('Time (s)','FontSize',16);
    ylabel('Pot','FontSize',16);
    title('Head Pot Values per time','FontSize',12);
    grid on
```

```
    if(velocity_plots == 1)
        vel_figure = figure('Position', window_pos_size);
        subplot(4,2,1:2);


        diff_graph = diff(head_pot_filtered)./diff(total_plot_time)';
        diff_graph_smooth = smooth(diff_graph, velocity_smooth_frame,
'moving');
        plot(diff_graph_smooth);

        xlabel('Time (s)','FontSize',16);
        ylabel('\leftarrow L  HTV (\circ/s)  R \rightarrow' ,'FontSize',16);
        title('HT Velocity Per Time','FontSize',12);
        grid on

        figure(pos_figure);
    end


    p1 = (o-((o-1)/2));
    p2 = p1 + 2;

    plotnum = 1;

    %This reads the tempfile output swicth and toggles the control for file
    %output of the data plot intermediary for testing.
    if(savetempfile==1)
        saved = 0;
    else
        saved = 1;
    end


    for(p = p1:p2)
        subplot(4,2,(2*plotnum)+1);
        lead_in = head_pot_filtered((HTBegin(2*p-1)-60):(HTBegin(2*p-1)-1));
        plot_array = head_pot_filtered(HTBegin(2*p-1):HTEnd(2*p-1));
        lead_out = head_pot_filtered((HTEnd(2*p-1)+1):(HTEnd(2*p-1)+60));
        turn_plot_time =
0:(1/SamplingRateHertz):((1/SamplingRateHertz)*(length(plot_array)+length(lead_
in) + length(lead_out)-1));

        turn_plot = lead_in;
        turn_plot = cat(1, turn_plot, plot_array);
        turn_plot = cat(1, turn_plot, lead_out);
        plot (turn_plot_time, turn_plot);

        text(turn_plot_time(61), (plot_array(1)+arrowheight), arrowmarker);
        text(turn_plot_time(length(turn_plot_time)-60),
(plot_array(length(plot_array)) + arrowheight), arrowmarker);

        xlabel('Time (s)','FontSize',16);
        ylabel('Pot','FontSize',16);
        tit = sprintf('Head Turn %u', (2*p)-1);
        title( tit,'FontSize',12);
        grid on;

        if(velocity_plots == 1)
            figure(vel_figure);
            subplot(4,2,(2*plotnum)+1);

            diff_graph = diff(turn_plot)./diff(turn_plot_time)';
```

```
            diff_graph_smooth = smooth(diff_graph, velocity_smooth_frame,
'moving');
%             plot(diff_graph_smooth);

            translate = abs(NUPabs-REDabs)/HTRangeDegrees;  %translate pot to
degrees, to give X units of pot per degree.

            plot(turn_plot_time(1:(length(turn_plot_time)-1)),
(diff_graph_smooth/translate));

            peakvel =
max(diff_graph_smooth(peakvelocitytailskip:(length(diff_graph_smooth)-
peakvelocitytailskip))/translate);
            differences = diff_graph_smooth/translate;

            for (velindex = 1:length(diff_graph_smooth))
                if (differences(velindex) == peakvel)
                    peakvelindex = velindex;
                end
            end

            %plot an arrow on the max velocity point
            text(((peakvelindex-1)/SamplingRateHertz), peakvel+velarrowheight,
arrowmarker);
            text(((peakvelindex-1)/SamplingRateHertz), peakvel-
(velarrowheight*4), num2str(peakvel));

            xlabel('Time (s)','FontSize',16);
            ylabel('HTV (\circ/s)','FontSize',16);
            tit = sprintf('Head Turn %u', (2*p)-1);
            title( tit,'FontSize',12);
            grid on;

            figure(pos_figure);
        end


 %This outputs the first headturn to a data file for testing and playing
 %around purposes.  Strictly debug use.
if(saved==0)
temp_turn_plot = turn_plot;
temp_turn_plot_time = turn_plot_time;
save('tempfile', 'temp_turn_plot', 'temp_turn_plot_time');
saved = 1;
end

        subplot(4,2,(2*plotnum)+2);
        lead_in = head_pot_filtered((HTBegin(2*p)-60):(HTBegin(2*p)-1));
        plot_array = head_pot_filtered(HTBegin(2*p):HTEnd(2*p));
        lead_out = head_pot_filtered((HTEnd(2*p)+1):(HTEnd(2*p)+60));
        turn_plot_time =
0:(1/SamplingRateHertz):((1/SamplingRateHertz)*(length(plot_array)+length(lead_
in) + length(lead_out)-1));

        turn_plot = lead_in;
        turn_plot = cat(1, turn_plot, plot_array);
        turn_plot = cat(1, turn_plot, lead_out);
        plot (turn_plot_time, turn_plot);

        text(turn_plot_time(61), (plot_array(1)+arrowheight), arrowmarker);
        text(turn_plot_time(length(turn_plot_time)-60),
(plot_array(length(plot_array)) + arrowheight), arrowmarker);
```

```
        xlabel('Time (s)','FontSize',16);
        ylabel('Pot','FontSize',16);
        tit = sprintf('Head Turn %u', 2*p);
        title( tit,'FontSize',12);
        grid on


        if(velocity_plots == 1)
            figure(vel_figure);
            subplot(4,2,(2*plotnum)+2);

            diff_graph = diff(turn_plot)./diff(turn_plot_time)';
            diff_graph_smooth = smooth(diff_graph, velocity_smooth_frame,
'moving');
%             plot(diff_graph_smooth);

            translate = abs(NUPabs-REDabs)/HTRangeDegrees;  %translate pot to
degrees, to give X units of pot per degree.

            plot(turn_plot_time(1:(length(turn_plot_time)-1)),
(diff_graph_smooth/translate));

            % peakvel = min(diff_graph_smooth/translate);
            peakvel =
min(diff_graph_smooth(peakvelocitytailskip:(length(diff_graph_smooth)-
peakvelocitytailskip))/translate);
            differences = diff_graph_smooth/translate;

            for (velindex = 1:length(diff_graph_smooth))
                if (differences(velindex) == peakvel)
                    peakvelindex = velindex;
                end
            end

            %plot an arrow on the max velocity point
            text(((peakvelindex-1)/SamplingRateHertz), peakvel+velarrowheight,
arrowmarker);
            text(((peakvelindex-1)/SamplingRateHertz),
peakvel+(velarrowheight*4), num2str(peakvel));

            xlabel('Time (s)','FontSize',16);
            ylabel('HTV (\circ/s)','FontSize',16);
            tit = sprintf('Head Turn %u', 2*p);
            title( tit,'FontSize',12);
            grid on

            figure(pos_figure);
        end

        plotnum = plotnum +1;
    end


% %test plot
% figure('Position', window_pos_size);
% %subplot(4,2,1:2);
% total_plot_time =
0:(1/SamplingRateHertz):((1/SamplingRateHertz)*(length(head_pot_filtered)-1));
% plot (total_plot_time, head_pot_filtered);
% xlabel('Time (s)','FontSize',16);
% ylabel('Pot','FontSize',16);
% title('Head Pot Values per time','FontSize',12);
```

```
% grid on

%scratch paper
%1, 2, 8, 1.4, 4, .7, 2.8, 5.6, 2, 1, 1.4, 8, .7, 4, 5.6, 2.8

% Now lets plot the velocities by getting the derivatives.
% figure


o = o+6;  %this increments our 6-plot group selector.
end

%*********************************************************************


% ----------------------------------------------------------------------
%  Completely manual operation - this is so we can manually get the head
%  turn velocities assuming something catastrophic like a loss of tumbling
%  button data or something weird like that.
% ----------------------------------------------------------------------
%
% load(c:\working_data\....);
%
% head_pot_filtered = head_pot_vector;
%
% peak_size = 70;
% SamplingRateHertz = 60;
% window_pos_size = [100 100 900 800];
%
% for w = 60:(length(head_pot_filtered))
%     if( (abs(head_pot_filtered(w) - head_pot_filtered(w-1))) > peak_size)
%         head_pot_filtered(w) = head_pot_filtered(w-1);
%     end
% end
%
% head_pot_filtered = smooth (head_pot_filtered, 5, 'moving');
%
% pos_figure = figure('Position', window_pos_size);
% total_plot_time =
0:(1/SamplingRateHertz):((1/SamplingRateHertz)*(length(head_pot_filtered)-1));
% plot (total_plot_time, head_pot_filtered);
% xlabel('Time (s)','FontSize',16);
% ylabel('Pot','FontSize',16);
% title('Head Pot Values per time','FontSize',12);
% grid on
```

Appendix C: Consent Forms

CONSENT TO PARTICIPATE IN NON-BIOMEDICAL RESEARCH

Neurovestibular Aspects of Artifical Gravity: Toward a Comprehensice Countermeasure.

You are asked to participate in a research study conducted by Laurence Young, Sc.D., from the Department of Aeronautics and Astronautics at the Massachusetts Institute of Technology (M.I.T.) The NASA Johnson Space Center is also participating in this study. The results of this study may be published in a student thesis or scientific journal. You were selected as a possible participant in this study because you volunteered and meet the minimum health and physical requirements. You should read the information below, and ask questions about anything you do not understand, before deciding whether or not to participate.

PARTICIPATION AND WITHDRAWAL

Your participation in this study is completely voluntary and you are free to choose whether to be in it or not. If you choose to be in this study, you may subsequently withdraw from it at any time without penalty or consequences of any kind. The investigator may withdraw you from this research if circumstances arise which warrant doing so. Such circumstances include evidence that you do not meet the minimum health and physical requirements, or that during the study it becomes clear to the experimenter that are becoming drowsy, unalert, or uncooperative.

You should not participate in this study if you have any medical heart conditions, respiratory conditions, medical conditions which would be triggered if you develop motion sickness, are under the influence of alcohol, caffeine, anti-depressants, or sedatives, have suffered in the past from a serious head injury (concussion), or if there is any possibility that you may be pregnant. The experimenter will check to see if you meet these requirements.

PURPOSE OF THE STUDY

The purpose of this study is to understand the cognitive and physiological effects of short-radius centrifugation used to produce Artificial Gravity (AG). Short radius centrifugation is currently being investigated as a countermeasure to the deleterious effects of weightlessness experienced during long duration spaceflight.

PROCEDURES USED IN THIS STUDY

If you volunteer to participate in this study, we would ask you to do the following things: When you arrive at the lab, you will be briefed on the background of centrifugation, disqualifying medical conditions, the experiment protocol, and the various components of the centrifuge, including the emergency stop button, restraining belt, and data collection devices. Data collection devices include goggles that monitor your eye movement, heart rate sensors, and sensors that detect your head movement. After your briefing, the experimenter will record your answers to basic questions about your health, and take your height, weight, blood pressure, and heart rate.

During the experiment you will he on the centrifuge In either the supine position, the prone position, or on the side on the rotator bed You may be asked to place your head Into a cushioned pivoting helmet at the center of the centrifuge that limits your head movement to one or several rotational axes After lying down, the experimenter may collect some data while the centrifuge is stationary. The experimenter will ask you if you are ready before starting rotation. Your rotation on the AGs will not exceed the following parameters:

- Acceleration no greater than 5 revolutions per minute, per second
- G-level along you body axis will not exceed 2.0G at your feet (a "1G" is defined as the acceleration or force that you experience normally while standing on earth)
- Time of rotation not exceeding 1 hour

During rotation the experimenter may direct you to make voluntary head movements or to perform simple tasks such as adjusting a line of lights or reading portions of text. A possible protocol for an actual trial will consist of a short period of supine rest in the dark, followed by a period of head movements (ranging from 90 degrees to the left, to vertical, to 90 degrees to the right) In the dark, followed by a period of similar head movements In the light, and that this trial could be repeated many times. During these head movements, your head should move at approximately a speed of 0.25 meters per second.

During and after the experiment you will be asked to report your subjective experience (how you feel, how you perceive your head movements, etc.). During and after the experiment you will be asked to report your motion sickness rating. This data will be recorded anonymously.

When the experiment is complete, the centrifuge will be stopped, and the experimenter may collect some additional data.

As a participant in experimental trials, you tentatively agree to return for additional trials (at most 10) requested by the experimenter. You may or may not be assigned to a study group that performs similar tasks. Other than the time required for rotation, the time commitment is 20 minutes for the first briefing, and 10-60 minutes for other procedures before and after rotation.

POTENTIAL RISKS AND DISCOMFORTS

During rotation you may develop a headache or feel pressure In your legs caused by a fluid shift due to centrifugation You may also experience nausea or motion sickness, especially as a result of the required head movements You will not be forced to make any head movements If you experience any discomfort, you are free to discontinue head movements at any time. The experimenter will frequently ask you about your motion sickness to ensure your comfort. You may also feel sleepy during the experiment, and the experimenter will monitor your alertness through communication and through a video camera.

ANTICIPATED BENEFITS TO SUBJECTS

You will receive no benefits from this research.

ANTICIPATED BENEFITS TO SOCIETY

The potential benefits to science and society are a better understanding of how short radius centrifugation can enable long duration spaceflight.

PAYMENT FOR PARTICIPATION

Eligible subjects will receive payment of $10/hr for their participation. Checks will be mailed within 4-6 weeks of participation. Subjects not eligible for compensation include international students who work more than 20 hours per week, or volunteers from the M.I.T. Man Vehicle Lab.

PRIVACY AND CONFIDENTIALITY

Any information that Is obtained In connection with this study and that can be identified with you will remain confidentlal and will be disclosed only with your permission or as required by law.

Some of the data collected in this study may be published In scientific journals and student theses, or archived with the National Space Biomedical Research Institute. The data may consist of measurements of your eye movement, subjective ratings of illusions experienced during centrifugation, subjective descriptions of your experience during centrifugation, measurements related to your subjective orientation in space, measurements of your cognitive abilities before, during, and after centrifugation, subjective ratings of your motion sickness, and heart rate.

During the experiment, the experimenter will monitor you through a video camera capable of imaging in darkness. You will be monitored to ensure your state of well being and compliance with the experiment protocol. In some cases the video data will be recorded on VHS tapes. You have a right to review and edit the tape. Any recorded videotapes will be accessible only by members of the current Artificial Gravity research team. Videotapes will be erased in 5 years, at most.

Research data collected during the experiment is stored in coded files that contain no personal information. This coding of the data will prevent linking your personal data to research data when it is analyzed or archived. Research data is stored in Microsoft excel files and ASCII files, and there is no certain date for destruction. The data is stored in Man Vehicle Lab computers that remain accessible only by Artificial Gravity team members, except data archived with the National Space Biomedical Research Institute. The investigator will retain a record of your participation so that you may be contacted in the future should your data be used for purposes other than those described here.

EMERGENCY CARE AND COMPENSATION FOR INJURY

"In the unlikely event of physical injury resulting from participation in this research you may receive medical treatment from the M.I.T. Medical Department, including emergency treatment and follow-up care as needed. Your insurance carrier may be billed for the cost of such treatment. M.I.T. does not provide any other form of compensation for injury. Moreover, in either providing or making such medical care available it does not imply the injury is the fault of the investigator. Further information may be obtained by calling the MIT Insurance and Legal Affairs Office at 1-617-253 2822."

IDENTIFICATION OF INVESTIGATORS

If you have any questions or concerns about the research, please feel free to contact:

Principle Investigator: Laurence Young (37-219) 77 Massachusetts Avenue Cambridge, MA 02139 (617) 253-7759	

RIGHTS OF RESEARCH SUBJECTS

You are not waiving any legal claims, rights or remedies because of your participation in this research study. If you feel you have been treated unfairly, or you have questions regarding your lights as a research subject, you may contact the Chairman of the Committee on the Use of Humans as Experimental Subjects, M.I.T., Room E23-230, 77 Massachusetts Ave, Cambridge, MA 02139, phone 1-617-253 4909.

SIGNATURE OF RESEARCH SUBJECT OR LEGAL REPRESENTATIVE

I have read (or someone has read to me) the information provided above. I have been given an opportunity to ask questions and all of my questions have been answered to my satisfaction. I have been given a copy of this form.

BY SIGNING THIS FORM, I WILLINGLY AGREE TO PARTICIPATE IN THE RESEARCH IT DESCRIBES.

____

Name of Subject

____

Name of Legal Representative (if applicable)

____________________________________ _____________

Signature of Subject or Legal Representative Date

SIGNATURE OF INVESTIGATOR

I have explained the research to the subject or his/her legal representative, and answered all of his/her questions. I believe that he/she understands the information described in this document and freely consents to participate.

____

Name of Investigator

____________________________________ ___________________________

Signature of Investigator Date (must be the same as subject's)

SIGNATURE OF WITNESS (If required by COUHES)

My signature as witness certified that the subject or his/her legal representative signed this consent form in my presence as his/her voluntary act and deed.

______________________________ ___________________________

Name of Witness Date

Appendix D: Raw Subject Datasets

SUB	SEX	RPM	DAY	PSE#	PSE	HT	HTDIR	HTD	HTV	AHTD	AHTV	PKV	MS	TLT	DPHT	INT	TAU	SPV
101	M	0	1	2	pre		to RED	1	60.00				0	45		0		
101	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
101	M	0	1	2	pre		to RED	1	60.00				0	45		0		
101	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
101	M	0	1	2	pre		to RED	1	60.00				0	45		0		
101	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
101	M	23	1	3	PRE	1	to RED	1	60.00	1.4	42.86	57.1	0	43	7.05	10	7.72	-43.31
101	M	23	1	3	PRE	2	to NUP	1	60.00	0.93	64.52	81.6	0	45	9.37	12	6.76	55.73
101	M	23	1	3	PRE	3	to RED	1	60.00	1.05	57.14	70.5	0	45	5.28	10	6.89	-64.38
101	M	23	1	3	PRE	4	to NUP	1	60.00	1.08	55.56	71.9	0	45	7.2	12	7.29	63.43
101	M	23	1	3	PRE	5	to RED	1	60.00	1.03	58.25	73.8	0	45	7.62	10	7.76	-42.73
101	M	23	1	3	PRE	6	to NUP	1	60.00	0.95	63.16	88.3	1	45	8.67	14	6.25	65.06
101	M	19	1	4	STIM	7	to RED	4.1	14.63	3.7	16.22	39.4	0	45	0.83	5	6.38	-39.15
101	M	19	1	4	STIM	8	to NUP	4.1	14.63	3.1	19.35	30.5	0	47	5.37	7	5.48	44.98
101	M	19	1	4	STIM	9	to RED	8.3	7.23	6.82	8.80	24.3	0	45	5.35	4	6.53	-28.76
101	M	19	1	4	STIM	10	to NUP	8.3	7.23	5	12.00	23.6	0	45	5.38	4	6.13	70.51
101	M	19	1	4	STIM	11	to RED	0.8	75.00	0.88	68.18	73.6	0	45	4.39	7	7.25	-40.77
101	M	19	1	4	STIM	12	to NUP	0.8	75.00	0.92	65.22	76.5	0	45	9.33	10	5.30	46.72
101	M	19	1	4	STIM	13	to RED	16.8	3.57	16.98	3.53	22.3	0	45	1	1	7.69	-19.23
101	M	19	1	4	STIM	14	to NUP	16.8	3.57	16.27	3.69	15.9	0	45	4.03	2	5.27	38.15
101	M	19	1	4	STIM	15	to RED	6.6	9.09	5.67	10.58	25.5	0	45	3.85	3	5.52	-28.52
101	M	19	1	4	STIM	16	to NUP	6.6	9.09	6	10.00	22.5	0	45	6.1	4	5.10	62.64
101	M	19	1	4	STIM	17	to RED	3.2	18.75	2.72	22.06	44.8	0	45	4.33	5	7.05	-43.18
101	M	19	1	4	STIM	18	to NUP	3.2	18.75	2.98	20.13	33.5	0	45	4.7	5	5.81	49.24
101	M	19	1	4	STIM	19	to RED	1.6	37.50	1.4	42.86	55.7	0	45	4.92	7	5.76	-43.73
101	M	19	1	4	STIM	20	to NUP	1.6	37.50	1.43	41.96	49.2	0	45	6.3	7	5.42	43.42
101	M	19	1	4	STIM	21	to RED	10.5	5.71	9.15	6.56	17.6	0	45	1.82	3	5.89	-29.48
101	M	19	1	4	STIM	22	to NUP	10.5	5.71	7.8	7.69	18.2	0	45	4.33	3	5.84	44.80
101	M	19	1	4	STIM	23	to RED	10.5	5.71	10.03	5.98	18.2	0	45	3.54	3	6.69	-27.30
101	M	19	1	4	STIM	24	to NUP	10.5	5.71	9.33	6.43	16.6	0	45	4.5	3	6.23	55.59
101	M	19	1	4	STIM	25	to RED	1.6	37.50	1.75	34.29	43.4	0	45	4.95	3	7.45	-38.68
101	M	19	1	4	STIM	26	to NUP	1.6	37.50	1.67	35.93	41.8	0	45	5.93	4	5.15	50.72
101	M	19	1	4	STIM	27	to RED	3.2	18.75	3.43	17.49	29.8	0	45	4.74	3	5.31	-30.22
101	M	19	1	4	STIM	28	to NUP	3.2	18.75	2.72	22.06	31	0	45	6.25	5	6.25	29.56
101	M	19	1	4	STIM	29	to RED	6.6	9.09	6.68	8.98	28.5	0	45	3.97	3	5.80	-33.34
101	M	19	1	4	STIM	30	to NUP	6.6	9.09	5.82	10.31	21.8	0	45	4.8	2	6.16	39.90
101	M	19	1	4	STIM	31	to RED	16.8	3.57	14.8	4.05	17.8	0	45	3.85	1	7.27	-18.98
101	M	19	1	4	STIM	32	to NUP	16.8	3.57	12.23	4.91	16.7	0	45	3.59	1	5.65	30.00
101	M	19	1	4	STIM	33	to RED	0.8	75.00	1.2	50.00	71.2	0	45	5.37	6	4.35	-44.75
101	M	19	1	4	STIM	34	to NUP	0.8	75.00	1.18	50.85	67.2	0	45	5.8	8	5.89	44.79
101	M	19	1	4	STIM	35	to RED	8.3	7.23	6.72	8.93	24.6	0	45	5.18	4	5.48	-32.11
101	M	19	1	4	STIM	36	to NUP	8.3	7.23	5.13	11.70	20.6	0	45	4.02	3	5.10	60.39
101	M	19	1	4	STIM	37	to RED	4.1	14.63	4.27	14.05	30.5	0	45	4.88	3	5.34	-28.40
101	M	19	1	4	STIM	38	to NUP	4.1	14.63	3.7	16.22	30.7	0	45	5.23	6	4.44	49.89
101	M	23	1	5	POST	39	to RED	1	60.00	1.52	39.47	56.7	0	45	5.13	7	5.17	-47.56

101	M	23	1	5	POST	40	to NUP	1	60.00	1.43	41.96	60.7	0	45	6.44	9	6.03	48.93
101	M	23	1	5	POST	41	to RED	1	60.00	1.1	54.55	65.1	0	45	4.72	6	4.45	-48.84
101	M	23	1	5	POST	42	to NUP	1	60.00	1.33	45.11	62.1	1	45	5.84	9	5.00	47.52
101	M	23	1	5	POST	43	to RED	1	60.00	1.47	40.82	51.1	1	45	6.78	7	4.89	-39.57
101	M	23	1	5	POST	44	to NUP	1	60.00	1.1	54.55	67.5	0	45	7.05	9	4.92	38.74
101	M	0	1	6	post		to RED	1	60.00				0	45		0		
101	M	0	1	6	post		to NUP	1	60.00				0	45		0		
101	M	0	1	6	post		to RED	1	60.00				0	45		0		
101	M	0	1	6	post		to NUP	1	60.00				0	45		0		
101	M	0	1	6	post		to RED	1	60.00				0	45		0		
101	M	0	1	6	post		to NUP	1	60.00				0	45		0		
101	M	0	2	2	pre		to RED	1	60.00				0	45		0		
101	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
101	M	0	2	2	pre		to RED	1	60.00				0	45		0		
101	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
101	M	0	2	2	pre		to RED	1	60.00				0	45		0		
101	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
101	M	23	2	3	PRE	1	to RED	1	60.00	1.23	48.78	57.1	0	45	3.89	5	6.53	-12.83
101	M	23	2	3	PRE	2	to NUP	1	60.00	0.88	68.18	86.1	0	45	8.3	10	6.25	31.57
101	M	23	2	3	PRE	3	to RED	1	60.00	1.32	45.45	56	0	45	4.88	6	4.75	-15.68
101	M	23	2	3	PRE	4	to NUP	1	60.00	0.93	64.52	79.6	0	45	6.2	6	6.08	30.01
101	M	23	2	3	PRE	5	to RED	1	60.00	0.92	65.22	76.1	0	45	3.91	4	5.58	-12.63
101	M	23	2	3	PRE	6	to NUP	1	60.00	0.83	72.29	70.7	0	45	8.4	7	5.42	33.08
101	M	19	2	4	STIM	7	to RED	4.1	14.63	3.97	15.11	27.8	0	45	2.76	3	4.59	-8.67
101	M	19	2	4	STIM	8	to NUP	4.1	14.63	2.85	21.05	29.6	0	45	5.13	4	4.80	36.55
101	M	19	2	4	STIM	9	to RED	8.3	7.23	7.17	8.37	26.5	0	45	3.56	3	4.83	-8.09
101	M	19	2	4	STIM	10	to NUP	8.3	7.23	6.15	9.76	18.9	0	45	5.65	3	5.10	33.15
101	M	19	2	4	STIM	11	to RED	0.8	75.00	0.93	64.52	77.8	0	45	4.02	3	4.41	-11.81
101	M	19	2	4	STIM	12	to NUP	0.8	75.00	1.02	58.82	73.3	0	45	4.68	4	4.40	30.22
101	M	19	2	4	STIM	13	to RED	16.8	3.57	15.37	3.90	16.1	0	45	1.83	1	3.29	-3.91
101	M	19	2	4	STIM	14	to NUP	16.8	3.57	16.15	3.72	15.8	0	45	1.6	2	4.58	23.23
101	M	19	2	4	STIM	15	to RED	6.6	9.09	4.88	12.30	25.8	0	45	3.25	3	4.21	-8.68
101	M	19	2	4	STIM	16	to NUP	6.6	9.09	4.12	14.56	23.9	0	45	4.1	2	4.93	36.06
101	M	19	2	4	STIM	17	to RED	3.2	18.75	2.88	20.83	30.5	0	45	3.94	2	5.56	-9.51
101	M	19	2	4	STIM	18	to NUP	3.2	18.75	2.58	23.26	38.6	0	45	4.05	3	4.32	18.38
101	M	19	2	4	STIM	19	to RED	1.6	37.50	1.37	43.80	54.3	0	45	2.75	3	5.49	-14.51
101	M	19	2	4	STIM	20	to NUP	1.6	37.50	1.9	31.58	42.9	0	45	0.47	3	4.24	31.92
101	M	19	2	4	STIM	21	to RED	10.5	5.71	8.3	7.23	21.1	0	45	7.3	2	4.80	-8.14
101	M	19	2	4	STIM	22	to NUP	10.5	5.71	6.82	8.80	20.6	0	45	5.18	2	5.50	22.40
101	M	19	2	4	STIM	23	to RED	10.5	5.71	8.5	7.06	32.8	0	45	4.5	1	3.37	-17.29
101	M	19	2	4	STIM	24	to NUP	10.5	5.71	7.17	8.37	16.9	0	45	3.71	2	3.11	22.16
101	M	19	2	4	STIM	25	to RED	1.6	37.50	1.47	40.82	52.4	0	45	3.03	2	3.90	-15.93
101	M	19	2	4	STIM	26	to NUP	1.6	37.50	1.58	37.97	46.3	0	45	4.57	3	6.20	10.58
101	M	19	2	4	STIM	27	to RED	3.2	18.75	2.67	22.47	34.7	0	45	3.25	3	4.17	-10.54
101	M	19	2	4	STIM	28	to NUP	3.2	18.75	2.42	24.79	35.4	0	45	4.55	3	5.27	14.28
101	M	19	2	4	STIM	29	to RED	6.6	9.09	5.68	10.56	20.1	0	45	2.94	2	3.02	-19.38
101	M	19	2	4	STIM	30	to NUP	6.6	9.09	4.62	12.99	23.5	0	45	3.76	2	4.15	-2.55
101	M	19	2	4	STIM	31	to RED	16.8	3.57	17.42	3.44	14.3	0	45	2.36	1	4.99	7.21

101	M	19	2	4	STIM	32	to NUP	16.8	3.57	15.87	3.78	15.3	0	45	2.83	1	6.23	23.71
101	M	19	2	4	STIM	33	to RED	0.8	75.00	0.87	68.97	82.1	0	45	3.91	2	3.75	-9.30
101	M	19	2	4	STIM	34	to NUP	0.8	75.00	1	60.00	79.1	0	45	5.12	3	4.37	12.92
101	M	19	2	4	STIM	35	to RED	8.3	7.23	5.52	10.87	31.9	0	45	2.95	2	4.92	-21.06
101	M	19	2	4	STIM	36	to NUP	8.3	7.23	6.98	8.60	22	0	45	3.84	3	6.06	27.13
101	M	19	2	4	STIM	37	to RED	4.1	14.63	3.9	15.38	28.8	0	45	2.82	2	5.09	-11.62
101	M	19	2	4	STIM	38	to NUP	4.1	14.63	3.35	17.91	28.3	0	45	4.57	2	6.33	14.68
101	M	23	2	5	POST	39	to RED	1	60.00	1.12	53.57	78.4	0	45	3.31	3	5.01	-14.80
101	M	23	2	5	POST	40	to NUP	1	60.00	1.12	53.57	66.2	0	45	5.26	5	3.81	22.62
101	M	23	2	5	POST	41	to RED	1	60.00	0.87	68.97	87.1	0	45	3.05	2	5.33	-12.81
101	M	23	2	5	POST	42	to NUP	1	60.00	1.02	58.82	72.4	0	45	5.03	4	3.94	33.90
101	M	23	2	5	POST	43	to RED	1	60.00	0.87	68.97	83.4	0	45	4.5	2	4.71	-11.60
101	M	23	2	5	POST	44	to NUP	1	60.00	0.73	82.19	98.1	0	45	5.69	3	3.81	32.72
101	M	0	2	6	post		to RED	1	60.00				0	45		0		
101	M	0	2	6	post		to NUP	1	60.00				0	45		0		
101	M	0	2	6	post		to RED	1	60.00				0	45		0		
101	M	0	2	6	post		to NUP	1	60.00				0	45		0		
101	M	0	2	6	post		to RED	1	60.00				0	45		0		
101	M	0	2	6	post		to NUP	1	60.00				0	45		0		
102	M	0	1	2	pre		to RED	1	60.00				0	45		0		
102	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
102	M	0	1	2	pre		to RED	1	60.00				0	45		0		
102	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
102	M	0	1	2	pre		to RED	1	60.00				0	45		0		
102	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
102	M	23	1	3	PRE	1	to RED	1	60.00	1.38	43.48	53.1	0	43	1.2	10	4.48	-62.15
102	M	23	1	3	PRE	2	to NUP	1	60.00	0.95	63.16	83.6	0	42	8.63	20	7.32	61.43
102	M	23	1	3	PRE	3	to RED	1	60.00	0.98	61.22	69.5	0	45	3.19	8	5.57	-57.22
102	M	23	1	3	PRE	4	to NUP	1	60.00	0.7	85.71	110.8	0	42	7.92	17	6.49	77.27
102	M	23	1	3	PRE	5	to RED	1	60.00	1.3	46.15	55.2	0	45	3.42	7	5.97	-63.17
102	M	23	1	3	PRE	6	to NUP	1	60.00	0.65	92.31	105.4	0	42	6.88	15	5.14	76.26
102	M	19	1	4	STIM	7	to RED	4.1	14.63	3.42	17.54	25.3	0	44	2.31	4	6.80	-32.32
102	M	19	1	4	STIM	8	to NUP	4.1	14.63	4.25	14.12	48.1	0	43	4.6	12	6.52	64.85
102	M	19	1	4	STIM	9	to RED	8.3	7.23	7.55	7.95	25.3	0	45	2.32	3	8.17	-24.12
102	M	19	1	4	STIM	10	to NUP	8.3	7.23	7.02	8.55	26.5	0	40	6.68	12	8.21	40.67
102	M	19	1	4	STIM	11	to RED	0.8	75.00	0.72	83.33	98.1	0	45	3.13	7	5.64	-42.66
102	M	19	1	4	STIM	12	to NUP	0.8	75.00	0.6	100.00	139.1	0	42	5.58	10	6.73	76.16
102	M	19	1	4	STIM	13	to RED	16.8	3.57	16.25	3.69	17.5	0	45	1.05	0	5.59	-14.67
102	M	19	1	4	STIM	14	to NUP	16.8	3.57	13.95	4.30	18.5	0	42	2.62	3	4.93	27.78
102	M	19	1	4	STIM	15	to RED	6.6	9.09	5.27	11.39	22.6	0	45	3.73	4	4.11	-31.05
102	M	19	1	4	STIM	16	to NUP	6.6	9.09	5.47	10.97	22.8	0	42	4.6	6	6.18	57.64
102	M	19	1	4	STIM	17	to RED	3.2	18.75	2.57	23.35	31.4	0	45	3.1	4	4.45	-38.81
102	M	19	1	4	STIM	18	to NUP	3.2	18.75	2.62	22.90	35.6	0	42	6.15	8	5.98	65.39
102	M	19	1	4	STIM	19	to RED	1.6	37.50	1.45	41.38	48.7	0	45	3.07	5	3.90	-54.39
102	M	19	1	4	STIM	20	to NUP	1.6	37.50	1.15	52.17	63.5	0	42	4.32	9	5.96	67.90
102	M	19	1	4	STIM	21	to RED	10.5	5.71	9	6.67	18.9	0	45	2.38	1	8.22	-15.58
102	M	19	1	4	STIM	22	to NUP	10.5	5.71	9.3	6.45	17.5	0	42	2.17	2	6.44	48.33

102	M	19	1	4	STIM	23	to RED	10.5	5.71	8.97	6.69	16.9	0	45	3.16	1	6.22	-17.05
102	M	19	1	4	STIM	24	to NUP	10.5	5.71	8.77	6.84	19.5	0	43	2.65	2	5.55	45.11
102	M	19	1	4	STIM	25	to RED	1.6	37.50	1.7	35.29	46.1	0	45	4.35	7	4.58	-51.39
102	M	19	1	4	STIM	26	to NUP	1.6	37.50	1.33	45.11	67.5	0	44	4.32	8	4.73	54.18
102	M	19	1	4	STIM	27	to RED	3.2	18.75	2.68	22.39	27.2	0	45	3.07	5	4.37	-46.84
102	M	19	1	4	STIM	28	to NUP	3.2	18.75	1.97	30.46	44.1	0	42	5.65	7	6.11	65.24
102	M	19	1	4	STIM	29	to RED	6.6	9.09	4.2	14.29	20.9	0	45	3.05	4	4.15	-33.33
102	M	19	1	4	STIM	30	to NUP	6.6	9.09	6.12	9.80	23.9	0	42	3.46	5	6.01	49.84
102	M	19	1	4	STIM	31	to RED	16.8	3.57	14.53	4.13	16.1	0	45	3.82	0	3.84	-7.93
102	M	19	1	4	STIM	32	to NUP	16.8	3.57	15.57	3.85	15.7	0	43	2.95	1	5.68	25.13
102	M	19	1	4	STIM	33	to RED	0.8	75.00	0.98	61.22	89.4	0	45	3.82	7	3.85	-52.45
102	M	19	1	4	STIM	34	to NUP	0.8	75.00	0.7	85.71	102.8	0	44	5.93	9	5.82	77.31
102	M	19	1	4	STIM	35	to RED	8.3	7.23	6.3	9.52	20.2	0	45	2.33	2	5.22	-24.89
102	M	19	1	4	STIM	36	to NUP	8.3	7.23	7.28	8.24	26.2	0	44	3.12	3	6.42	60.11
102	M	19	1	4	STIM	37	to RED	4.1	14.63	3.53	17.00	25.3	0	45	2.17	3	4.80	-48.06
102	M	19	1	4	STIM	38	to NUP	4.1	14.63	3.35	17.91	38.9	0	44	3.12	4	5.97	77.73
102	M	23	1	5	POST	39	to RED	1	60.00	1.27	47.24	68.1	0	45	3.05	6	4.15	-63.64
102	M	23	1	5	POST	40	to NUP	1	60.00	0.68	88.24	114.3	0	43	7.84	11	6.49	58.58
102	M	23	1	5	POST	41	to RED	1	60.00	0.97	61.86	72.6	0	45	3.61	6	4.58	-66.53
102	M	23	1	5	POST	42	to NUP	1	60.00	0.8	75.00	91.9	0	42	6.73	11	5.39	63.77
102	M	23	1	5	POST	43	to RED	1	60.00	1.08	55.56	66.3	0	45	4.42	5	4.43	-61.62
102	M	23	1	5	POST	44	to NUP	1	60.00	0.8	75.00	94.7	0	43	6.33	10	5.97	69.67
102	M	0	1	6	post		to RED	1	60.00				0	45		0		
102	M	0	1	6	post		to NUP	1	60.00				0	45		1		
102	M	0	1	6	post		to RED	1	60.00				0	45		0		
102	M	0	1	6	post		to NUP	1	60.00				0	45		1		
102	M	0	1	6	post		to RED	1	60.00				0	45		0		
102	M	0	1	6	post		to NUP	1	60.00				0	45		0		
102	M	0	2	2	pre		to RED	1	60.00				0	45		0		
102	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
102	M	0	2	2	pre		to RED	1	60.00				0	45		0		
102	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
102	M	0	2	2	pre		to RED	1	60.00				0	45		0		
102	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
102	M	23	2	3	PRE	1	to RED	1	60.00	1.43	41.96	56.9	0	45	3.04	7	4.47	-40.01
102	M	23	2	3	PRE	2	to NUP	1	60.00	1.1	54.55	75.8	0	40	7.98	14	6.67	54.70
102	M	23	2	3	PRE	3	to RED	1	60.00	1.07	56.07	64.8	0	45	3.18	7	4.24	-68.46
102	M	23	2	3	PRE	4	to NUP	1	60.00	0.78	76.92	96.7	0	40	8.05	13	6.11	48.29
102	M	23	2	3	PRE	5	to RED	1	60.00	1.05	57.14	66.2	0	45	3.48	6	3.77	-38.87
102	M	23	2	3	PRE	6	to NUP	1	60.00	0.83	72.29	93.2	0	40	7.52	13	5.84	72.58
102	M	19	2	4	STIM	7	to RED	4.1	14.63	3.82	15.71	26.7	0	45	1.86	3	4.59	-41.18
102	M	19	2	4	STIM	8	to NUP	4.1	14.63	3.62	16.57	36.1	0	40	4.48	8	6.38	45.79
102	M	19	2	4	STIM	9	to RED	8.3	7.23	6.97	8.61	22.7	0	44	2.48	2	4.38	-22.14
102	M	19	2	4	STIM	10	to NUP	8.3	7.23	7.17	8.37	24.3	0	40	3.68	5	6.42	55.95
102	M	19	2	4	STIM	11	to RED	0.8	75.00	0.95	63.16	84.7	0	45	5.03	7	3.49	-61.49
102	M	19	2	4	STIM	12	to NUP	0.8	75.00	0.67	89.55	112.8	0	40	6.53	9	5.52	44.75
102	M	19	2	4	STIM	13	to RED	16.8	3.57	14.32	4.19	15.7	0	45	2.73	0	4.96	-14.72

102	M	19	2	4	STIM	14	to NUP	16.8	3.57	16.15	3.72	16.6	0	40	2.45	1	5.04	32.71
102	M	19	2	4	STIM	15	to RED	6.6	9.09	6.38	9.40	18.7	0	45	2.35	3	5.60	-29.43
102	M	19	2	4	STIM	16	to NUP	6.6	9.09	6.58	9.12	23.4	0	42	3.87	4	6.41	54.35
102	M	19	2	4	STIM	17	to RED	3.2	18.75	2.63	22.81	37	0	45	3.92	5	3.72	-28.93
102	M	19	2	4	STIM	18	to NUP	3.2	18.75	2.9	20.69	40.5	0	42	5.65	6	5.19	59.40
102	M	19	2	4	STIM	19	to RED	1.6	37.50	1.87	32.09	45.9	0	45	3.3	4	4.62	-26.60
102	M	19	2	4	STIM	20	to NUP	1.6	37.50	1.4	42.86	58.8	0	43	6.37	7	6.19	50.29
102	M	19	2	4	STIM	21	to RED	10.5	5.71	7.82	7.67	20.8	0	45	2.75	1	4.11	-33.83
102	M	19	2	4	STIM	22	to NUP	10.5	5.71	10.77	5.57	16.4	0	42	2.65	2	7.49	45.13
102	M	19	2	4	STIM	23	to RED	10.5	5.71	8.98	6.68	18.2	0	45	2.57	1	6.91	-25.37
102	M	19	2	4	STIM	24	to NUP	10.5	5.71	10.08	5.95	15.7	0	43	4.09	2	5.13	58.66
102	M	19	2	4	STIM	25	to RED	1.6	37.50	1.27	47.24	65.8	0	45	4.41	3	2.69	-52.03
102	M	19	2	4	STIM	26	to NUP	1.6	37.50	1.27	47.24	60.7	0	43	6.71	4	6.47	84.48
102	M	19	2	4	STIM	27	to RED	3.2	18.75	3.2	18.75	29.5	0	45	3.2	2	4.13	-50.43
102	M	19	2	4	STIM	28	to NUP	3.2	18.75	2.78	21.58	54.1	0	42	3.95	4	5.07	68.07
102	M	19	2	4	STIM	29	to RED	6.6	9.09	5.72	10.49	21.6	0	45	3.38	2	3.70	-59.08
102	M	19	2	4	STIM	30	to NUP	6.6	9.09	6.4	9.38	29.5	0	42	2.97	3	4.98	57.05
102	M	19	2	4	STIM	31	to RED	16.8	3.57	13.15	4.56	16.2	0	44	4.78	0	7.55	-26.14
102	M	19	2	4	STIM	32	to NUP	16.8	3.57	16.1	3.73	19.7	0	45	2.43	1	5.11	27.09
102	M	19	2	4	STIM	33	to RED	0.8	75.00	1.25	48.00	62	0	45	4.28	6	4.12	-64.53
102	M	19	2	4	STIM	34	to NUP	0.8	75.00	0.84	71.43	97.2	0	42	6.38	7	6.41	52.80
102	M	19	2	4	STIM	35	to RED	8.3	7.23	6.65	9.02	22.7	0	45	3.6	2	2.88	-22.66
102	M	19	2	4	STIM	36	to NUP	8.3	7.23	7.1	8.45	28.8	0	42	3.43	2	5.00	53.21
102	M	19	2	4	STIM	37	to RED	4.1	14.63	3.32	18.07	29.8	0	45	3.23	2	3.83	-49.97
102	M	19	2	4	STIM	38	to NUP	4.1	14.63	3.3	18.18	34.9	0	42	3.43	3	5.24	74.96
102	M	23	2	5	POST	39	to RED	1	60.00	1.33	45.11	75.6	0	45	3.97	8	3.25	-83.66
102	M	23	2	5	POST	40	to NUP	1	60.00	0.98	61.22	87.6	0	42	6.82	10	5.36	77.73
102	M	23	2	5	POST	41	to RED	1	60.00	1.23	48.78	70.3	0	45	5.15	7	3.10	-78.52
102	M	23	2	5	POST	42	to NUP	1	60.00	0.9	66.67	102.8	0	44	6.17	10	5.02	70.14
102	M	23	2	5	POST	43	to RED	1	60.00	1.4	42.86	56.4	0	45	3.62	7	3.36	-71.78
102	M	23	2	5	POST	44	to NUP	1	60.00	0.92	65.22	90.8	0	43	6.5	10	4.64	64.25
102	M	0	2	6	post		to RED	1	60.00				0	45		0		
102	M	0	2	6	post		to NUP	1	60.00				0	45		1		
102	M	0	2	6	post		to RED	1	60.00				0	45		0		
102	M	0	2	6	post		to NUP	1	60.00				0	45		1		
102	M	0	2	6	post		to RED	1	60.00				0	45		0		
102	M	0	2	6	post		to NUP	1	60.00				0	45		0		
103	M	0	1	2	pre		to RED	1	60.00				0	45		0		
103	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
103	M	0	1	2	pre		to RED	1	60.00				0	45		0		
103	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
103	M	0	1	2	pre		to RED	1	60.00				0	45		0		
103	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
103	M	23	1	3	PRE	1	to RED	1	60.00	1.12	53.57	57.8	0	45	1.71	10	4.65	-62.87
103	M	23	1	3	PRE	2	to NUP	1	60.00	1.12	53.57	57.3	0	42	6.08	20	3.02	75.22
103	M	23	1	3	PRE	3	to RED	1	60.00	1.2	50.00	56.3	0	46	0.53	12	3.00	-57.56
103	M	23	1	3	PRE	4	to NUP	1	60.00	1	60.00	67.7	0	42	0.37	15	3.28	75.96
103	M	23	1	3	PRE	5	to RED	1	60.00	0.82	73.17	82.3	0	45	3.36	9	3.73	-43.19

103	M	23	1	3	PRE	6	to NUP	1	60.00	0.95	63.16	74.5	0	43	4.57	10	5.76	66.38
103	M	19	1	4	STIM	7	to RED	4.1	14.63	2.83	21.20	37.9	0	45	1.54	5	3.08	-28.72
103	M	19	1	4	STIM	8	to NUP	4.1	14.63	4.02	14.93	26.9	0	43	1.03	5	5.75	46.35
103	M	19	1	4	STIM	9	to RED	8.3	7.23	7.8	7.69	19.7	0	45	2.25	2	5.24	-21.94
103	M	19	1	4	STIM	10	to NUP	8.3	7.23	7.72	7.77	18	0	44	1.5	4	4.65	59.81
103	M	19	1	4	STIM	11	to RED	0.8	75.00	0.7	85.71	92.3	0	45	2.55	7	3.63	-33.35
103	M	19	1	4	STIM	12	to NUP	0.8	75.00	0.77	77.92	87.8	0	45	4	9	4.26	24.32
103	M	19	1	4	STIM	13	to RED	16.8	3.57	15.38	3.90	16.6	0	45	1.07	1	4.30	-12.81
103	M	19	1	4	STIM	14	to NUP	16.8	3.57	16.47	3.64	15.7	0	46	2.41	1	3.24	42.68
103	M	19	1	4	STIM	15	to RED	6.6	9.09	5.22	11.49	21.8	0	45	2.01	2	2.69	-38.84
103	M	19	1	4	STIM	16	to NUP	6.6	9.09	6.37	9.42	25.7	0	43	3.5	4	4.31	49.63
103	M	19	1	4	STIM	17	to RED	3.2	18.75	2.42	24.79	34.6	0	45	0.88	6	2.77	-28.12
103	M	19	1	4	STIM	18	to NUP	3.2	18.75	3	20.00	30.5	0	43	4.77	11	4.60	63.30
103	M	19	1	4	STIM	19	to RED	1.6	37.50	1.65	36.36	47.8	0	45	1.8	10	3.43	-32.54
103	M	19	1	4	STIM	20	to NUP	1.6	37.50	1.92	31.25	45.2	0	45	3.91	12	3.69	89.10
103	M	19	1	4	STIM	21	to RED	10.5	5.71	11.03	5.44	18.9	0	45	1.35	2	5.35	-23.18
103	M	19	1	4	STIM	22	to NUP	10.5	5.71	10.67	5.62	16.2	0	44	2.95	4	3.80	49.65
103	M	19	1	4	STIM	23	to RED	10.5	5.71	7.77	7.72	17.6	0	45	1.63	1	4.98	-17.62
103	M	19	1	4	STIM	24	to NUP	10.5	5.71	9.43	6.36	21.1	0	43	3.17	4	3.69	63.55
103	M	19	1	4	STIM	25	to RED	1.6	37.50	1.68	35.71	51.8	0	45	1.5	7	3.77	-39.45
103	M	19	1	4	STIM	26	to NUP	1.6	37.50	1.82	32.97	45.1	0	44	3.71	8	3.33	88.07
103	M	19	1	4	STIM	27	to RED	3.2	18.75	3.68	16.30	26.5	0	45	1.79	7	3.15	-45.53
103	M	19	1	4	STIM	28	to NUP	3.2	18.75	3.18	18.87	30.2	0	45	4.09	8	2.86	110.03
103	M	19	1	4	STIM	29	to RED	6.6	9.09	5.33	11.26	23.4	0	45	2.42	5	4.23	-19.59
103	M	19	1	4	STIM	30	to NUP	6.6	9.09	5.67	10.58	22	0	44	1.38	3	3.66	74.51
103	M	19	1	4	STIM	31	to RED	16.8	3.57	14.08	4.26	14.8	0	45	1.85	1	3.95	55.61
103	M	19	1	4	STIM	32	to NUP	16.8	3.57	15.95	3.76	18.3	0	44	1.75	2	4.24	36.72
103	M	19	1	4	STIM	33	to RED	0.8	75.00	1.12	53.57	83.8	0	45	1.86	9	2.88	-48.89
103	M	19	1	4	STIM	34	to NUP	0.8	75.00	1.08	55.56	71.4	0	45	3.09	10	3.67	49.97
103	M	19	1	4	STIM	35	to RED	8.3	7.23	7.2	8.33	21.8	0	45	1.75	1	4.94	-34.29
103	M	19	1	4	STIM	36	to NUP	8.3	7.23	8.48	7.08	19.5	0	45	1.8	2	4.72	70.78
103	M	19	1	4	STIM	37	to RED	4.1	14.63	4.15	14.46	27.2	0	45	0.95	3	2.58	-40.74
103	M	19	1	4	STIM	38	to NUP	4.1	14.63	4.55	13.19	23	0	45	1.72	7	2.83	47.57
103	M	23	1	5	POST	39	to RED	1	60.00	1.03	58.25	63.4	0	45	1.67	10	3.37	-34.65
103	M	23	1	5	POST	40	to NUP	1	60.00	0.8	75.00	83.3	0	45	3.35	14	4.26	75.56
103	M	23	1	5	POST	41	to RED	1	60.00	0.72	83.33	90.4	0	45	1.63	10	3.35	-62.50
103	M	23	1	5	POST	42	to NUP	1	60.00	0.8	75.00	90.2	0	44	5.53	15	4.06	68.85
103	M	23	1	5	POST	43	to RED	1	60.00	0.88	68.18	90.4	0	45	2.15	10	2.62	-77.34
103	M	23	1	5	POST	44	to NUP	1	60.00	0.7	85.71	87.4	0	45	3.37	12	2.68	70.44
103	M	0	1	6	post		to RED	1	60.00				0	45		0		
103	M	0	1	6	post		to NUP	1	60.00				0	45		0		
103	M	0	1	6	post		to RED	1	60.00				0	45		0		
103	M	0	1	6	post		to NUP	1	60.00				0	45		0		
103	M	0	1	6	post		to RED	1	60.00				0	45		0		
103	M	0	1	6	post		to NUP	1	60.00				0	45		0		
103	M	0	2	2	pre		to RED	1	60.00				0	45		0		
103	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
103	M	0	2	2	pre		to RED	1	60.00				0	45		0		

103	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
103	M	0	2	2	pre		to RED	1	60.00				0	45		0		
103	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
103	M	23	2	3	PRE	1	to RED	1	60.00	0.98	61.22	63.2	0	45	1.29	9	3.88	-56.07
103	M	23	2	3	PRE	2	to NUP	1	60.00	1.03	58.25	69.1	0	45	2.7	12	5.60	86.47
103	M	23	2	3	PRE	3	to RED	1	60.00	1.03	58.25	77.1	0	45	1.45	9	4.26	-56.88
103	M	23	2	3	PRE	4	to NUP	1	60.00	0.87	68.97	87.1	0	44	3.26	12	4.18	63.65
103	M	23	2	3	PRE	5	to RED	1	60.00	0.9	66.67	88	0	45	1.45	10	4.11	-58.81
103	M	23	2	3	PRE	6	to NUP	1	60.00	0.83	72.29	91.6	0	45	2.69	11	4.04	83.04
103	M	19	2	4	STIM	7	to RED	4.1	14.63	3.75	16.00	36.7	0	45	1.38	1	3.64	-30.49
103	M	19	2	4	STIM	8	to NUP	4.1	14.63	3.17	18.93	30.7	0	45	1.01	3	3.17	47.91
103	M	19	2	4	STIM	9	to RED	8.3	7.23	8.17	7.34	21.6	0	45	1.53	1	3.50	-22.29
103	M	19	2	4	STIM	10	to NUP	8.3	7.23	7.12	8.43	21.3	0	45	0.98	2	3.81	60.34
103	M	19	2	4	STIM	11	to RED	0.8	75.00	0.73	82.19	94.1	0	45	0.67	7	3.57	-46.81
103	M	19	2	4	STIM	12	to NUP	0.8	75.00	0.75	80.00	96.9	0	45	2.52	11	4.78	86.85
103	M	19	2	4	STIM	13	to RED	16.8	3.57	13.47	4.45	23.4	0	45	3.03	0	4.67	-16.07
103	M	19	2	4	STIM	14	to NUP	16.8	3.57	18.45	3.25	17.2	0	45	1.08	0	3.28	40.32
103	M	19	2	4	STIM	15	to RED	6.6	9.09	6.33	9.48	22.7	0	45	0.79	2	3.43	-19.31
103	M	19	2	4	STIM	16	to NUP	6.6	9.09	5.17	11.61	23.7	0	45	1.43	3	3.70	74.06
103	M	19	2	4	STIM	17	to RED	3.2	18.75	2.33	25.75	33.5	0	45	1.15	5	3.48	-47.56
103	M	19	2	4	STIM	18	to NUP	3.2	18.75	2.47	24.29	40.3	0	45	1.16	10	3.63	82.01
103	M	19	2	4	STIM	19	to RED	1.6	37.50	1.43	41.96	57.1	0	45	1.47	9	3.45	-41.14
103	M	19	2	4	STIM	20	to NUP	1.6	37.50	1.43	41.96	48.7	0	45	2.74	11	3.93	84.67
103	M	19	2	4	STIM	21	to RED	10.5	5.71	8.27	7.26	21.6	0	45	1.95	2	5.05	-30.85
103	M	19	2	4	STIM	22	to NUP	10.5	5.71	9.98	6.01	17.5	0	45	0.6	1	3.73	62.97
103	M	19	2	4	STIM	23	to RED	10.5	5.71	8.97	6.69	18.6	0	45	1.3	1	4.43	-19.45
103	M	19	2	4	STIM	24	to NUP	10.5	5.71	9.5	6.32	20.8	0	45	1.53	1	2.78	23.68
103	M	19	2	4	STIM	25	to RED	1.6	37.50	1.72	34.88	43.1	0	45	0.91	8	3.86	-59.29
103	M	19	2	4	STIM	26	to NUP	1.6	37.50	1.23	48.78	51.5	0	44	2.69	9	3.60	108.96
103	M	19	2	4	STIM	27	to RED	3.2	18.75	3.2	18.75	31.2	0	45	1.12	4	3.78	-50.25
103	M	19	2	4	STIM	28	to NUP	3.2	18.75	3.15	19.05	27.1	0	44	1.77	9	3.99	79.62
103	M	19	2	4	STIM	29	to RED	6.6	9.09	5.17	11.61	24.8	0	45	1.61	3	3.35	-27.40
103	M	19	2	4	STIM	30	to NUP	6.6	9.09	5.05	11.88	23.4	0	45	2.12	5	2.88	93.19
103	M	19	2	4	STIM	31	to RED	16.8	3.57	15.48	3.88	14	0	45	1.74	1	5.06	-9.22
103	M	19	2	4	STIM	32	to NUP	16.8	3.57	15.83	3.79	15.4	0	44	1.39	2	3.48	54.27
103	M	19	2	4	STIM	33	to RED	0.8	75.00	1.02	58.82	86.4	0	45	1.93	11	3.45	-51.55
103	M	19	2	4	STIM	34	to NUP	0.8	75.00	1.13	53.10	72.4	0	44	3.39	11	3.27	70.65
103	M	19	2	4	STIM	35	to RED	8.3	7.23	9.03	6.64	19.2	0	46	1.59	2	3.60	-23.11
103	M	19	2	4	STIM	36	to NUP	8.3	7.23	7.68	7.81	20.2	0	45	2.19	2	2.89	65.13
103	M	19	2	4	STIM	37	to RED	4.1	14.63	4.12	14.56	29.7	0	45	1.58	3	2.97	-47.56
103	M	19	2	4	STIM	38	to NUP	4.1	14.63	4.42	13.57	28.8	0	44	1.13	4	4.66	50.75
103	M	23	2	5	POST	39	to RED	1	60.00	0.9	66.67	79.1	0	45	1.37	6	3.92	-56.81
103	M	23	2	5	POST	40	to NUP	1	60.00	1	60.00	84.5	0	45	3.57	12	4.49	62.84
103	M	23	2	5	POST	41	to RED	1	60.00	1.23	48.78	76.1	0	45	0.9	6	4.85	-50.62
103	M	23	2	5	POST	42	to NUP	1	60.00	0.95	63.16	81.3	0	45	2.78	11	4.01	73.72
103	M	23	2	5	POST	43	to RED	1	60.00	0.93	64.52	82.4	0	45	1.67	9	3.97	-46.65
103	M	23	2	5	POST	44	to NUP	1	60.00	1.1	54.55	83.3	0	45	3.05	13	2.87	70.06
103	M	0	2	6	post		to RED	1	60.00				0	45		1		

103	M	0	2	6	post		to NUP	1	60.00				0	45		0		
103	M	0	2	6	post		to RED	1	60.00				0	45		0		
103	M	0	2	6	post		to NUP	1	60.00				0	45		0		
103	M	0	2	6	post		to RED	1	60.00				0	45		0		
103	M	0	2	6	post		to NUP	1	60.00				0	45		0		
104	M	0	1	2	pre		to RED	1	60.00				0	45		0		
104	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
104	M	0	1	2	pre		to RED	1	60.00				0	45		0		
104	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
104	M	0	1	2	pre		to RED	1	60.00				0	45		0		
104	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
104	M	23	1	3	PRE	1	to RED	1	60.00	0.83	72.29	74.8	0	45	5.39	10	5.07	-96.39
104	M	23	1	3	PRE	2	to NUP	1	60.00	0.85	70.59	83.4	0	45	11.43	10	4.76	40.90
104	M	23	1	3	PRE	3	to RED	1	60.00	0.87	68.97	86.2	0	50	4.28	10	5.36	-34.30
104	M	23	1	3	PRE	4	to NUP	1	60.00	0.82	73.17	94.3	0	45	9.61	11	3.24	29.69
104	M	23	1	3	PRE	5	to RED	1	60.00	1.3	46.15	55	0	45	4.58	8	6.92	-73.40
104	M	23	1	3	PRE	6	to NUP	1	60.00	0.82	73.17	95	0	45	9.38	8	3.24	64.75
104	M	19	1	4	STIM	7	to RED	4.1	14.63	3.78	15.87	25	0	45	3.62	5	9.29	-36.48
104	M	19	1	4	STIM	8	to NUP	4.1	14.63	2.6	23.08	34.7	0	45	8.4	5	6.01	41.01
104	M	19	1	4	STIM	9	to RED	8.3	7.23	7.62	7.87	18.2	0	45	2.28	2	9.24	-31.86
104	M	19	1	4	STIM	10	to NUP	8.3	7.23	5.37	11.17	22.3	0	43	9.88	5	3.06	48.95
104	M	19	1	4	STIM	11	to RED	0.8	75.00	0.75	80.00	99.8	0	45	3.12	5	7.17	-49.21
104	M	19	1	4	STIM	12	to NUP	0.8	75.00	0.77	77.92	88.1	0	45	8.08	6	4.70	17.90
104	M	19	1	4	STIM	13	to RED	16.8	3.57	14.58	4.12	16.8	0	45	2.72	2	6.90	-12.59
104	M	19	1	4	STIM	14	to NUP	16.8	3.57	13.03	4.60	18.2	0	42	5.5	3	4.06	19.89
104	M	19	1	4	STIM	15	to RED	6.6	9.09	5.88	10.20	18.7	0	45	4.54	2	5.42	-40.29
104	M	19	1	4	STIM	16	to NUP	6.6	9.09	5.25	11.43	27.6	0	45	5.95	4	3.39	38.68
104	M	19	1	4	STIM	17	to RED	3.2	18.75	2.97	20.20	31.2	0	45	3.85	4	5.57	-39.12
104	M	19	1	4	STIM	18	to NUP	3.2	18.75	2.62	22.90	36.8	0	42	5.51	4	4.06	23.66
104	M	19	1	4	STIM	19	to RED	1.6	37.50	1.38	43.48	47.7	0	45	4.24	3	8.05	-41.11
104	M	19	1	4	STIM	20	to NUP	1.6	37.50	1.73	34.68	44	0	42	9.02	5	4.50	29.54
104	M	19	1	4	STIM	21	to RED	10.5	5.71	8.7	6.90	21	0	45	3.83	2	8.71	-25.46
104	M	19	1	4	STIM	22	to NUP	10.5	5.71	9.6	6.25	19.2	0	42	8.2	4	5.96	42.07
104	M	19	1	4	STIM	23	to RED	10.5	5.71	10.02	5.99	20.9	0	45	4.36	2	7.41	-24.59
104	M	19	1	4	STIM	24	to NUP	10.5	5.71	9.07	6.62	21.3	0	45	6.81	4	5.03	38.55
104	M	19	1	4	STIM	25	to RED	1.6	37.50	1.63	36.81	43.8	0	45	3.62	4	5.48	-31.46
104	M	19	1	4	STIM	26	to NUP	1.6	37.50	1.8	33.33	44.2	0	42	0.53	4	6.15	29.82
104	M	19	1	4	STIM	27	to RED	3.2	18.75	2.75	21.82	32.8	0	45	4.53	4	9.54	-23.36
104	M	19	1	4	STIM	28	to NUP	3.2	18.75	2.88	20.83	31.2	0	42	9.52	6	4.68	36.05
104	M	19	1	4	STIM	29	to RED	6.6	9.09	6.53	9.19	17.6	0	45	4.85	2	8.22	-39.88
104	M	19	1	4	STIM	30	to NUP	6.6	9.09	5.37	11.17	20.1	0	42	6.78	5	4.66	45.84
104	M	19	1	4	STIM	31	to RED	16.8	3.57	13.33	4.50	16.6	0	45	7.47	3	3.90	-15.87
104	M	19	1	4	STIM	32	to NUP	16.8	3.57	15.77	3.80	15.3	0	42	8.2	4	6.52	34.75
104	M	19	1	4	STIM	33	to RED	0.8	75.00	1.05	57.14	68.1	0	45	6.05	5	6.37	-53.43
104	M	19	1	4	STIM	34	to NUP	0.8	75.00	0.98	61.22	68.9	0	44	11.54	7	6.21	38.49
104	M	19	1	4	STIM	35	to RED	8.3	7.23	6.9	8.70	22.9	0	45	6.7	4	6.39	-32.36
104	M	19	1	4	STIM	36	to NUP	8.3	7.23	6.27	9.57	20.9	0	45	6.18	5	3.87	14.05
104	M	19	1	4	STIM	37	to RED	4.1	14.63	4.4	13.64	28.5	0	45	4.1	4	6.19	-36.30

104	M	19	1	4	STIM	38	to NUP	4.1	14.63	3.38	17.75	26.7	0	45	11.04	5	6.15	15.92
104	M	23	1	5	POST	39	to RED	1	60.00	1.03	58.25	68.6	0	45	6.34	6	6.83	-37.07
104	M	23	1	5	POST	40	to NUP	1	60.00	0.91	65.93	72.1	0	45	9.64	8	5.93	27.27
104	M	23	1	5	POST	41	to RED	1	60.00	0.88	68.18	74.2	0	45	6.29	5	7.80	-43.06
104	M	23	1	5	POST	42	to NUP	1	60.00	0.95	63.16	74.4	0	45	10.83	8	4.52	30.04
104	M	23	1	5	POST	43	to RED	1	60.00	1.07	56.07	53.4	0	45	8.78	5	7.04	-25.03
104	M	23	1	5	POST	44	to NUP	1	60.00	1.18	50.85	58.6	0	42	11.79	8	3.92	19.07
104	M	0	1	6	post		to RED	1	60.00				0	45		0		
104	M	0	1	6	post		to NUP	1	60.00				0	45		0		
104	M	0	1	6	post		to RED	1	60.00				0	45		0		
104	M	0	1	6	post		to NUP	1	60.00				0	45		0		
104	M	0	1	6	post		to RED	1	60.00				0	45		0		
104	M	0	1	6	post		to NUP	1	60.00				0	45		0		
104	M	0	2	2	pre		to RED	1	60.00				0	45		0		
104	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
104	M	0	2	2	pre		to RED	1	60.00				0	45		0		
104	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
104	M	0	2	2	pre		to RED	1	60.00				0	45		0		
104	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
104	M	23	2	3	PRE	1	to RED	1	60.00	1.08	55.56	71.9	0	45	1.44	5	6.55	-53.41
104	M	23	2	3	PRE	2	to NUP	1	60.00	1.02	58.82	86.6	0	42	9.33	8	5.42	48.49
104	M	23	2	3	PRE	3	to RED	1	60.00	0.67	89.55	115.5	0	45	-0.42	5	6.22	-70.15
104	M	23	2	3	PRE	4	to NUP	1	60.00	0.92	65.22	87.1	0	45	10.21	6	5.02	42.49
104	M	23	2	3	PRE	5	to RED	1	60.00	0.88	68.18	89.4	0	45	4.47	4	5.33	-57.19
104	M	23	2	3	PRE	6	to NUP	1	60.00	0.7	85.71	94.3	0	45	8.38	6	4.13	25.36
104	M	19	2	4	STIM	7	to RED	4.1	14.63	3.03	19.80	35.6	0	45	2.9	2	9.37	-25.77
104	M	19	2	4	STIM	8	to NUP	4.1	14.63	3.23	18.58	26.5	0	42	6.27	5	5.32	37.18
104	M	19	2	4	STIM	9	to RED	8.3	7.23	8.03	7.47	17.3	0	45	2.74	2	9.20	-32.48
104	M	19	2	4	STIM	10	to NUP	8.3	7.23	8.57	7.00	20.8	0	42	5.75	4	6.88	55.31
104	M	19	2	4	STIM	11	to RED	0.8	75.00	0.75	80.00	81.3	0	45	3.47	5	6.13	-57.88
104	M	19	2	4	STIM	12	to NUP	0.8	75.00	0.92	65.22	87.1	0	42	4.78	6	4.99	41.27
104	M	19	2	4	STIM	13	to RED	16.8	3.57	13.13	4.57	16.6	0	45	5.04	2	12.39	-11.25
104	M	19	2	4	STIM	14	to NUP	16.8	3.57	15.17	3.96	16.7	0	42	4.08	4	5.03	36.33
104	M	19	2	4	STIM	15	to RED	6.6	9.09	5.72	10.49	16.7	0	45	2.98	4	8.30	-23.91
104	M	19	2	4	STIM	16	to NUP	6.6	9.09	5.75	10.43	24.6	0	42	8.25	5	4.94	56.89
104	M	19	2	4	STIM	17	to RED	3.2	18.75	2.8	21.43	33.9	0	45	3.87	3	7.02	-34.38
104	M	19	2	4	STIM	18	to NUP	3.2	18.75	2.8	21.43	34.7	0	42	5.02	5	4.53	48.54
104	M	19	2	4	STIM	19	to RED	1.6	37.50	1.37	43.80	54.8	0	45	2.85	4	8.02	-31.83
104	M	19	2	4	STIM	20	to NUP	1.6	37.50	1.7	35.29	57.4	0	42	7.33	6	5.18	29.79
104	M	19	2	4	STIM	21	to RED	10.5	5.71	8.45	7.10	18.3	0	45	4.5	2	7.82	-17.55
104	M	19	2	4	STIM	22	to NUP	10.5	5.71	9.47	6.34	21.6	0	42	8.05	4	3.63	26.30
104	M	19	2	4	STIM	23	to RED	10.5	5.71	9.82	6.11	20.9	0	45	9.81	3	6.16	-17.75
104	M	19	2	4	STIM	24	to NUP	10.5	5.71	9.58	6.26	19.5	0	42	4	4	5.16	39.85
104	M	19	2	4	STIM	25	to RED	1.6	37.50	1.62	37.04	45.9	0	45	5.5	4	7.95	-29.07
104	M	19	2	4	STIM	26	to NUP	1.6	37.50	1.5	40.00	48.7	0	42	7.37	6	5.34	38.02
104	M	19	2	4	STIM	27	to RED	3.2	18.75	2.78	21.58	34.6	0	45	3.95	3	6.96	-27.78

104	M	19	2	4	STIM	28	to NUP	3.2	18.75	2.63	22.81	36.1	0	44	5.59	5	4.57	43.03
104	M	19	2	4	STIM	29	to RED	6.6	9.09	5.35	11.21	21.5	0	45	5.33	3	6.25	-26.41
104	M	19	2	4	STIM	30	to NUP	6.6	9.09	5.4	11.11	24.3	0	42	7.15	5	5.29	33.71
104	M	19	2	4	STIM	31	to RED	16.8	3.57	13.52	4.44	16.1	0	45	5.25	2	9.66	-11.82
104	M	19	2	4	STIM	32	to NUP	16.8	3.57	13.75	4.36	15.5	0	42	6.43	4	4.95	34.65
104	M	19	2	4	STIM	33	to RED	0.8	75.00	0.78	76.92	96.5	0	45	1.72	4	6.06	-38.40
104	M	19	2	4	STIM	34	to NUP	0.8	75.00	0.9	66.67	81	0	42	4.77	6	4.70	36.59
104	M	19	2	4	STIM	35	to RED	8.3	7.23	7.38	8.13	25	0	45	3.69	3	6.15	-15.87
104	M	19	2	4	STIM	36	to NUP	8.3	7.23	7.78	7.71	18	0	42	3.84	5	4.11	45.83
104	M	19	2	4	STIM	37	to RED	4.1	14.63	3.13	19.17	30.7	0	45	4.62	3	6.82	-27.20
104	M	19	2	4	STIM	38	to NUP	4.1	14.63	3.33	18.02	31.2	0	42	5.87	5	4.86	26.74
104	M	23	2	5	POST	39	to RED	1	60.00	0.8	75.00	85.5	0	45	4.12	5	6.36	-30.39
104	M	23	2	5	POST	40	to NUP	1	60.00	1.08	55.56	71.9	0	40	6.99	7	6.13	29.61
104	M	23	2	5	POST	41	to RED	1	60.00	0.93	64.52	83.6	0	45	4.35	4	6.56	-28.41
104	M	23	2	5	POST	42	to NUP	1	60.00	0.75	80.00	94.8	0	42	5.1	7	6.28	41.39
104	M	23	2	5	POST	43	to RED	1	60.00	0.8	75.00	94.4	0	45	5.7	5	6.36	-43.00
104	M	23	2	5	POST	44	to NUP	1	60.00	0.8	75.00	96.9	0	40	7.88	8	4.92	24.35
104	M	0	2	6	post		to RED	1	60.00				0	45		0		
104	M	0	2	6	post		to NUP	1	60.00				0	45		0		
104	M	0	2	6	post		to RED	1	60.00				0	45		0		
104	M	0	2	6	post		to NUP	1	60.00				0	45		0		
104	M	0	2	6	post		to RED	1	60.00				0	45		0		
104	M	0	2	6	post		to NUP	1	60.00				0	45		0		
105	F	0	1	2	pre		to RED	1	60.00				0	45		0		
105	F	0	1	2	pre		to NUP	1	60.00				0	45		0		
105	F	0	1	2	pre		to RED	1	60.00				0	45		0		
105	F	0	1	2	pre		to NUP	1	60.00				0	45		0		
105	F	0	1	2	pre		to RED	1	60.00				0	45		0		
105	F	0	1	2	pre		to NUP	1	60.00				0	45		0		
105	F	23	1	3	PRE	1	to RED	1	60.00	0.87	68.97	80.3	1	45	3.2	10	4.33	-32.09
105	F	23	1	3	PRE	2	to NUP	1	60.00	1.02	58.82	81	1	42	7.25	15	3.67	30.62
105	F	23	1	3	PRE	3	to RED	1	60.00	0.95	63.16	74.7	1	44	4.32	9	7.74	-30.72
105	F	23	1	3	PRE	4	to NUP	1	60.00	0.77	77.92	83.3	1	42	7.78	13	4.92	32.67
105	F	23	1	3	PRE	5	to RED	1	60.00	0.98	61.22	62.1	2	44	3.47	8	6.09	-19.76
105	F	23	1	3	PRE	6	to NUP	1	60.00	0.82	73.17	86.7	2	42	9.35	13	4.81	42.60
105	F	19	1	4	STIM	7	to RED	4.1	14.63	3.27	18.35	30.5	2	44	2.58	7	5.94	-44.07
105	F	19	1	4	STIM	8	to NUP	4.1	14.63	2.98	20.13	29.7	2	43	4.2	9	5.56	31.87
105	F	19	1	4	STIM	9	to RED	8.3	7.23	7.13	8.42	21.1	2	45	2.02	5	8.23	-33.55
105	F	19	1	4	STIM	10	to NUP	8.3	7.23	7.1	8.45	20.4	2	43	3.55	7	3.65	29.02
105	F	19	1	4	STIM	11	to RED	0.8	75.00	0.82	73.17	82.7	2	44	3.16	7	6.74	-20.44
105	F	19	1	4	STIM	12	to NUP	0.8	75.00	0.88	68.18	84.8	2	43	3.85	8	4.99	35.88
105	F	19	1	4	STIM	13	to RED	16.8	3.57	15.15	3.96	19.7	2	45	1.92	3	7.34	-21.23
105	F	19	1	4	STIM	14	to NUP	16.8	3.57	15.95	3.76	18.6	2	43	3.28	2	4.75	18.96
105	F	19	1	4	STIM	15	to RED	6.6	9.09	4.97	12.07	24.6	2	44	2.81	4	7.15	-18.16
105	F	19	1	4	STIM	16	to NUP	6.6	9.09	5.27	11.39	20.9	2	43	2.23	4	3.52	21.57
105	F	19	1	4	STIM	17	to RED	3.2	18.75	2.28	26.32	36.7	2	45	3.97	4	8.78	-20.15
105	F	19	1	4	STIM	18	to NUP	3.2	18.75	2.6	23.08	36	2	43	3.02	3	0.00	29.87
105	F	19	1	4	STIM	19	to RED	1.6	37.50	1.47	40.82	47.5	2	45	3.33	3	2.41	-30.59

105	F	19	1	4	STIM	20	to NUP	1.6	37.50	1.42	42.25	54.8	2	43	2.73	4	3.91	20.32
105	F	19	1	4	STIM	21	to RED	10.5	5.71	8.83	6.80	18	2	45	2.29	1	3.56	-17.65
105	F	19	1	4	STIM	22	to NUP	10.5	5.71	9.05	6.63	20.6	2	43	1.58	1	3.82	16.29
105	F	19	1	4	STIM	23	to RED	10.5	5.71	9.37	6.40	16.9	2	45	2.68	1	6.28	-26.92
105	F	19	1	4	STIM	24	to NUP	10.5	5.71	8.7	6.90	18.3	2	43	2.57	2	0.00	19.62
105	F	19	1	4	STIM	25	to RED	1.6	37.50	1.48	40.54	52.4	2	44	2.79	3	3.02	-24.86
105	F	19	1	4	STIM	26	to NUP	1.6	37.50	1.32	45.45	57.4	2	43	3.71	4	0.00	28.96
105	F	19	1	4	STIM	27	to RED	3.2	18.75	2.53	23.72	33.7	2	44	2.27	2	8.69	-16.83
105	F	19	1	4	STIM	28	to NUP	3.2	18.75	2.42	24.79	36.1	2	43	2.43	1	4.74	18.06
105	F	19	1	4	STIM	29	to RED	6.6	9.09	4.87	12.32	23.2	2	45	2.31	2	0.00	-23.25
105	F	19	1	4	STIM	30	to NUP	6.6	9.09	5.77	10.40	22.3	2	43	1.76	2	6.45	15.31
105	F	19	1	4	STIM	31	to RED	16.8	3.57	15.02	3.99	17.45	2	45	2.16	1	5.55	-25.12
105	F	19	1	4	STIM	32	to NUP	16.8	3.57	16.05	3.74	13.4	2	43	1.43	2	4.45	11.67
105	F	19	1	4	STIM	33	to RED	0.8	75.00	0.73	82.19	93.5	2	45	2.1	3	6.27	-32.80
105	F	19	1	4	STIM	34	to NUP	0.8	75.00	0.73	82.19	97.9	2	43	2.42	4	4.86	18.43
105	F	19	1	4	STIM	35	to RED	8.3	7.23	6.5	9.23	18.7	2	45	2.67	2	5.15	-22.59
105	F	19	1	4	STIM	36	to NUP	8.3	7.23	6.57	9.13	24.6	2	43	2.33	3	4.09	17.12
105	F	19	1	4	STIM	37	to RED	4.1	14.63	3.05	19.67	33.7	2	45	1.8	2	3.58	-15.23
105	F	19	1	4	STIM	38	to NUP	4.1	14.63	3.1	19.35	29.8	2	43	1.67	4	5.56	18.03
105	F	23	1	5	POST	39	to RED	1	60.00	1.05	57.14	68.9	2	45	3.5	5	6.26	-20.88
105	F	23	1	5	POST	40	to NUP	1	60.00	1.1	54.55	67	2	43	2.58	7	4.01	35.56
105	F	23	1	5	POST	41	to RED	1	60.00	0.9	66.67	75.2	2	45	2.98	5	6.05	-21.05
105	F	23	1	5	POST	42	to NUP	1	60.00	0.85	70.59	87.1	2	43	2.02	7	6.74	30.49
105	F	23	1	5	POST	43	to RED	1	60.00	0.78	76.92	95.5	2	45	3.25	4	0.00	-15.99
105	F	23	1	5	POST	44	to NUP	1	60.00	0.97	61.86	85.2	2	43	2.8	6	2.44	26.45
105	F	0	1	6	post		to RED	1	60.00				1	45		0		
105	F	0	1	6	post		to NUP	1	60.00				1	45		0		
105	F	0	1	6	post		to RED	1	60.00				1	45		0		
105	F	0	1	6	post		to NUP	1	60.00				1	45		0		
105	F	0	1	6	post		to RED	1	60.00				1	45		0		
105	F	0	1	6	post		to NUP	1	60.00				1	45		0		
105	F	0	2	2	pre		to RED	1	60.00				0	45		0		
105	F	0	2	2	pre		to NUP	1	60.00				0	45		0		
105	F	0	2	2	pre		to RED	1	60.00				0	45		0		
105	F	0	2	2	pre		to NUP	1	60.00				0	45		0		
105	F	0	2	2	pre		to RED	1	60.00				0	45		0		
105	F	0	2	2	pre		to NUP	1	60.00				0	45		0		
105	F	23	2	3	PRE	1	to RED	1	60.00	0.82	73.17	86.1	0	44	3.6	8	7.17	-37.99
105	F	23	2	3	PRE	2	to NUP	1	60.00	0.7	85.71	104.2	0	43	7.18	11	3.36	42.50
105	F	23	2	3	PRE	3	to RED	1	60.00	0.95	63.16	77.3	0	45	1.75	7	5.97	-28.20
105	F	23	2	3	PRE	4	to NUP	1	60.00	0.87	68.97	85.4	1	43	7.5	9	4.30	43.00
105	F	23	2	3	PRE	5	to RED	1	60.00	0.78	76.92	86.6	1	45	4.19	7	6.35	-21.98
105	F	23	2	3	PRE	6	to NUP	1	60.00	0.8	75.00	78	1	43	6.88	8	4.74	36.11
105	F	19	2	4	STIM	7	to RED	4.1	14.63	3.15	19.05	30.9	1	45	2.62	5	3.91	-27.27
105	F	19	2	4	STIM	8	to NUP	4.1	14.63	2.88	20.83	39.1	1	43	3.94	6	5.19	25.69
105	F	19	2	4	STIM	9	to RED	8.3	7.23	7.4	8.11	19.9	1	45	2.78	4	6.46	-16.65
105	F	19	2	4	STIM	10	to NUP	8.3	7.23	7.42	8.09	19	1	43	2.78	5	4.29	26.84
105	F	19	2	4	STIM	11	to RED	0.8	75.00	0.78	76.92	81.2	1	44	3.49	6	0.00	-23.12

105	F	19	2	4	STIM	12	to NUP	0.8	75.00	0.95	63.16	84	1	43	5.28	6	4.65	19.29
105	F	19	2	4	STIM	13	to RED	16.8	3.57	15.3	3.92	21.3	1	45	3.27	3	8.60	-27.78
105	F	19	2	4	STIM	14	to NUP	16.8	3.57	15.67	3.83	15.5	1	43	2.5	3	3.42	27.07
105	F	19	2	4	STIM	15	to RED	6.6	9.09	5.53	10.85	22	1	45	4.69	4	8.89	-18.93
105	F	19	2	4	STIM	16	to NUP	6.6	9.09	5.33	11.26	28.5	1	44	3.9	5	3.77	25.73
105	F	19	2	4	STIM	17	to RED	3.2	18.75	2.42	24.79	41.2	1	45	4.05	5	8.58	-17.73
105	F	19	2	4	STIM	18	to NUP	3.2	18.75	2.37	25.32	43.3	1	44	4.1	6	5.47	19.30
105	F	19	2	4	STIM	19	to RED	1.6	37.50	1.48	40.54	51.3	1	45	3.84	5	5.74	-23.07
105	F	19	2	4	STIM	20	to NUP	1.6	37.50	1.47	40.82	59.7	2	43	2.41	5	3.94	28.37
105	F	19	2	4	STIM	21	to RED	10.5	5.71	8.77	6.84	22	2	45	4.11	3	0.00	-17.13
105	F	19	2	4	STIM	22	to NUP	10.5	5.71	9.38	6.40	19	2	43	1.74	3	6.57	18.98
105	F	19	2	4	STIM	23	to RED	10.5	5.71	9.5	6.32	10.1	2	45	3.87	3	9.44	-24.36
105	F	19	2	4	STIM	24	to NUP	10.5	5.71	8.8	6.82	17.1	2	44	3.63	3	4.24	21.75
105	F	19	2	4	STIM	25	to RED	1.6	37.50	1.68	35.71	49	2	45	4.52	4	7.13	-36.53
105	F	19	2	4	STIM	26	to NUP	1.6	37.50	1.5	40.00	63	2	44	4.53	3	2.92	15.20
105	F	19	2	4	STIM	27	to RED	3.2	18.75	2.68	22.39	28.3	2	45	3.05	4	6.50	-24.23
105	F	19	2	4	STIM	28	to NUP	3.2	18.75	2.68	22.39	33.3	2	44	2.5	3	6.17	22.89
105	F	19	2	4	STIM	29	to RED	6.6	9.09	5.45	11.01	27.6	2	45	3.13	4	0.00	-22.56
105	F	19	2	4	STIM	30	to NUP	6.6	9.09	3.6	16.67	29	2	43	3.5	3	3.76	20.85
105	F	19	2	4	STIM	31	to RED	16.8	3.57	15.85	3.79	14.1	2	45	2.85	2	7.84	-25.32
105	F	19	2	4	STIM	32	to NUP	16.8	3.57	16.33	3.67	49.4	2	44	2.1	2	3.50	15.86
105	F	19	2	4	STIM	33	to RED	0.8	75.00	0.85	70.59	90.2	2	45	4.05	4	0.00	-26.46
105	F	19	2	4	STIM	34	to NUP	0.8	75.00	0.92	65.22	75.4	2	44	3.15	4	3.42	17.16
105	F	19	2	4	STIM	35	to RED	8.3	7.23	6.73	8.92	24.1	2	45	3.09	3	0.00	-28.25
105	F	19	2	4	STIM	36	to NUP	8.3	7.23	6.2	9.68	26.2	2	44	3.33	3	2.81	26.61
105	F	19	2	4	STIM	37	to RED	4.1	14.63	3.75	16.00	25.3	2	45	2.05	4	0.00	-13.39
105	F	19	2	4	STIM	38	to NUP	4.1	14.63	3.5	17.14	26.4	2	44	3.78	3	4.38	17.90
105	F	23	2	5	POST	39	to RED	1	60.00	0.85	70.59	74.9	2	45	3.48	5	7.03	-22.50
105	F	23	2	5	POST	40	to NUP	1	60.00	0.98	61.22	74.4	2	43	3.74	6	4.30	21.00
105	F	23	2	5	POST	41	to RED	1	60.00	0.62	96.77	111.7	2	45	3.83	5	5.43	-27.21
105	F	23	2	5	POST	42	to NUP	1	60.00	0.9	66.67	94.3	2	43	3.47	6	4.66	45.49
105	F	23	2	5	POST	43	to RED	1	60.00	0.85	70.59	92.7	1	45	3.67	4	4.80	-30.91
105	F	23	2	5	POST	44	to NUP	1	60.00	0.92	65.22	83.1	1	44	2.6	5	3.96	53.68
105	F	0	2	6	post		to RED	1	60.00				0	45		0		
105	F	0	2	6	post		to NUP	1	60.00				0	45		0		
105	F	0	2	6	post		to RED	1	60.00				0	45		0		
105	F	0	2	6	post		to NUP	1	60.00				0	45		0		
105	F	0	2	6	post		to RED	1	60.00				0	45		0		
105	F	0	2	6	post		to NUP	1	60.00				0	45		0		
106	M	0	1	2	pre		to RED	1	60.00				0	45		0		
106	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
106	M	0	1	2	pre		to RED	1	60.00				0	45		0		
106	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
106	M	0	1	2	pre		to RED	1	60.00				0	45		0		
106	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
106	M	23	1	3	PRE	1	to RED	1	60.00	1.62	37.04	52.9	1	45	9.4	10	3.62	-33.95
106	M	23	1	3	PRE	2	to NUP	1	60.00	1.4	42.86	56.6	2	43	14.77	15	6.48	34.95
106	M	23	1	3	PRE	3	to RED	1	60.00	1.25	48.00	60.2	1	44	9	12	5.34	-8.24

106	M	23	1	3	PRE	4	to NUP	1	60.00	0.68	88.24	105.1	1	43	15.6	15	6.13	33.81
106	M	23	1	3	PRE	5	to RED	1	60.00	1.25	48.00	63.9	0	45	8.85	10	5.12	-5.69
106	M	23	1	3	PRE	6	to NUP	1	60.00	0.87	68.97	82.4	1	42	9.31	12	3.70	30.91
106	M	19	1	4	STIM	7	to RED	4.1	14.63	5.05	11.88	26.18	0	45	0.9	5	3.87	-34.56
106	M	19	1	4	STIM	8	to NUP	4.1	14.63	3.08	19.48	74.5	0	44	1.45	9	5.85	39.75
106	M	19	1	4	STIM	9	to RED	8.3	7.23	7.25	8.28	22.9	0	45	2.53	3	4.75	-30.82
106	M	19	1	4	STIM	10	to NUP	8.3	7.23	7	8.57	19.7	0	44	6.2	9	5.35	42.86
106	M	19	1	4	STIM	11	to RED	0.8	75.00	0.92	65.22	81	0	44	8.45	7	3.13	-60.88
106	M	19	1	4	STIM	12	to NUP	0.8	75.00	0.93	64.52	81.9	0	43	7.52	12	6.35	27.86
106	M	19	1	4	STIM	13	to RED	16.8	3.57	15.67	3.83	18.5	0	45	1.7	1	2.68	-16.06
106	M	19	1	4	STIM	14	to NUP	16.8	3.57	14.57	4.12	18.9	0	44	1.66	1	4.17	23.75
106	M	19	1	4	STIM	15	to RED	6.6	9.09	6.38	9.40	20.95	0	45	3.47	7	4.03	-32.56
106	M	19	1	4	STIM	16	to NUP	6.6	9.09	5.7	10.53	22.9	0	43	6.73	10	4.01	34.19
106	M	19	1	4	STIM	17	to RED	3.2	18.75	2.9	20.69	35.4	0	46	5.22	13	2.34	-47.62
106	M	19	1	4	STIM	18	to NUP	3.2	18.75	2.37	25.32	39.8	0	42	7.11	14	4.07	32.56
106	M	19	1	4	STIM	19	to RED	1.6	37.50	1.58	37.97	49.7	0	46	5.35	12	3.85	-17.16
106	M	19	1	4	STIM	20	to NUP	1.6	37.50	1.18	50.85	64.4	0	43	7.5	14	4.40	30.92
106	M	19	1	4	STIM	21	to RED	10.5	5.71	10.52	5.70	22	0	44	2.78	2	2.18	-31.59
106	M	19	1	4	STIM	22	to NUP	10.5	5.71	10.33	5.81	28.3	1	43	4.14	8	4.04	34.61
106	M	19	1	4	STIM	23	to RED	10.5	5.71	8.33	7.20	18.7	0	45	4.24	1	3.28	-33.95
106	M	19	1	4	STIM	24	to NUP	10.5	5.71	7.47	8.03	23.2	0	45	3.23	2	3.54	45.53
106	M	19	1	4	STIM	25	to RED	1.6	37.50	1.6	37.50	46.3	0	47	7.25	11	2.09	-28.74
106	M	19	1	4	STIM	26	to NUP	1.6	37.50	1.5	40.00	48	0	43	8.53	14	3.52	24.52
106	M	19	1	4	STIM	27	to RED	3.2	18.75	3.17	18.93	28.1	0	45	4.1	10	6.51	-13.67
106	M	19	1	4	STIM	28	to NUP	3.2	18.75	2.4	25.00	37.2	0	42	6.3	12	2.75	23.04
106	M	19	1	4	STIM	29	to RED	6.6	9.09	6.07	9.88	20.8	0	45	2.21	9	4.14	-15.78
106	M	19	1	4	STIM	30	to NUP	6.6	9.09	4.87	12.32	27.6	0	43	4.06	9	2.75	22.35
106	M	19	1	4	STIM	31	to RED	16.8	3.57	16.87	3.56	17.8	0	45	5.51	2	2.61	-14.82
106	M	19	1	4	STIM	32	to NUP	16.8	3.57	15.1	3.97	16.8	0	44	0.78	1	3.38	25.30
106	M	19	1	4	STIM	33	to RED	0.8	75.00	0.92	65.22	91.3	0	47	5.11	9	3.51	-27.33
106	M	19	1	4	STIM	34	to NUP	0.8	75.00	0.9	66.67	91.8	1	41	8.68	16	3.86	53.64
106	M	19	1	4	STIM	35	to RED	8.3	7.23	7.67	7.82	21.8	0	44	4.35	3	3.41	-13.36
106	M	19	1	4	STIM	36	to NUP	8.3	7.23	8.35	7.19	32.6	1	43	1.7	4	3.79	27.29
106	M	19	1	4	STIM	37	to RED	4.1	14.63	3.58	16.76	35.4	0	44	4.74	11	2.52	-14.44
106	M	19	1	4	STIM	38	to NUP	4.1	14.63	2.47	24.29	39.1	0	43	6.9	12	2.94	26.33
106	M	23	1	5	POST	39	to RED	1	60.00	1.48	40.54	53.4	1	43	8.47	13	3.41	-34.06
106	M	23	1	5	POST	40	to NUP	1	60.00	1.02	58.82	70.7	1	41	10.41	16	5.28	18.50
106	M	23	1	5	POST	41	to RED	1	60.00	1.05	57.14	71.6	1	42	8.15	13	5.66	-15.72
106	M	23	1	5	POST	42	to NUP	1	60.00	0.78	76.92	93.2	0	40	9.84	17	4.12	23.82
106	M	23	1	5	POST	43	to RED	1	60.00	0.77	77.92	98.8	0	44	6.48	15	4.87	-30.64
106	M	23	1	5	POST	44	to NUP	1	60.00	1.07	56.07	76.3	0	42	9.63	16	4.03	24.34
106	M	0	1	6	post		to RED	1	60.00				0	45		1		
106	M	0	1	6	post		to NUP	1	60.00				0	45		1		
106	M	0	1	6	post		to RED	1	60.00				0	45		0		
106	M	0	1	6	post		to NUP	1	60.00				0	45		0		
106	M	0	1	6	post		to RED	1	60.00				0	45		0		
106	M	0	1	6	post		to NUP	1	60.00				0	45		0		

106	M	0	2	2	pre		to RED	1	60.00				0	45		0		
106	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
106	M	0	2	2	pre		to RED	1	60.00				0	45		0		
106	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
106	M	0	2	2	pre		to RED	1	60.00				0	45		0		
106	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
106	M	23	2	3	PRE	1	to RED	1	60.00	1.18	50.85	67	1	44	6.97	10	4.98	-35.32
106	M	23	2	3	PRE	2	to NUP	1	60.00	0.9	66.67	81.5	3	43	11.52	19	5.76	62.40
106	M	23	2	3	PRE	3	to RED	1	60.00	1.7	35.29	48.5	1	44	6.3	11	4.99	-35.15
106	M	23	2	3	PRE	4	to NUP	1	60.00	0.75	80.00	98.4	1	42	7.33	12	5.54	54.69
106	M	23	2	3	PRE	5	to RED	1	60.00	1.68	35.71	51	1	44	5.82	12	5.41	-40.74
106	M	23	2	3	PRE	6	to NUP	1	60.00	1.1	54.55	83.8	2	43	6.63	17	4.80	38.82
106	M	19	2	4	STIM	7	to RED	4.1	14.63	3.88	15.46	32.6	0	44	2.7	6	4.26	-56.41
106	M	19	2	4	STIM	8	to NUP	4.1	14.63	2.97	20.20	36.1	0	42	4.4	10	5.05	39.29
106	M	19	2	4	STIM	9	to RED	8.3	7.23	8.67	6.92	19.9	0	45	0.6	2	5.19	-36.03
106	M	19	2	4	STIM	10	to NUP	8.3	7.23	7	8.57	23.9	0	45	2.6	3	3.45	41.50
106	M	19	2	4	STIM	11	to RED	0.8	75.00	0.62	96.77	118.2	0	44	5.9	8	3.30	-31.42
106	M	19	2	4	STIM	12	to NUP	0.8	75.00	0.83	72.29	88	0	42	5.42	12	9.20	15.03
106	M	19	2	4	STIM	13	to RED	16.8	3.57	17.38	3.45	22.7	0	45	3.17	1	4.74	-24.75
106	M	19	2	4	STIM	14	to NUP	16.8	3.57	15.48	3.88	20.6	2	44	2.59	3	4.26	20.98
106	M	19	2	4	STIM	15	to RED	6.6	9.09	6.82	8.80	20.9	0	45	4.08	5	4.33	-46.64
106	M	19	2	4	STIM	16	to NUP	6.6	9.09	5.47	10.97	25.7	1	43	4.81	13	3.82	19.41
106	M	19	2	4	STIM	17	to RED	3.2	18.75	3.8	15.79	31.4	0	45	3.8	11	3.37	-15.02
106	M	19	2	4	STIM	18	to NUP	3.2	18.75	1.87	32.09	43.3	0	43	7.25	12	4.27	33.85
106	M	19	2	4	STIM	19	to RED	1.6	37.50	1.93	31.09	48.3	0	44	4.15	10	3.09	-70.99
106	M	19	2	4	STIM	20	to NUP	1.6	37.50	1.77	33.90	49.7	0	42	8.15	14	3.75	17.31
106	M	19	2	4	STIM	21	to RED	10.5	5.71	12.2	4.92	18.2	0	45	2.72	3	2.91	-28.62
106	M	19	2	4	STIM	22	to NUP	10.5	5.71	8.18	7.33	17.8	0	44	2.04	8	3.93	34.09
106	M	19	2	4	STIM	23	to RED	10.5	5.71	11.97	5.01	24.4	1	45	2.26	5	2.34	-20.81
106	M	19	2	4	STIM	24	to NUP	10.5	5.71	11.45	5.24	20.6	1	44	4.77	10	4.02	20.23
106	M	19	2	4	STIM	25	to RED	1.6	37.50	1.87	32.09	46.3	0	46	4.96	12	5.79	-18.79
106	M	19	2	4	STIM	26	to NUP	1.6	37.50	1.55	38.71	48.7	2	43	8.22	17	3.95	24.21
106	M	19	2	4	STIM	27	to RED	3.2	18.75	4.02	14.93	28.8	1	44	3.7	12	3.52	-17.03
106	M	19	2	4	STIM	28	to NUP	3.2	18.75	2.1	28.57	41	2	43	7.28	13	3.93	21.61
106	M	19	2	4	STIM	29	to RED	6.6	9.09	7.25	8.28	19.7	1	45	3.28	6	3.33	-17.13
106	M	19	2	4	STIM	30	to NUP	6.6	9.09	4.48	13.39	26.4	0	43	5.92	11	5.02	31.84
106	M	19	2	4	STIM	31	to RED	16.8	3.57	17.78	3.37	14.8	1	45	2.1	3	4.82	-8.94
106	M	19	2	4	STIM	32	to NUP	16.8	3.57	13.92	4.31	18.5	0	45	3.46	1	3.65	21.98
106	M	19	2	4	STIM	33	to RED	0.8	75.00	1.15	52.17	72.3	0	44	6.15	15	5.59	-7.20
106	M	19	2	4	STIM	34	to NUP	0.8	75.00	1.18	50.85	60.6	2	41	8.09	17	4.45	23.77
106	M	19	2	4	STIM	35	to RED	8.3	7.23	9.8	6.12	20.6	0	45	1.68	2	3.72	23.86
106	M	19	2	4	STIM	36	to NUP	8.3	7.23	7.72	7.77	37.4	1	44	4.25	7	2.99	23.94
106	M	19	2	4	STIM	37	to RED	4.1	14.63	4.38	13.70	26.4	1	44	3.8	6	4.25	-23.85
106	M	19	2	4	STIM	38	to NUP	4.1	14.63	4.82	12.45	29.3	0	43	3.7	9	3.72	17.55
106	M	23	2	5	POST	39	to RED	1	60.00	1.43	41.96	48	1	47	7.34	13	5.46	-28.92
106	M	23	2	5	POST	40	to NUP	1	60.00	0.73	82.19	91.8	2	41	9.44	18	4.29	41.07
106	M	23	2	5	POST	41	to RED	1	60.00	1.7	35.29	62.7	1	44	5.55	12	2.77	-23.21
106	M	23	2	5	POST	42	to NUP	1	60.00	0.93	64.52	71.7	2	40	10.1	19	4.07	57.41

106	M	23	2	5	POST	43	to RED	1	60.00	1.37	43.80	56.4	1	44	7.43	13	3.54	-59.47
106	M	23	2	5	POST	44	to NUP	1	60.00	1.17	51.28	71	1	42	7.91	16	4.03	38.12
106	M	0	2	6	post		to RED	1	60.00				0	45		1		
106	M	0	2	6	post		to NUP	1	60.00				0	45		2		
106	M	0	2	6	post		to RED	1	60.00				0	45		0		
106	M	0	2	6	post		to NUP	1	60.00				0	45		0		
106	M	0	2	6	post		to RED	1	60.00				0	45		0		
106	M	0	2	6	post		to NUP	1	60.00				0	45		0		
107	M	0	1	2	pre		to RED	1	60.00				0	45		0		
107	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
107	M	0	1	2	pre		to RED	1	60.00				0	45		0		
107	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
107	M	0	1	2	pre		to RED	1	60.00				0	45		0		
107	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
107	M	23	1	3	PRE	1	to RED	1	60.00	0.87	68.97	84.3	0	45	12.68	10	4.58	-35.48
107	M	23	1	3	PRE	2	to NUP	1	60.00	0.9	66.67	80.3	0	45	20.6	9	4.37	37.87
107	M	23	1	3	PRE	3	to RED	1	60.00	0.63	95.24	106.6	0	45	10.72	7	0.00	1.46
107	M	23	1	3	PRE	4	to NUP	1	60.00	0.8	75.00	85.4	0	45	16.85	9	0.00	21.02
107	M	23	1	3	PRE	5	to RED	1	60.00	0.68	88.24	90.6	0	45	11.02	7	7.26	-29.12
107	M	23	1	3	PRE	6	to NUP	1	60.00	0.83	72.29	82.7	0	45	9.17	6	0.00	34.79
107	M	19	1	4	STIM	7	to RED	4.1	14.63	3.6	16.67	28.6	0	45	10.92	5	0.00	-20.64
107	M	19	1	4	STIM	8	to NUP	4.1	14.63	3.57	16.81	29.8	0	45	11.4	5	0.00	22.44
107	M	19	1	4	STIM	9	to RED	8.3	7.23	6.87	8.73	22.7	0	45	5.4	3	0.00	-20.92
107	M	19	1	4	STIM	10	to NUP	8.3	7.23	7.83	7.66	29.8	0	45	6	3	0.00	19.25
107	M	19	1	4	STIM	11	to RED	0.8	75.00	0.5	120.00	131.4	0	45	9.13	4	0.00	-16.81
107	M	19	1	4	STIM	12	to NUP	0.8	75.00	0.47	127.66	130	0	45	11.96	4	0.00	33.38
107	M	19	1	4	STIM	13	to RED	16.8	3.57	15.22	3.94	21.1	0	45	1.1	2	0.00	-24.21
107	M	19	1	4	STIM	14	to NUP	16.8	3.57	16.18	3.71	22.5	0	45	-14.6	2	0.00	-6.37
107	M	19	1	4	STIM	15	to RED	6.6	9.09	4.75	12.63	19.7	0	45	15.1	2	0.00	-43.82
107	M	19	1	4	STIM	16	to NUP	6.6	9.09	5.73	10.47	23.7	0	45	3.52	2	0.00	5.74
107	M	19	1	4	STIM	17	to RED	3.2	18.75	2.43	24.69	41.7	0	45	9.69	2	0.00	-16.15
107	M	19	1	4	STIM	18	to NUP	3.2	18.75	2.67	22.47	32.6	0	45	6.71	3	0.00	80.46
107	M	19	1	4	STIM	19	to RED	1.6	37.50	0.92	65.22	87.3	0	45	11.08	3	0.00	-18.19
107	M	19	1	4	STIM	20	to NUP	1.6	37.50	1.33	45.11	55	0	45	6.55	3	0.00	101.52
107	M	19	1	4	STIM	21	to RED	10.5	5.71	9.5	6.32	22	0	45	8.6	1	0.00	-22.11
107	M	19	1	4	STIM	22	to NUP	10.5	5.71	10.35	5.80	23.7	0	45	2.7	2	0.00	117.97
107	M	19	1	4	STIM	23	to RED	10.5	5.71	9.97	6.02	18.9	0	45	3.6	1	0.00	-15.38
107	M	19	1	4	STIM	24	to NUP	10.5	5.71	10.05	5.97	20.8	0	45	2.73	2	0.00	171.62
107	M	19	1	4	STIM	25	to RED	1.6	37.50	1.2	50.00	78.9	0	45	12.88	3	0.00	1.04
107	M	19	1	4	STIM	26	to NUP	1.6	37.50	1.13	53.10	57.8	0	45	7.84	3	0.00	79.64
107	M	19	1	4	STIM	27	to RED	3.2	18.75	2.53	23.72	48.7	0	45	6.32	2	0.00	3.28
107	M	19	1	4	STIM	28	to NUP	3.2	18.75	2.93	20.48	28.3	0	45	5.42	2	0.00	123.92
107	M	19	1	4	STIM	29	to RED	6.6	9.09	5.9	10.17	23	0	45	3.13	2	0.00	-13.90
107	M	19	1	4	STIM	30	to NUP	6.6	9.09	5.27	11.39	37.7	0	45	3.33	2	0.00	133.77

107	M	19	1	4	STIM	31	to RED	16.8	3.57	15.48	3.88	20.2	0	45	-5.66	0	0.00	1.32
107	M	19	1	4	STIM	32	to NUP	16.8	3.57	16.28	3.69	26.4	0	45	0.7	0	0.00	-3.42
107	M	19	1	4	STIM	33	to RED	0.8	75.00	0.6	100.00	109.9	0	45	17.65	5	0.00	3.44
107	M	19	1	4	STIM	34	to NUP	0.8	75.00	0.58	103.45	91.6	0	45	6.55	5	0.00	60.48
107	M	19	1	4	STIM	35	to RED	8.3	7.23	7.67	7.82	28.8	0	45	3.6	2	0.00	11.69
107	M	19	1	4	STIM	36	to NUP	8.3	7.23	8.73	6.87	23.6	0	45	1.15	2	0.00	28.56
107	M	19	1	4	STIM	37	to RED	4.1	14.63	3.33	18.02	29.5	0	45	7.75	3	0.00	-37.23
107	M	19	1	4	STIM	38	to NUP	4.1	14.63	3.48	17.24	26.4	0	45	5.39	2	0.00	164.16
107	M	23	1	5	POST	39	to RED	1	60.00	1.12	53.57	70	0	45	0.51	3	0.00	-0.70
107	M	23	1	5	POST	40	to NUP	1	60.00	0.5	120.00	110.1	0	45	5.98	4	0.00	-2.53
107	M	23	1	5	POST	41	to RED	1	60.00	0.8	75.00	92.3	0	45	6.32	4	0.00	1900.51
107	M	23	1	5	POST	42	to NUP	1	60.00	0.98	61.22	72.1	0	45	9.14	5	0.00	49.28
107	M	23	1	5	POST	43	to RED	1	60.00	0.83	72.29	80.8	0	45	7.6	4	0.00	-129.87
107	M	23	1	5	POST	44	to NUP	1	60.00	0.7	85.71	95.1	0	45	8	5	0.00	60.39
107	M	0	1	6	post		to RED	1	60.00				0	45		1		
107	M	0	1	6	post		to NUP	1	60.00				0	45		1		
107	M	0	1	6	post		to RED	1	60.00				0	45		0		
107	M	0	1	6	post		to NUP	1	60.00				0	45		0		
107	M	0	1	6	post		to RED	1	60.00				0	45		0		
107	M	0	1	6	post		to NUP	1	60.00				0	45		0		
107	M	0	2	2	pre		to RED	1	60.00				0	45		0		
107	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
107	M	0	2	2	pre		to RED	1	60.00				0	45		0		
107	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
107	M	0	2	2	pre		to RED	1	60.00				0	45		0		
107	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
107	M	23	2	3	PRE	1	to RED	1	60.00	0.87	68.97	77.9	0	45	7.53	8	0.00	-12.84
107	M	23	2	3	PRE	2	to NUP	1	60.00	0.63	95.24	91.8	0	45	8.52	7	0.00	13.26
107	M	23	2	3	PRE	3	to RED	1	60.00	0.68	88.24	98.1	0	45	9.55	7	0.00	-17.40
107	M	23	2	3	PRE	4	to NUP	1	60.00	0.58	103.45	98.4	0	45	9.72	7	0.00	9.14
107	M	23	2	3	PRE	5	to RED	1	60.00	0.83	72.29	82.9	0	45	8.87	6	0.00	-17.82
107	M	23	2	3	PRE	6	to NUP	1	60.00	0.7	85.71	86.1	0	45	8.12	7	0.00	12.56
107	M	19	2	4	STIM	7	to RED	4.1	14.63	3.72	16.13	36	0	45	1.86	4	0.00	0.25
107	M	19	2	4	STIM	8	to NUP	4.1	14.63	3.71	16.17	27.1	0	45	0.62	3	0.00	7.09
107	M	19	2	4	STIM	9	to RED	8.3	7.23	6.97	8.61	33.5	0	45	2.46	2	0.00	-5.13
107	M	19	2	4	STIM	10	to NUP	8.3	7.23	6.28	9.55	21.5	0	45	2.39	2	0.00	-0.86
107	M	19	2	4	STIM	11	to RED	0.8	75.00	0.6	100.00	113.3	0	45	7.5	5	0.00	-5.16
107	M	19	2	4	STIM	12	to NUP	0.8	75.00	0.57	105.26	85.2	0	45	8.78	6	0.00	24.97
107	M	19	2	4	STIM	13	to RED	16.8	3.57	15.78	3.80	17.1	0	45	1.39	1	0.00	-9.90
107	M	19	2	4	STIM	14	to NUP	16.8	3.57	16.87	3.56	17.3	0	45	0.36	2	0.00	2.98
107	M	19	2	4	STIM	15	to RED	6.6	9.09	7.02	8.55	22.7	0	45	1.58	1	0.00	-8.97
107	M	19	2	4	STIM	16	to NUP	6.6	9.09	6.3	9.52	18.3	0	45	1.57	1	0.00	9.25
107	M	19	2	4	STIM	17	to RED	3.2	18.75	2.92	20.55	36	0	45	1.58	2	0.00	0.76
107	M	19	2	4	STIM	18	to NUP	3.2	18.75	2.2	27.27	40.5	0	45	3.8	3	0.00	-0.32
107	M	19	2	4	STIM	19	to RED	1.6	37.50	1.57	38.22	61.1	0	45	2.21	3	0.00	10.77
107	M	19	2	4	STIM	20	to NUP	1.6	37.50	1.38	43.48	50.5	0	45	4.9	3	0.00	-1.29

107	M	19	2	4	STIM	21	to RED	10.5	5.71	9.15	6.56	21.6	0	45	1.95	2	0.00	1.26
107	M	19	2	4	STIM	22	to NUP	10.5	5.71	10.02	5.99	23.4	0	45	2.68	2	0.00	12.72
107	M	19	2	4	STIM	23	to RED	10.5	5.71	9.62	6.24	21.6	0	45	2	1	0.00	-9.58
107	M	19	2	4	STIM	24	to NUP	10.5	5.71	10.9	5.50	29	0	45	2.93	2	0.00	18.82
107	M	19	2	4	STIM	25	to RED	1.6	37.50	1.25	48.00	68.2	0	45	4.28	3	0.00	0.43
107	M	19	2	4	STIM	26	to NUP	1.6	37.50	1.4	42.86	53.4	0	45	4.47	2	0.00	18.79
107	M	19	2	4	STIM	27	to RED	3.2	18.75	2.33	25.75	48.7	0	45	3.22	2	0.00	-35.29
107	M	19	2	4	STIM	28	to NUP	3.2	18.75	2.6	23.08	34.6	0	45	2.55	2	0.00	8.12
107	M	19	2	4	STIM	29	to RED	6.6	9.09	3.08	19.48	41.4	0	45	4.2	1	0.00	56.18
107	M	19	2	4	STIM	30	to NUP	6.6	9.09	4.92	12.20	24.8	0	45	2.61	2	0.00	0.49
107	M	19	2	4	STIM	31	to RED	16.8	3.57	13.02	4.61	23.7	0	45	3.23	1	0.00	1.11
107	M	19	2	4	STIM	32	to NUP	16.8	3.57	16.98	3.53	19.5	0	45	1.65	1	0.00	10.54
107	M	19	2	4	STIM	33	to RED	0.8	75.00	0.72	83.33	92.3	0	45	3.65	3	0.00	-1.50
107	M	19	2	4	STIM	34	to NUP	0.8	75.00	1	60.00	75.1	0	45	6.17	3	0.00	20.67
107	M	19	2	4	STIM	35	to RED	8.3	7.23	8.25	7.27	29	0	45	2.38	1	0.00	1.14
107	M	19	2	4	STIM	36	to NUP	8.3	7.23	6.63	9.05	22.2	0	45	1.9	0	0.00	-1.20
107	M	19	2	4	STIM	37	to RED	4.1	14.63	2.97	20.20	57.8	0	45	2.8	1	0.00	2.57
107	M	19	2	4	STIM	38	to NUP	4.1	14.63	3.13	19.17	42.8	0	45	2.72	1	0.00	28.06
107	M	23	2	5	POST	39	to RED	1	60.00	0.82	73.17	73.7	0	45	5.11	3	0.00	4.71
107	M	23	2	5	POST	40	to NUP	1	60.00	0.88	68.18	65.8	0	45	4.32	3	0.00	20.56
107	M	23	2	5	POST	41	to RED	1	60.00	0.98	61.22	76.1	0	45	3.89	3	0.00	4.23
107	M	23	2	5	POST	42	to NUP	1	60.00	0.62	96.77	101.4	0	45	2.81	3	0.00	32.24
107	M	23	2	5	POST	43	to RED	1	60.00	0.82	73.17	75.2	0	45	4.38	2	0.00	13.71
107	M	23	2	5	POST	44	to NUP	1	60.00	0.97	61.86	65.6	0	45	6.1	2	0.00	87.29
107	M	0	2	6	post		to RED	1	60.00				0	45		0		
107	M	0	2	6	post		to NUP	1	60.00				0	45		0		
107	M	0	2	6	post		to RED	1	60.00				0	45		0		
107	M	0	2	6	post		to NUP	1	60.00				0	45		0		
107	M	0	2	6	post		to RED	1	60.00				0	45		0		
107	M	0	2	6	post		to NUP	1	60.00				0	45		0		
108	M	0	1	2	pre		to RED	1	60.00				0	45		0		
108	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
108	M	0	1	2	pre		to RED	1	60.00				0	45		0		
108	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
108	M	0	1	2	pre		to RED	1	60.00				0	45		0		
108	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
108	M	23	1	3	PRE	1	to RED	1	60.00	1.3	46.15	63.7	0	45	1.4	10	4.74	-168.64
108	M	23	1	3	PRE	2	to NUP	1	60.00	1	60.00	72.6	0	43	8.33	12	7.99	89.91
108	M	23	1	3	PRE	3	to RED	1	60.00	1.15	52.17	60.6	0	45	8.03	11	4.65	-96.13
108	M	23	1	3	PRE	4	to NUP	1	60.00	1.1	54.55	77	0	44	8.85	12	7.63	63.90
108	M	23	1	3	PRE	5	to RED	1	60.00	1.33	45.11	61.8	0	47	8.54	12	5.32	-130.98
108	M	23	1	3	PRE	6	to NUP	1	60.00	0.85	70.59	92.3	0	44	8.55	12	6.57	72.22
108	M	19	1	4	STIM	7	to RED	4.1	14.63	4	15.00	30.5	0	47	4.48	9	5.05	-87.36
108	M	19	1	4	STIM	8	to NUP	4.1	14.63	1.57	38.22	50.3	0	44	5.61	11	6.40	84.08
108	M	19	1	4	STIM	9	to RED	8.3	7.23	7.95	7.55	17.1	0	47	3.47	8	4.54	-58.57
108	M	19	1	4	STIM	10	to NUP	8.3	7.23	4.2	14.29	28.3	0	43	5.65	11	7.42	81.39
108	M	19	1	4	STIM	11	to RED	0.8	75.00	1.03	58.25	72.8	0	47	8.02	12	4.10	-103.39
108	M	19	1	4	STIM	12	to NUP	0.8	75.00	0.7	85.71	107	1	43	8.45	13	4.91	80.20

108	M	19	1	4	STIM	13	to RED	16.8	3.57	13.2	4.55	25.7	2	45	3.87	6	2.81	-42.31
108	M	19	1	4	STIM	14	to NUP	16.8	3.57	13.57	4.42	15.9	1	45	3.9	7	2.65	40.70
108	M	19	1	4	STIM	15	to RED	6.6	9.09	6.57	9.13	21.6	1	47	4.15	9	4.00	-48.06
108	M	19	1	4	STIM	16	to NUP	6.6	9.09	4.38	13.70	28.1	1	44	4.25	10	4.67	42.65
108	M	19	1	4	STIM	17	to RED	3.2	18.75	3.58	16.76	31.2	0	47	0.6	10	3.17	-68.65
108	M	19	1	4	STIM	18	to NUP	3.2	18.75	3.45	17.39	33.3	1	43	6.57	11	5.75	46.37
108	M	19	1	4	STIM	19	to RED	1.6	37.50	1.48	40.54	53.6	1	46	6.55	10	3.12	-78.13
108	M	19	1	4	STIM	20	to NUP	1.6	37.50	1.65	36.36	45.2	1	44	7.65	11	3.75	50.56
108	M	19	1	4	STIM	21	to RED	10.5	5.71	12.17	4.93	17.6	1	46	2.06	8	3.12	-41.70
108	M	19	1	4	STIM	22	to NUP	10.5	5.71	8.97	6.69	17.5	1	45	3.41	8	4.29	44.28
108	M	19	1	4	STIM	23	to RED	10.5	5.71	11	5.45	18.2	2	47	4.12	9	3.68	-42.54
108	M	19	1	4	STIM	24	to NUP	10.5	5.71	9.22	6.51	17.1	2	44	5.78	9	4.53	39.75
108	M	19	1	4	STIM	25	to RED	1.6	37.50	1.92	31.25	48.2	2	46	4.45	10	2.47	-35.25
108	M	19	1	4	STIM	26	to NUP	1.6	37.50	1.15	52.17	59.9	2	45	5.6	11	3.18	-39.49
108	M	19	1	4	STIM	27	to RED	3.2	18.75	3.43	17.49	35.3	1	46	5.39	10	3.89	-43.74
108	M	19	1	4	STIM	28	to NUP	3.2	18.75	3.22	18.63	32.5	1	45	6.76	10	2.52	33.90
108	M	19	1	4	STIM	29	to RED	6.6	9.09	6.5	9.23	19.4	1	47	2.77	9	2.60	-28.20
108	M	19	1	4	STIM	30	to NUP	6.6	9.09	5.3	11.32	25.1	1	44	7.28	9	3.01	-36.30
108	M	19	1	4	STIM	31	to RED	16.8	3.57	15.37	3.90	15.7	1	47	3.6	6	3.41	-44.41
108	M	19	1	4	STIM	32	to NUP	16.8	3.57	13	4.62	15.36	1	43	4.8	7	2.69	34.09
108	M	19	1	4	STIM	33	to RED	0.8	75.00	0.97	61.86	73	1	47	2.95	11	4.28	-50.60
108	M	19	1	4	STIM	34	to NUP	0.8	75.00	0.55	109.09	128.1	2	43	7.45	12	4.73	65.74
108	M	19	1	4	STIM	35	to RED	8.3	7.23	8.3	7.23	22.3	2	47	7.07	9	3.36	-18.04
108	M	19	1	4	STIM	36	to NUP	8.3	7.23	5.47	10.97	24.1	2	43	4.8	8	2.33	32.49
108	M	19	1	4	STIM	37	to RED	4.1	14.63	4.08	14.71	31.1	2	47	6.07	9	2.81	-28.95
108	M	19	1	4	STIM	38	to NUP	4.1	14.63	3.08	19.48	30.2	2	43	6.67	9	2.89	-74.66
108	M	23	1	5	POST	39	to RED	1	60.00	0.98	61.22	70.5	2	46	4.74	10	2.96	-120.37
108	M	23	1	5	POST	40	to NUP	1	60.00	0.55	109.09	135.8	3	42	8.2	12	4.60	88.93
108	M	23	1	5	POST	41	to RED	1	60.00	0.98	61.22	70.9	3	43	5.14	11	3.18	-117.27
108	M	23	1	5	POST	42	to NUP	1	60.00	0.78	76.92	89.2	3	42	8.49	12	5.96	31.84
108	M	23	1	5	POST	43	to RED	1	60.00	0.68	88.24	101.8	3	47	6.12	11	3.73	-38.80
108	M	23	1	5	POST	44	to NUP	1	60.00	0.85	70.59	87.1	3	42	8.68	12	3.87	47.07
108	M	0	1	6	post		to RED	1	60.00				2	46		0		
108	M	0	1	6	post		to NUP	1	60.00				2	46		0		
108	M	0	1	6	post		to RED	1	60.00				2	45		0		
108	M	0	1	6	post		to NUP	1	60.00				2	45		0		
108	M	0	1	6	post		to RED	1	60.00				1	45		0		
108	M	0	1	6	post		to NUP	1	60.00				1	45		0		
108	M	0	2	2	pre		to RED	1	60.00				0	45		0		
108	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
108	M	0	2	2	pre		to RED	1	60.00				0	45		0		
108	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
108	M	0	2	2	pre		to RED	1	60.00				0	45		0		
108	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
108	M	23	2	3	PRE	1	to RED	1	60.00	0.73	82.19	97.4	0	45	2.39	8	4.67	-104.37
108	M	23	2	3	PRE	2	to NUP	1	60.00	0.67	89.55	95.3	0	43	6.68	10	7.20	98.01
108	M	23	2	3	PRE	3	to RED	1	60.00	0.83	72.29	81.7	0	45	5.29	8	3.89	-82.40

108	M	23	2	3	PRE	4	to NUP	1	60.00	0.68	88.24	92.9	0	44	6.4	9	7.27	65.10
108	M	23	2	3	PRE	5	to RED	1	60.00	0.67	89.55	107.2	0	46	4.1	8	5.05	-80.72
108	M	23	2	3	PRE	6	to NUP	1	60.00	0.58	103.45	110.7	0	45	5.25	9	6.22	67.46
108	M	19	2	4	STIM	7	to RED	4.1	14.63	3.85	15.58	28.4	0	46	2.17	3	4.15	-49.60
108	M	19	2	4	STIM	8	to NUP	4.1	14.63	3	20.00	34.7	0	45	2.93	5	6.73	65.14
108	M	19	2	4	STIM	9	to RED	8.3	7.23	6.93	8.66	18.2	0	45	2.12	2	3.57	-60.47
108	M	19	2	4	STIM	10	to NUP	8.3	7.23	6.78	8.85	20.2	0	45	2.02	2	5.34	63.83
108	M	19	2	4	STIM	11	to RED	0.8	75.00	0.87	68.97	72.8	0	46	3.83	5	3.28	-80.88
108	M	19	2	4	STIM	12	to NUP	0.8	75.00	0.77	77.92	89.9	0	45	3.18	7	4.56	71.45
108	M	19	2	4	STIM	13	to RED	16.8	3.57	11.08	5.42	15.9	0	46	4.94	1	3.15	-42.68
108	M	19	2	4	STIM	14	to NUP	16.8	3.57	13.57	4.42	19.2	0	45	3.68	2	4.49	33.44
108	M	19	2	4	STIM	15	to RED	6.6	9.09	5.13	11.70	18.9	0	46	1.19	2	3.90	-54.61
108	M	19	2	4	STIM	16	to NUP	6.6	9.09	4.35	13.79	23.4	0	44	2.6	3	4.84	62.90
108	M	19	2	4	STIM	17	to RED	3.2	18.75	3	20.00	35.6	1	46	4.05	4	3.88	-84.28
108	M	19	2	4	STIM	18	to NUP	3.2	18.75	2.68	22.39	29.7	0	44	3.84	5	3.62	78.47
108	M	19	2	4	STIM	19	to RED	1.6	37.50	1.67	35.93	52.4	0	46	2.86	5	4.44	-64.00
108	M	19	2	4	STIM	20	to NUP	1.6	37.50	1.6	37.50	54.5	0	44	5.38	7	3.13	69.68
108	M	19	2	4	STIM	21	to RED	10.5	5.71	7.58	7.92	17.5	0	46	3.57	2	4.15	-49.01
108	M	19	2	4	STIM	22	to NUP	10.5	5.71	7.7	7.79	19.2	1	45	3.53	2	1.95	40.89
108	M	19	2	4	STIM	23	to RED	10.5	5.71	9.63	6.23	18.2	1	46	2.12	2	3.80	-48.04
108	M	19	2	4	STIM	24	to NUP	10.5	5.71	7.37	8.14	22.3	1	45	3.71	2	4.60	35.61
108	M	19	2	4	STIM	25	to RED	1.6	37.50	1.55	38.71	53.6	2	46	4.98	5	2.90	-74.44
108	M	19	2	4	STIM	26	to NUP	1.6	37.50	1.53	39.22	52.2	1	44	2.5	6	3.95	41.86
108	M	19	2	4	STIM	27	to RED	3.2	18.75	3.25	18.46	27.1	1	46	3.78	4	2.81	-30.71
108	M	19	2	4	STIM	28	to NUP	3.2	18.75	3.85	15.58	34.2	1	46	3.8	4	2.50	64.30
108	M	19	2	4	STIM	29	to RED	6.6	9.09	5.02	11.95	23	0	46	2.8	2	2.95	-44.37
108	M	19	2	4	STIM	30	to NUP	6.6	9.09	4.6	13.04	31.4	0	45	2.95	3	6.35	40.41
108	M	19	2	4	STIM	31	to RED	16.8	3.57	11.55	5.19	18.5	0	46	4.83	1	4.06	-44.86
108	M	19	2	4	STIM	32	to NUP	16.8	3.57	9.75	6.15	17.6	0	44	7.13	2	3.93	25.56
108	M	19	2	4	STIM	33	to RED	0.8	75.00	0.8	75.00	89.2	0	45	3.83	5	3.62	-96.68
108	M	19	2	4	STIM	34	to NUP	0.8	75.00	0.88	68.18	83.1	0	45	3.15	5	3.51	37.77
108	M	19	2	4	STIM	35	to RED	8.3	7.23	6.48	9.26	22.3	0	46	2.92	2	3.71	-43.01
108	M	19	2	4	STIM	36	to NUP	8.3	7.23	6.27	9.57	22.9	0	44	3.01	3	3.87	35.00
108	M	19	2	4	STIM	37	to RED	4.1	14.63	4.55	13.19	23	0	46	1.82	3	3.62	-32.07
108	M	19	2	4	STIM	38	to NUP	4.1	14.63	3.98	15.08	30.5	1	45	4.14	4	2.59	19.37
108	M	23	2	5	POST	39	to RED	1	60.00	1.15	52.17	69.1	0	46	2.95	6	2.97	-56.35
108	M	23	2	5	POST	40	to NUP	1	60.00	1.02	58.82	76.8	1	44	7.75	8	3.79	52.83
108	M	23	2	5	POST	41	to RED	1	60.00	1	60.00	67.7	1	46	5.68	7	4.15	-34.08
108	M	23	2	5	POST	42	to NUP	1	60.00	0.87	68.97	73.5	1	44	6.86	7	5.29	-33.88
108	M	23	2	5	POST	43	to RED	1	60.00	0.98	61.22	81.7	1	46	3.9	6	6.43	-33.68
108	M	23	2	5	POST	44	to NUP	1	60.00	0.93	64.52	85.9	1	44	4.55	6	3.78	25.83
108	M	0	2	6	post		to RED	1	60.00				0	46		0		
108	M	0	2	6	post		to NUP	1	60.00				0	46		0		
108	M	0	2	6	post		to RED	1	60.00				0	45		0		
108	M	0	2	6	post		to NUP	1	60.00				0	45		0		
108	M	0	2	6	post		to RED	1	60.00				0	45		0		
108	M	0	2	6	post		to NUP	1	60.00				0	45		0		
109	M	0	1	2	pre		to RED	1	60.00				0	45		0		

109	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
109	M	0	1	2	pre		to RED	1	60.00				0	45		0		
109	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
109	M	0	1	2	pre		to RED	1	60.00				0	45		0		
109	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
109	M	23	1	3	PRE	1	to RED	1	60.00	1.17	51.28	71.4	0	45	3.83	10	5.28	-61.98
109	M	23	1	3	PRE	2	to NUP	1	60.00	0.8	75.00	83.4	0	45	4.18	10	6.06	33.64
109	M	23	1	3	PRE	3	to RED	1	60.00	1.13	53.10	88	0	45	0.87	9	4.51	-70.52
109	M	23	1	3	PRE	4	to NUP	1	60.00	1.13	53.10	85.4	0	45	2.92	11	4.65	35.96
109	M	23	1	3	PRE	5	to RED	1	60.00	1.52	39.47	59.3	0	43	2.53	10	5.41	-52.93
109	M	23	1	3	PRE	6	to NUP	1	60.00	0.85	70.59	99.7	0	45	3.82	10	5.83	24.97
109	M	19	1	4	STIM	7	to RED	4.1	14.63	3.97	15.11	24.6	0	45	1.63	6	4.33	-39.53
109	M	19	1	4	STIM	8	to NUP	4.1	14.63	2.97	20.20	36.7	0	45	1.98	8	6.40	17.79
109	M	19	1	4	STIM	9	to RED	8.3	7.23	8.28	7.25	19.2	0	45	1.04	6	4.26	-24.08
109	M	19	1	4	STIM	10	to NUP	8.3	7.23	7.88	7.61	22.5	0	45	0.9	6	4.30	35.19
109	M	19	1	4	STIM	11	to RED	0.8	75.00	0.78	76.92	93.7	0	45	1.59	8	5.66	-37.35
109	M	19	1	4	STIM	12	to NUP	0.8	75.00	0.53	113.21	128.5	0	45	2.2	8	5.92	36.76
109	M	19	1	4	STIM	13	to RED	16.8	3.57	12.98	4.62	16.6	0	45	3.52	4	3.51	-18.24
109	M	19	1	4	STIM	14	to NUP	16.8	3.57	12.68	4.73	21.1	0	45	3.09	6	3.30	21.68
109	M	19	1	4	STIM	15	to RED	6.6	9.09	4	15.00	24.3	0	45	3	4	4.11	-32.84
109	M	19	1	4	STIM	16	to NUP	6.6	9.09	1.98	30.30	33.3	0	45	4.72	6	0.00	1.86
109	M	19	1	4	STIM	17	to RED	3.2	18.75	3.82	15.71	29.3	0	45	0.81	5	3.83	-25.96
109	M	19	1	4	STIM	18	to NUP	3.2	18.75	2.18	27.52	41.4	0	45	2.64	5	5.57	35.35
109	M	19	1	4	STIM	19	to RED	1.6	37.50	1.77	33.90	44.9	0	45	1.95	5	7.02	-38.40
109	M	19	1	4	STIM	20	to NUP	1.6	37.50	1.68	35.71	50.8	0	45	1.07	4	6.67	27.67
109	M	19	1	4	STIM	21	to RED	10.5	5.71	10.53	5.70	19.7	0	45	1.69	4	6.33	-23.49
109	M	19	1	4	STIM	22	to NUP	10.5	5.71	8.42	7.13	20.1	0	45	1.81	3	3.45	24.03
109	M	19	1	4	STIM	23	to RED	10.5	5.71	8.7	6.90	18.2	0	45	2.48	3	3.66	-24.87
109	M	19	1	4	STIM	24	to NUP	10.5	5.71	7.4	8.11	18.9	0	45	2.88	3	4.37	17.38
109	M	19	1	4	STIM	25	to RED	1.6	37.50	1.62	37.04	49	0	45	0.8	5	3.96	-30.14
109	M	19	1	4	STIM	26	to NUP	1.6	37.50	1.47	40.82	71.6	0	45	1.36	5	0.00	17.94
109	M	19	1	4	STIM	27	to RED	3.2	18.75	3.42	17.54	31.8	0	45	1.76	4	3.90	-16.75
109	M	19	1	4	STIM	28	to NUP	3.2	18.75	2.32	25.86	42.6	0	45	1.31	5	4.91	24.61
109	M	19	1	4	STIM	29	to RED	6.6	9.09	6.43	9.33	19.5	0	45	1.37	3	4.76	-20.86
109	M	19	1	4	STIM	30	to NUP	6.6	9.09	4.6	13.04	27.2	0	45	2.28	4	5.01	18.55
109	M	19	1	4	STIM	31	to RED	16.8	3.57	15.7	3.82	11.7	0	45	1.55	2	2.97	-18.63
109	M	19	1	4	STIM	32	to NUP	16.8	3.57	14.22	4.22	17.9	0	45	1.58	2	0.00	29.69
109	M	19	1	4	STIM	33	to RED	0.8	75.00	1.07	56.07	76.8	0	45	1.93	5	5.72	-13.12
109	M	19	1	4	STIM	34	to NUP	0.8	75.00	0.93	64.52	80.1	0	45	1.79	4	5.38	13.81
109	M	19	1	4	STIM	35	to RED	8.3	7.23	7.98	7.52	18.7	0	45	1.62	3	4.88	-17.15
109	M	19	1	4	STIM	36	to NUP	8.3	7.23	7.4	8.11	38.6	0	45	1.1	2	4.35	19.82
109	M	19	1	4	STIM	37	to RED	4.1	14.63	4.27	14.05	33	0	45	1.25	4	4.34	-21.70
109	M	19	1	4	STIM	38	to NUP	4.1	14.63	4.03	14.89	36.8	0	45	1.2	3	5.86	20.83
109	M	23	1	5	POST	39	to RED	1	60.00	1.8	33.33	49.6	0	45	1.23	5	7.93	-29.11
109	M	23	1	5	POST	40	to NUP	1	60.00	0.85	70.59	82.9	0	45	3.17	4	4.09	16.76
109	M	23	1	5	POST	41	to RED	1	60.00	1.03	58.25	83.6	0	45	1.87	4	5.20	-21.64
109	M	23	1	5	POST	42	to NUP	1	60.00	0.73	82.19	95.5	0	45	2.8	4	0.00	27.70
109	M	23	1	5	POST	43	to RED	1	60.00	0.8	75.00	70.3	0	45	2.08	3	3.16	-37.44

109	M	23	1	5	POST	44	to NUP	1	60.00	0.95	63.16	84.7	0	45	2.8	3	2.45	10.49
109	M	0	1	6	post		to RED	1	60.00				0	45		0		
109	M	0	1	6	post		to NUP	1	60.00				0	45		0		
109	M	0	1	6	post		to RED	1	60.00				0	45		0		
109	M	0	1	6	post		to NUP	1	60.00				0	45		0		
109	M	0	1	6	post		to RED	1	60.00				0	45		0		
109	M	0	1	6	post		to NUP	1	60.00				0	45		0		
109	M	0	2	2	pre		to RED	1	60.00				0	45		0		
109	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
109	M	0	2	2	pre		to RED	1	60.00				0	45		0		
109	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
109	M	0	2	2	pre		to RED	1	60.00				0	45		0		
109	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
109	M	23	2	3	PRE	1	to RED	1	60.00	1.1	54.55	64.1	0	45	0.67	5	4.35	-50.32
109	M	23	2	3	PRE	2	to NUP	1	60.00	0.65	92.31	97.4	0	45	3.48	6	4.52	41.24
109	M	23	2	3	PRE	3	to RED	1	60.00	0.83	72.29	88.3	0	45	1.32	5	3.99	-42.06
109	M	23	2	3	PRE	4	to NUP	1	60.00	0.55	109.09	106.8	0	45	0.65	5	4.67	17.33
109	M	23	2	3	PRE	5	to RED	1	60.00	0.78	76.92	88.7	0	45	1.24	4	5.06	-33.74
109	M	23	2	3	PRE	6	to NUP	1	60.00	0.95	63.16	80.5	0	45	1.47	4	0.00	50.64
109	M	19	2	4	STIM	7	to RED	4.1	14.63	2.87	20.91	32.5	0	45	1.71	3	4.36	-56.32
109	M	19	2	4	STIM	8	to NUP	4.1	14.63	2.72	22.06	33.3	0	45	1.83	3	3.01	31.37
109	M	19	2	4	STIM	9	to RED	8.3	7.23	7.48	8.02	21.1	0	45	1.12	2	0.00	-14.34
109	M	19	2	4	STIM	10	to NUP	8.3	7.23	7	8.57	22.9	0	45	1.2	3	4.03	17.17
109	M	19	2	4	STIM	11	to RED	0.8	75.00	0.62	96.77	100	0	45	1.18	3	0.00	-78.10
109	M	19	2	4	STIM	12	to NUP	0.8	75.00	0.67	89.55	107.3	0	45	1.05	3	0.00	41.89
109	M	19	2	4	STIM	13	to RED	16.8	3.57	15.38	3.90	26	0	45	1.22	2	3.46	-22.25
109	M	19	2	4	STIM	14	to NUP	16.8	3.57	10.57	5.68	18.5	0	45	4.83	1	0.00	21.79
109	M	19	2	4	STIM	15	to RED	6.6	9.09	6.07	9.88	25.8	0	45	0.75	1	0.00	-62.13
109	M	19	2	4	STIM	16	to NUP	6.6	9.09	6.1	9.84	22.3	0	45	0.57	2	0.00	-1.48
109	M	19	2	4	STIM	17	to RED	3.2	18.75	3.08	19.48	32.3	2	45	0.7	2	3.24	-50.75
109	M	19	2	4	STIM	18	to NUP	3.2	18.75	2.17	27.65	44.9	0	45	1.21	2	5.00	50.67
109	M	19	2	4	STIM	19	to RED	1.6	37.50	1.57	38.22	48.3	0	45	0.95	2	0.00	-18.09
109	M	19	2	4	STIM	20	to NUP	1.6	37.50	1.6	37.50	52.7	0	45	0.62	3	4.33	26.66
109	M	19	2	4	STIM	21	to RED	10.5	5.71	10.32	5.81	18	0	45	0.66	3	4.66	-24.36
109	M	19	2	4	STIM	22	to NUP	10.5	5.71	6.73	8.92	22.3	0	45	2.69	2	4.25	22.59
109	M	19	2	4	STIM	23	to RED	10.5	5.71	8.62	6.96	21.6	0	45	1.61	2	0.00	-12.91
109	M	19	2	4	STIM	24	to NUP	10.5	5.71	8.77	6.84	20.4	0	45	1.9	2	3.93	33.82
109	M	19	2	4	STIM	25	to RED	1.6	37.50	1.67	35.93	63	0	45	1.11	2	0.00	-85.58
109	M	19	2	4	STIM	26	to NUP	1.6	37.50	1.48	40.54	58.1	0	45	1.1	2	1.60	32.39
109	M	19	2	4	STIM	27	to RED	3.2	18.75	2.98	20.13	34.7	0	45	0.89	2	5.43	-25.76
109	M	19	2	4	STIM	28	to NUP	3.2	18.75	3.6	16.67	30.5	0	45	0.85	2	0.00	24.58
109	M	19	2	4	STIM	29	to RED	6.6	9.09	6.13	9.79	20.1	0	45	1.17	2	3.18	-18.91
109	M	19	2	4	STIM	30	to NUP	6.6	9.09	2	30.00	37.9	0	45	4.33	1	3.28	62.66
109	M	19	2	4	STIM	31	to RED	16.8	3.57	10.9	5.50	18	0	45	2.48	1	4.62	-36.43
109	M	19	2	4	STIM	32	to NUP	16.8	3.57	11.9	5.04	16.4	0	45	2.8	0	0.00	22.09
109	M	19	2	4	STIM	33	to RED	0.8	75.00	0.97	61.86	74.5	0	45	0.63	1	0.00	-22.25
109	M	19	2	4	STIM	34	to NUP	0.8	75.00	1.12	53.57	77	0	45	0.93	2	3.92	27.78
109	M	19	2	4	STIM	35	to RED	8.3	7.23	6.9	8.70	21.6	0	45	1.92	1	0.00	-23.22

109	M	19	2	4	STIM	36	to NUP	8.3	7.23	7.72	7.77	17.3	0	45	0.8	2	2.80	35.23
109	M	19	2	4	STIM	37	to RED	4.1	14.63	3.58	16.76	26.5	0	45	1.1	3	0.00	-24.00
109	M	19	2	4	STIM	38	to NUP	4.1	14.63	3.88	15.46	26.7	0	45	-3.56	1	6.00	84.22
109	M	23	2	5	POST	39	to RED	1	60.00	1.28	46.88	73.7	0	45	0.75	3	3.94	-18.74
109	M	23	2	5	POST	40	to NUP	1	60.00	1.12	53.57	77	0	45	0.78	2	0.00	11.71
109	M	23	2	5	POST	41	to RED	1	60.00	1.03	58.25	79.1	0	45	0.9	2	0.00	-24.41
109	M	23	2	5	POST	42	to NUP	1	60.00	1.07	56.07	75.2	0	45	1.01	2	0.00	20.57
109	M	23	2	5	POST	43	to RED	1	60.00	1.3	46.15	64.8	0	45	0.75	2	3.74	-44.35
109	M	23	2	5	POST	44	to NUP	1	60.00	0.95	63.16	80.6	0	45	0.98	2	4.33	13.70
109	M	0	2	6	post		to RED	1	60.00				0	45		0		
109	M	0	2	6	post		to NUP	1	60.00				0	45		0		
109	M	0	2	6	post		to RED	1	60.00				0	45		0		
109	M	0	2	6	post		to NUP	1	60.00				0	45		0		
109	M	0	2	6	post		to RED	1	60.00				0	45		0		
109	M	0	2	6	post		to NUP	1	60.00				0	45		0		
110	M	0	1	2	pre		to RED	1	60.00				0	45		0		
110	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
110	M	0	1	2	pre		to RED	1	60.00				0	45		0		
110	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
110	M	0	1	2	pre		to RED	1	60.00				0	45		0		
110	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
110	M	23	1	3	PRE	1	to RED	1	60.00	0.87	68.97	72.3	0	45	1.88	10	5.23	-41.46
110	M	23	1	3	PRE	2	to NUP	1	60.00	0.78	76.92	89.9	0	40	2.5	10	7.05	38.38
110	M	23	1	3	PRE	3	to RED	1	60.00	0.7	85.71	89.9	0	40	2.07	12	5.11	-45.94
110	M	23	1	3	PRE	4	to NUP	1	60.00	0.78	76.92	94.7	0	40	3.07	12	6.52	39.68
110	M	23	1	3	PRE	5	to RED	1	60.00	0.88	68.18	81.3	0	40	3.34	12	7.46	-43.14
110	M	23	1	3	PRE	6	to NUP	1	60.00	0.9	66.67	75.4	0	35	17.68	13	6.71	40.90
110	M	19	1	4	STIM	7	to RED	4.1	14.63	3.08	19.48	38.6	0	45	1.7	5	6.20	-29.39
110	M	19	1	4	STIM	8	to NUP	4.1	14.63	3.43	17.49	35.1	0	45	1.72	3	7.31	25.06
110	M	19	1	4	STIM	9	to RED	8.3	7.23	7.15	8.39	21.6	0	45	1.85	0	6.68	-17.02
110	M	19	1	4	STIM	10	to NUP	8.3	7.23	7.48	8.02	19.7	0	45	0.79	2	7.99	45.66
110	M	19	1	4	STIM	11	to RED	0.8	75.00	0.58	103.45	114.2	0	40	0.85	4	6.72	-38.73
110	M	19	1	4	STIM	12	to NUP	0.8	75.00	0.8	75.00	95	0	40	2.27	7	7.33	50.36
110	M	19	1	4	STIM	13	to RED	16.8	3.57	17.62	3.41	16.7	0	45	2.36	1	4.45	-11.74
110	M	19	1	4	STIM	14	to NUP	16.8	3.57	16.02	3.75	14.6	0	43	2.11	1	4.66	42.05
110	M	19	1	4	STIM	15	to RED	6.6	9.09	6.42	9.35	20.8	0	45	1.65	2	6.36	-24.86
110	M	19	1	4	STIM	16	to NUP	6.6	9.09	6.45	9.30	18.5	0	42	1.7	2	6.41	55.02
110	M	19	1	4	STIM	17	to RED	3.2	18.75	2.02	29.70	34.9	0	43	2.03	4	6.49	-42.31
110	M	19	1	4	STIM	18	to NUP	3.2	18.75	2.37	25.32	34.9	0	40	2.86	7	5.30	52.50
110	M	19	1	4	STIM	19	to RED	1.6	37.50	1.02	58.82	73.3	0	43	1.91	5	5.91	-49.16
110	M	19	1	4	STIM	20	to NUP	1.6	37.50	1.42	42.25	48.7	0	40	3.13	6	3.62	53.04
110	M	19	1	4	STIM	21	to RED	10.5	5.71	8.97	6.69	19	0	45	2.41	1	7.23	-10.78
110	M	19	1	4	STIM	22	to NUP	10.5	5.71	10.18	5.89	20.8	0	41	2.5	5	5.52	50.34
110	M	19	1	4	STIM	23	to RED	10.5	5.71	9.93	6.04	17.8	0	45	1.55	2	4.65	-14.61
110	M	19	1	4	STIM	24	to NUP	10.5	5.71	9.78	6.13	16.4	0	43	2.55	2	5.57	38.75
110	M	19	1	4	STIM	25	to RED	1.6	37.50	1.68	35.71	49.7	0	43	2.12	4	4.89	-40.59
110	M	19	1	4	STIM	26	to NUP	1.6	37.50	1.58	37.97	47.7	0	40	3.3	7	7.85	43.00

110	M	19	1	4	STIM	27	to RED	3.2	18.75	2.18	27.52	30.9	0	43	2.34	5	5.02	-30.57
110	M	19	1	4	STIM	28	to NUP	3.2	18.75	2.78	21.58	33.7	0	43	2.55	6	6.22	32.27
110	M	19	1	4	STIM	29	to RED	6.6	9.09	6.02	9.97	30.2	0	45	2.38	3	4.66	-22.23
110	M	19	1	4	STIM	30	to NUP	6.6	9.09	5.58	10.75	26	0	41	2.4	3	5.70	29.21
110	M	19	1	4	STIM	31	to RED	16.8	3.57	15.95	3.76	17.5	0	44	2.13	2	3.13	-12.60
110	M	19	1	4	STIM	32	to NUP	16.8	3.57	16.95	3.54	16.4	0	43	0.83	2	4.77	21.90
110	M	19	1	4	STIM	33	to RED	0.8	75.00	0.62	96.77	107. 5	0	43	1.98	5	4.42	-33.24
110	M	19	1	4	STIM	34	to NUP	0.8	75.00	0.8	75.00	93.2	0	39	4.2	8	7.37	43.64
110	M	19	1	4	STIM	35	to RED	8.3	7.23	7.78	7.71	20.2	0	44	1.45	3	3.58	-19.06
110	M	19	1	4	STIM	36	to NUP	8.3	7.23	8.48	7.08	19.2	0	43	1.8	4	6.06	41.87
110	M	19	1	4	STIM	37	to RED	4.1	14.63	3.68	16.30	26.4	0	42	1.7	5	4.28	-33.11
110	M	19	1	4	STIM	38	to NUP	4.1	14.63	3.32	18.07	29.1	0	40	1.7	5	6.29	52.07
110	M	23	1	5	POST	39	to RED	1	60.00	0.75	80.00	93.4	0	43	1.98	6	5.00	-49.60
110	M	23	1	5	POST	40	to NUP	1	60.00	0.98	61.22	71	0	39	3.19	9	6.02	47.98
110	M	23	1	5	POST	41	to RED	1	60.00	0.93	64.52	82.9	0	42	1.62	5	4.45	-42.18
110	M	23	1	5	POST	42	to NUP	1	60.00	0.88	68.18	87.4	0	40	4.34	8	5.91	46.89
110	M	23	1	5	POST	43	to RED	1	60.00	0.77	77.92	95.1	0	43	2.5	4	4.40	-36.12
110	M	23	1	5	POST	44	to NUP	1	60.00	0.82	73.17	79.9	0	40	4.93	8	5.89	45.57
110	M	0	1	6	post		to RED	1	60.00				0	45		1		
110	M	0	1	6	post		to NUP	1	60.00				0	45		0		
110	M	0	1	6	post		to RED	1	60.00				0	45		0		
110	M	0	1	6	post		to NUP	1	60.00				0	45		0		
110	M	0	1	6	post		to RED	1	60.00				0	45		0		
110	M	0	1	6	post		to NUP	1	60.00				0	45		0		
110	M	0	2	2	pre		to RED	1	60.00				0	45		0		
110	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
110	M	0	2	2	pre		to RED	1	60.00				0	45		0		
110	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
110	M	0	2	2	pre		to RED	1	60.00				0	45		0		
110	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
110	M	23	2	3	PRE	1	to RED	1	60.00	0.63	95.24	115. 7	0	43	1.02	5	5.34	-65.80
110	M	23	2	3	PRE	2	to NUP	1	60.00	0.75	80.00	87.8	0	40	3.15	8	6.41	62.36
110	M	23	2	3	PRE	3	to RED	1	60.00	0.85	70.59	79.4	0	42	2.25	6	4.37	-76.79
110	M	23	2	3	PRE	4	to NUP	1	60.00	0.73	82.19	113. 1	0	39	3.44	8	6.29	36.00
110	M	23	2	3	PRE	5	to RED	1	60.00	0.82	73.17	85.2	0	42	1.56	4	3.81	-70.73
110	M	23	2	3	PRE	6	to NUP	1	60.00	0.75	80.00	98.6	0	40	4.08	7	5.65	47.37
110	M	19	2	4	STIM	7	to RED	4.1	14.63	3.35	17.91	34.2	0	45	1.55	2	5.16	-56.60
110	M	19	2	4	STIM	8	to NUP	4.1	14.63	3.27	18.35	32.3	0	44	1.83	2	6.29	60.45
110	M	19	2	4	STIM	9	to RED	8.3	7.23	8.17	7.34	20.6	0	45	1.11	1	5.06	-32.26
110	M	19	2	4	STIM	10	to NUP	8.3	7.23	7.4	8.11	17.1	0	44	1.28	1	6.22	53.91
110	M	19	2	4	STIM	11	to RED	0.8	75.00	0.77	77.92	92.9	0	44	1.28	3	5.16	-51.00
110	M	19	2	4	STIM	12	to NUP	0.8	75.00	0.9	66.67	94.4	0	42	3.18	5	4.72	59.90
110	M	19	2	4	STIM	13	to RED	16.8	3.57	15.45	3.88	13.4	0	45	1.4	0	3.96	-16.03
110	M	19	2	4	STIM	14	to NUP	16.8	3.57	16.8	3.57	17.5	0	44	0.65	1	3.49	49.36
110	M	19	2	4	STIM	15	to RED	6.6	9.09	5.03	11.93	24.4	0	45	1.74	1	4.68	-36.23
110	M	19	2	4	STIM	16	to NUP	6.6	9.09	6	10.00	21.3	0	41	1.58	2	3.60	34.76
110	M	19	2	4	STIM	17	to RED	3.2	18.75	2.55	23.53	36.5	0	44	1.73	2	4.29	-41.32

110	M	19	2	4	STIM	18	to NUP	3.2	18.75	2.88	20.83	32.1	0	42	2.22	4	4.67	52.70
110	M	19	2	4	STIM	19	to RED	1.6	37.50	1.17	51.28	66.9	0	44	1.66	4	2.97	-52.03
110	M	19	2	4	STIM	20	to NUP	1.6	37.50	1.18	50.85	63	0	40	3.99	5	5.23	48.06
110	M	19	2	4	STIM	21	to RED	10.5	5.71	9.72	6.17	19	0	45	1.35	0	4.18	-21.37
110	M	19	2	4	STIM	22	to NUP	10.5	5.71	10.25	5.85	17.1	0	43	1	1	3.74	36.05
110	M	19	2	4	STIM	23	to RED	10.5	5.71	12.78	4.69	16.9	0	45	1.49	0	3.78	-20.09
110	M	19	2	4	STIM	24	to NUP	10.5	5.71	9.85	6.09	21.5	0	42	1.82	1	4.43	38.71
110	M	19	2	4	STIM	25	to RED	1.6	37.50	1.1	54.55	60.2	0	44	2.65	3	3.82	-45.56
110	M	19	2	4	STIM	26	to NUP	1.6	37.50	1.48	40.54	48.3	0	40	2.64	5	4.41	47.07
110	M	19	2	4	STIM	27	to RED	3.2	18.75	2.1	28.57	44.3	0	45	2.25	3	3.40	-54.08
110	M	19	2	4	STIM	28	to NUP	3.2	18.75	3.18	18.87	31.2	0	42	3.05	3	4.80	35.04
110	M	19	2	4	STIM	29	to RED	6.6	9.09	5.37	11.17	22.5	0	45	1.3	1	3.87	-25.83
110	M	19	2	4	STIM	30	to NUP	6.6	9.09	5.2	11.54	25.5	0	42	2.8	2	4.70	45.37
110	M	19	2	4	STIM	31	to RED	16.8	3.57	14.1	4.26	16.1	0	45	2.08	1	3.67	-8.61
110	M	19	2	4	STIM	32	to NUP	16.8	3.57	13.3	4.51	15	0	45	5.43	1	4.31	21.81
110	M	19	2	4	STIM	33	to RED	0.8	75.00	1.02	58.82	73.8	0	45	2.21	3	3.58	-52.73
110	M	19	2	4	STIM	34	to NUP	0.8	75.00	0.95	63.16	88.5	0	41	3.4	5	5.82	28.47
110	M	19	2	4	STIM	35	to RED	8.3	7.23	7.47	8.03	19	0	45	1.21	1	4.09	-21.42
110	M	19	2	4	STIM	36	to NUP	8.3	7.23	6.83	8.78	19.9	0	44	1.45	1	6.93	28.37
110	M	19	2	4	STIM	37	to RED	4.1	14.63	3.75	16.00	26.4	0	45	3.45	2	3.16	-38.85
110	M	19	2	4	STIM	38	to NUP	4.1	14.63	3.43	17.49	25.8	0	43	3	3	4.88	21.48
110	M	23	2	5	POST	39	to RED	1	60.00	1.13	53.10	76.3	0	45	1.57	2	3.33	-65.54
110	M	23	2	5	POST	40	to NUP	1	60.00	1.08	55.56	73.7	0	40	5.04	6	4.39	35.18
110	M	23	2	5	POST	41	to RED	1	60.00	0.93	64.52	79.1	0	44	3.02	4	3.47	-47.35
110	M	23	2	5	POST	42	to NUP	1	60.00	0.88	68.18	83.6	0	39	5.04	7	6.53	25.60
110	M	23	2	5	POST	43	to RED	1	60.00	0.88	68.18	82.6	0	45	2.79	4	4.07	-51.69
110	M	23	2	5	POST	44	to NUP	1	60.00	0.9	66.67	91.5	0	40	5.55	6	4.69	52.96
110	M	0	2	6	post		to RED	1	60.00				0	45		0		
110	M	0	2	6	post		to NUP	1	60.00				0	45		0		
110	M	0	2	6	post		to RED	1	60.00				0	45		0		
110	M	0	2	6	post		to NUP	1	60.00				0	45		0		
110	M	0	2	6	post		to RED	1	60.00				0	45		0		
110	M	0	2	6	post		to NUP	1	60.00				0	45		0		
111	M	0	1	2	pre		to RED	1	60.00				0	45		0		
111	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
111	M	0	1	2	pre		to RED	1	60.00				0	45		0		
111	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
111	M	0	1	2	pre		to RED	1	60.00				0	45		0		
111	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
111	M	23	1	3	PRE	1	to RED	1	60.00	0.99	60.61	73.5	0	45	20.39	10	8.69	-53.39
111	M	23	1	3	PRE	2	to NUP	1	60.00	0.87	68.97	84.1	0	45	15.13	11	6.36	78.59
111	M	23	1	3	PRE	3	to RED	1	60.00	1.2	50.00	59.5	0	45	8.03	10	6.74	-50.68
111	M	23	1	3	PRE	4	to NUP	1	60.00	0.96	62.50	92.2	0	45	14.94	12	6.20	61.16
111	M	23	1	3	PRE	5	to RED	1	60.00	0.95	63.16	75.6	0	45	10.28	10	6.60	-56.32
111	M	23	1	3	PRE	6	to NUP	1	60.00	0.87	68.97	94.8	0	45	11.61	11	6.84	52.45
111	M	19	1	4	STIM	7	to RED	4.1	14.63	3.35	17.91	33.3	0	45	4.52	6	7.84	-37.53

111	M	19	1	4	STIM	8	to NUP	4.1	14.63	3.53	17.00	28.6	0	45	6.59	10	6.04	48.35
111	M	19	1	4	STIM	9	to RED	8.3	7.23	7.42	8.09	23.6	0	45	3.61	5	6.15	-23.54
111	M	19	1	4	STIM	10	to NUP	8.3	7.23	6.68	8.98	19.5	0	45	4.87	9	5.87	42.96
111	M	19	1	4	STIM	11	to RED	0.8	75.00	0.85	70.59	87.8	0	45	4.58	8	6.98	-32.55
111	M	19	1	4	STIM	12	to NUP	0.8	75.00	0.75	80.00	90.1	0	45	13.2	11	6.00	51.02
111	M	19	1	4	STIM	13	to RED	16.8	3.57	15.98	3.75	20.1	0	45	3.19	3	5.62	-14.67
111	M	19	1	4	STIM	14	to NUP	16.8	3.57	15.85	3.79	16.2	0	45	5.02	6	4.45	25.35
111	M	19	1	4	STIM	15	to RED	6.6	9.09	6.42	9.35	21.8	0	45	2.85	7	5.71	-27.58
111	M	19	1	4	STIM	16	to NUP	6.6	9.09	5.92	10.14	27.2	0	45	4.75	10	6.65	48.61
111	M	19	1	4	STIM	17	to RED	3.2	18.75	2.5	24.00	39.4	0	45	4.12	7	5.68	-44.21
111	M	19	1	4	STIM	18	to NUP	3.2	18.75	2.97	20.20	35.1	0	45	9.88	11	5.67	59.71
111	M	19	1	4	STIM	19	to RED	1.6	37.50	1.32	45.45	61.6	0	45	4.95	8	5.15	-46.85
111	M	19	1	4	STIM	20	to NUP	1.6	37.50	1.18	50.85	59.3	0	45	4.6	10	5.42	51.60
111	M	19	1	4	STIM	21	to RED	10.5	5.71	8.88	6.76	19.2	0	45	2.69	4	5.81	-18.46
111	M	19	1	4	STIM	22	to NUP	10.5	5.71	9.98	6.01	20.4	0	45	4.72	8	5.58	38.75
111	M	19	1	4	STIM	23	to RED	10.5	5.71	9.22	6.51	21.8	0	45	7.51	4	6.17	-19.69
111	M	19	1	4	STIM	24	to NUP	10.5	5.71	9.6	6.25	19.5	0	45	3.23	9	4.36	37.45
111	M	19	1	4	STIM	25	to RED	1.6	37.50	1.4	42.86	55.3	0	45	3.28	7	4.16	-58.63
111	M	19	1	4	STIM	26	to NUP	1.6	37.50	1.27	47.24	53.6	0	45	6.08	10	5.75	67.63
111	M	19	1	4	STIM	27	to RED	3.2	18.75	2.67	22.47	34.4	0	45	3.1	7	4.04	-45.81
111	M	19	1	4	STIM	28	to NUP	3.2	18.75	2.52	23.81	57.3	0	45	3.56	9	5.84	57.96
111	M	19	1	4	STIM	29	to RED	6.6	9.09	5.38	11.15	24.8	0	45	2.04	6	5.31	-31.80
111	M	19	1	4	STIM	30	to NUP	6.6	9.09	6.07	9.88	24.4	0	45	3.3	8	4.36	51.07
111	M	19	1	4	STIM	31	to RED	16.8	3.57	14.35	4.18	15.7	0	45	3.92	3	6.25	-8.11
111	M	19	1	4	STIM	32	to NUP	16.8	3.57	15.58	3.85	15.7	0	45	3.42	4	6.18	26.30
111	M	19	1	4	STIM	33	to RED	0.8	75.00	0.76	78.95	90.4	0	45	2.24	6	4.89	-54.38
111	M	19	1	4	STIM	34	to NUP	0.8	75.00	0.82	73.17	88.5	0	45	3.85	9	6.02	68.91
111	M	19	1	4	STIM	35	to RED	8.3	7.23	7.62	7.87	23.9	0	45	1.63	4	5.16	-39.06
111	M	19	1	4	STIM	36	to NUP	8.3	7.23	8.43	7.12	22.9	0	45	3.35	6	4.79	36.54
111	M	19	1	4	STIM	37	to RED	4.1	14.63	3.85	15.58	29	0	45	1.35	4	5.81	-38.69
111	M	19	1	4	STIM	38	to NUP	4.1	14.63	3.55	16.90	26.5	0	45	6.63	8	4.50	43.05
111	M	23	1	5	POST	39	to RED	1	60.00	0.88	68.18	78	0	45	1.84	7	4.11	-65.78
111	M	23	1	5	POST	40	to NUP	1	60.00	0.85	70.59	81.5	0	45	6.4	10	6.37	52.90
111	M	23	1	5	POST	41	to RED	1	60.00	0.85	70.59	97	0	45	1.98	5	3.44	-76.76
111	M	23	1	5	POST	42	to NUP	1	60.00	0.7	85.71	100.7	0	45	5.38	10	5.59	57.96
111	M	23	1	5	POST	43	to RED	1	60.00	0.74	81.08	106.8	0	45	1.61	5	4.03	-53.26
111	M	23	1	5	POST	44	to NUP	1	60.00	1.03	58.25	103.9	0	45	7.4	11	6.26	65.24
111	M	0	1	6	post		to RED	1	60.00				0	45		1		
111	M	0	1	6	post		to NUP	1	60.00				0	45		1		
111	M	0	1	6	post		to RED	1	60.00				0	45		0		
111	M	0	1	6	post		to NUP	1	60.00				0	45		0		
111	M	0	1	6	post		to RED	1	60.00				0	45		0		
111	M	0	1	6	post		to NUP	1	60.00				0	45		0		
111	M	0	2	2	pre		to RED	1	60.00				0	45		0		
111	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
111	M	0	2	2	pre		to RED	1	60.00				0	45		0		
111	M	0	2	2	pre		to NUP	1	60.00				0	45		0		

111	M	0	2	2	pre		to RED	1	60.00				0	45		0		
111	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
111	M	23	2	3	PRE	1	to RED	1	60.00	0.6	100.00	105.3	0	45	3.15	9	5.75	-100.45
111	M	23	2	3	PRE	2	to NUP	1	60.00	0.67	89.55	107.5	0	45	9.71	10	5.81	73.13
111	M	23	2	3	PRE	3	to RED	1	60.00	0.71	84.51	90.2	0	45	2.39	6	6.61	-79.54
111	M	23	2	3	PRE	4	to NUP	1	60.00	0.72	83.33	97.4	0	45	7.23	10	5.29	95.09
111	M	23	2	3	PRE	5	to RED	1	60.00	0.78	76.92	93.6	0	45	1.89	5	3.57	-112.12
111	M	23	2	3	PRE	6	to NUP	1	60.00	0.69	86.96	109.3	0	45	8.56	10	5.47	75.44
111	M	19	2	4	STIM	7	to RED	4.1	14.63	3.35	17.91	30.5	0	45	3.58	7	5.95	-70.70
111	M	19	2	4	STIM	8	to NUP	4.1	14.63	3.45	17.39	30.7	0	45	6.18	9	5.85	82.60
111	M	19	2	4	STIM	9	to RED	8.3	7.23	6.48	9.26	23.7	0	45	3.79	6	5.12	-49.59
111	M	19	2	4	STIM	10	to NUP	8.3	7.23	7.18	8.36	21.8	0	45	2.39	4	5.23	69.74
111	M	19	2	4	STIM	11	to RED	0.8	75.00	0.68	88.24	107.9	0	45	1.92	5	5.21	-98.92
111	M	19	2	4	STIM	12	to NUP	0.8	75.00	0.7	85.71	114.5	0	45	2.52	6	5.56	91.75
111	M	19	2	4	STIM	13	to RED	16.8	3.57	14.18	4.23	18.2	0	45	2.87	2	6.54	-27.35
111	M	19	2	4	STIM	14	to NUP	16.8	3.57	15.6	3.85	25	0	45	2.87	2	4.48	43.15
111	M	19	2	4	STIM	15	to RED	6.6	9.09	5.45	11.01	22.9	0	45	1.87	3	6.39	-64.95
111	M	19	2	4	STIM	16	to NUP	6.6	9.09	5.53	10.85	25.3	0	45	1.82	3	5.34	75.27
111	M	19	2	4	STIM	17	to RED	3.2	18.75	2.77	21.66	30.4	0	45	2.58	3	5.45	-65.65
111	M	19	2	4	STIM	18	to NUP	3.2	18.75	2.47	24.29	34	0	45	3.6	4	6.08	87.93
111	M	19	2	4	STIM	19	to RED	1.6	37.50	1.55	38.71	47.3	0	45	1.73	4	5.46	-75.32
111	M	19	2	4	STIM	20	to NUP	1.6	37.50	1.27	47.24	58.5	0	45	3.25	5	5.38	76.12
111	M	19	2	4	STIM	21	to RED	10.5	5.71	9.73	6.17	18.2	0	45	1.59	2	5.40	-52.23
111	M	19	2	4	STIM	22	to NUP	10.5	5.71	10.83	5.54	21.6	0	45	1.97	3	4.50	64.51
111	M	19	2	4	STIM	23	to RED	10.5	5.71	8.3	7.23	19.5	0	45	3.17	2	7.23	-55.00
111	M	19	2	4	STIM	24	to NUP	10.5	5.71	11.83	5.07	19.5	0	45	1.3	2	4.56	65.28
111	M	19	2	4	STIM	25	to RED	1.6	37.50	1.52	39.47	49	0	45	1.08	3	4.73	-105.26
111	M	19	2	4	STIM	26	to NUP	1.6	37.50	1.22	49.18	56	0	45	1.46	3	5.58	98.82
111	M	19	2	4	STIM	27	to RED	3.2	18.75	2.88	20.83	37.2	0	45	3.25	3	6.55	-67.44
111	M	19	2	4	STIM	28	to NUP	3.2	18.75	2.72	22.06	34.7	0	45	2.45	3	6.37	72.68
111	M	19	2	4	STIM	29	to RED	6.6	9.09	5.8	10.34	28.1	0	45	1.4	2	5.16	-59.47
111	M	19	2	4	STIM	30	to NUP	6.6	9.09	6.62	9.06	20.2	0	45	1.83	3	5.12	75.74
111	M	19	2	4	STIM	31	to RED	16.8	3.57	15.53	3.86	20.4	0	45	1.89	1	5.36	-35.89
111	M	19	2	4	STIM	32	to NUP	16.8	3.57	15.88	3.78	20.1	0	45	1.65	1	4.38	56.44
111	M	19	2	4	STIM	33	to RED	0.8	75.00	0.77	77.92	98.4	0	45	1.75	2	5.18	-101.99
111	M	19	2	4	STIM	34	to NUP	0.8	75.00	0.63	95.24	118	0	45	2.67	3	5.61	76.73
111	M	19	2	4	STIM	35	to RED	8.3	7.23	7.22	8.31	22.3	0	45	1.95	2	5.33	-44.55
111	M	19	2	4	STIM	36	to NUP	8.3	7.23	8.12	7.39	17.6	0	45	1.33	3	4.90	66.61
111	M	19	2	4	STIM	37	to RED	4.1	14.63	3.98	15.08	26.9	0	45	1.59	2	4.43	-86.70
111	M	19	2	4	STIM	38	to NUP	4.1	14.63	3.7	16.22	31.6	0	45	3.45	4	5.62	86.22
111	M	23	2	5	POST	39	to RED	1	60.00	0.75	80.00	93.4	0	45	2.27	4	5.45	-85.90
111	M	23	2	5	POST	40	to NUP	1	60.00	1.03	58.25	79.2	0	45	1.95	4	5.72	102.56
111	M	23	2	5	POST	41	to RED	1	60.00	0.8	75.00	91.6	0	45	2.3	3	4.30	-121.05
111	M	23	2	5	POST	42	to NUP	1	60.00	0.8	75.00	91.8	0	45	2.27	3	5.25	88.38
111	M	23	2	5	POST	43	to RED	1	60.00	0.78	76.92	104.2	0	45	2.69	3	5.08	-116.90
111	M	23	2	5	POST	44	to NUP	1	60.00	0.77	77.92	89.2	0	45	1.16	2	6.12	96.63

111	M	0	2	6	post		to RED	1	60.00				0	45		0		
111	M	0	2	6	post		to NUP	1	60.00				0	45		0		
111	M	0	2	6	post		to RED	1	60.00				0	45		0		
111	M	0	2	6	post		to NUP	1	60.00				0	45		0		
111	M	0	2	6	post		to RED	1	60.00				0	45		0		
111	M	0	2	6	post		to NUP	1	60.00				0	45		0		
112	M	0	1	2	pre		to RED	1	60.00				0	45		0		
112	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
112	M	0	1	2	pre		to RED	1	60.00				0	45		0		
112	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
112	M	0	1	2	pre		to RED	1	60.00				0	45		0		
112	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
112	M	23	1	3	PRE	1	to RED	1	60.00	0.82	73.17	74.4	2	42	1.15	10	6.32	-51.89
112	M	23	1	3	PRE	2	to NUP	1	60.00	0.85	70.59	82.7	3	38	5.75	20	9.94	57.42
112	M	23	1	3	PRE	3	to RED	1	60.00	0.73	82.19	91.1	2	38	1.37	8	6.62	-41.70
112	M	23	1	3	PRE	4	to NUP	1	60.00	0.63	95.24	103	2	38	4.49	12	10.43	33.56
112	M	23	1	3	PRE	5	to RED	1	60.00	0.75	80.00	104.6	2	40	2	8	7.19	-42.54
112	M	23	1	3	PRE	6	to NUP	1	60.00	0.6	100.00	116.4	3	40	3.37	13	9.95	29.43
112	M	19	1	4	STIM	7	to RED	4.1	14.63	3.83	15.67	31.8	2	38	0.89	6	8.01	-28.94
112	M	19	1	4	STIM	8	to NUP	4.1	14.63	3.07	19.54	38.9	2	38	2.68	8	10.53	24.80
112	M	19	1	4	STIM	9	to RED	8.3	7.23	7.23	8.30	19.9	2	35	2.99	6	9.17	-21.65
112	M	19	1	4	STIM	10	to NUP	8.3	7.23	7.87	7.62	23	2	34	3.4	8	7.09	39.70
112	M	19	1	4	STIM	11	to RED	0.8	75.00	0.67	89.55	86.7	2	38	5.25	10	7.20	-35.16
112	M	19	1	4	STIM	12	to NUP	0.8	75.00	0.84	71.43	81	2	38	6.63	12	6.95	19.74
112	M	19	1	4	STIM	13	to RED	16.8	3.57	16.38	3.66	15.5	2	42	2.65	2	5.51	-11.55
112	M	19	1	4	STIM	14	to NUP	16.8	3.57	14.22	4.22	18.5	2	40	2.18	5	7.84	32.92
112	M	19	1	4	STIM	15	to RED	6.6	9.09	5.27	11.39	26	1	38	3.9	8	6.08	-29.74
112	M	19	1	4	STIM	16	to NUP	6.6	9.09	5.68	10.56	22	1	40	3.1	4	5.68	34.70
112	M	19	1	4	STIM	17	to RED	3.2	18.75	3.22	18.63	38.1	1	38	4.68	8	6.84	-28.69
112	M	19	1	4	STIM	18	to NUP	3.2	18.75	2.53	23.72	33.9	1	38	5.95	10	10.13	28.40
112	M	19	1	4	STIM	19	to RED	1.6	37.50	1.42	42.25	61.8	1	38	4.06	8	5.90	-34.11
112	M	19	1	4	STIM	20	to NUP	1.6	37.50	1.48	40.54	53.1	1	40	6.24	10	7.97	21.80
112	M	19	1	4	STIM	21	to RED	10.5	5.71	9.97	6.02	17.1	1	40	2.43	3	7.71	-18.79
112	M	19	1	4	STIM	22	to NUP	10.5	5.71	8.45	7.10	16.7	1	42	2.55	4	6.17	22.79
112	M	19	1	4	STIM	23	to RED	10.5	5.71	11.5	5.22	18.5	1	40	2.22	2	5.55	-17.30
112	M	19	1	4	STIM	24	to NUP	10.5	5.71	9	6.67	18	1	40	2.68	3	10.24	30.62
112	M	19	1	4	STIM	25	to RED	1.6	37.50	1.55	38.71	45.2	1	38	3.27	7	6.60	-35.24
112	M	19	1	4	STIM	26	to NUP	1.6	37.50	1.62	37.04	47.8	1	40	4.63	8	5.42	36.54
112	M	19	1	4	STIM	27	to RED	3.2	18.75	2.9	20.69	37.7	1	38	3.13	5	5.57	-29.60
112	M	19	1	4	STIM	28	to NUP	3.2	18.75	3.23	18.58	29.3	1	40	3.59	6	0.00	6.76
112	M	19	1	4	STIM	29	to RED	6.6	9.09	5.48	10.95	22.3	1	40	2.3	4	6.30	-31.33
112	M	19	1	4	STIM	30	to NUP	6.6	9.09	5.8	10.34	25.3	1	33	8.68	6	6.15	34.50
112	M	19	1	4	STIM	31	to RED	16.8	3.57	12.7	4.72	26	1	40	3.6	2	0.00	-9.89
112	M	19	1	4	STIM	32	to NUP	16.8	3.57	16.28	3.69	16.2	1	40	1.72	2	9.87	24.95
112	M	19	1	4	STIM	33	to RED	0.8	75.00	0.85	70.59	77.8	1	38	2.37	6	5.36	-32.26
112	M	19	1	4	STIM	34	to NUP	0.8	75.00	1.03	58.25	70.2	1	38	7.1	8	5.67	34.00
112	M	19	1	4	STIM	35	to RED	8.3	7.23	7.33	8.19	23.6	1	40	4.1	4	6.17	-18.65
112	M	19	1	4	STIM	36	to NUP	8.3	7.23	7.85	7.64	18.9	1	40	1.87	4	7.36	27.36

112	M	19	1	4	STIM	37	to RED	4.1	14.63	4.3	13.95	29.5	1	40	2.82	6	5.43	-22.33
112	M	19	1	4	STIM	38	to NUP	4.1	14.63	3.68	16.30	31.6	1	40	3.49	4	6.95	23.83
112	M	23	1	5	POST	39	to RED	1	60.00	0.75	80.00	80.3	1	38	5.03	8	6.36	-35.93
112	M	23	1	5	POST	40	to NUP	1	60.00	1.1	54.55	68.4	1	34	6.2	10	8.24	20.36
112	M	23	1	5	POST	41	to RED	1	60.00	0.83	72.29	84.1	1	35	3.99	6	7.62	-24.38
112	M	23	1	5	POST	42	to NUP	1	60.00	1.35	44.44	56.7	1	36	7.13	8	8.99	31.83
112	M	23	1	5	POST	43	to RED	1	60.00	0.92	65.22	78.9	1	34	5.71	7	6.93	-24.54
112	M	23	1	5	POST	44	to NUP	1	60.00	0.73	82.19	86.2	1	34	9.95	10	7.18	28.98
112	M	0	1	6	post		to RED	1	60.00				0	45		0		
112	M	0	1	6	post		to NUP	1	60.00				0	45		1		
112	M	0	1	6	post		to RED	1	60.00				0	45		0		
112	M	0	1	6	post		to NUP	1	60.00				0	45		0		
112	M	0	1	6	post		to RED	1	60.00				0	45		0		
112	M	0	1	6	post		to NUP	1	60.00				0	45		0		
112	M	0	2	2	pre		to RED	1	60.00				0	45		0		
112	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
112	M	0	2	2	pre		to RED	1	60.00				0	45		0		
112	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
112	M	0	2	2	pre		to RED	1	60.00				0	45		0		
112	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
112	M	23	2	3	PRE	1	to RED	1	60.00	0.65	92.31	97.9	0	40	2.35	8	7.02	-40.83
112	M	23	2	3	PRE	2	to NUP	1	60.00	0.68	88.24	95.5	2	38	10.89	20	9.31	47.66
112	M	23	2	3	PRE	3	to RED	1	60.00	0.85	70.59	71.9	0	35	2.38	6	7.08	-78.77
112	M	23	2	3	PRE	4	to NUP	1	60.00	0.7	85.71	98.6	2	35	5.35	10	8.57	65.86
112	M	23	2	3	PRE	5	to RED	1	60.00	0.83	72.29	80.5	1	40	3.02	5	5.95	-63.40
112	M	23	2	3	PRE	6	to NUP	1	60.00	0.65	92.31	102.8	1	38	8.27	8	8.12	41.90
112	M	19	2	4	STIM	7	to RED	4.1	14.63	3.27	18.35	32.8	1	42	2.93	4	7.14	-46.44
112	M	19	2	4	STIM	8	to NUP	4.1	14.63	2.93	20.48	35.1	1	42	3.52	5	7.62	47.53
112	M	19	2	4	STIM	9	to RED	8.3	7.23	7.98	7.52	19.7	1	38	1.77	2	7.36	-33.90
112	M	19	2	4	STIM	10	to NUP	8.3	7.23	7.32	8.20	23	1	38	4.61	4	8.55	53.58
112	M	19	2	4	STIM	11	to RED	0.8	75.00	0.9	66.67	78.9	1	38	5.6	5	5.94	-57.04
112	M	19	2	4	STIM	12	to NUP	0.8	75.00	0.83	72.29	95.3	1	35	7.2	6	7.70	36.95
112	M	19	2	4	STIM	13	to RED	16.8	3.57	13.6	4.41	15.4	0	40	4	1	3.72	-27.33
112	M	19	2	4	STIM	14	to NUP	16.8	3.57	15.97	3.76	16.8	0	42	3.58	3	6.15	39.38
112	M	19	2	4	STIM	15	to RED	6.6	9.09	5.4	11.11	22.3	0	38	2.65	4	7.29	-26.89
112	M	19	2	4	STIM	16	to NUP	6.6	9.09	5.68	10.56	23	0	38	4.59	6	4.63	39.37
112	M	19	2	4	STIM	17	to RED	3.2	18.75	2.98	20.13	33.2	0	38	3.65	4	6.76	-28.16
112	M	19	2	4	STIM	18	to NUP	3.2	18.75	2.78	21.58	38.2	0	38	5.25	7	4.31	37.60
112	M	19	2	4	STIM	19	to RED	1.6	37.50	1.28	46.88	52.9	0	40	4.32	4	6.17	-41.59
112	M	19	2	4	STIM	20	to NUP	1.6	37.50	1.67	35.93	60	0	40	5.68	6	4.77	34.86
112	M	19	2	4	STIM	21	to RED	10.5	5.71	8.75	6.86	19.7	0	38	2.97	2	7.47	-33.02
112	M	19	2	4	STIM	22	to NUP	10.5	5.71	8.7	6.90	17.5	1	38	4.67	6	4.32	60.53
112	M	19	2	4	STIM	23	to RED	10.5	5.71	7.98	7.52	18.7	1	38	3.27	3	4.75	-29.73
112	M	19	2	4	STIM	24	to NUP	10.5	5.71	9.97	6.02	18.5	1	38	3.31	5	5.13	38.55
112	M	19	2	4	STIM	25	to RED	1.6	37.50	1.52	39.47	54.1	1	38	3.9	6	4.99	-54.76
112	M	19	2	4	STIM	26	to NUP	1.6	37.50	1.47	40.82	55	1	38	4.91	7	7.27	35.19
112	M	19	2	4	STIM	27	to RED	3.2	18.75	2.43	24.69	37	1	37	3.54	5	0.00	-12.58
112	M	19	2	4	STIM	28	to NUP	3.2	18.75	2.83	21.20	37	1	38	6.17	6	5.71	20.39

112	M	19	2	4	STIM	29	to RED	6.6	9.09	3.82	15.71	31.2	1	38	3.86	4	5.14	-21.63
112	M	19	2	4	STIM	30	to NUP	6.6	9.09	6.8	8.82	20.1	1	38	4.45	3	0.00	19.88
112	M	19	2	4	STIM	31	to RED	16.8	3.57	15.03	3.99	15.7	1	35	3.24	1	5.13	-24.72
112	M	19	2	4	STIM	32	to NUP	16.8	3.57	15.43	3.89	15	1	35	4.67	2	0.00	10.51
112	M	19	2	4	STIM	33	to RED	0.8	75.00	0.9	66.67	90.6	1	38	3.17	5	5.80	-31.19
112	M	19	2	4	STIM	34	to NUP	0.8	75.00	1.05	57.14	99.8	1	35	6.58	6	6.76	39.78
112	M	19	2	4	STIM	35	to RED	8.3	7.23	6.9	8.70	21.8	1	38	3.6	4	5.96	-25.82
112	M	19	2	4	STIM	36	to NUP	8.3	7.23	8.68	6.91	21.6	1	38	3.77	4	4.99	27.68
112	M	19	2	4	STIM	37	to RED	4.1	14.63	2.93	20.48	38.2	1	40	3.04	4	6.73	-36.62
112	M	19	2	4	STIM	38	to NUP	4.1	14.63	3.78	15.87	30.4	1	40	5.99	6	6.28	29.06
112	M	23	2	5	POST	39	to RED	1	60.00	0.93	64.52	78.9	1	35	4.72	6	6.78	-31.97
112	M	23	2	5	POST	40	to NUP	1	60.00	1.05	57.14	76.8	1	35	6.92	8	9.58	33.07
112	M	23	2	5	POST	41	to RED	1	60.00	1.13	53.10	74.7	1	35	4.29	6	5.03	-35.39
112	M	23	2	5	POST	42	to NUP	1	60.00	0.87	68.97	83.6	1	32	7.25	7	4.43	38.85
112	M	23	2	5	POST	43	to RED	1	60.00	0.78	76.92	84.5	1	35	4.9	4	5.58	-43.40
112	M	23	2	5	POST	44	to NUP	1	60.00	0.83	72.29	90.2	1	32	7.17	7	6.96	42.92
112	M	0	2	6	post		to RED	1	60.00				0	45		0		
112	M	0	2	6	post		to NUP	1	60.00				0	45		2		
112	M	0	2	6	post		to RED	1	60.00				0	45		0		
112	M	0	2	6	post		to NUP	1	60.00				0	45		0		
112	M	0	2	6	post		to RED	1	60.00				0	45		0		
112	M	0	2	6	post		to NUP	1	60.00				0	45		0		
113	M	0	1	2	pre		to RED	1	60.00				0	45		0		
113	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
113	M	0	1	2	pre		to RED	1	60.00				0	45		0		
113	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
113	M	0	1	2	pre		to RED	1	60.00				0	45		0		
113	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
113	M	23	1	3	PRE	1	to RED	1	60.00	1.08	55.56	63.5	0	40	2.87	10	5.90	-76.23
113	M	23	1	3	PRE	2	to NUP	1	60.00	0.92	65.22	76.3	0	50	7.51	14	5.34	62.78
113	M	23	1	3	PRE	3	to RED	1	60.00	1.3	46.15	61.1	0	45	6.73	10	6.18	-63.83
113	M	23	1	3	PRE	4	to NUP	1	60.00	0.8	75.00	80.3	0.5	50	6.6	15	4.55	45.27
113	M	23	1	3	PRE	5	to RED	1	60.00	0.93	64.52	88.3	0	40	6.19	10	5.45	-61.77
113	M	23	1	3	PRE	6	to NUP	1	60.00	0.92	65.22	83.1	0	50	6.08	15	4.22	49.30
113	M	19	1	4	STIM	7	to RED	4.1	14.63	3.87	15.50	26.7	0	45	2.81	6	7.35	-34.11
113	M	19	1	4	STIM	8	to NUP	4.1	14.63	3.02	19.87	33.9	0	40	5.91	10	4.34	57.39
113	M	19	1	4	STIM	9	to RED	8.3	7.23	7.57	7.93	21.3	0	50	1.63	5	7.13	-27.89
113	M	19	1	4	STIM	10	to NUP	8.3	7.23	6.47	9.27	19.2	0.5	45	4.06	12	4.45	78.43
113	M	19	1	4	STIM	11	to RED	0.8	75.00	0.9	66.67	78.9	0	40	6.85	10	5.55	-56.77
113	M	19	1	4	STIM	12	to NUP	0.8	75.00	1.17	51.28	68.1	0.5	50	5.9	10	4.50	47.24
113	M	19	1	4	STIM	13	to RED	16.8	3.57	16.72	3.59	16.6	0	45	0.56	0	5.55	-10.48
113	M	19	1	4	STIM	14	to NUP	16.8	3.57	14.98	4.01	15.4	0	50	3.49	5	4.03	55.95
113	M	19	1	4	STIM	15	to RED	6.6	9.09	6.17	9.72	23.6	0	45	3.96	3	4.71	-29.29
113	M	19	1	4	STIM	16	to NUP	6.6	9.09	5.32	11.28	20.8	0.5	50	5.06	15	3.82	44.07
113	M	19	1	4	STIM	17	to RED	3.2	18.75	2.9	20.69	44.2	0	45	5.55	10	5.67	-57.33
113	M	19	1	4	STIM	18	to NUP	3.2	18.75	2.83	21.20	52	0	50	6.84	15	3.99	67.44
113	M	19	1	4	STIM	19	to RED	1.6	37.50	1.2	50.00	64.4	0	45	6.07	10	5.25	-49.13

113	M	19	1	4	STIM	20	to NUP	1.6	37.50	1.6	37.50	76.5	0	45	7.72	17	4.07	29.80
113	M	19	1	4	STIM	21	to RED	10.5	5.71	9.95	6.03	22.7	0	50	2.2	0	5.60	-18.78
113	M	19	1	4	STIM	22	to NUP	10.5	5.71	8.5	7.06	18.9	0	50	4.73	12	4.06	71.46
113	M	19	1	4	STIM	23	to RED	10.5	5.71	10.23	5.87	20.8	0	45	2.5	0	2.81	-20.40
113	M	19	1	4	STIM	24	to NUP	10.5	5.71	8.83	6.80	16.6	0.5	45	5.92	15	4.46	70.69
113	M	19	1	4	STIM	25	to RED	1.6	37.50	0.78	76.92	98.4	0	50	7.09	10	4.16	-56.02
113	M	19	1	4	STIM	26	to NUP	1.6	37.50	1.98	30.30	37.2	0	40	8.54	15	2.83	31.69
113	M	19	1	4	STIM	27	to RED	3.2	18.75	2.58	23.26	32.8	0	45	7.74	10	4.41	-32.65
113	M	19	1	4	STIM	28	to NUP	3.2	18.75	2.75	21.82	36.5	0.5	45	8.1	15	4.37	32.27
113	M	19	1	4	STIM	29	to RED	6.6	9.09	5.63	10.66	29	0	50	4.87	10	4.84	-30.59
113	M	19	1	4	STIM	30	to NUP	6.6	9.09	4.8	12.50	23.4	0	45	5.28	10	3.98	76.89
113	M	19	1	4	STIM	31	to RED	16.8	3.57	13.72	4.37	15.5	0	45	3.23	2	2.60	-13.06
113	M	19	1	4	STIM	32	to NUP	16.8	3.57	14.82	4.05	17.8	0.5	40	4.7	7	3.92	56.91
113	M	19	1	4	STIM	33	to RED	0.8	75.00	1.13	53.10	70.5	0	45	6.45	10	4.79	-58.00
113	M	19	1	4	STIM	34	to NUP	0.8	75.00	1.2	50.00	70	0.5	50	7	12	3.61	46.40
113	M	19	1	4	STIM	35	to RED	8.3	7.23	7.1	8.45	19.5	0	45	5.15	8	5.26	-24.48
113	M	19	1	4	STIM	36	to NUP	8.3	7.23	6.13	9.79	20.6	1	40	2.49	10	3.70	77.17
113	M	19	1	4	STIM	37	to RED	4.1	14.63	3.47	17.29	30	0	45	5.66	10	5.06	-38.60
113	M	19	1	4	STIM	38	to NUP	4.1	14.63	3.08	19.48	29.5	0	50	7.27	11	3.85	22.58
113	M	23	1	5	POST	39	to RED	1	60.00	0.8	75.00	97.2	0	45	5.42	8	4.88	-59.29
113	M	23	1	5	POST	40	to NUP	1	60.00	0.98	61.22	64.4	0.5	45	6.42	15	3.33	24.72
113	M	23	1	5	POST	41	to RED	1	60.00	1.27	47.24	76.8	0	50	6.43	10	4.02	-84.10
113	M	23	1	5	POST	42	to NUP	1	60.00	1.18	50.85	69.3	0	40	6.85	13	3.53	52.16
113	M	23	1	5	POST	43	to RED	1	60.00	0.7	85.71	93.4	0	45	6.95	10	4.74	-76.83
113	M	23	1	5	POST	44	to NUP	1	60.00	0.95	63.16	75.4	0	40	7.92	12	4.14	35.22
113	M	0	1	6	post		to RED	1	60.00				0	45		0		
113	M	0	1	6	post		to NUP	1	60.00				0	45		0		
113	M	0	1	6	post		to RED	1	60.00				0	45		0		
113	M	0	1	6	post		to NUP	1	60.00				0	45		0		
113	M	0	1	6	post		to RED	1	60.00				0	45		0		
113	M	0	1	6	post		to NUP	1	60.00				0	45		0		
113	M	0	2	2	pre		to RED	1	60.00				0	45		0		
113	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
113	M	0	2	2	pre		to RED	1	60.00				0	45		0		
113	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
113	M	0	2	2	pre		to RED	1	60.00				0	45		0		
113	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
113	M	23	2	3	PRE	1	to RED	1	60.00	0.77	77.92	90.1	0	45	3.45	10	4.91	-103.58
113	M	23	2	3	PRE	2	to NUP	1	60.00	0.73	82.19	98.6	0	40	6.9	15	4.76	74.61
113	M	23	2	3	PRE	3	to RED	1	60.00	1	60.00	82.4	0	45	5.53	15	4.98	-88.50
113	M	23	2	3	PRE	4	to NUP	1	60.00	0.72	83.33	92.3	0	40	8.15	17	4.51	47.68
113	M	23	2	3	PRE	5	to RED	1	60.00	0.77	77.92	99	0	50	4.78	11	4.79	-104.88
113	M	23	2	3	PRE	6	to NUP	1	60.00	0.8	75.00	90	0	50	6.73	12	4.56	75.22
113	M	19	2	4	STIM	7	to RED	4.1	14.63	2.9	20.69	28.1	0	45	3	3	5.15	-79.27
113	M	19	2	4	STIM	8	to NUP	4.1	14.63	3.15	19.05	31.2	0	40	5.18	11	4.28	39.22
113	M	19	2	4	STIM	9	to RED	8.3	7.23	7.4	8.11	22	0	45	2	3	4.76	-41.25

113	M	19	2	4	STIM	10	to NUP	8.3	7.23	6.6	9.09	19.7	0	40	3.5	8	5.07	46.56
113	M	19	2	4	STIM	11	to RED	0.8	75.00	0.5	120.00	118.2	0	45	3.53	5	4.60	-70.30
113	M	19	2	4	STIM	12	to NUP	0.8	75.00	0.77	77.92	88.3	0	50	6.65	12	3.45	43.11
113	M	19	2	4	STIM	13	to RED	16.8	3.57	12.67	4.74	22	0	45	3.58	1	4.41	-17.81
113	M	19	2	4	STIM	14	to NUP	16.8	3.57	14.97	4.01	24.1	0	45	1.91	2	4.22	44.79
113	M	19	2	4	STIM	15	to RED	6.6	9.09	5.63	10.66	31.9	0	45	2.1	5	4.04	-45.46
113	M	19	2	4	STIM	16	to NUP	6.6	9.09	6.05	9.92	26	0	40	3.33	5	4.24	42.70
113	M	19	2	4	STIM	17	to RED	3.2	18.75	3.37	17.80	30.4	0	45	2.66	4	4.70	-63.96
113	M	19	2	4	STIM	18	to NUP	3.2	18.75	2.33	25.75	41.7	0	40	1.6	6	3.98	65.66
113	M	19	2	4	STIM	19	to RED	1.6	37.50	1.57	38.22	52.5	0	45	3.35	7	4.97	-68.58
113	M	19	2	4	STIM	20	to NUP	1.6	37.50	1.62	37.04	45.2	0	50	5.06	8	4.05	22.94
113	M	19	2	4	STIM	21	to RED	10.5	5.71	10.22	5.87	19.9	0	45	1.08	0	5.23	-29.44
113	M	19	2	4	STIM	22	to NUP	10.5	5.71	9.22	6.51	20.2	0	45	1.73	2	4.49	55.23
113	M	19	2	4	STIM	23	to RED	10.5	5.71	8.87	6.76	20.8	0	45	2.1	1	4.45	-23.54
113	M	19	2	4	STIM	24	to NUP	10.5	5.71	9.45	6.35	22.3	0	50	1.6	2	4.73	52.90
113	M	19	2	4	STIM	25	to RED	1.6	37.50	1.4	42.86	57.4	0	45	3.48	8	3.98	-48.39
113	M	19	2	4	STIM	26	to NUP	1.6	37.50	1.27	47.24	62.8	0	40	4.65	6	4.06	56.14
113	M	19	2	4	STIM	27	to RED	3.2	18.75	2.85	21.05	31.9	0	45	2.93	6	4.04	-77.45
113	M	19	2	4	STIM	28	to NUP	3.2	18.75	2.9	20.69	31.9	0	40	4.03	7	5.44	24.78
113	M	19	2	4	STIM	29	to RED	6.6	9.09	6.05	9.92	24.1	0	45	2.53	8	3.60	-24.75
113	M	19	2	4	STIM	30	to NUP	6.6	9.09	5.8	10.34	23.2	0	50	2.35	7	3.27	76.84
113	M	19	2	4	STIM	31	to RED	16.8	3.57	14.25	4.21	15.9	0	45	1.83	1	4.68	-10.75
113	M	19	2	4	STIM	32	to NUP	16.8	3.57	14.88	4.03	20.4	0	50	1.52	2	3.93	36.76
113	M	19	2	4	STIM	33	to RED	0.8	75.00	0.77	77.92	89.5	0	45	3.2	10	3.78	-51.33
113	M	19	2	4	STIM	34	to NUP	0.8	75.00	0.92	65.22	93	0	50	4.78	10	3.31	18.44
113	M	19	2	4	STIM	35	to RED	8.3	7.23	7.35	8.16	19.4	0	45	1.77	5	4.15	-28.37
113	M	19	2	4	STIM	36	to NUP	8.3	7.23	7.3	8.22	21.3	0	50	1.85	6	3.81	67.41
113	M	19	2	4	STIM	37	to RED	4.1	14.63	3.4	17.65	28.3	0	45	2.42	4	4.28	-54.48
113	M	19	2	4	STIM	38	to NUP	4.1	14.63	3.48	17.24	27.9	0	45	2.52	5	4.58	37.48
113	M	23	2	5	POST	39	to RED	1	60.00	1.18	50.85	71.4	0	45	2.19	10	4.08	-93.48
113	M	23	2	5	POST	40	to NUP	1	60.00	0.9	66.67	91.5	0	40	1.5	8	4.56	39.69
113	M	23	2	5	POST	41	to RED	1	60.00	0.67	89.55	102.3	0	45	3.85	10	4.69	-46.74
113	M	23	2	5	POST	42	to NUP	1	60.00	0.64	93.75	102.1	0.5	40	5.44	15	3.98	33.75
113	M	23	2	5	POST	43	to RED	1	60.00	0.82	73.17	85	0	45	4.81	8	3.82	-76.78
113	M	23	2	5	POST	44	to NUP	1	60.00	0.98	61.22	73	0	50	4.82	12	3.41	41.22
113	M	0	2	6	post		to RED	1	60.00				0	45		0		
113	M	0	2	6	post		to NUP	1	60.00				0	45		0		
113	M	0	2	6	post		to RED	1	60.00				0	45		0		
113	M	0	2	6	post		to NUP	1	60.00				0	45		0		
113	M	0	2	6	post		to RED	1	60.00				0	45		0		
113	M	0	2	6	post		to NUP	1	60.00				0	45		0		
114	M	0	1	2	pre		to RED	1	60.00				0	45		0		
114	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
114	M	0	1	2	pre		to RED	1	60.00				0	45		0		
114	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
114	M	0	1	2	pre		to RED	1	60.00				0	45		0		
114	M	0	1	2	pre		to NUP	1	60.00				0	45		0		

114	M	23	1	3	PRE	1	to RED	1	60.00	0.82	73.17	81.3	1	45	13.81	10	4.88	-83.10
114	M	23	1	3	PRE	2	to NUP	1	60.00	0.8	75.00	76.1	2	40	18.12	14	5.92	47.33
114	M	23	1	3	PRE	3	to RED	1	60.00	0.83	72.29	95.8	1	40	12.07	10	5.32	-110.33
114	M	23	1	3	PRE	4	to NUP	1	60.00	0.78	76.92	101.9	2	40	14.24	13	4.23	59.36
114	M	23	1	3	PRE	5	to RED	1	60.00	0.93	64.52	84.8	1	40	10.42	9	5.26	-93.31
114	M	23	1	3	PRE	6	to NUP	1	60.00	0.8	75.00	94.8	1	40	13.28	12	4.06	82.99
114	M	19	1	4	STIM	7	to RED	4.1	14.63	3.62	16.57	27.4	0	45	8.4	7	5.33	-47.90
114	M	19	1	4	STIM	8	to NUP	4.1	14.63	3.35	17.91	28.1	1	42	12.1	8	5.23	62.77
114	M	19	1	4	STIM	9	to RED	8.3	7.23	7.72	7.77	20.9	1	43	4.8	5	5.01	-38.29
114	M	19	1	4	STIM	10	to NUP	8.3	7.23	8.07	7.43	19.7	1	45	0.48	6	3.31	54.76
114	M	19	1	4	STIM	11	to RED	0.8	75.00	0.67	89.55	114.7	0	40	8.1	8	4.68	-69.59
114	M	19	1	4	STIM	12	to NUP	0.8	75.00	0.72	83.33	109.4	1	42	11.03	10	6.71	49.73
114	M	19	1	4	STIM	13	to RED	16.8	3.57	15.05	3.99	16.9	0	43	3.08	2	3.86	-13.27
114	M	19	1	4	STIM	14	to NUP	16.8	3.57	17.6	3.41	25.8	0.5	43	6.68	2	4.74	32.05
114	M	19	1	4	STIM	15	to RED	6.6	9.09	6.1	9.84	21.3	1	45	5.85	3	4.31	-42.28
114	M	19	1	4	STIM	16	to NUP	6.6	9.09	5.85	10.26	21.5	1	45	9.77	4	4.98	62.91
114	M	19	1	4	STIM	17	to RED	3.2	18.75	2.57	23.35	31.4	1	42	9.63	4	4.41	-65.70
114	M	19	1	4	STIM	18	to NUP	3.2	18.75	2.37	25.32	36.3	1	43	10.98	6	4.77	40.44
114	M	19	1	4	STIM	19	to RED	1.6	37.50	1.55	38.71	60.7	1	43	10.57	7	4.64	-69.12
114	M	19	1	4	STIM	20	to NUP	1.6	37.50	1.38	43.48	58.5	0.5	44	12.92	8	4.63	74.05
114	M	19	1	4	STIM	21	to RED	10.5	5.71	10.23	5.87	18.9	0	42	4.39	1	3.25	-34.48
114	M	19	1	4	STIM	22	to NUP	10.5	5.71	9.72	6.17	17.1	0	45	4.86	1	4.53	44.27
114	M	19	1	4	STIM	23	to RED	10.5	5.71	10.57	5.68	16.1	1	43	4.46	2	3.46	-27.23
114	M	19	1	4	STIM	24	to NUP	10.5	5.71	10.12	5.93	19.5	0.5	43	6.58	2	4.54	41.00
114	M	19	1	4	STIM	25	to RED	1.6	37.50	1.32	45.45	57.4	0.5	42	6.85	3	4.63	-68.51
114	M	19	1	4	STIM	26	to NUP	1.6	37.50	1.63	36.81	41	0.5	44	9.4	5	4.70	40.62
114	M	19	1	4	STIM	27	to RED	3.2	18.75	2.98	20.13	34.2	1	45	5.19	3	4.16	-62.40
114	M	19	1	4	STIM	28	to NUP	3.2	18.75	2.43	24.69	34	0.5	45	9.67	4	4.17	48.07
114	M	19	1	4	STIM	29	to RED	6.6	9.09	5.67	10.58	24.6	0	44	4.95	2	4.82	-35.73
114	M	19	1	4	STIM	30	to NUP	6.6	9.09	5.8	10.34	22.7	0	43	7.8	2	5.18	52.69
114	M	19	1	4	STIM	31	to RED	16.8	3.57	17.23	3.48	16.2	0	45	2.55	0	4.86	-21.84
114	M	19	1	4	STIM	32	to NUP	16.8	3.57	15.17	3.96	16.4	0	45	5.5	1	4.78	34.08
114	M	19	1	4	STIM	33	to RED	0.8	75.00	0.8	75.00	94.6	0.5	43	7.35	5	4.81	-53.93
114	M	19	1	4	STIM	34	to NUP	0.8	75.00	0.87	68.97	81.2	0.5	44	11.33	6	4.97	53.52
114	M	19	1	4	STIM	35	to RED	8.3	7.23	7.67	7.82	43.6	0.5	44	4.26	1	3.98	-47.38
114	M	19	1	4	STIM	36	to NUP	8.3	7.23	7.72	7.77	27.4	0.5	44	5.3	2	4.21	35.39
114	M	19	1	4	STIM	37	to RED	4.1	14.63	3.15	19.05	34.2	0.5	44	7.62	3	4.37	-62.72
114	M	19	1	4	STIM	38	to NUP	4.1	14.63	3.79	15.83	24.6	1	43	7.86	3	4.14	57.12
114	M	23	1	5	POST	39	to RED	1	60.00	0.95	63.16	68.4	0.5	41	7.33	6	4.17	-85.87

114	M	23	1	5	POST	40	to NUP	1	60.00	1	60.00	65.6	0.5	41	11.62	8	5.33	66.96
114	M	23	1	5	POST	41	to RED	1	60.00	1.18	50.85	77.1	0.5	41	7.64	5	4.58	-79.62
114	M	23	1	5	POST	42	to NUP	1	60.00	0.93	64.52	71.7	0.5	41	10	7	4.73	71.44
114	M	23	1	5	POST	43	to RED	1	60.00	0.92	65.22	78.4	0.5	41	8.88	5	4.83	-75.65
114	M	23	1	5	POST	44	to NUP	1	60.00	1	60.00	67.7	0	41	11.07	6	4.43	59.66
114	M	0	1	6	post		to RED	1	60.00				0	45		0		
114	M	0	1	6	post		to NUP	1	60.00				0	45		0		
114	M	0	1	6	post		to RED	1	60.00				0	45		0		
114	M	0	1	6	post		to NUP	1	60.00				0	45		0		
114	M	0	1	6	post		to RED	1	60.00				0	45		0		
114	M	0	1	6	post		to NUP	1	60.00				0	45		0		
114	M	0	2	2	pre		to RED	1	60.00				0	45		0		
114	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
114	M	0	2	2	pre		to RED	1	60.00				0	45		0		
114	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
114	M	0	2	2	pre		to RED	1	60.00				0	45		0		
114	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
114	M	23	2	3	PRE	1	to RED	1	60.00	0.88	68.18	95.1	0	42	17.34	3	4.69	-103.71
114	M	23	2	3	PRE	2	to NUP	1	60.00	0.82	73.17	88.3	0	41	11.53	8	4.15	65.51
114	M	23	2	3	PRE	3	to RED	1	60.00	1.05	57.14	76.3	0.5	41	8.07	5	4.67	-89.91
114	M	23	2	3	PRE	4	to NUP	1	60.00	0.92	65.22	77.5	0.5	43	10.38	7	4.91	58.06
114	M	23	2	3	PRE	5	to RED	1	60.00	0.93	64.52	79.2	0	43	8.72	5	4.92	-82.31
114	M	23	2	3	PRE	6	to NUP	1	60.00	0.82	73.17	79.2	0	43	11.03	6	5.11	48.10
114	M	19	2	4	STIM	7	to RED	4.1	14.63	3.93	15.27	27.4	0	44	3.57	2	4.60	-34.09
114	M	19	2	4	STIM	8	to NUP	4.1	14.63	3.85	15.58	23.9	0.5	45	6.82	3	4.13	60.00
114	M	19	2	4	STIM	9	to RED	8.3	7.23	8.2	7.32	19.4	0	45	3.42	1	4.00	-23.71
114	M	19	2	4	STIM	10	to NUP	8.3	7.23	8.22	7.30	19	0	44	3.31	2	5.08	35.31
114	M	19	2	4	STIM	11	to RED	0.8	75.00	0.87	68.97	87.3	0	44	7.58	3	4.38	-56.27
114	M	19	2	4	STIM	12	to NUP	0.8	75.00	0.9	66.67	74	0	45	9.8	4	5.24	47.42
114	M	19	2	4	STIM	13	to RED	16.8	3.57	17.42	3.44	25.7	0	45	0.7	0	3.88	-23.17
114	M	19	2	4	STIM	14	to NUP	16.8	3.57	17.93	3.35	15.2	0	45	0.74	0	4.85	22.73
114	M	19	2	4	STIM	15	to RED	6.6	9.09	6.15	9.76	38.1	0	45	3.55	1	4.80	-34.51
114	M	19	2	4	STIM	16	to NUP	6.6	9.09	5.03	11.93	26.4	0	45	4.52	2	4.55	53.58
114	M	19	2	4	STIM	17	to RED	3.2	18.75	3	20.00	30.5	0	45	5.22	2	4.44	-38.47
114	M	19	2	4	STIM	18	to NUP	3.2	18.75	2.65	22.64	34.6	0	44	8.2	3	5.68	61.05
114	M	19	2	4	STIM	19	to RED	1.6	37.50	1.5	40.00	51.1	0	45	6.4	2	4.67	-54.60
114	M	19	2	4	STIM	20	to NUP	1.6	37.50	1.33	45.11	56.2	0	44	10.3	4	4.98	47.79
114	M	19	2	4	STIM	21	to RED	10.5	5.71	10.05	5.97	17.5	0	45	2.85	1	4.52	-24.52
114	M	19	2	4	STIM	22	to NUP	10.5	5.71	10.07	5.96	19	0	45	3.46	1	4.55	48.91
114	M	19	2	4	STIM	23	to RED	10.5	5.71	10.2	5.88	20.6	0	45	2.53	0	4.35	-20.26
114	M	19	2	4	STIM	24	to NUP	10.5	5.71	10.75	5.58	17.6	0	45	3.23	1	4.18	41.10
114	M	19	2	4	STIM	25	to RED	1.6	37.50	1.45	41.38	49	0	45	5.6	2	4.25	-54.45
114	M	19	2	4	STIM	26	to NUP	1.6	37.50	1.58	37.97	48.2	0	45	7.85	3	4.83	61.40
114	M	19	2	4	STIM	27	to RED	3.2	18.75	2.77	21.66	30.5	0	45	4.85	2	3.22	-40.74

114	M	19	2	4	STIM	28	to NUP	3.2	18.75	2.32	25.86	34	0	45	6.75	2	5.42	32.26
114	M	19	2	4	STIM	29	to RED	6.6	9.09	5.87	10.22	23.9	0	45	3.38	1	4.59	-31.88
114	M	19	2	4	STIM	30	to NUP	6.6	9.09	6.55	9.16	19.2	0	45	4.25	1	6.79	48.75
114	M	19	2	4	STIM	31	to RED	16.8	3.57	15.85	3.79	16.4	0	45	1.75	0	3.57	-19.04
114	M	19	2	4	STIM	32	to NUP	16.8	3.57	16.07	3.73	16.1	0	45	1.76	0	3.47	29.84
114	M	19	2	4	STIM	33	to RED	0.8	75.00	1.08	55.56	74.4	0	45	6.07	1	4.70	-45.47
114	M	19	2	4	STIM	34	to NUP	0.8	75.00	0.95	63.16	78.5	0	45	6.22	2	5.29	50.34
114	M	19	2	4	STIM	35	to RED	8.3	7.23	7.53	7.97	21.5	0	45	2.64	1	3.82	-46.48
114	M	19	2	4	STIM	36	to NUP	8.3	7.23	8.07	7.43	23.4	0	45	3.85	1	2.56	46.17
114	M	19	2	4	STIM	37	to RED	4.1	14.63	3.63	16.53	31.2	0	45	2.35	0	4.27	-34.23
114	M	19	2	4	STIM	38	to NUP	4.1	14.63	3.65	16.44	26.2	0	45	4.33	1	4.88	59.07
114	M	23	2	5	POST	39	to RED	1	60.00	0.78	76.92	89.5	0	43	6.47	2	4.04	-69.00
114	M	23	2	5	POST	40	to NUP	1	60.00	1.05	57.14	67.9	0	42	9.5	3	4.79	71.54
114	M	23	2	5	POST	41	to RED	1	60.00	1.02	58.82	78.4	0	43	7.53	2	4.44	-69.92
114	M	23	2	5	POST	42	to NUP	1	60.00	1.1	54.55	67.2	0	45	11.17	3	3.72	57.91
114	M	23	2	5	POST	43	to RED	1	60.00	0.88	68.18	74.5	0	45	6.59	2	4.83	-56.17
114	M	23	2	5	POST	44	to NUP	1	60.00	0.97	61.86	75.4	0	45	9.21	2	3.54	68.94
114	M	0	2	6	post		to RED	1	60.00				0	45		0		
114	M	0	2	6	post		to NUP	1	60.00				0	45		0		
114	M	0	2	6	post		to RED	1	60.00				0	45		0		
114	M	0	2	6	post		to NUP	1	60.00				0	45		0		
114	M	0	2	6	post		to RED	1	60.00				0	45		0		
114	M	0	2	6	post		to NUP	1	60.00				0	45		0		
115	M	0	1	2	pre		to RED	1	60.00				0	45		0		
115	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
115	M	0	1	2	pre		to RED	1	60.00				0	45		0		
115	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
115	M	0	1	2	pre		to RED	1	60.00				0	45		0		
115	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
115	M	23	1	3	PRE	1	to RED	1	60.00	0.82	73.17	99.3	1	40	1.03	10	5.47	-82.08
115	M	23	1	3	PRE	2	to NUP	1	60.00	0.65	92.31	113.5	1	40	1.07	20	5.07	52.53
115	M	23	1	3	PRE	3	to RED	1	60.00	0.7	85.71	100.9	1	40	2.32	20	5.04	-96.55
115	M	23	1	3	PRE	4	to NUP	1	60.00	0.73	82.19	98.4	1	40	6.82	25	4.96	35.87
115	M	23	1	3	PRE	5	to RED	1	60.00	0.7	85.71	86.1	1	43	5.08	18	4.47	-80.35
115	M	23	1	3	PRE	6	to NUP	1	60.00	0.62	96.77	107.5	2	38	7.33	20	4.58	49.05
115	M	19	1	4	STIM	7	to RED	4.1	14.63	2.32	25.86	43.8	1	45	3.18	17	4.71	-76.11
115	M	19	1	4	STIM	8	to NUP	4.1	14.63	2.48	24.19	48.5	1	40	2.74	18	5.17	39.06
115	M	19	1	4	STIM	9	to RED	8.3	7.23	8.72	6.88	22	1	45	1.46	17	4.79	-59.50
115	M	19	1	4	STIM	10	to NUP	8.3	7.23	5.87	10.22	22.2	2	40	3.33	18	5.15	25.28
115	M	19	1	4	STIM	11	to RED	0.8	75.00	0.73	82.19	92.3	2	45	1.67	17	4.87	-60.32
115	M	19	1	4	STIM	12	to NUP	0.8	75.00	0.67	89.55	113.8	2	40	5.16	18	5.56	18.27
115	M	19	1	4	STIM	13	to RED	16.8	3.57	16.38	3.66	17.1	1	45	1.35	11	3.92	-44.76
115	M	19	1	4	STIM	14	to NUP	16.8	3.57	13.4	4.48	15.9	1	45	2.5	15	3.63	28.61
115	M	19	1	4	STIM	15	to RED	6.6	9.09	6.22	9.65	22.9	1	45	1.11	15	4.07	-66.82
115	M	19	1	4	STIM	16	to NUP	6.6	9.09	5.03	11.93	22.9	2	43	1.82	16	6.52	27.93
115	M	19	1	4	STIM	17	to RED	3.2	18.75	2.82	21.28	45.2	1	45	1.31	15	5.03	-50.53

115	M	19	1	4	STIM	18	to NUP	3.2	18.75	2.33	25.75	44.7	2	43	1.27	16	4.00	29.98
115	M	19	1	4	STIM	19	to RED	1.6	37.50	1.33	45.11	50.3	1	45	1.42	16	4.86	-56.13
115	M	19	1	4	STIM	20	to NUP	1.6	37.50	1.45	41.38	50.4	2	40	1.37	17	5.19	38.05
115	M	19	1	4	STIM	21	to RED	10.5	5.71	9.67	6.20	25.8	1	45	1.08	14	3.66	-35.56
115	M	19	1	4	STIM	22	to NUP	10.5	5.71	6.98	8.60	24.8	2	45	3.02	15	0.00	43.38
115	M	19	1	4	STIM	23	to RED	10.5	5.71	9.6	6.25	24.8	2	45	1.73	15	5.30	-35.87
115	M	19	1	4	STIM	24	to NUP	10.5	5.71	9.23	6.50	20.8	3	43	1.82	15	0.00	28.50
115	M	19	1	4	STIM	25	to RED	1.6	37.50	1.22	49.18	53.1	2	45	2.03	16	5.06	-50.35
115	M	19	1	4	STIM	26	to NUP	1.6	37.50	1.43	41.96	58.5	2	40	1.77	16	4.71	38.10
115	M	19	1	4	STIM	27	to RED	3.2	18.75	2.85	21.05	37.4	2	45	1.57	14	4.60	-35.66
115	M	19	1	4	STIM	28	to NUP	3.2	18.75	2.38	25.21	34.4	3	40	1.72	16	0.00	41.66
115	M	19	1	4	STIM	29	to RED	6.6	9.09	6.97	8.61	25.8	2	45	1.2	15	4.46	-28.03
115	M	19	1	4	STIM	30	to NUP	6.6	9.09	5.25	11.43	25.1	3	45	2.6	16	0.00	25.49
115	M	19	1	4	STIM	31	to RED	16.8	3.57	16.98	3.53	32.3	2	45	1.44	11	0.00	-25.48
115	M	19	1	4	STIM	32	to NUP	16.8	3.57	12.87	4.66	19.5	2	45	3.88	14	2.58	18.70
115	M	19	1	4	STIM	33	to RED	0.8	75.00	0.85	70.59	83.8	3	45	2.08	16	4.99	-30.98
115	M	19	1	4	STIM	34	to NUP	0.8	75.00	0.87	68.97	81.5	3	40	1.83	16	0.00	33.40
115	M	19	1	4	STIM	35	to RED	8.3	7.23	8.37	7.17	20.6	2	45	1.48	15	5.14	-24.02
115	M	19	1	4	STIM	36	to NUP	8.3	7.23	4.57	13.13	34.6	3	40	4.11	16	3.47	21.03
115	M	19	1	4	STIM	37	to RED	4.1	14.63	4.8	12.50	28.3	3	40	1.42	16	3.21	-39.64
115	M	19	1	4	STIM	38	to NUP	4.1	14.63	2.92	20.55	36.8	3	40	1.86	16	3.69	37.35
115	M	23	1	5	POST	39	to RED	1	60.00	0.8	75.00	78.2	2	45	2.1	15	4.08	-34.05
115	M	23	1	5	POST	40	to NUP	1	60.00	0.95	63.16	73.8	3	40	4.2	16	4.01	27.52
115	M	23	1	5	POST	41	to RED	1	60.00	0.85	70.59	99.7	3	45	1.93	16	3.23	-63.94
115	M	23	1	5	POST	42	to NUP	1	60.00	0.87	68.97	84	3	40	3.7	16	3.79	18.50
115	M	23	1	5	POST	43	to RED	1	60.00	0.78	76.92	83.3	3	45	1.35	16	3.84	-54.67
115	M	23	1	5	POST	44	to NUP	1	60.00	0.72	83.33	90.9	3	40	2.36	17	0.00	33.76
115	M	0	1	6	post		to RED	1	60.00				1	45		0		
115	M	0	1	6	post		to NUP	1	60.00				1	45		0		
115	M	0	1	6	post		to RED	1	60.00				1	45		0		
115	M	0	1	6	post		to NUP	1	60.00				1	45		0		
115	M	0	1	6	post		to RED	1	60.00				1	45		0		
115	M	0	1	6	post		to NUP	1	60.00				1	45		0		
115	M	0	2	2	pre		to RED	1	60.00				0	45		0		
115	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
115	M	0	2	2	pre		to RED	1	60.00				0	45		0		
115	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
115	M	0	2	2	pre		to RED	1	60.00				0	45		0		
115	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
115	M	23	2	3	PRE	1	to RED	1	60.00	0.73	82.19	93.2	1	45	1.5	20	3.85	-51.14
115	M	23	2	3	PRE	2	to NUP	1	60.00	0.77	77.92	95.5	1	40	6.26	25	3.56	31.23
115	M	23	2	3	PRE	3	to RED	1	60.00	0.75	80.00	100.5	1	45	1.07	20	4.85	-39.19
115	M	23	2	3	PRE	4	to NUP	1	60.00	0.65	92.31	108.7	2	40	6.7	25	4.48	46.39
115	M	23	2	3	PRE	5	to RED	1	60.00	0.7	85.71	86.9	1	50	1.1	20	4.01	-61.64
115	M	23	2	3	PRE	6	to NUP	1	60.00	0.6	100.00	107.9	2	40	6.2	25	3.13	56.02
115	M	19	2	4	STIM	7	to RED	4.1	14.63	4.53	13.25	25.1	1	45	0.92	18	3.76	-72.08
115	M	19	2	4	STIM	8	to NUP	4.1	14.63	2.4	25.00	40.3	2	45	2.25	20	4.29	29.52

115	M	19	2	4	STIM	9	to RED	8.3	7.23	6.85	8.76	22.3	1	45	1.37	18	3.61	-40.43
115	M	19	2	4	STIM	10	to NUP	8.3	7.23	5.05	11.88	29.7	2	45	3.27	20	2.96	26.00
115	M	19	2	4	STIM	11	to RED	0.8	75.00	0.82	73.17	93.4	1	50	0.9	20	4.30	-49.05
115	M	19	2	4	STIM	12	to NUP	0.8	75.00	0.87	68.97	84.1	2	40	5.23	22	0.00	21.87
115	M	19	2	4	STIM	13	to RED	16.8	3.57	15.58	3.85	16.2	1	45	1.54	18	0.00	-23.54
115	M	19	2	4	STIM	14	to NUP	16.8	3.57	11.12	5.40	30.7	1	45	5.13	20	3.00	36.20
115	M	19	2	4	STIM	15	to RED	6.6	9.09	6.47	9.27	23	1	45	1.86	22	3.59	-34.11
115	M	19	2	4	STIM	16	to NUP	6.6	9.09	5.73	10.47	26.2	2	45	1.54	25	4.48	43.25
115	M	19	2	4	STIM	17	to RED	3.2	18.75	2.63	22.81	37.5	1	50	1.22	20	4.68	-31.33
115	M	19	2	4	STIM	18	to NUP	3.2	18.75	2.14	28.04	35.3	2	45	1.79	25	2.38	38.95
115	M	19	2	4	STIM	19	to RED	1.6	37.50	1.48	40.54	59.5	1	50	1.27	20	4.47	-42.92
115	M	19	2	4	STIM	20	to NUP	1.6	37.50	1.18	50.85	71.2	2	40	2.77	27	3.13	19.04
115	M	19	2	4	STIM	21	to RED	10.5	5.71	9.8	6.12	23.4	1	45	1.47	20	3.16	-28.35
115	M	19	2	4	STIM	22	to NUP	10.5	5.71	8.55	7.02	25.5	1	45	1.93	20	4.73	21.07
115	M	19	2	4	STIM	23	to RED	10.5	5.71	10.85	5.53	17.2 8	1	45	1.4	20	3.56	-22.79
115	M	19	2	4	STIM	24	to NUP	10.5	5.71	9.33	6.43	25	1	45	1.49	25	4.35	22.59
115	M	19	2	4	STIM	25	to RED	1.6	37.50	1.41	42.55	56.2	1	45	1.56	20	4.43	-32.83
115	M	19	2	4	STIM	26	to NUP	1.6	37.50	1.57	38.22	48.5	2	40	2.75	25	0.00	28.12
115	M	19	2	4	STIM	27	to RED	3.2	18.75	2.58	23.26	34.7	1	50	1.69	20	2.49	-40.47
115	M	19	2	4	STIM	28	to NUP	3.2	18.75	2.6	23.08	36.8	1	45	1.5	25	2.38	34.97
115	M	19	2	4	STIM	29	to RED	6.6	9.09	6.53	9.19	21.3	1	45	1.32	20	0.00	-34.76
115	M	19	2	4	STIM	30	to NUP	6.6	9.09	4.7	12.77	27.1	2	45	2.2	25	0.00	22.94
115	M	19	2	4	STIM	31	to RED	16.8	3.57	17.03	3.52	19.2	1	45	1.45	20	2.74	-17.92
115	M	19	2	4	STIM	32	to NUP	16.8	3.57	16.13	3.72	25.8	1	45	1.52	20	0.00	11.92
115	M	19	2	4	STIM	33	to RED	0.8	75.00	0.78	76.92	82	1	50	1.2	20	3.93	-50.16
115	M	19	2	4	STIM	34	to NUP	0.8	75.00	1.07	56.07	65.3	2	40	3.15	25	3.82	14.93
115	M	19	2	4	STIM	35	to RED	8.3	7.23	8.07	7.43	21.5	1	45	1.3	20	3.90	-45.00
115	M	19	2	4	STIM	36	to NUP	8.3	7.23	6.35	9.45	23.4	1	45	2.03	20	4.41	19.66
115	M	19	2	4	STIM	37	to RED	4.1	14.63	3.93	15.27	29.1	1	45	1.89	22	0.00	-18.00
115	M	19	2	4	STIM	38	to NUP	4.1	14.63	3.27	18.35	25.8	2	45	1.8	25	0.00	34.87
115	M	23	2	5	POST	39	to RED	1	60.00	0.85	70.59	77.8	1	50	1.4	20	3.75	-54.74
115	M	23	2	5	POST	40	to NUP	1	60.00	1.13	53.10	67.7	2	40	4.62	25	0.00	36.65
115	M	23	2	5	POST	41	to RED	1	60.00	1.25	48.00	60.4	1	45	1.68	20	0.00	-29.17
115	M	23	2	5	POST	42	to NUP	1	60.00	1.05	57.14	79.4	1	40	3.67	22	2.92	21.36
115	M	23	2	5	POST	43	to RED	1	60.00	1.38	43.48	75.6	1	50	1.27	20	3.40	-47.21
115	M	23	2	5	POST	44	to NUP	1	60.00	1.03	58.25	77.1	2	40	3.72	25	3.95	37.48
115	M	0	2	6	post		to RED	1	60.00				0	45		0		
115	M	0	2	6	post		to NUP	1	60.00				0	45		0		
115	M	0	2	6	post		to RED	1	60.00				0	45		0		
115	M	0	2	6	post		to NUP	1	60.00				0	45		0		
115	M	0	2	6	post		to RED	1	60.00				0	45		0		
115	M	0	2	6	post		to NUP	1	60.00				0	45		0		
116	M	0	1	2	pre		to RED	1	60.00				0	45		0		
116	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
116	M	0	1	2	pre		to RED	1	60.00				0	45		0		
116	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
116	M	0	1	2	pre		to RED	1	60.00				0	45		0		
116	M	0	1	2	pre		to NUP	1	60.00				0	45		0		

116	M	23	1	3	PRE	1	to RED	1	60.00	1.28	46.88	65.1	0	45	1.9	10	3.48	-55.04
116	M	23	1	3	PRE	2	to NUP	1	60.00	1.28	46.88	78.7	0	45	6.62	30	3.86	51.05
116	M	23	1	3	PRE	3	to RED	1	60.00	0.95	63.16	88.3	0	45	1.37	10	3.54	-54.21
116	M	23	1	3	PRE	4	to NUP	1	60.00	1.1	54.55	74.9	0	45	6.38	30	4.01	35.81
116	M	23	1	3	PRE	5	to RED	1	60.00	0.77	77.92	94.3	0	45	1.05	10	4.43	-31.65
116	M	23	1	3	PRE	6	to NUP	1	60.00	1.02	58.82	66	1	45	6.35	30	4.64	36.39
116	M	19	1	4	STIM	7	to RED	4.1	14.63	4.2	14.29	28.1	0	45	0.82	8	5.33	-21.37
116	M	19	1	4	STIM	8	to NUP	4.1	14.63	4.3	13.95	25.7	0	45	7.52	15	4.99	45.64
116	M	19	1	4	STIM	9	to RED	8.3	7.23	8.37	7.17	23.6	0	45	0.28	5	4.53	-7.50
116	M	19	1	4	STIM	10	to NUP	8.3	7.23	8.03	7.47	18	0	45	1.42	15	5.29	57.57
116	M	19	1	4	STIM	11	to RED	0.8	75.00	0.72	83.33	110. 1	0	45	2.65	10	2.88	-38.31
116	M	19	1	4	STIM	12	to NUP	0.8	75.00	0.58	103.45	126	0	45	7.94	20	5.79	70.82
116	M	19	1	4	STIM	13	to RED	16.8	3.57	14.58	4.12	15	0	45	1	4	0.00	-13.03
116	M	19	1	4	STIM	14	to NUP	16.8	3.57	15.22	3.94	17.1	0	45	1.25	5	3.23	28.03
116	M	19	1	4	STIM	15	to RED	6.6	9.09	6.47	9.27	23.9	0	45	0.81	8	5.47	-24.01
116	M	19	1	4	STIM	16	to NUP	6.6	9.09	6.78	8.85	21.5	0	45	0.74	8	6.34	72.47
116	M	19	1	4	STIM	17	to RED	3.2	18.75	2.73	21.98	41.2	0	45	1.62	12	4.81	-36.87
116	M	19	1	4	STIM	18	to NUP	3.2	18.75	3.42	17.54	32.1	0	45	0.65	15	5.01	69.31
116	M	19	1	4	STIM	19	to RED	1.6	37.50	0.87	68.97	79.1	0	45	2.05	10	4.16	-40.24
116	M	19	1	4	STIM	20	to NUP	1.6	37.50	1.5	40.00	49.2	0	45	7.38	25	5.21	74.34
116	M	19	1	4	STIM	21	to RED	10.5	5.71	9.67	6.20	16.1	0	45	1.23	4	0.00	-16.97
116	M	19	1	4	STIM	22	to NUP	10.5	5.71	10.55	5.69	17.5	0	45	1.35	8	3.19	56.84
116	M	19	1	4	STIM	23	to RED	10.5	5.71	9.98	6.01	19.7	0	45	1.2	5	6.13	-15.37
116	M	19	1	4	STIM	24	to NUP	10.5	5.71	9.47	6.34	16.6	0	45	0.93	5	0.00	39.28
116	M	19	1	4	STIM	25	to RED	1.6	37.50	1.63	36.81	47.7	0	45	1.39	10	4.39	-39.68
116	M	19	1	4	STIM	26	to NUP	1.6	37.50	1.3	46.15	60.4	0	45	6.57	20	6.18	76.52
116	M	19	1	4	STIM	27	to RED	3.2	18.75	3.05	19.67	33	0	45	1.43	10	5.57	-25.69
116	M	19	1	4	STIM	28	to NUP	3.2	18.75	3.22	18.63	31.4	0	45	5.9	15	5.39	70.95
116	M	19	1	4	STIM	29	to RED	6.6	9.09	6.12	9.80	20.2	0	45	1.08	8	4.60	-7.98
116	M	19	1	4	STIM	30	to NUP	6.6	9.09	5.5	10.91	24.4	0	45	4.22	12	6.69	61.89
116	M	19	1	4	STIM	31	to RED	16.8	3.57	16.6	3.61	15.9	0	45	0.73	5	3.12	-15.54
116	M	19	1	4	STIM	32	to NUP	16.8	3.57	16.9	3.55	18.3	0	45	1.25	5	2.84	30.62
116	M	19	1	4	STIM	33	to RED	0.8	75.00	1	60.00	83.4	0	45	0.9	12	3.13	-32.93
116	M	19	1	4	STIM	34	to NUP	0.8	75.00	1.22	49.18	80.1	0	45	7.16	20	5.80	91.50
116	M	19	1	4	STIM	35	to RED	8.3	7.23	8.23	7.29	17.8	0	45	0.62	2	0.00	-24.25
116	M	19	1	4	STIM	36	to NUP	8.3	7.23	8.53	7.03	16.9	0	45	0.94	10	4.33	51.87
116	M	19	1	4	STIM	37	to RED	4.1	14.63	2.95	20.34	31.6	0	45	1.98	10	5.67	-21.28
116	M	19	1	4	STIM	38	to NUP	4.1	14.63	3.1	19.35	43.3	0	45	3.65	15	5.61	59.01
116	M	23	1	5	POST	39	to RED	1	60.00	0.88	68.18	87.1	0	45	2.49	12	3.32	-35.82
116	M	23	1	5	POST	40	to NUP	1	60.00	0.98	61.22	96.2	0	45	8.24	25	5.37	86.29
116	M	23	1	5	POST	41	to RED	1	60.00	0.97	61.86	87.4	0	45	2.48	12	3.91	-25.29
116	M	23	1	5	POST	42	to NUP	1	60.00	1.08	55.56	82.2	0	45	8.4	30	3.88	65.28
116	M	23	1	5	POST	43	to RED	1	60.00	1.17	51.28	77.3	0	45	3.41	15	4.71	-32.19
116	M	23	1	5	POST	44	to NUP	1	60.00	1.13	53.10	75.9	0	45	7.77	30	0.00	96.94
116	M	0	1	6	post		to RED	1	60.00				0	45		3		
116	M	0	1	6	post		to NUP	1	60.00				0	45		0		
116	M	0	1	6	post		to RED	1	60.00				0	45		0		
116	M	0	1	6	post		to NUP	1	60.00				0	45		0		

116	M	0	1	6	post		to RED	1	60.00				0	45		0		
116	M	0	1	6	post		to NUP	1	60.00				0	45		0		
116	M	0	2	2	pre		to RED	1	60.00				0	45		0		
116	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
116	M	0	2	2	pre		to RED	1	60.00				0	45		0		
116	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
116	M	0	2	2	pre		to RED	1	60.00				0	45		0		
116	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
116	M	23	2	3	PRE	1	to RED	1	60.00	1.02	58.82	88.7	0	45	1.16	12	3.19	-140.55
116	M	23	2	3	PRE	2	to NUP	1	60.00	0.9	66.67	76.1	0	45	8.37	30	2.32	62.53
116	M	23	2	3	PRE	3	to RED	1	60.00	1.08	55.56	80.8	0	45	0.75	10	3.77	-567.52
116	M	23	2	3	PRE	4	to NUP	1	60.00	0.87	68.97	85.5	0	45	8.06	30	5.14	68.26
116	M	23	2	3	PRE	5	to RED	1	60.00	0.9	66.67	89.9	0	45	0.92	10	3.92	-458.54
116	M	23	2	3	PRE	6	to NUP	1	60.00	0.92	65.22	95.5	0	45	6.95	25	6.07	84.86
116	M	19	2	4	STIM	7	to RED	4.1	14.63	3.58	16.76	27.6	0	45	1.14	5	5.56	-236.27
116	M	19	2	4	STIM	8	to NUP	4.1	14.63	4.03	14.89	30	0	45	3.07	15	3.60	588.90
116	M	19	2	4	STIM	9	to RED	8.3	7.23	7.98	7.52	22.2	0	45	1.27	3	6.18	-156.62
116	M	19	2	4	STIM	10	to NUP	8.3	7.23	8.32	7.21	19.7	0	45	2.46	5	2.51	378.93
116	M	19	2	4	STIM	11	to RED	0.8	75.00	0.6	100.00	99.1	0	45	1.87	8	0.00	-346.55
116	M	19	2	4	STIM	12	to NUP	0.8	75.00	1.05	57.14	99	0	45	6.02	20	5.63	445.49
116	M	19	2	4	STIM	13	to RED	16.8	3.57	14.37	4.18	10.1	0	45	1.7	2	0.00	-54.56
116	M	19	2	4	STIM	14	to NUP	16.8	3.57	15.92	3.77	15.2	0	45	1.83	2	0.00	301.16
116	M	19	2	4	STIM	15	to RED	6.6	9.09	5.38	11.15	29	0	45	1.65	6	0.00	-177.78
116	M	19	2	4	STIM	16	to NUP	6.6	9.09	6	10.00	23.7	0	45	1	12	0.00	614.36
116	M	19	2	4	STIM	17	to RED	3.2	18.75	2.22	27.03	41.9	0	45	1.81	8	8.52	-151.57
116	M	19	2	4	STIM	18	to NUP	3.2	18.75	2.92	20.55	32.3	0	45	5.8	15	0.00	523.52
116	M	19	2	4	STIM	19	to RED	1.6	37.50	1.2	50.00	78.4	0	45	1.52	12	4.47	-273.83
116	M	19	2	4	STIM	20	to NUP	1.6	37.50	1.38	43.48	70.7	0	45	7.05	20	0.00	317.41
116	M	19	2	4	STIM	21	to RED	10.5	5.71	9.4	6.38	41.4	0	45	1.2	5	0.00	-136.84
116	M	19	2	4	STIM	22	to NUP	10.5	5.71	9.25	6.49	20.9	0	45	1.6	8	0.00	401.39
116	M	19	2	4	STIM	23	to RED	10.5	5.71	9.5	6.32	16.2	0	45	1.33	3	11.12	-129.40
116	M	19	2	4	STIM	24	to NUP	10.5	5.71	10.4	5.77	16.9	0	45	2.17	8	0.00	327.85
116	M	19	2	4	STIM	25	to RED	1.6	37.50	1.08	55.56	66.7	0	45	1.62	12	5.34	-257.91
116	M	19	2	4	STIM	26	to NUP	1.6	37.50	1.28	46.88	79.2	0	45	5.87	20	0.00	257.41
116	M	19	2	4	STIM	27	to RED	3.2	18.75	2.32	25.86	32.3	0	45	1.7	10	5.65	-136.36
116	M	19	2	4	STIM	28	to NUP	3.2	18.75	2.52	23.81	35.4	0	45	5.28	20	5.49	397.37
116	M	19	2	4	STIM	29	to RED	6.6	9.09	5.58	10.75	21.3	0	45	1.75	12	4.19	-130.73
116	M	19	2	4	STIM	30	to NUP	6.6	9.09	5.98	10.03	20.9	0	45	4.12	15	0.00	375.95
116	M	19	2	4	STIM	31	to RED	16.8	3.57	16	3.75	29.3	0	45	1.38	3	0.00	-90.44
116	M	19	2	4	STIM	32	to NUP	16.8	3.57	15.83	3.79	16.6	0	45	1.94	3	0.00	453.77
116	M	19	2	4	STIM	33	to RED	0.8	75.00	0.72	83.33	110.8	0	45	2.98	12	4.90	-229.59
116	M	19	2	4	STIM	34	to NUP	0.8	75.00	0.97	61.86	94.8	0	45	5.15	17	0.00	185.48
116	M	19	2	4	STIM	35	to RED	8.3	7.23	7.15	8.39	22.7	0	45	1.87	5	0.00	-78.68
116	M	19	2	4	STIM	36	to NUP	8.3	7.23	8.52	7.04	21.6	0	45	1.56	12	0.00	427.58
116	M	19	2	4	STIM	37	to RED	4.1	14.63	2.85	21.05	32.3	0	45	2.2	12	0.00	-213.49
116	M	19	2	4	STIM	38	to NUP	4.1	14.63	4.2	14.29	27.6	0	45	3.57	15	0.00	216.87
116	M	23	2	5	POST	39	to RED	1	60.00	1.03	58.25	82.2	0	45	6.59	13	4.66	-325.38
116	M	23	2	5	POST	40	to NUP	1	60.00	1.03	58.25	80.6	0	45	7.34	25	0.00	353.72

116	M	23	2	5	POST	41	to RED	1	60.00	0.97	61.86	80.3	0	45	2.68	13	0.00	-328.44
116	M	23	2	5	POST	42	to NUP	1	60.00	0.85	70.59	93.2	0	45	7.9	20	3.09	221.82
116	M	23	2	5	POST	43	to RED	1	60.00	0.85	70.59	92.7	0	45	1.22	12	0.00	-326.02
116	M	23	2	5	POST	44	to NUP	1	60.00	0.83	72.29	105.6	0	45	9.2	20	3.10	55.97
116	M	0	2	6	post		to RED	1	60.00				0	45		3		
116	M	0	2	6	post		to NUP	1	60.00				0	45		0		
116	M	0	2	6	post		to RED	1	60.00				0	45		0		
116	M	0	2	6	post		to NUP	1	60.00				0	45		0		
116	M	0	2	6	post		to RED	1	60.00				0	45		0		
116	M	0	2	6	post		to NUP	1	60.00				0	45		0		
117	M	0	1	2	pre		to RED	1	60.00				0	45		0		
117	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
117	M	0	1	2	pre		to RED	1	60.00				0	45		0		
117	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
117	M	0	1	2	pre		to RED	1	60.00				0	45		0		
117	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
117	M	23	1	3	PRE	1	to RED	1	60.00	1.72	34.88	51.1	0	45	4.75	10	4.12	-59.87
117	M	23	1	3	PRE	2	to NUP	1	60.00	1.43	41.96	62.8	0	43	12.57	20	4.88	52.05
117	M	23	1	3	PRE	3	to RED	1	60.00	1.03	58.25	80.5	0	45	8.54	15	4.06	-60.28
117	M	23	1	3	PRE	4	to NUP	1	60.00	1.3	46.15	60.9	0	43	9.93	18	5.56	50.49
117	M	23	1	3	PRE	5	to RED	1	60.00	1.85	32.43	48	0	45	6.83	15	5.90	-56.47
117	M	23	1	3	PRE	6	to NUP	1	60.00	1.37	43.80	43.8	0	42	12	18	5.06	56.89
117	M	19	1	4	STIM	7	to RED	4.1	14.63	4.25	14.12	24.1	0	45	1.73	5	3.46	-35.12
117	M	19	1	4	STIM	8	to NUP	4.1	14.63	3.97	15.11	26.9	0	44	5.61	4	5.76	65.80
117	M	19	1	4	STIM	9	to RED	8.3	7.23	7.38	8.13	20.9	0	45	1.17	0	5.84	-13.11
117	M	19	1	4	STIM	10	to NUP	8.3	7.23	8.13	7.38	26.7	0	44.5	3.12	2	5.41	44.85
117	M	19	1	4	STIM	11	to RED	0.8	75.00	0.92	65.22	84.7	0	45	5.78	10	4.45	-77.40
117	M	19	1	4	STIM	12	to NUP	0.8	75.00	0.85	70.59	95.3	0	42	9.62	12	5.81	64.49
117	M	19	1	4	STIM	13	to RED	16.8	3.57	13.63	4.40	19.2	0	45	3.77	0	3.76	-21.58
117	M	19	1	4	STIM	14	to NUP	16.8	3.57	16.13	3.72	18.5	0	45	0.59	0	4.32	31.13
117	M	19	1	4	STIM	15	to RED	6.6	9.09	5.5	10.91	23.7	0	45	1.93	1	3.42	-50.26
117	M	19	1	4	STIM	16	to NUP	6.6	9.09	6.15	9.76	27.1	0	45	5.28	2	5.14	50.26
117	M	19	1	4	STIM	17	to RED	3.2	18.75	2.8	21.43	30.9	0	45	3.17	2	3.75	-63.72
117	M	19	1	4	STIM	18	to NUP	3.2	18.75	2.58	23.26	44.5	0	43	8.92	5	6.14	35.33
117	M	19	1	4	STIM	19	to RED	1.6	37.50	1.79	33.52	42.9	0	46	2.16	2	4.78	-46.90
117	M	19	1	4	STIM	20	to NUP	1.6	37.50	1.43	41.96	53.2	0	44	8.12	5	4.75	45.04
117	M	19	1	4	STIM	21	to RED	10.5	5.71	9.18	6.54	17.8	0	45	0.99	0	3.97	-31.83
117	M	19	1	4	STIM	22	to NUP	10.5	5.71	9.62	6.24	25.8	0	45	2.73	1	5.31	36.24
117	M	19	1	4	STIM	23	to RED	10.5	5.71	10.22	5.87	17.3	0	45	0.93	0	4.65	-28.12
117	M	19	1	4	STIM	24	to NUP	10.5	5.71	9.72	6.17	20.4	0	45	2.51	0	4.49	41.41
117	M	19	1	4	STIM	25	to RED	1.6	37.50	1.97	30.46	42.1	0	45	3.61	3	4.25	-64.11
117	M	19	1	4	STIM	26	to NUP	1.6	37.50	1.77	33.90	48.5	0	44	8.76	5	4.37	46.23
117	M	19	1	4	STIM	27	to RED	3.2	18.75	3.38	17.75	30.9	0	45	2.04	1	3.51	-84.84
117	M	19	1	4	STIM	28	to NUP	3.2	18.75	2.5	24.00	37.4	0	45	6.18	3	5.41	50.03
117	M	19	1	4	STIM	29	to RED	6.6	9.09	5.67	10.58	22.5	0	45	2.18	0	4.15	-33.19
117	M	19	1	4	STIM	30	to NUP	6.6	9.09	6.02	9.97	22	0	45	5.95	1	5.00	57.51
117	M	19	1	4	STIM	31	to RED	16.8	3.57	15.07	3.98	46.1	0	45	1.4	0	2.93	-21.47
117	M	19	1	4	STIM	32	to NUP	16.8	3.57	15.73	3.81	17.4	0	45	1.74	0	4.60	28.96

117	M	19	1	4	STIM	33	to RED	0.8	75.00	0.98	61.22	71.6	0	45	5.29	5	4.46	-25.61
117	M	19	1	4	STIM	34	to NUP	0.8	75.00	1.1	54.55	76.5	0	44	10.1	7	6.24	48.40
117	M	19	1	4	STIM	35	to RED	8.3	7.23	7.32	8.20	20.1	0	45	1.48	0	1.56	-50.37
117	M	19	1	4	STIM	36	to NUP	8.3	7.23	6.42	9.35	26.2	0	45	4.55	1	4.49	49.80
117	M	19	1	4	STIM	37	to RED	4.1	14.63	3.55	16.90	28.3	0	45	3.15	1	3.84	-37.20
117	M	19	1	4	STIM	38	to NUP	4.1	14.63	3.33	18.02	29.1	0	45	7.52	3	4.87	48.50
117	M	23	1	5	POST	39	to RED	1	60.00	1.6	37.50	50	0	44	5.75	10	3.95	-48.65
117	M	23	1	5	POST	40	to NUP	1	60.00	1	60.00	68.9	0	42	10.97	12	5.01	44.65
117	M	23	1	5	POST	41	to RED	1	60.00	1.32	45.45	59.9	0	45	7.66	10	5.35	-21.85
117	M	23	1	5	POST	42	to NUP	1	60.00	1.08	55.56	79.4	0	41	10.85	13	3.26	44.82
117	M	23	1	5	POST	43	to RED	1	60.00	1.08	55.56	75.1	0	45	6.3	8	5.54	-26.02
117	M	23	1	5	POST	44	to NUP	1	60.00	0.92	65.22	75.9	0	44	10.35	11	4.15	59.14
117	M	0	1	6	post		to RED	1	60.00				0	45		0		
117	M	0	1	6	post		to NUP	1	60.00				0	45		0		
117	M	0	1	6	post		to RED	1	60.00				0	45		0		
117	M	0	1	6	post		to NUP	1	60.00				0	45		0		
117	M	0	1	6	post		to RED	1	60.00				0	45		0		
117	M	0	1	6	post		to NUP	1	60.00				0	45		0		
117	M	0	2	2	pre		to RED	1	60.00				0	45		0		
117	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
117	M	0	2	2	pre		to RED	1	60.00				0	45		0		
117	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
117	M	0	2	2	pre		to RED	1	60.00				0	45		0		
117	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
117	M	23	2	3	PRE	1	to RED	1	60.00	1.1	54.55	61.8	0	45	6.68	11	4.37	-82.81
117	M	23	2	3	PRE	2	to NUP	1	60.00	1	60.00	69.8	0	44	12.28	18	4.07	72.19
117	M	23	2	3	PRE	3	to RED	1	60.00	1.4	42.86	56.2	0	45	7.87	11	3.71	-128.81
117	M	23	2	3	PRE	4	to NUP	1	60.00	1	60.00	67	0	45	8.77	15	3.27	74.59
117	M	23	2	3	PRE	5	to RED	1	60.00	1.15	52.17	70	0	46	7.4	11	3.55	-112.34
117	M	23	2	3	PRE	6	to NUP	1	60.00	1.08	55.56	75.2	0	44	10.34	13	4.20	69.44
117	M	19	2	4	STIM	7	to RED	4.1	14.63	3.32	18.07	26.7	0	45	2.76	2	4.09	-68.85
117	M	19	2	4	STIM	8	to NUP	4.1	14.63	3.83	15.67	29.3	0	45	5.27	4	5.54	44.13
117	M	19	2	4	STIM	9	to RED	8.3	7.23	7.57	7.93	25.1	0	45	1.61	1	3.70	-45.11
117	M	19	2	4	STIM	10	to NUP	8.3	7.23	8	7.50	31.4	0	45	4.5	1	4.08	26.71
117	M	19	2	4	STIM	11	to RED	0.8	75.00	1.1	54.55	67.5	0	46	6.77	12	3.68	-98.15
117	M	19	2	4	STIM	12	to NUP	0.8	75.00	0.78	76.92	94.1	0	44	8.19	14	4.94	80.51
117	M	19	2	4	STIM	13	to RED	16.8	3.57	15.25	3.93	15.2	0	45	0.83	0	3.25	-24.73
117	M	19	2	4	STIM	14	to NUP	16.8	3.57	16.02	3.75	17.5	0	45	1.9	1	5.30	18.13
117	M	19	2	4	STIM	15	to RED	6.6	9.09	5.72	10.49	23.4	0	46	3.16	1	4.89	-31.83
117	M	19	2	4	STIM	16	to NUP	6.6	9.09	5.35	11.21	23.9	0	45	2.72	1	4.78	30.50
117	M	19	2	4	STIM	17	to RED	3.2	18.75	2.72	22.06	32.1	0	45	2	2	4.48	-59.00
117	M	19	2	4	STIM	18	to NUP	3.2	18.75	2.72	22.06	37.9	0	44	6.88	3	2.92	17.42
117	M	19	2	4	STIM	19	to RED	1.6	37.50	1.63	36.81	49.6	0	45	5.24	3	3.42	-75.60
117	M	19	2	4	STIM	20	to NUP	1.6	37.50	1.28	46.88	53.8	0	45	6.64	5	4.32	47.75
117	M	19	2	4	STIM	21	to RED	10.5	5.71	7.9	7.59	28.6	0	45	2.97	0	4.30	-46.69
117	M	19	2	4	STIM	22	to NUP	10.5	5.71	10	6.00	21.1	0	45	2.23	1	5.43	21.67

117	M	19	2	4	STIM	23	to RED	10.5	5.71	9.75	6.15	29.3	0	45	2.08	1	3.92	-20.89
117	M	19	2	4	STIM	24	to NUP	10.5	5.71	9.38	6.40	26.5	0	45	1.57	1	3.65	17.77
117	M	19	2	4	STIM	25	to RED	1.6	37.50	1.98	30.30	40.5	0	45	3.02	2	4.97	-67.70
117	M	19	2	4	STIM	26	to NUP	1.6	37.50	0.87	68.97	88	0	44	8.08	6	3.00	91.04
117	M	19	2	4	STIM	27	to RED	3.2	18.75	3.2	18.75	27.9	0	45	2.53	2	4.10	-82.60
117	M	19	2	4	STIM	28	to NUP	3.2	18.75	2.63	22.81	35.1	0	45	5.39	4	4.19	14.58
117	M	19	2	4	STIM	29	to RED	6.6	9.09	5.6	10.71	22.7	0	45	2.48	1	3.10	-57.40
117	M	19	2	4	STIM	30	to NUP	6.6	9.09	5.85	10.26	25.5	0	45	3.9	1	5.27	28.55
117	M	19	2	4	STIM	31	to RED	16.8	3.57	15.07	3.98	15.4	0	45	1.65	0	3.58	-20.46
117	M	19	2	4	STIM	32	to NUP	16.8	3.57	15.18	3.95	17.6	0	45	1.45	0	4.04	18.99
117	M	19	2	4	STIM	33	to RED	0.8	75.00	1.43	41.96	52.2	0	45	5.2	4	4.15	-78.34
117	M	19	2	4	STIM	34	to NUP	0.8	75.00	1.02	58.82	77.7	0	45	7.56	7	4.17	39.96
117	M	19	2	4	STIM	35	to RED	8.3	7.23	7.43	8.08	19.9	0	45	2.14	1	2.51	-37.42
117	M	19	2	4	STIM	36	to NUP	8.3	7.23	7.13	8.42	21.5	0	45	3.35	1	4.15	27.50
117	M	19	2	4	STIM	37	to RED	4.1	14.63	4.13	14.53	25.5	0	45	2.25	1	4.48	-54.21
117	M	19	2	4	STIM	38	to NUP	4.1	14.63	3.58	16.76	30.5	0	45	5.42	1	3.20	61.38
117	M	23	2	5	POST	39	to RED	1	60.00	1.33	45.11	51	0	45	5	9	4.38	-91.96
117	M	23	2	5	POST	40	to NUP	1	60.00	1.47	40.82	54.1	0	45	7.58	11	4.92	25.08
117	M	23	2	5	POST	41	to RED	1	60.00	1.28	46.88	64.1	0	45	8.29	8	4.45	-91.70
117	M	23	2	5	POST	42	to NUP	1	60.00	1.08	55.56	73.1	0	45	8.95	10	4.91	36.92
117	M	23	2	5	POST	43	to RED	1	60.00	1.28	46.88	58.1	0	45	7.92	6	3.79	-92.75
117	M	23	2	5	POST	44	to NUP	1	60.00	0.95	63.16	87.1	0	45	12.05	12	4.06	20.27
117	M	0	2	6	post		to RED	1	60.00				0	45		0		
117	M	0	2	6	post		to NUP	1	60.00				0	45		1		
117	M	0	2	6	post		to RED	1	60.00				0	45		0		
117	M	0	2	6	post		to NUP	1	60.00				0	45		0		
117	M	0	2	6	post		to RED	1	60.00				0	45		0		
117	M	0	2	6	post		to NUP	1	60.00				0	45		0		
118	M	0	1	2	pre		to RED	1	60.00				0	45		0		
118	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
118	M	0	1	2	pre		to RED	1	60.00				0	45		0		
118	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
118	M	0	1	2	pre		to RED	1	60.00				0	45		0		
118	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
118	M	23	1	3	PRE	1	to RED	1	60.00	1.38	43.48	55.2	0	45	7.75	10	3.81	-65.80
118	M	23	1	3	PRE	2	to NUP	1	60.00	1.05	57.14	74.5	0	40	13.63	10	4.91	66.74
118	M	23	1	3	PRE	3	to RED	1	60.00	1.1	54.55	74.7	0	42	9.75	10	3.56	-112.47
118	M	23	1	3	PRE	4	to NUP	1	60.00	1.02	58.82	77.5	1	42	11.95	12	3.46	54.79
118	M	23	1	3	PRE	5	to RED	1	60.00	1.1	54.55	64.9	1	42	9.88	10	3.30	-76.79
118	M	23	1	3	PRE	6	to NUP	1	60.00	1.18	50.85	70	0	44	13.1	12	3.69	49.96
118	M	19	1	4	STIM	7	to RED	4.1	14.63	1.9	31.58	57.4	0	43	6.57	7	4.37	-39.69
118	M	19	1	4	STIM	8	to NUP	4.1	14.63	3.2	18.75	31.4	0	42	6.63	6	4.59	43.74
118	M	19	1	4	STIM	9	to RED	8.3	7.23	6.38	9.40	19.9	0	44	4.44	6	3.21	-58.61
118	M	19	1	4	STIM	10	to NUP	8.3	7.23	8.23	7.29	26.9	0	45	3.69	6	4.71	44.00
118	M	19	1	4	STIM	11	to RED	0.8	75.00	0.83	72.29	89.9	0	43	7.84	7	4.23	-57.09
118	M	19	1	4	STIM	12	to NUP	0.8	75.00	0.85	70.59	81.3	0	44	10.77	8	4.36	43.48
118	M	19	1	4	STIM	13	to RED	16.8	3.57	10.57	5.68	20.8	0	43	7.56	6	3.46	-26.67

118	M	19	1	4	STIM	14	to NUP	16.8	3.57	17.98	3.34	26.4	0	43	1.57	5	4.85	25.17
118	M	19	1	4	STIM	15	to RED	6.6	9.09	5.77	10.40	21.6	0	42	3.66	7	3.21	-60.93
118	M	19	1	4	STIM	16	to NUP	6.6	9.09	6.58	9.12	29.7	0	43	4.2	5	4.05	49.86
118	M	19	1	4	STIM	17	to RED	3.2	18.75	2.4	25.00	39.8	0	42	5.82	4	3.36	-73.85
118	M	19	1	4	STIM	18	to NUP	3.2	18.75	3.22	18.63	29.7	0	44	6.2	5	4.04	38.84
118	M	19	1	4	STIM	19	to RED	1.6	37.50	1.45	41.38	58.5	0	42	5.72	4	4.63	-59.25
118	M	19	1	4	STIM	20	to NUP	1.6	37.50	1.6	37.50	58.3	0	43	8.3	5	4.36	51.00
118	M	19	1	4	STIM	21	to RED	10.5	5.71	9.48	6.33	24.1	0	43	2.12	3	3.81	-21.85
118	M	19	1	4	STIM	22	to NUP	10.5	5.71	11.35	5.29	18.2	0	42	1.83	3	4.84	55.31
118	M	19	1	4	STIM	23	to RED	10.5	5.71	9.85	6.09	15.9	0	43	1.55	2	4.83	-27.10
118	M	19	1	4	STIM	24	to NUP	10.5	5.71	11	5.45	17.8	0	44	2.18	2	3.68	49.12
118	M	19	1	4	STIM	25	to RED	1.6	37.50	1.72	34.88	52	0	43	5.6	4	3.31	-54.96
118	M	19	1	4	STIM	26	to NUP	1.6	37.50	1.4	42.86	55.2	0	43	6.75	5	3.89	46.85
118	M	19	1	4	STIM	27	to RED	3.2	18.75	3.37	17.80	30.4	0	44	5.35	4	3.07	-36.07
118	M	19	1	4	STIM	28	to NUP	3.2	18.75	2.65	22.64	33.3	0	43	9.2	4	3.02	41.53
118	M	19	1	4	STIM	29	to RED	6.6	9.09	5.9	10.17	24.4	0	43	3.88	4	3.40	-30.21
118	M	19	1	4	STIM	30	to NUP	6.6	9.09	6.07	9.88	22.3	0	43	6.01	4	3.98	25.11
118	M	19	1	4	STIM	31	to RED	16.8	3.57	15.98	3.75	19.2	0	44	1.8	1	4.44	-9.90
118	M	19	1	4	STIM	32	to NUP	16.8	3.57	13.15	4.56	15	0	43	4.17	0	3.46	24.38
118	M	19	1	4	STIM	33	to RED	0.8	75.00	1.2	50.00	86.1	0	43	3.53	3	3.70	-61.51
118	M	19	1	4	STIM	34	to NUP	0.8	75.00	1.2	50.00	63	0	45	5.78	3	4.03	51.71
118	M	19	1	4	STIM	35	to RED	8.3	7.23	8.38	7.16	19.2	0	45	0.92	2	3.82	-29.72
118	M	19	1	4	STIM	36	to NUP	8.3	7.23	11.02	5.44	16.9	0	44	1.75	1	4.25	50.32
118	M	19	1	4	STIM	37	to RED	4.1	14.63	3.63	16.53	28.8	0	43	3.25	2	3.91	-22.02
118	M	19	1	4	STIM	38	to NUP	4.1	14.63	4.05	14.81	25.8	0	44	4.9	3	3.26	34.17
118	M	23	1	5	POST	39	to RED	1	60.00	0.95	63.16	76.3	0	42	4.6	4	3.06	-45.02
118	M	23	1	5	POST	40	to NUP	1	60.00	1.37	43.80	66	0	43	6.95	5	4.80	48.59
118	M	23	1	5	POST	41	to RED	1	60.00	1.33	45.11	72.6	0	43	4.44	4	3.95	-69.63
118	M	23	1	5	POST	42	to NUP	1	60.00	1.27	47.24	66.7	1	42	6.56	4	3.03	82.92
118	M	23	1	5	POST	43	to RED	1	60.00	1.03	58.25	79.1	0	42	5.67	3	3.72	-67.27
118	M	23	1	5	POST	44	to NUP	1	60.00	1.28	46.88	69.3	2	42	8.32	3	3.98	30.92
118	M	0	1	6	post		to RED	1	60.00				0	44		0		
118	M	0	1	6	post		to NUP	1	60.00				0	47		1		
118	M	0	1	6	post		to RED	1	60.00				0	45		0		
118	M	0	1	6	post		to NUP	1	60.00				0	45		0		
118	M	0	1	6	post		to RED	1	60.00				0	45		0		
118	M	0	1	6	post		to NUP	1	60.00				0	45		0		
118	M	0	2	2	pre		to RED	1	60.00				0	45		0		
118	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
118	M	0	2	2	pre		to RED	1	60.00				0	45		0		
118	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
118	M	0	2	2	pre		to RED	1	60.00				0	45		0		
118	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
118	M	23	2	3	PRE	1	to RED	1	60.00	1.08	55.56	87.3	0	44	4.09	7	2.76	-56.05
118	M	23	2	3	PRE	2	to NUP	1	60.00	0.88	68.18	80.1	0	44	10.64	9	3.21	66.29
118	M	23	2	3	PRE	3	to RED	1	60.00	1.17	51.28	78.5	1	43	5.6	8	3.54	-34.43
118	M	23	2	3	PRE	4	to NUP	1	60.00	0.78	76.92	85.5	0	44	9.84	9	3.73	19.57
118	M	23	2	3	PRE	5	to RED	1	60.00	1.28	46.88	73.3	1	42	7.49	8	3.59	-39.07

118	M	23	2	3	PRE	6	to NUP	1	60.00	0.97	61.86	73.1	0	42	10.58	9	3.33	29.73
118	M	19	2	4	STIM	7	to RED	4.1	14.63	3.95	15.19	28.1	0	44	3.87	3	3.04	-42.61
118	M	19	2	4	STIM	8	to NUP	4.1	14.63	3.38	17.75	31.2	0	43	5.57	3	3.41	32.28
118	M	19	2	4	STIM	9	to RED	8.3	7.23	7.42	8.09	22.3	0	44	2.26	2	3.26	-21.97
118	M	19	2	4	STIM	10	to NUP	8.3	7.23	8.22	7.30	25.8	0	44	1.93	1	3.78	58.98
118	M	19	2	4	STIM	11	to RED	0.8	75.00	1.18	50.85	63.5	0	43	4.84	3	3.37	-46.39
118	M	19	2	4	STIM	12	to NUP	0.8	75.00	1.25	48.00	64.9	0	44	4.9	4	4.22	25.64
118	M	19	2	4	STIM	13	to RED	16.8	3.57	18.4	3.26	12.1	0	44	1.23	0	3.59	-10.95
118	M	19	2	4	STIM	14	to NUP	16.8	3.57	18.37	3.27	25.1	0	44	0.66	0	2.87	28.16
118	M	19	2	4	STIM	15	to RED	6.6	9.09	6.83	8.78	20.9	0	43	2.1	1	3.52	-18.23
118	M	19	2	4	STIM	16	to NUP	6.6	9.09	6.42	9.35	24.4	0	44	2.26	1	3.78	38.32
118	M	19	2	4	STIM	17	to RED	3.2	18.75	3.12	19.23	32.3	0	44	3.9	2	4.04	-58.33
118	M	19	2	4	STIM	18	to NUP	3.2	18.75	2.8	21.43	30.4	0	43	4.43	3	1.58	38.61
118	M	19	2	4	STIM	19	to RED	1.6	37.50	2	30.00	49.7	0	43	4.38	4	3.40	-49.33
118	M	19	2	4	STIM	20	to NUP	1.6	37.50	1.85	32.43	46.3	0	44	5.32	4	2.88	30.72
118	M	19	2	4	STIM	21	to RED	10.5	5.71	10.85	5.53	17.3	0	44	2.08	1	4.94	-29.86
118	M	19	2	4	STIM	22	to NUP	10.5	5.71	10.47	5.73	20.9	0	44	2.06	0	3.07	52.42
118	M	19	2	4	STIM	23	to RED	10.5	5.71	11.13	5.39	20.2	0	44	1.35	0	3.06	-12.59
118	M	19	2	4	STIM	24	to NUP	10.5	5.71	10.57	5.68	17.8	0	43	1.51	0	2.58	41.55
118	M	19	2	4	STIM	25	to RED	1.6	37.50	1.8	33.33	48.5	0	44	2.15	2	2.32	-71.01
118	M	19	2	4	STIM	26	to NUP	1.6	37.50	1.97	30.46	43.8	0	44	3.43	2	2.37	32.24
118	M	19	2	4	STIM	27	to RED	3.2	18.75	3.48	17.24	29.5	0	43	1.97	2	3.49	-36.46
118	M	19	2	4	STIM	28	to NUP	3.2	18.75	3	20.00	29.8	0	44	3.52	2	3.36	23.82
118	M	19	2	4	STIM	29	to RED	6.6	9.09	6.32	9.49	21.6	0	44	1.31	0	2.63	-30.01
118	M	19	2	4	STIM	30	to NUP	6.6	9.09	5.07	11.83	27.4	0	44	1.91	1	1.69	14.68
118	M	19	2	4	STIM	31	to RED	16.8	3.57	15.45	3.88	17.8	0	43	1.7	0	2.25	-13.51
118	M	19	2	4	STIM	32	to NUP	16.8	3.57	15.25	3.93	18	0	44	1.78	0	4.05	30.59
118	M	19	2	4	STIM	33	to RED	0.8	75.00	1.6	37.50	62.8	0	44	1.2	2	2.63	-46.35
118	M	19	2	4	STIM	34	to NUP	0.8	75.00	1.47	40.82	66.9	0	44	3.13	1	3.77	61.38
118	M	19	2	4	STIM	35	to RED	8.3	7.23	6.13	9.79	26.9	0	44	2.4	1	3.07	-26.49
118	M	19	2	4	STIM	36	to NUP	8.3	7.23	7.7	7.79	21.1	0	44	0.93	1	2.89	39.27
118	M	19	2	4	STIM	37	to RED	4.1	14.63	2.77	21.66	37	0	44	1.96	1	1.60	-40.55
118	M	19	2	4	STIM	38	to NUP	4.1	14.63	4	15.00	26.9	0	44	2.28	1	2.96	29.41
118	M	23	2	5	POST	39	to RED	1	60.00	1.82	32.97	50.3	0	42	3	1	2.08	-49.95
118	M	23	2	5	POST	40	to NUP	1	60.00	1.47	40.82	59.2	0	42	5.65	2	3.08	25.64
118	M	23	2	5	POST	41	to RED	1	60.00	1.22	49.18	59.9	1	43	3.13	1	2.55	-53.86
118	M	23	2	5	POST	42	to NUP	1	60.00	1.43	41.96	56.9	2	43	4.09	2	3.31	40.29
118	M	23	2	5	POST	43	to RED	1	60.00	1.05	57.14	58.6	0	43	2.7	1	2.06	-74.84
118	M	23	2	5	POST	44	to NUP	1	60.00	1.4	42.86	52.9	0	43	4.18	1	2.98	29.29
118	M	0	2	6	post		to RED	1	60.00				0	46		0		
118	M	0	2	6	post		to NUP	1	60.00				0	46		1		
118	M	0	2	6	post		to RED	1	60.00				0	45		0		
118	M	0	2	6	post		to NUP	1	60.00				0	45		0		
118	M	0	2	6	post		to RED	1	60.00				0	45		0		
118	M	0	2	6	post		to NUP	1	60.00				0	45		0		
119	M	0	1	2	pre		to RED	1	60.00				0	45		0		
119	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
119	M	0	1	2	pre		to RED	1	60.00				0	45		0		

119	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
119	M	0	1	2	pre		to RED	1	60.00				0	45		0		
119	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
119	M	23	1	3	PRE	1	to RED	1	60.00	2.53	23.72	34.6	0	45	5.05	10	7.15	-74.18
119	M	23	1	3	PRE	2	to NUP	1	60.00	1.78	33.71	46.6	0	42	6.55	11	7.63	73.80
119	M	23	1	3	PRE	3	to RED	1	60.00	3.13	19.17	36.8	0	45	6.14	9	6.99	-78.96
119	M	23	1	3	PRE	4	to NUP	1	60.00	1.8	33.33	46.6	0	40	1.05	11	7.29	67.29
119	M	23	1	3	PRE	5	to RED	1	60.00	1.45	41.38	51.1	0	45	5.18	9	6.76	-52.76
119	M	23	1	3	PRE	6	to NUP	1	60.00	1.33	45.11	59.5	0	40	10.19	11	6.22	67.32
119	M	19	1	4	STIM	7	to RED	4.1	14.63	3.53	17.00	28.5	0	45	3.95	8	5.49	-37.84
119	M	19	1	4	STIM	8	to NUP	4.1	14.63	2.98	20.13	38.4	0	40	2.22	10	5.97	41.12
119	M	19	1	4	STIM	9	to RED	8.3	7.23	13	4.62	15.5	0	45	3.1	7	6.41	-23.53
119	M	19	1	4	STIM	10	to NUP	8.3	7.23	7.57	7.93	18.3	0	45	4.86	10	6.55	56.23
119	M	19	1	4	STIM	11	to RED	0.8	75.00	0.72	83.33	92	0	45	4.03	9	6.35	-70.93
119	M	19	1	4	STIM	12	to NUP	0.8	75.00	0.87	68.97	81.9	0	45	7.88	11	5.58	64.40
119	M	19	1	4	STIM	13	to RED	16.8	3.57	18.08	3.32	17.1	0	45	3.79	7	7.56	-20.18
119	M	19	1	4	STIM	14	to NUP	16.8	3.57	15.98	3.75	22	0	45	6.84	9	4.92	36.68
119	M	19	1	4	STIM	15	to RED	6.6	9.09	4.02	14.93	25.5	0	45	5.88	8	6.15	-51.72
119	M	19	1	4	STIM	16	to NUP	6.6	9.09	7.58	7.92	21.6	0	45	1.47	11	5.36	55.37
119	M	19	1	4	STIM	17	to RED	3.2	18.75	2.93	20.48	34.4	0	45	3.14	11	5.50	-54.64
119	M	19	1	4	STIM	18	to NUP	3.2	18.75	2.57	23.35	35.1	0	45	3.18	10	5.88	54.76
119	M	19	1	4	STIM	19	to RED	1.6	37.50	1.73	34.68	42.8	0	45	5.75	9	5.09	-50.20
119	M	19	1	4	STIM	20	to NUP	1.6	37.50	1.75	34.29	48.2	0	45	6.3	10	5.28	55.32
119	M	19	1	4	STIM	21	to RED	10.5	5.71	10.22	5.87	16.6	0	45	2.48	8	5.59	-25.35
119	M	19	1	4	STIM	22	to NUP	10.5	5.71	10.17	5.90	17.6	0	45	4.61	8	4.91	50.58
119	M	19	1	4	STIM	23	to RED	10.5	5.71	11.97	5.01	18	0	45	2.23	7	5.09	-25.67
119	M	19	1	4	STIM	24	to NUP	10.5	5.71	8.6	6.98	25.1	0	45	5.38	7	5.09	56.40
119	M	19	1	4	STIM	25	to RED	1.6	37.50	1.27	47.24	57.4	0	45	2.53	8	5.96	-51.96
119	M	19	1	4	STIM	26	to NUP	1.6	37.50	1.4	42.86	54.8	0	45	6.22	8	5.24	53.26
119	M	19	1	4	STIM	27	to RED	3.2	18.75	3.35	17.91	27.8	0	45	2.2	8	5.97	-47.50
119	M	19	1	4	STIM	28	to NUP	3.2	18.75	2.68	22.39	32.8	0	45	5.99	8	5.95	76.15
119	M	19	1	4	STIM	29	to RED	6.6	9.09	5.67	10.58	24.8	0	45	2.48	7	5.24	-43.61
119	M	19	1	4	STIM	30	to NUP	6.6	9.09	6.2	9.68	24.1	0	45	5.3	8	5.65	54.99
119	M	19	1	4	STIM	31	to RED	16.8	3.57	15.58	3.85	18	0	45	2.47	7	4.24	-13.76
119	M	19	1	4	STIM	32	to NUP	16.8	3.57	18.53	3.24	15.5	0	45	3.74	7	5.17	27.97
119	M	19	1	4	STIM	33	to RED	0.8	75.00	0.97	61.86	82.6	0	45	1.7	8	6.81	-47.33
119	M	19	1	4	STIM	34	to NUP	0.8	75.00	0.93	64.52	77	0	45	6.92	8	5.91	78.12
119	M	19	1	4	STIM	35	to RED	8.3	7.23	7.53	7.97	19.9	0	45	2.12	8	4.79	-35.06
119	M	19	1	4	STIM	36	to NUP	8.3	7.23	7.38	8.13	16.4	0	45	5.9	8	4.86	43.60
119	M	19	1	4	STIM	37	to RED	4.1	14.63	4.15	14.46	32.5	1	45	2.42	9	5.73	-40.98
119	M	19	1	4	STIM	38	to NUP	4.1	14.63	4.1	14.63	26.2	1	45	5.97	9	4.92	45.03
119	M	23	1	5	POST	39	to RED	1	60.00	1.47	40.82	60	0	45	3.4	10	5.74	-57.63
119	M	23	1	5	POST	40	to NUP	1	60.00	1.33	45.11	67.2	0	43	1.05	10	5.15	73.45
119	M	23	1	5	POST	41	to RED	1	60.00	0.92	65.22	91.8	0	45	2.63	10	4.49	-81.46
119	M	23	1	5	POST	42	to NUP	1	60.00	1.42	42.25	56	0	45	6.65	10	4.22	58.46
119	M	23	1	5	POST	43	to RED	1	60.00	1.25	48.00	85.4	0	45	2.62	9	5.36	-36.21
119	M	23	1	5	POST	44	to NUP	1	60.00	1.33	45.11	64.1	1	45	7.84	10	5.19	68.38
119	M	0	1	6	post		to RED	1	60.00				0	45		1		

119	M	0	1	6	post		to NUP	1	60.00				0	45		1		
119	M	0	1	6	post		to RED	1	60.00				0	45		0		
119	M	0	1	6	post		to NUP	1	60.00				0	45		0		
119	M	0	1	6	post		to RED	1	60.00				0	45		0		
119	M	0	1	6	post		to NUP	1	60.00				0	45		0		
119	M	0	2	2	pre		to RED	1	60.00				0	45		0		
119	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
119	M	0	2	2	pre		to RED	1	60.00				0	45		0		
119	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
119	M	0	2	2	pre		to RED	1	60.00				0	45		0		
119	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
119	M	23	2	3	PRE	1	to RED	1	60.00	1.27	47.24	67.4	0	45	2.41	8	5.21	-92.76
119	M	23	2	3	PRE	2	to NUP	1	60.00	1.95	30.77	38.7	0	45	5.35	9	5.65	118.46
119	M	23	2	3	PRE	3	to RED	1	60.00	1.08	55.56	77.3	0	45	1.99	8	5.25	-74.60
119	M	23	2	3	PRE	4	to NUP	1	60.00	0.95	63.16	88.7	0	45	5.72	8	6.19	132.49
119	M	23	2	3	PRE	5	to RED	1	60.00	1.27	47.24	67.7	0	45	2.85	8	5.37	-72.27
119	M	23	2	3	PRE	6	to NUP	1	60.00	1.08	55.56	77.3	0	45	7.6	8	5.34	138.29
119	M	19	2	4	STIM	7	to RED	4.1	14.63	5.77	10.40	24.4	0	45	1.96	6	5.53	-43.07
119	M	19	2	4	STIM	8	to NUP	4.1	14.63	3.58	16.76	30.2	0	45	5.64	7	4.70	106.57
119	M	19	2	4	STIM	9	to RED	8.3	7.23	8.62	6.96	24.8	0	45	1.93	6	4.75	-26.84
119	M	19	2	4	STIM	10	to NUP	8.3	7.23	7.27	8.25	24.4	0	45	3.13	7	4.41	85.82
119	M	19	2	4	STIM	11	to RED	0.8	75.00	1	60.00	86.6	0	45	1.77	6	5.58	-66.13
119	M	19	2	4	STIM	12	to NUP	0.8	75.00	1.13	53.10	77.5	0	45	4.67	7	4.69	126.10
119	M	19	2	4	STIM	13	to RED	16.8	3.57	16.57	3.62	15.2	0	45	1.43	5	5.89	-17.04
119	M	19	2	4	STIM	14	to NUP	16.8	3.57	15.27	3.93	18.2	0	45	1.63	6	4.07	45.60
119	M	19	2	4	STIM	15	to RED	6.6	9.09	7.08	8.47	21.5	0	45	1.77	6	5.10	-37.33
119	M	19	2	4	STIM	16	to NUP	6.6	9.09	6.93	8.66	27.8	0	45	3.45	6	4.47	77.50
119	M	19	2	4	STIM	17	to RED	3.2	18.75	3.48	17.24	30	0	45	1.62	6	5.40	-55.91
119	M	19	2	4	STIM	18	to NUP	3.2	18.75	2.9	20.69	35.3	0	45	4.53	6	4.24	41.82
119	M	19	2	4	STIM	19	to RED	1.6	37.50	1.78	33.71	54.3	0	45	1.5	6	5.07	-51.81
119	M	19	2	4	STIM	20	to NUP	1.6	37.50	1.78	33.71	56.7	0	45	4.79	6	4.57	44.84
119	M	19	2	4	STIM	21	to RED	10.5	5.71	9.63	6.23	33.5	0	45	1.35	5	6.22	-28.47
119	M	19	2	4	STIM	22	to NUP	10.5	5.71	7.58	7.92	23	0	45	5.47	5	4.48	37.99
119	M	19	2	4	STIM	23	to RED	10.5	5.71	11.83	5.07	15.9	0	45	1.55	5	4.82	-26.70
119	M	19	2	4	STIM	24	to NUP	10.5	5.71	9.35	6.42	25.5	0	45	1.92	5	4.29	85.18
119	M	19	2	4	STIM	25	to RED	1.6	37.50	1.88	31.91	46.1	0	45	1.69	6	6.13	-51.05
119	M	19	2	4	STIM	26	to NUP	1.6	37.50	1.5	40.00	54.5	0	45	5.68	6	3.52	48.92
119	M	19	2	4	STIM	27	to RED	3.2	18.75	2.78	21.58	33	0	45	1.59	5	4.36	-44.57
119	M	19	2	4	STIM	28	to NUP	3.2	18.75	3.4	17.65	31.6	0	45	4.62	6	5.56	29.00
119	M	19	2	4	STIM	29	to RED	6.6	9.09	6.13	9.79	25.1	0	45	1.27	6	5.04	-34.07
119	M	19	2	4	STIM	30	to NUP	6.6	9.09	5.92	10.14	22.3	0	45	4.26	6	4.60	33.76
119	M	19	2	4	STIM	31	to RED	16.8	3.57	16.28	3.69	14.8	0	45	1.32	4	3.66	-24.10
119	M	19	2	4	STIM	32	to NUP	16.8	3.57	17.43	3.44	19.7	0	45	1.97	5	2.75	37.88
119	M	19	2	4	STIM	33	to RED	0.8	75.00	1.47	40.82	62	0	45	1.46	6	5.40	-56.99
119	M	19	2	4	STIM	34	to NUP	0.8	75.00	1.07	56.07	70.7	0	45	4.51	6	4.20	65.98
119	M	19	2	4	STIM	35	to RED	8.3	7.23	8.77	6.84	20.6	0	45	1.86	5	3.73	-30.15
119	M	19	2	4	STIM	36	to NUP	8.3	7.23	9.4	6.38	20.9	0	45	3.68	5	3.44	25.85
119	M	19	2	4	STIM	37	to RED	4.1	14.63	4.1	14.63	32.5	0	45	1.93	6	4.81	-29.38

119	M	19	2	4	STIM	38	to NUP	4.1	14.63	5.1	11.76	24.8	0	45	3.77	6	6.55	19.28
119	M	23	2	5	POST	39	to RED	1	60.00	1.82	32.97	60.7	0	45	2.03	7	5.26	-63.35
119	M	23	2	5	POST	40	to NUP	1	60.00	1.38	43.48	57.6	0	45	3.34	7	4.36	66.11
119	M	23	2	5	POST	41	to RED	1	60.00	0.93	64.52	83.3	0	45	2.07	6	4.93	-65.07
119	M	23	2	5	POST	42	to NUP	1	60.00	1.57	38.22	47.5	0	45	4.65	7	3.21	58.66
119	M	23	2	5	POST	43	to RED	1	60.00	1.35	44.44	76.6	0	45	2.08	6	4.78	-63.28
119	M	23	2	5	POST	44	to NUP	1	60.00	1.25	48.00	75.8	0	45	4.92	6	5.12	52.92
119	M	0	2	6	post		to RED	1	60.00				0	45		1		
119	M	0	2	6	post		to NUP	1	60.00				0	45		1		
119	M	0	2	6	post		to RED	1	60.00				0	45		0		
119	M	0	2	6	post		to NUP	1	60.00				0	45		0		
119	M	0	2	6	post		to RED	1	60.00				0	45		0		
119	M	0	2	6	post		to NUP	1	60.00				0	45		0		
120	M	0	1	2	pre		to RED	1	60.00				0	45		0		
120	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
120	M	0	1	2	pre		to RED	1	60.00				0	45		0		
120	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
120	M	0	1	2	pre		to RED	1	60.00				0	45		0		
120	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
120	M	23	1	3	PRE	1	to RED	1	60.00	0.9	66.67	81.2	0	45	4.27	10	6.37	-49.52
120	M	23	1	3	PRE	2	to NUP	1	60.00	0.97	61.86	85.4	0	40	10.01	15	9.39	22.97
120	M	23	1	3	PRE	3	to RED	1	60.00	0.82	73.17	92.3	0	45	7.58	11	6.93	-32.17
120	M	23	1	3	PRE	4	to NUP	1	60.00	0.87	68.97	85.5	0	40	0.43	15	3.40	28.27
120	M	23	1	3	PRE	5	to RED	1	60.00	0.73	82.19	103.9	0	40	7.4	9	6.57	-25.04
120	M	23	1	3	PRE	6	to NUP	1	60.00	0.95	63.16	85.9	0	35	11.65	13	5.22	21.84
120	M	19	1	4	STIM	7	to RED	4.1	14.63	3.3	18.18	30.7	0	45		6	8.28	-32.96
120	M	19	1	4	STIM	8	to NUP	4.1	14.63	3.38	17.75	29	0	43		8	3.81	27.14
120	M	19	1	4	STIM	9	to RED	8.3	7.23	7.47	8.03	19.9	0	45		5	9.03	-21.00
120	M	19	1	4	STIM	10	to NUP	8.3	7.23	7.67	7.82	17.5	0	40		7	4.11	20.03
120	M	19	1	4	STIM	11	to RED	0.8	75.00	0.53	113.21	123.6	0	40		5	4.78	-20.04
120	M	19	1	4	STIM	12	to NUP	0.8	75.00	0.62	96.77	123.2	0	35		7	2.41	27.64
120	M	19	1	4	STIM	13	to RED	16.8	3.57	13.12	4.57	19.7	0	45		3	2.51	-13.59
120	M	19	1	4	STIM	14	to NUP	16.8	3.57	16.6	3.61	18.7	0	40		3	2.25	10.13
120	M	19	1	4	STIM	15	to RED	6.6	9.09	5.57	10.77	23.6	0	40		3	4.50	-35.02
120	M	19	1	4	STIM	16	to NUP	6.6	9.09	6.47	9.27	18.5	0	40		4	4.51	33.85
120	M	19	1	4	STIM	17	to RED	3.2	18.75	1.78	33.71	48.9	0	43		4	5.64	-35.83
120	M	19	1	4	STIM	18	to NUP	3.2	18.75	3.1	19.35	29.7	0	40		4	7.62	26.56
120	M	19	1	4	STIM	19	to RED	1.6	37.50	1.37	43.80	71.2	0	43		3	5.83	-22.20
120	M	19	1	4	STIM	20	to NUP	1.6	37.50	1.17	51.28	60.2	0	40		5	5.17	24.70
120	M	19	1	4	STIM	21	to RED	10.5	5.71	9.87	6.08	15.7	0	40		1	3.83	-24.75
120	M	19	1	4	STIM	22	to NUP	10.5	5.71	10.5	5.71	19	0	45		4	4.38	30.65
120	M	19	1	4	STIM	23	to RED	10.5	5.71	10.53	5.70	23.4	0	43		2	0.00	-25.51
120	M	19	1	4	STIM	24	to NUP	10.5	5.71	9.18	6.54	15.5	0	40		4	4.68	22.10
120	M	19	1	4	STIM	25	to RED	1.6	37.50	0.78	76.92	94.6	0	40		5	3.95	-13.09
120	M	19	1	4	STIM	26	to NUP	1.6	37.50	1.43	41.96	51.8	0	40		6	3.58	33.83
120	M	19	1	4	STIM	27	to RED	3.2	18.75	3.1	19.35	82.2	0	43		3	4.89	-22.43

120	M	19	1	4	STIM	28	to NUP	3.2	18.75	2.73	21.98	33.9	0	40		5	0.00	27.60
120	M	19	1	4	STIM	29	to RED	6.6	9.09	5.7	10.53	26.5	0	45		2	2.21	-42.74
120	M	19	1	4	STIM	30	to NUP	6.6	9.09	5.42	11.07	20.6	0	40		4	0.00	15.98
120	M	19	1	4	STIM	31	to RED	16.8	3.57	16.08	3.73	16.8	0	45		1	0.00	-17.70
120	M	19	1	4	STIM	32	to NUP	16.8	3.57	14.58	4.12	17.5	0	40		3	5.00	16.99
120	M	19	1	4	STIM	33	to RED	0.8	75.00	0.9	66.67	83.8	0	45		3	0.00	-21.03
120	M	19	1	4	STIM	34	to NUP	0.8	75.00	0.9	66.67	79.6	0	45		4	0.00	35.94
120	M	19	1	4	STIM	35	to RED	8.3	7.23	7.3	8.22	16.9	0	45		2	0.00	-27.43
120	M	19	1	4	STIM	36	to NUP	8.3	7.23	7.33	8.19	20.1	0	40		4	5.78	19.81
120	M	19	1	4	STIM	37	to RED	4.1	14.63	2.92	20.55	30.7	0	45		3	3.01	-26.75
120	M	19	1	4	STIM	38	to NUP	4.1	14.63	3.78	15.87	32.5	0	40		5	6.39	29.14
120	M	23	1	5	POST	39	to RED	1	60.00	0.87	68.97	92.9	0	45	6.13	4	5.94	-38.08
120	M	23	1	5	POST	40	to NUP	1	60.00	0.78	76.92	87.6	0	40	10.27	5	0.00	30.92
120	M	23	1	5	POST	41	to RED	1	60.00	1.03	58.25	69.3	0	45	7.92	4	2.57	-29.78
120	M	23	1	5	POST	42	to NUP	1	60.00	0.67	89.55	98.6	0	35	9.9	6	7.69	48.56
120	M	23	1	5	POST	43	to RED	1	60.00	1	60.00	96.9	0	40	6.83	4	4.82	-25.96
120	M	23	1	5	POST	44	to NUP	1	60.00	0.93	64.52	78.4	0	40	9.59	6	0.00	46.64
120	M	0	1	6	post		to RED	1	60.00				0	45		0		
120	M	0	1	6	post		to NUP	1	60.00				0	45		0		
120	M	0	1	6	post		to RED	1	60.00				0	45		0		
120	M	0	1	6	post		to NUP	1	60.00				0	45		0		
120	M	0	1	6	post		to RED	1	60.00				0	45		0		
120	M	0	1	6	post		to NUP	1	60.00				0	45		0		
120	M	0	2	2	pre		to RED	1	60.00				0	45		0		
120	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
120	M	0	2	2	pre		to RED	1	60.00				0	45		0		
120	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
120	M	0	2	2	pre		to RED	1	60.00				0	45		0		
120	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
120	M	23	2	3	PRE	1	to RED	1	60.00	1.07	56.07	73	0	45	4.15	7	6.49	-32.18
120	M	23	2	3	PRE	2	to NUP	1	60.00	0.73	82.19	104.4	0	45	11.05	9	3.84	37.89
120	M	23	2	3	PRE	3	to RED	1	60.00	0.6	100.00	106.8	0	45	5.63	6	6.64	-9.10
120	M	23	2	3	PRE	4	to NUP	1	60.00	0.72	83.33	99.1	0	40	8.18	8	0.00	12.14
120	M	23	2	3	PRE	5	to RED	1	60.00	0.83	72.29	93.2	0	45	7.7	5	2.62	-30.10
120	M	23	2	3	PRE	6	to NUP	1	60.00	0.73	82.19	96.2	0	45	7.72	6	0.00	12.66
120	M	19	2	4	STIM	7	to RED	4.1	14.63	4.6	13.04	25.1	0	45	3.57	4	2.69	-21.94
120	M	19	2	4	STIM	8	to NUP	4.1	14.63	3.92	15.31	24.6	0	45	5.76	5	4.25	11.23
120	M	19	2	4	STIM	9	to RED	8.3	7.23	8.85	6.78	19.2	0	45	2.35	2	4.75	-20.08
120	M	19	2	4	STIM	10	to NUP	8.3	7.23	6.98	8.60	18.7	0	40	5.4	3	6.41	12.18
120	M	19	2	4	STIM	11	to RED	0.8	75.00	0.98	61.22	75.1	0	45	5.2	4	6.42	-35.25
120	M	19	2	4	STIM	12	to NUP	0.8	75.00	0.75	80.00	90.1	0	45	6.82	5	4.41	14.51
120	M	19	2	4	STIM	13	to RED	16.8	3.57	16.9	3.55	18	0	45	2.82	1	0.00	-12.38
120	M	19	2	4	STIM	14	to NUP	16.8	3.57	16.25	3.69	20.9	0	40	2.98	2	0.00	7.78
120	M	19	2	4	STIM	15	to RED	6.6	9.09	6.12	9.80	23.2	0	45	3.75	3	0.00	-16.22
120	M	19	2	4	STIM	16	to NUP	6.6	9.09	4.97	12.07	24.3	0	45	4.61	4	0.00	20.78
120	M	19	2	4	STIM	17	to RED	3.2	18.75	2.98	20.13	34.6	0	45	4.29	3	5.21	-23.68
120	M	19	2	4	STIM	18	to NUP	3.2	18.75	2.85	21.05	33.2	0	45	5.38	3	0.00	18.78

120	M	19	2	4	STIM	19	to RED	1.6	37.50	1.6	37.50	43.5	0	45	4.05	3	0.00	-17.90
120	M	19	2	4	STIM	20	to NUP	1.6	37.50	1.5	40.00	56.7	0	45	7.03	4	0.00	19.86
120	M	19	2	4	STIM	21	to RED	10.5	5.71	9.97	6.02	19.4	0	45	2.81	2	3.17	-19.70
120	M	19	2	4	STIM	22	to NUP	10.5	5.71	10.27	5.84	18.9	0	45	5.71	3	4.28	18.02
120	M	19	2	4	STIM	23	to RED	10.5	5.71	10.87	5.52	19.7	0	45	3.23	2	0.00	-18.09
120	M	19	2	4	STIM	24	to NUP	10.5	5.71	11.2	5.36	17.1	0	45	2.9	2	0.00	18.27
120	M	19	2	4	STIM	25	to RED	1.6	37.50	1.42	42.25	54.1	0	45	4.73	3	0.00	-18.64
120	M	19	2	4	STIM	26	to NUP	1.6	37.50	1.55	38.71	50.3	0	45	7.58	4	3.86	18.73
120	M	19	2	4	STIM	27	to RED	3.2	18.75	2.62	22.90	33.9	0	45	5	3	0.00	-14.77
120	M	19	2	4	STIM	28	to NUP	3.2	18.75	3	20.00	30.7	0	40	5.47	3	0.00	11.51
120	M	19	2	4	STIM	29	to RED	6.6	9.09	6.3	9.52	20.6	0	45	3.22	3	0.00	-10.46
120	M	19	2	4	STIM	30	to NUP	6.6	9.09	5.88	10.20	20.4	0	45	5.72	4	0.00	17.29
120	M	19	2	4	STIM	31	to RED	16.8	3.57	15.87	3.78	15.5	0	45	4.13	2	7.47	-17.93
120	M	19	2	4	STIM	32	to NUP	16.8	3.57	17.13	3.50	29.1	0	40	3.7	2	2.78	27.12
120	M	19	2	4	STIM	33	to RED	0.8	75.00	0.75	80.00	89.9	0	45	5.43	4	0.00	-20.64
120	M	19	2	4	STIM	34	to NUP	0.8	75.00	1.08	55.56	73	0	45	7.8	5	0.00	22.45
120	M	19	2	4	STIM	35	to RED	8.3	7.23	7.92	7.58	20.1	0	45	2.5	2	0.00	-12.95
120	M	19	2	4	STIM	36	to NUP	8.3	7.23	7.87	7.62	18.5	0	45	5.5	3	0.00	25.60
120	M	19	2	4	STIM	37	to RED	4.1	14.63	3.88	15.46	29.7	0	45	3.8	3	0.00	-13.51
120	M	19	2	4	STIM	38	to NUP	4.1	14.63	3.42	17.54	28.3	0	45	6.38	4	0.00	22.37
120	M	23	2	5	POST	39	to RED	1	60.00	0.93	64.52	70	0	45	6.74	4	0.00	-20.72
120	M	23	2	5	POST	40	to NUP	1	60.00	1.02	58.82	73.3	0	45	8.51	5	4.91	25.71
120	M	23	2	5	POST	41	to RED	1	60.00	0.97	61.86	80.5	0	45	6.51	5	0.00	-23.11
120	M	23	2	5	POST	42	to NUP	1	60.00	0.97	61.86	82.2	0	40	7.58	6	0.00	21.12
120	M	23	2	5	POST	43	to RED	1	60.00	0.85	70.59	86.7	0	45	6.52	5	0.00	-17.22
120	M	23	2	5	POST	44	to NUP	1	60.00	0.9	66.67	80	0	40	6.13	5	0.00	18.59
120	M	0	2	6	post		to RED	1	60.00				0	45		0		
120	M	0	2	6	post		to NUP	1	60.00				0	45		0		
120	M	0	2	6	post		to RED	1	60.00				0	45		0		
120	M	0	2	6	post		to NUP	1	60.00				0	45		0		
120	M	0	2	6	post		to RED	1	60.00				0	45		0		
120	M	0	2	6	post		to NUP	1	60.00				0	45		0		
121	M	0	1	2	pre		to RED	1	60.00				0	45		0		
121	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
121	M	0	1	2	pre		to RED	1	60.00				0	45		0		
121	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
121	M	0	1	2	pre		to RED	1	60.00				0	45		0		
121	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
121	M	23	1	3	PRE	1	to RED	1	60.00	1.18	50.85	57.8	2	45	15.85	10	4.26	-208.74
121	M	23	1	3	PRE	2	to NUP	1	60.00	1.15	52.17	67.5	2	45	18.6	15	6.89	21.87
121	M	23	1	3	PRE	3	to RED	1	60.00	0.93	64.52	90.9	2	45	17.8	13	4.07	-20.94
121	M	23	1	3	PRE	4	to NUP	1	60.00	0.98	61.22	81.7	2	45	20.45	15	7.93	28.62
121	M	23	1	3	PRE	5	to RED	1	60.00	1.23	48.78	72.4	2	45	14.8	13	7.89	-20.45
121	M	23	1	3	PRE	6	to NUP	1	60.00	1.28	46.88	55.7	1	45	19.62	18	6.34	30.17
121	M	19	1	4	STIM	7	to RED	4.1	14.63	3.63	16.53	25.8	1	45	10.52	13	5.08	-32.72
121	M	19	1	4	STIM	8	to NUP	4.1	14.63	3.58	16.76	29.3	1	45	14	15	5.75	25.62
121	M	19	1	4	STIM	9	to RED	8.3	7.23	5.85	10.26	19.4	0	45	7.87	10	6.24	-33.38

121	M	19	1	4	STIM	10	to NUP	8.3	7.23	6.53	9.19	23.2	0	45	10.85	12	4.57	32.10
121	M	19	1	4	STIM	11	to RED	0.8	75.00	0.92	65.22	84.5	0	45	13.06	14	3.45	-68.49
121	M	19	1	4	STIM	12	to NUP	0.8	75.00	0.65	92.31	107.7	0	45	17.65	18	4.50	24.51
121	M	19	1	4	STIM	13	to RED	16.8	3.57	11.95	5.02	22.5	0	45	6.1	7	0.00	-7.03
121	M	19	1	4	STIM	14	to NUP	16.8	3.57	12.6	4.76	25.3	0	45	8.03	9	5.22	26.80
121	M	19	1	4	STIM	15	to RED	6.6	9.09	5.22	11.49	28.3	0	45	9.55	10	0.00	-187.03
121	M	19	1	4	STIM	16	to NUP	6.6	9.09	4.57	13.13	24.3	1	45	10.86	12	4.49	25.68
121	M	19	1	4	STIM	17	to RED	3.2	18.75	3.28	18.29	31.2	1	45	10.77	12	0.00	-144.53
121	M	19	1	4	STIM	18	to NUP	3.2	18.75	2.73	21.98	38.4	1	45	15.9	14	0.00	22.90
121	M	19	1	4	STIM	19	to RED	1.6	37.50	2.05	29.27	78.9	0	45	13.63	13	0.00	-211.04
121	M	19	1	4	STIM	20	to NUP	1.6	37.50	1.3	46.15	56.6	0	45	16.17	18	0.00	39.32
121	M	19	1	4	STIM	21	to RED	10.5	5.71	9.35	6.42	18.5	0	45	10.68	9	0.00	-75.60
121	M	19	1	4	STIM	22	to NUP	10.5	5.71	8.98	6.68	19.7	0	50	13.2	11	7.19	26.43
121	M	19	1	4	STIM	23	to RED	10.5	5.71	9.4	6.38	19.2	0	45	14.42	9	0.00	-81.91
121	M	19	1	4	STIM	24	to NUP	10.5	5.71	8.98	6.68	21.6	0	45	12.05	12	0.00	12.73
121	M	19	1	4	STIM	25	to RED	1.6	37.50	1.58	37.97	81.9	0	45	16.22	15	0.00	-163.48
121	M	19	1	4	STIM	26	to NUP	1.6	37.50	1.78	33.71	54.6	2	45	13.07	18	0.00	34.35
121	M	19	1	4	STIM	27	to RED	3.2	18.75	2.6	23.08	33.9	2	45	10.9	13	0.00	-97.31
121	M	19	1	4	STIM	28	to NUP	3.2	18.75	2.72	22.06	35.3	2	45	15.63	18	0.00	24.28
121	M	19	1	4	STIM	29	to RED	6.6	9.09	6.12	9.80	22.2	3	45	14.13	13	0.00	-167.80
121	M	19	1	4	STIM	30	to NUP	6.6	9.09	5.65	10.62	30.9	3	45	9.97	15	0.00	-9.72
121	M	19	1	4	STIM	31	to RED	16.8	3.57	15.27	3.93	19.4	3	45	8.91	9	0.00	-258.51
121	M	19	1	4	STIM	32	to NUP	16.8	3.57	14.98	4.01	19	4	45	11.34	11	0.00	178.60
121	M	19	1	4	STIM	33	to RED	0.8	75.00	1.17	51.28	85.2	4	45	17.2	15	5.69	-46.74
121	M	19	1	4	STIM	34	to NUP	0.8	75.00	1.4	42.86	67.5	4	45	14.27	17	0.00	80.70
121	M	19	1	4	STIM	35	to RED	8.3	7.23	7.08	8.47	23.7	5	45	11.65	10	0.00	-19.21
121	M	19	1	4	STIM	36	to NUP	8.3	7.23	6.6	9.09	24.1	5	45	17.27	12	0.00	-4.75
121	M	19	1	4	STIM	37	to RED	4.1	14.63	3.8	15.79	25.7	5	45	12.98	12	0.00	-38.79
121	M	19	1	4	STIM	38	to NUP	4.1	14.63	3.32	18.07	34	6	45	12.36	15	0.00	142.34
121	M	23	1	5	POST	39	to RED	1	60.00	0.75	80.00	92.7	7	45	17.4	15	3.27	-23.16
121	M	23	1	5	POST	40	to NUP	1	60.00	1.05	57.14	81	7	45	13.7	17	0.00	153.69
121	M	23	1	5	POST	41	to RED	1	60.00	1.07	56.07	79.2	7	43	15.96	15	6.07	-28.29
121	M	23	1	5	POST	42	to NUP	1	60.00	0.97	61.86	78.4	7	40	14.35	18	0.00	23.86
121	M	23	1	5	POST	43	to RED	1	60.00	0.93	64.52	77.8	6	45	15.67	16	0.00	-34.11
121	M	23	1	5	POST	44	to NUP	1	60.00	1.27	47.24	62.7	6	45	16.16	17	0.00	12.32
121	M	0	1	6	post		to RED	1	60.00				5	50		0		
121	M	0	1	6	post		to NUP	1	60.00				6	50		0		
121	M	0	1	6	post		to RED	1	60.00				6	50		0		

121	M	0	1	6	post		to NUP	1	60.00				6	50		0		
121	M	0	1	6	post		to RED	1	60.00				5	50		0		
121	M	0	1	6	post		to NUP	1	60.00				5	50		0		
121	M	0	2	2	pre		to RED	1	60.00				0	45		0		
121	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
121	M	0	2	2	pre		to RED	1	60.00				0	45		0		
121	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
121	M	0	2	2	pre		to RED	1	60.00				0	45		0		
121	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
121	M	23	2	3	PRE	1	to RED	1	60.00	0.78	76.92	86.7	0	45	10.2	8	3.73	-33.58
121	M	23	2	3	PRE	2	to NUP	1	60.00	0.82	73.17	88.3	1	45	16.81	14	4.28	22.50
121	M	23	2	3	PRE	3	to RED	1	60.00	0.72	83.33	89.4	0	45	11.3	8	5.90	-45.10
121	M	23	2	3	PRE	4	to NUP	1	60.00	0.83	72.29	89	1	45	13.77	14	0.00	28.69
121	M	23	2	3	PRE	5	to RED	1	60.00	0.83	72.29	94.6	1	50	15.02	8	7.60	-29.68
121	M	23	2	3	PRE	6	to NUP	1	60.00	0.87	68.97	83.6	1	47	14.1	14	0.00	25.35
121	M	19	2	4	STIM	7	to RED	4.1	14.63	2.97	20.20	31.4	1	47	9.43	5	0.00	-24.10
121	M	19	2	4	STIM	8	to NUP	4.1	14.63	3.82	15.71	24.6	1	45	12.83	10	2.52	25.53
121	M	19	2	4	STIM	9	to RED	8.3	7.23	7.27	8.25	20.6	1	47	6.76	4	5.19	-21.58
121	M	19	2	4	STIM	10	to NUP	8.3	7.23	7.33	8.19	21.8	1	45	9.04	7	0.00	-2.47
121	M	19	2	4	STIM	11	to RED	0.8	75.00	1.13	53.10	80.1	1	45	9.09	4	3.33	-41.74
121	M	19	2	4	STIM	12	to NUP	0.8	75.00	0.93	64.52	82.4	1	45	15.19	9	0.00	50.40
121	M	19	2	4	STIM	13	to RED	16.8	3.57	15.25	3.93	18.3	0	45	7.02	3	3.04	-22.48
121	M	19	2	4	STIM	14	to NUP	16.8	3.57	16.4	3.66	21.3	1	45	11.08	7	0.00	25.68
121	M	19	2	4	STIM	15	to RED	6.6	9.09	5.75	10.43	26.9	1	45	12.08	6	4.99	-19.83
121	M	19	2	4	STIM	16	to NUP	6.6	9.09	5.9	10.17	28.3	1	45	11.32	10	0.00	33.48
121	M	19	2	4	STIM	17	to RED	3.2	18.75	2.88	20.83	39.1	0	45	12.04	6	0.00	-22.68
121	M	19	2	4	STIM	18	to NUP	3.2	18.75	2.65	22.64	35.1	1	45	13.27	11	0.00	10.75
121	M	19	2	4	STIM	19	to RED	1.6	37.50	1.33	45.11	61.4	0	45	17.24	8	0.00	-45.74
121	M	19	2	4	STIM	20	to NUP	1.6	37.50	1.58	37.97	51.7	0	45	12.32	12	0.00	30.48
121	M	19	2	4	STIM	21	to RED	10.5	5.71	9.82	6.11	18.5	0	45	10.23	3	0.00	0.58
121	M	19	2	4	STIM	22	to NUP	10.5	5.71	9.58	6.26	18.9	0	45	12.29	7	0.00	13.32
121	M	19	2	4	STIM	23	to RED	10.5	5.71	9.8	6.12	17.5	0	45	6.97	3	0.00	-21.69
121	M	19	2	4	STIM	24	to NUP	10.5	5.71	9.23	6.50	19.5	0	45	9.67	5	0.00	13.85
121	M	19	2	4	STIM	25	to RED	1.6	37.50	1.75	34.29	50.1	0	45	10.67	4	0.00	2.30
121	M	19	2	4	STIM	26	to NUP	1.6	37.50	1.73	34.68	56	1	45	16.35	9	2.74	24.38
121	M	19	2	4	STIM	27	to RED	3.2	18.75	2.65	22.64	35.6	1	45	11.25	3	0.00	-36.62
121	M	19	2	4	STIM	28	to NUP	3.2	18.75	3.17	18.93	44.2	1	45	11.61	5	0.00	75.28
121	M	19	2	4	STIM	29	to RED	6.6	9.09	5.58	10.75	23	1	40	8.05	4	0.00	-63.45
121	M	19	2	4	STIM	30	to NUP	6.6	9.09	6.23	9.63	26.7	1	43	7.7	7	0.00	24.12
121	M	19	2	4	STIM	31	to RED	16.8	3.57	14.28	4.20	17.3	1	45	4.99	1	0.00	-14.14
121	M	19	2	4	STIM	32	to NUP	16.8	3.57	15.4	3.90	20.8	1	45	9.68	4	0.00	35.03

121	M	19	2	4	STIM	33	to RED	0.8	75.00	0.75	80.00	98.1	1	45	11.63	6	0.00	1.46
121	M	19	2	4	STIM	34	to NUP	0.8	75.00	1.05	57.14	80.8	1	45	12.92	8	0.00	34.59
121	M	19	2	4	STIM	35	to RED	8.3	7.23	7.12	8.43	22.5	1	45	7.4	5	0.00	-16.90
121	M	19	2	4	STIM	36	to NUP	8.3	7.23	6.98	8.60	19.7	1	43	9.77	5	0.00	17.03
121	M	19	2	4	STIM	37	to RED	4.1	14.63	3.45	17.39	29	1	45	8.58	7	0.00	-18.94
121	M	19	2	4	STIM	38	to NUP	4.1	14.63	3.82	15.71	30	1	45	11.2	8	0.00	46.35
121	M	23	2	5	POST	39	to RED	1	60.00	1.05	57.14	70.7	1	45	12.75	10	4.48	-18.24
121	M	23	2	5	POST	40	to NUP	1	60.00	0.95	63.16	77.5	2	45	12.12	14	5.88	21.19
121	M	23	2	5	POST	41	to RED	1	60.00	0.98	61.22	86.1	2	45	12.72	11	4.21	-38.14
121	M	23	2	5	POST	42	to NUP	1	60.00	0.9	66.67	75.2	2	45	12.62	14	0.00	51.07
121	M	23	2	5	POST	43	to RED	1	60.00	1.07	56.07	77.5	2	45	10.38	11	0.00	-36.24
121	M	23	2	5	POST	44	to NUP	1	60.00	0.93	64.52	81.5	2	43	12.24	14	0.00	23.60
121	M	0	2	6	post		to RED	1	60.00				0	45		0		
121	M	0	2	6	post		to NUP	1	60.00				0	45		0		
121	M	0	2	6	post		to RED	1	60.00				0	45		0		
121	M	0	2	6	post		to NUP	1	60.00				0	45		0		
121	M	0	2	6	post		to RED	1	60.00				0	45		0		
121	M	0	2	6	post		to NUP	1	60.00				0	45		0		
122	M	0	1	2	pre		to RED	1	60.00				0	45		0		
122	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
122	M	0	1	2	pre		to RED	1	60.00				0	45		0		
122	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
122	M	0	1	2	pre		to RED	1	60.00				0	45		0		
122	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
122	M	23	1	3	PRE	1	to RED	1	60.00	1.38	43.48	63.2	0	45	3.82	10	3.97	-98.42
122	M	23	1	3	PRE	2	to NUP	1	60.00	1.25	48.00	72.8	0	40	3	15	4.72	47.75
122	M	23	1	3	PRE	3	to RED	1	60.00	0.83	72.29	80.3	0	40	3.54	15	3.96	-102.96
122	M	23	1	3	PRE	4	to NUP	1	60.00	0.78	76.92	90.6	0	40	6.92	18	3.37	66.10
122	M	23	1	3	PRE	5	to RED	1	60.00	0.75	80.00	83.8	0	40	1.85	13	4.37	-71.03
122	M	23	1	3	PRE	6	to NUP	1	60.00	0.88	68.18	83.8	0	40	5.3	17	5.10	51.07
122	M	19	1	4	STIM	7	to RED	4.1	14.63	4.3	13.95	28.8	0	40	1.05	8	4.92	-41.46
122	M	19	1	4	STIM	8	to NUP	4.1	14.63	2.83	21.20	31.2	0	40	3.6	10	4.84	41.82
122	M	19	1	4	STIM	9	to RED	8.3	7.23	8.5	7.06	20.1	1	45	1.43	8	3.84	-34.01
122	M	19	1	4	STIM	10	to NUP	8.3	7.23	5.13	11.70	27.2	1	40	3.22	10	4.25	67.23
122	M	19	1	4	STIM	11	to RED	0.8	75.00	1.08	55.56	77.5	1	40	1.92	12	4.30	-70.83
122	M	19	1	4	STIM	12	to NUP	0.8	75.00	0.92	65.22	82.6	1	40	3.15	15	4.69	62.60
122	M	19	1	4	STIM	13	to RED	16.8	3.57	17.92	3.35	19.4	0	40	1.58	2	3.09	-13.52
122	M	19	1	4	STIM	14	to NUP	16.8	3.57	14.97	4.01	16.6	0	40	0.88	1	2.96	30.98
122	M	19	1	4	STIM	15	to RED	6.6	9.09	6.88	8.72	22.9	0	40	1.27	8	3.78	-26.18
122	M	19	1	4	STIM	16	to NUP	6.6	9.09	6.05	9.92	24.4	0	40	0.75	10	4.36	60.67
122	M	19	1	4	STIM	17	to RED	3.2	18.75	3.6	16.67	28.3	0	40	2.03	10	3.86	-36.80
122	M	19	1	4	STIM	18	to NUP	3.2	18.75	3.7	16.22	30.2	0	40	3.4	13	3.81	49.54
122	M	19	1	4	STIM	19	to RED	1.6	37.50	1.75	34.29	46.8	0	40	1.52	12	4.31	-54.39
122	M	19	1	4	STIM	20	to NUP	1.6	37.50	1.42	42.25	50.4	0	40	5.98	15	4.06	52.51
122	M	19	1	4	STIM	21	to RED	10.5	5.71	9.97	6.02	19.2	1	40	1.15	7	4.02	-30.81

122	M	19	1	4	STIM	22	to NUP	10.5	5.71	6.57	9.13	48.3	0	40	3.18	9	3.60	51.72
122	M	19	1	4	STIM	23	to RED	10.5	5.71	10.6	5.66	21.1	0	40	0.83	8	3.59	-18.52
122	M	19	1	4	STIM	24	to NUP	10.5	5.71	9.92	6.05	20.9	0	40	0.88	7	3.15	42.28
122	M	19	1	4	STIM	25	to RED	1.6	37.50	1.9	31.58	38.6	0	40	1.75	11	3.93	-43.41
122	M	19	1	4	STIM	26	to NUP	1.6	37.50	2.11	28.44	39.4	0	40	3.02	13	4.35	69.43
122	M	19	1	4	STIM	27	to RED	3.2	18.75	3.58	16.76	27.2	0	40	1.29	10	3.86	-43.96
122	M	19	1	4	STIM	28	to NUP	3.2	18.75	3.33	18.02	34.2	0	40	2.97	13	4.03	51.00
122	M	19	1	4	STIM	29	to RED	6.6	9.09	6.15	9.76	21.5	0	40	0.97	9	3.94	-32.42
122	M	19	1	4	STIM	30	to NUP	6.6	9.09	5.33	11.26	26	0	40	1.29	11	4.33	49.39
122	M	19	1	4	STIM	31	to RED	16.8	3.57	18.32	3.28	18.2	0	40	1.18	5	2.87	-9.01
122	M	19	1	4	STIM	32	to NUP	16.8	3.57	15.25	3.93	16.4	0	40	0.78	7	3.09	34.12
122	M	19	1	4	STIM	33	to RED	0.8	75.00	0.97	61.86	76.3	0	40	1.36	13	2.67	-73.84
122	M	19	1	4	STIM	34	to NUP	0.8	75.00	0.72	83.33	95.1	0	35	4.33	16	4.22	59.63
122	M	19	1	4	STIM	35	to RED	8.3	7.23	6.82	8.80	22.3	0	40	1.9	7	4.12	-28.77
122	M	19	1	4	STIM	36	to NUP	8.3	7.23	6.83	8.78	21.5	0	40	2.55	8	4.60	48.16
122	M	19	1	4	STIM	37	to RED	4.1	14.63	3.65	16.44	25.8	0	40	2.03	9	4.30	-35.88
122	M	19	1	4	STIM	38	to NUP	4.1	14.63	3.15	19.05	33.9	0	40	2.88	11	3.78	56.10
122	M	23	1	5	POST	39	to RED	1	60.00	1.17	51.28	62.8	0	40	2.41	13	3.40	-54.48
122	M	23	1	5	POST	40	to NUP	1	60.00	1.17	51.28	71.2	0	35	5.3	17	3.81	54.13
122	M	23	1	5	POST	41	to RED	1	60.00	1.57	38.22	51	0	40	2.35	13	3.32	-79.75
122	M	23	1	5	POST	42	to NUP	1	60.00	1.07	56.07	69.8	0	35	4.01	17	3.44	55.92
122	M	23	1	5	POST	43	to RED	1	60.00	1.65	36.36	52.4	0	40	1.68	15	3.78	-52.61
122	M	23	1	5	POST	44	to NUP	1	60.00	0.98	61.22	75.2	0	35	4.74	18	3.67	52.13
122	M	0	1	6	post		to RED	1	60.00				0	45		0		
122	M	0	1	6	post		to NUP	1	60.00				0	45		2		
122	M	0	1	6	post		to RED	1	60.00				0	45		0		
122	M	0	1	6	post		to NUP	1	60.00				0	45		0		
122	M	0	1	6	post		to RED	1	60.00				0	45		0		
122	M	0	1	6	post		to NUP	1	60.00				0	45		0		
122	M	0	2	2	pre		to RED	1	60.00				0	45		0		
122	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
122	M	0	2	2	pre		to RED	1	60.00				0	45		0		
122	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
122	M	0	2	2	pre		to RED	1	60.00				0	45		0		
122	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
122	M	23	2	3	PRE	1	to RED	1	60.00	1.4	42.86	49.7	0	35	3.72	7	3.39	-365.86
122	M	23	2	3	PRE	2	to NUP	1	60.00	1.08	55.56	73.9	0	32	7.75	20	4.06	173.56
122	M	23	2	3	PRE	3	to RED	1	60.00	1.92	31.25	41.4	0	40	0.78	10	3.25	-338.79
122	M	23	2	3	PRE	4	to NUP	1	60.00	0.98	61.22	81	0	32	5.2	18	3.36	189.95
122	M	23	2	3	PRE	5	to RED	1	60.00	1.07	56.07	78.7	0	40	0.75	10	3.62	-289.24
122	M	23	2	3	PRE	6	to NUP	1	60.00	0.98	61.22	73.8	0	35	5.32	17	4.42	226.40
122	M	19	2	4	STIM	7	to RED	4.1	14.63	3.6	16.67	29.1	0	40	0.7	5	3.38	-182.16
122	M	19	2	4	STIM	8	to NUP	4.1	14.63	2.33	25.75	41	0	40	4.49	9	4.15	193.42
122	M	19	2	4	STIM	9	to RED	8.3	7.23	7.95	7.55	29.1	0	40	1.5	4	3.58	-152.39
122	M	19	2	4	STIM	10	to NUP	8.3	7.23	6.6	9.09	23.7	0	40	2.25	6	4.37	219.33
122	M	19	2	4	STIM	11	to RED	0.8	75.00	1.15	52.17	89.9	0	40	1.47	8	4.30	-309.93
122	M	19	2	4	STIM	12	to NUP	0.8	75.00	1.47	40.82	59.9	0	35	3.4	12	4.21	184.04
122	M	19	2	4	STIM	13	to RED	16.8	3.57	13.62	4.41	24.6	0	45	2.36	1	2.21	-76.95

122	M	19	2	4	STIM	14	to NUP	16.8	3.57	15.62	3.84	16.1	0	45	1.68	1	3.42	114.37
122	M	19	2	4	STIM	15	to RED	6.6	9.09	6.18	9.71	21.5	0	45	1.3	4	3.28	-101.84
122	M	19	2	4	STIM	16	to NUP	6.6	9.09	6.87	8.73	25.3	0	40	0.83	4	2.63	144.53
122	M	19	2	4	STIM	17	to RED	3.2	18.75	2.9	20.69	32.5	0	40	0.9	6	2.75	-202.70
122	M	19	2	4	STIM	18	to NUP	3.2	18.75	2.8	21.43	32.6	0	40	3.25	8	4.50	118.94
122	M	19	2	4	STIM	19	to RED	1.6	37.50	1.83	32.79	54.3	0	40	3.92	8	3.80	-191.90
122	M	19	2	4	STIM	20	to NUP	1.6	37.50	1.42	42.25	56	0	35	4.93	13	3.47	216.58
122	M	19	2	4	STIM	21	to RED	10.5	5.71	9.6	6.25	23	0	45	0.75	3	3.89	-69.46
122	M	19	2	4	STIM	22	to NUP	10.5	5.71	8.72	6.88	24.3	0	40	2.28	4	3.04	156.88
122	M	19	2	4	STIM	23	to RED	10.5	5.71	9.22	6.51	20.1	0	40	1.5	4	4.52	-73.55
122	M	19	2	4	STIM	24	to NUP	10.5	5.71	10.08	5.95	23.4	0	40	0.72	5	2.98	134.30
122	M	19	2	4	STIM	25	to RED	1.6	37.50	2.7	22.22	35.8	0	40	2.58	5	4.10	-202.26
122	M	19	2	4	STIM	26	to NUP	1.6	37.50	2.03	29.56	39.6	0	40	2.74	8	2.98	153.95
122	M	19	2	4	STIM	27	to RED	3.2	18.75	3.5	17.14	32.8	0	40	2.35	4	3.96	-296.67
122	M	19	2	4	STIM	28	to NUP	3.2	18.75	2.9	20.69	42.6	0	40	3	8	3.43	120.83
122	M	19	2	4	STIM	29	to RED	6.6	9.09	5.67	10.58	25.5	0	40	1.85	3	2.95	-169.84
122	M	19	2	4	STIM	30	to NUP	6.6	9.09	6.27	9.57	20.6	0	40	2.6	5	4.38	182.76
122	M	19	2	4	STIM	31	to RED	16.8	3.57	15.7	3.82	15.7	0	45	1.2	1	3.36	-41.33
122	M	19	2	4	STIM	32	to NUP	16.8	3.57	15.03	3.99	16.8	0	45	2.02	1	3.63	132.04
122	M	19	2	4	STIM	33	to RED	0.8	75.00	0.98	61.22	78.2	0	40	3.42	8	4.08	-243.24
122	M	19	2	4	STIM	34	to NUP	0.8	75.00	1.07	56.07	65.1	0	35	3.68	11	3.93	166.72
122	M	19	2	4	STIM	35	to RED	8.3	7.23	7.95	7.55	17.1	0	45	2.43	4	2.83	-129.60
122	M	19	2	4	STIM	36	to NUP	8.3	7.23	8.13	7.38	17.8	0	40	1.64	5	3.44	194.91
122	M	19	2	4	STIM	37	to RED	4.1	14.63	3.32	18.07	33.5	0	40	2.26	5	3.91	-212.87
122	M	19	2	4	STIM	38	to NUP	4.1	14.63	3.5	17.14	27.6	0	40	2.22	8	3.84	242.49
122	M	23	2	5	POST	39	to RED	1	60.00	1.35	44.44	61.8	0	40	2.3	10	3.46	-423.08
122	M	23	2	5	POST	40	to NUP	1	60.00	1.35	44.44	63.4	0	35	4.62	13	3.88	198.77
122	M	23	2	5	POST	41	to RED	1	60.00	1.38	43.48	66.2	0	40	3.95	9	3.79	-180.54
122	M	23	2	5	POST	42	to NUP	1	60.00	1.12	53.57	60.9	0	35	4.8	11	3.51	175.33
122	M	23	2	5	POST	43	to RED	1	60.00	0.9	66.67	77.7	0	40	3.78	10	3.40	-326.48
122	M	23	2	5	POST	44	to NUP	1	60.00	1.22	49.18	65.3	0	35	4.5	13	3.48	177.90
122	M	0	2	6	post		to RED	1	60.00				0	45		0		
122	M	0	2	6	post		to NUP	1	60.00				0	45		0		
122	M	0	2	6	post		to RED	1	60.00				0	45		0		
122	M	0	2	6	post		to NUP	1	60.00				0	45		0		
122	M	0	2	6	post		to RED	1	60.00				0	45		0		
122	M	0	2	6	post		to NUP	1	60.00				0	45		0		
123	M	0	1	2	pre		to RED	1	60.00				0	45		0		
123	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
123	M	0	1	2	pre		to RED	1	60.00				0	45		0		
123	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
123	M	0	1	2	pre		to RED	1	60.00				0	45		0		
123	M	0	1	2	pre		to NUP	1	60.00				0	45		0		
123	M	23	1	3	PRE	1	to RED	1	60.00				0	45		10	3.69	-70.53
123	M	23	1	3	PRE	2	to NUP	1	60.00				1	45		13	3.73	24.48
123	M	23	1	3	PRE	3	to RED	1	60.00				0	45		10	3.24	-37.99
123	M	23	1	3	PRE	4	to NUP	1	60.00				1	45		13	3.63	23.73
123	M	23	1	3	PRE	5	to RED	1	60.00				1	45		9	4.24	-40.71

123	M	23	1	3	PRE	6	to NUP	1	60.00				1	45		12	3.56	28.45
123	M	19	1	4	STIM	7	to RED	4.1	14.63				1	45		7	4.15	-42.37
123	M	19	1	4	STIM	8	to NUP	4.1	14.63				1	45		10	2.80	26.81
123	M	19	1	4	STIM	9	to RED	8.3	7.23				1	45		6	3.44	-26.97
123	M	19	1	4	STIM	10	to NUP	8.3	7.23				1	45		10	1.71	39.81
123	M	19	1	4	STIM	11	to RED	0.8	75.00				1	45		10	4.48	-40.88
123	M	19	1	4	STIM	12	to NUP	0.8	75.00				1	45		10	3.58	27.76
123	M	19	1	4	STIM	13	to RED	16.8	3.57				1	45		2	2.25	-16.68
123	M	19	1	4	STIM	14	to NUP	16.8	3.57				1	45		5	3.17	20.38
123	M	19	1	4	STIM	15	to RED	6.6	9.09				1	45		7	4.26	-33.73
123	M	19	1	4	STIM	16	to NUP	6.6	9.09				1	44		9	4.74	16.29
123	M	19	1	4	STIM	17	to RED	3.2	18.75				1	45		9	3.46	-37.18
123	M	19	1	4	STIM	18	to NUP	3.2	18.75				1	45		10	3.72	35.08
123	M	19	1	4	STIM	19	to RED	1.6	37.50				1	40		6	3.03	-59.73
123	M	19	1	4	STIM	20	to NUP	1.6	37.50				1	45		10	4.07	35.20
123	M	19	1	4	STIM	21	to RED	10.5	5.71				1	40		2	4.47	-30.11
123	M	19	1	4	STIM	22	to NUP	10.5	5.71				1	45		5	3.08	21.34
123	M	19	1	4	STIM	23	to RED	10.5	5.71				1	40		2	3.73	-23.26
123	M	19	1	4	STIM	24	to NUP	10.5	5.71				1	45		5	2.75	30.01
123	M	19	1	4	STIM	25	to RED	1.6	37.50				1	40		7	3.04	-36.50
123	M	19	1	4	STIM	26	to NUP	1.6	37.50				1	45		7	2.63	16.68
123	M	19	1	4	STIM	27	to RED	3.2	18.75				1	40		6	2.82	-39.74
123	M	19	1	4	STIM	28	to NUP	3.2	18.75				1	45		8	0.00	456.31
123	M	19	1	4	STIM	29	to RED	6.6	9.09				1	45		2	3.38	-10.67
123	M	19	1	4	STIM	30	to NUP	6.6	9.09				1	45		5	1.97	36.57
123	M	19	1	4	STIM	31	to RED	16.8	3.57				1	40		1	4.32	-8.73
123	M	19	1	4	STIM	32	to NUP	16.8	3.57				1	45		2	2.88	32.97
123	M	19	1	4	STIM	33	to RED	0.8	75.00				1	45		8	4.16	-28.14
123	M	19	1	4	STIM	34	to NUP	0.8	75.00				1	45		8	4.01	29.59
123	M	19	1	4	STIM	35	to RED	8.3	7.23				1	45		3	4.71	-29.43
123	M	19	1	4	STIM	36	to NUP	8.3	7.23				1	45		4	5.07	39.49
123	M	19	1	4	STIM	37	to RED	4.1	14.63				1	45		4	4.06	-21.34
123	M	19	1	4	STIM	38	to NUP	4.1	14.63				1	45		5	2.94	29.88
123	M	23	1	5	POST	39	to RED	1	60.00				1	50		5	0.00	-9.09
123	M	23	1	5	POST	40	to NUP	1	60.00				1	50		7	0.00	13.75
123	M	23	1	5	POST	41	to RED	1	60.00				1	45		6	3.69	-55.92
123	M	23	1	5	POST	42	to NUP	1	60.00				1	45		7	3.19	26.82
123	M	23	1	5	POST	43	to RED	1	60.00				1	45		5	3.23	-39.37
123	M	23	1	5	POST	44	to NUP	1	60.00				1	45		7	3.28	29.44
123	M	0	1	6	post		to RED	1	60.00				0	45		0		
123	M	0	1	6	post		to NUP	1	60.00				0	45		0		
123	M	0	1	6	post		to RED	1	60.00				0	45		0		
123	M	0	1	6	post		to NUP	1	60.00				0	45		0		
123	M	0	1	6	post		to RED	1	60.00				0	45		0		
123	M	0	1	6	post		to NUP	1	60.00				0	45		0		
123	M	0	2	2	pre		to RED	1	60.00				0	45		0		
123	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
123	M	0	2	2	pre		to RED	1	60.00				0	45		0		

123	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
123	M	0	2	2	pre		to RED	1	60.00				0	45		0		
123	M	0	2	2	pre		to NUP	1	60.00				0	45		0		
123	M	23	2	3	PRE	1	to RED	1	60.00	1	60.00	85	0	45	1.53	5	3.00	-38.48
123	M	23	2	3	PRE	2	to NUP	1	60.00	0.9	66.67	83.2	0	45	3.47	9	2.81	43.85
123	M	23	2	3	PRE	3	to RED	1	60.00	0.95	63.16	76.5	0	45	3.38	4	3.57	-61.02
123	M	23	2	3	PRE	4	to NUP	1	60.00	0.83	72.29	100.7	0	45	4.82	7	4.09	61.36
123	M	23	2	3	PRE	5	to RED	1	60.00	0.8	75.00	91.5	0	45	4.82	3	3.28	-46.43
123	M	23	2	3	PRE	6	to NUP	1	60.00	0.95	63.16	94.3	0	45	4.62	6	2.86	37.30
123	M	19	2	4	STIM	7	to RED	4.1	14.63	3.27	18.35	37.9	0	45	1.03	2	2.74	-48.19
123	M	19	2	4	STIM	8	to NUP	4.1	14.63	3.38	17.75	28.6	0	45	1.17	4	2.60	53.39
123	M	19	2	4	STIM	9	to RED	8.3	7.23	6.73	8.92	21.6	0	45	1.69	1	3.39	-28.25
123	M	19	2	4	STIM	10	to NUP	8.3	7.23	7.35	8.16	20.2	0	45	3.35	4	5.18	36.03
123	M	19	2	4	STIM	11	to RED	0.8	75.00	0.87	68.97	85.8	0	45	2.43	3	4.97	-37.00
123	M	19	2	4	STIM	12	to NUP	0.8	75.00	1.4	42.86	58.5	0	45	3.92	5	3.13	37.48
123	M	19	2	4	STIM	13	to RED	16.8	3.57	11.73	5.12	19.7	0	45	4.17	1	4.42	-16.46
123	M	19	2	4	STIM	14	to NUP	16.8	3.57	17.77	3.38	26.4	0	45	2.08	2	3.74	26.90
123	M	19	2	4	STIM	15	to RED	6.6	9.09	5.3	11.32	20	0	45	2.1	1	3.47	-36.15
123	M	19	2	4	STIM	16	to NUP	6.6	9.09	5.98	10.03	32.5	1	45	1.57	3	2.48	45.38
123	M	19	2	4	STIM	17	to RED	3.2	18.75	2.92	20.55	33.5	1	45	2.76	3	3.90	-37.80
123	M	19	2	4	STIM	18	to NUP	3.2	18.75	2.48	24.19	35.2	0	45	3.72	4	4.93	23.14
123	M	19	2	4	STIM	19	to RED	1.6	37.50	1.45	41.38	63.5	0	45	1.28	1	3.31	-36.21
123	M	19	2	4	STIM	20	to NUP	1.6	37.50	1.58	37.97	48.2	0	45	2	3	2.31	41.72
123	M	19	2	4	STIM	21	to RED	10.5	5.71	9.65	6.22	18.15	0	45	1.83	1	4.04	-22.13
123	M	19	2	4	STIM	22	to NUP	10.5	5.71	9.23	6.50	20.7	0	45	2.35	3	3.18	31.88
123	M	19	2	4	STIM	23	to RED	10.5	5.71	10.23	5.87	20.4	0	45	0.99	2	3.70	-26.48
123	M	19	2	4	STIM	24	to NUP	10.5	5.71	9.48	6.33	16.5	1	45	4.34	3	2.71	6.85
123	M	19	2	4	STIM	25	to RED	1.6	37.50	1.18	50.85	60.4	1	45	2.17	4	3.33	-53.08
123	M	19	2	4	STIM	26	to NUP	1.6	37.50	1.53	39.22	54.3	1	45	1.94	3	4.76	41.26
123	M	19	2	4	STIM	27	to RED	3.2	18.75	2.97	20.20	32.3	1	45	5.03	3	4.48	-44.76
123	M	19	2	4	STIM	28	to NUP	3.2	18.75	3.02	19.87	33.3	1	45	2.25	3	4.18	41.98
123	M	19	2	4	STIM	29	to RED	6.6	9.09	5.33	11.26	25.5	1	45	3.22	4	4.24	-36.96
123	M	19	2	4	STIM	30	to NUP	6.6	9.09	5.88	10.20	21.7	1	45	1.47	3	4.42	40.12
123	M	19	2	4	STIM	31	to RED	16.8	3.57	11.57	5.19	18.5	0	45	4.45	1	4.77	-25.26
123	M	19	2	4	STIM	32	to NUP	16.8	3.57	16	3.75	17.5	1	45	1.2	2	3.71	19.39
123	M	19	2	4	STIM	33	to RED	0.8	75.00	0.95	63.16	72	1	45	2.63	3	3.41	-37.57
123	M	19	2	4	STIM	34	to NUP	0.8	75.00	1.5	40.00	58.5	1	45	1.67	4	4.05	30.07
123	M	19	2	4	STIM	35	to RED	8.3	7.23	7.32	8.20	18	1	45	2.16	3	3.61	-25.21
123	M	19	2	4	STIM	36	to NUP	8.3	7.23	6.98	8.60	18.5	2	45	2.67	4	3.11	32.47
123	M	19	2	4	STIM	37	to RED	4.1	14.63	3.23	18.58	30.2	2	45	3.37	3	3.48	-32.27
123	M	19	2	4	STIM	38	to NUP	4.1	14.63	3.2	18.75	31.9	2	45	1.9	3	5.68	22.68
123	M	23	2	5	POST	39	to RED	1	60.00	1.15	52.17	62.8	2	45	1.15	6	3.70	-60.10
123	M	23	2	5	POST	40	to NUP	1	60.00	0.95	63.16	90.6	1	45	3.28	7	4.15	54.20
123	M	23	2	5	POST	41	to RED	1	60.00	1.07	56.07	73.6	1	45	2.13	5	3.30	-40.73
123	M	23	2	5	POST	42	to NUP	1	60.00	1.25	48.00	61.1	1	45	3.47	5	4.52	50.46
123	M	23	2	5	POST	43	to RED	1	60.00	1.02	58.82	73.8	1	45	6.91	4	3.25	-61.75
123	M	23	2	5	POST	44	to NUP	1	60.00	0.93	64.52	91.8	1	45	2.04	3	4.56	50.62
123	M	0	2	6	post		to RED	1	60.00				0	45		0		

123	M	0	2	6	post		to NUP	1	60.00				0	45		0		
123	M	0	2	6	post		to RED	1	60.00				0	45		0		
123	M	0	2	6	post		to NUP	1	60.00				0	45		0		
123	M	0	2	6	post		to RED	1	60.00				0	45		0		
123	M	0	2	6	post		to NUP	1	60.00				0	45		0		

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