

# THE EFFECT OF MENTAL TRAINING ON THE PERFORMANCE OF YOUNG MALE GYMNASTS

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**DECLARATION**

I, the undersigned, hereby declare that the work presented in this thesis is my own original work, which has never before been submitted at any other university for the purpose of obtaining a degree.

## **ABSTRACT**

This study examined the effect of a mental training program on the performance of eight-to-nine-year-old male gymnasts in the acquisition and execution of a newly learned gymnastic element, namely the headspring. Twenty-five gymnasts, all with one-year experience in gymnastics, were tested on the four prerequisite elements for the headspring. The selected group was randomly assigned to an experimental and a control group respectively. The experimental group received six weekly mental training interventions, consisting of an adapted progressive relaxation approach with deepening techniques and imagery. In addition to the mental training interventions the experimental group took part in the weekly physical training program. The control group only received the physical training. The gymnasts were evaluated on a daily basis to monitor their progress. The headspring was evaluated by means of a post-intervention testing. A pre- and post-intervention interview was also conducted with all the gymnasts to determine qualitatively whether the mental training influenced the gymnasts' physical symptoms, cognitions and emotions during a competition situation. Inter-judge reliability coefficients were also calculated for the pre- and posttests in order to establish to what degree the judges evaluated the elements uniformly.

The results of the daily-progression testing indicated that the control group performed significantly better than the experimental group on one occasion, namely the session before the first mental training session was introduced to the experimental group. The experimental group, however, performed significantly better than the control group on two occasions just before and just after the third mental training session. The results of the post-intervention testing indicated that the experimental group did not perform significantly better than the control group during the execution of the headspring. The experimental group did, however, show a clear non-significant tendency to perform better than the control group during the daily-progression testing and the post-intervention testing. The pre- and post-intervention interviews indicated that the control group, in comparison with the experimental group, reported the same number of positive physical symptoms, cognitions and emotions before and after the experiment. The experimental group reported fewer positive physical symptoms during a competition situation, but more thoughts about the correct execution of the headspring and more positive emotions during competitions were reported after the experiment. The inter-judge reliability coefficients indicated that the judges evaluated the elements in the pretest more uniformly.

## OPSOMMING

Met hierdie studie is gepoog om vas te stel watter effek 'n sielkundige inoefeningsprogram met die aanleer en uitvoering van 'n nuutaangeleerde gimnastiekelement, naamlik die kopwip, op agt- tot nege-jarige seunsgimnaste gehad het. Vyf en twintig gimnaste, wat almal een jaar gimnastiekondervinding het, is getoets met betrekking tot die vier voorvereistes van die kopwip. Die geselekteerde groep is ewekansig ingedeel in 'n eksperimentele en kontrolegroep onderskeidelik. Die eksperimentele groep het ses weeklike sielkundige inoefeningsessies gehad, bestaande uit 'n gewysigde progressiewe ontspanningsbenadering met verdiepingstegnieke en visualisering. Benewens die sielkundige inoefeningsprogram is hulle weekliks aan die fisiese afrigtingsprogram blootgestel. Die kontrolegroep het slegs die fisiese afrigtingsprogram ontvang. Al die subjekte is op 'n daaglikse basis geëvalueer om hul stapsgewyse vordering te monitor. Die kopwip as geheel is deur middel van 'n natoets geëvalueer. 'n Voor- en na-onderhoud is met elke gimnas gevoer om kwalitatief vas te stel of die eksperiment 'n verandering in die gimnaste se rapportering van fisiese simptome, kognisies en emosies tydens 'n kompetisie teweeggebring het. Interbeoordelaar-betroubaarheidskoeffisiënte is bereken vir beide die voor- en natoets om te bepaal tot watter mate die drie beoordelaars se punte ooreengestem het.

Die resultate van die daaglikse evaluering toon dat die kontrolegroep tydens een toetsgeleentheid, naamlik die sessie voor die eerste sielkundige inoefeningsessie op die eksperimentele groep toegepas is, beduidend beter as die eksperimentele groep gevaar het. Die eksperimentele groep het egter by twee toetsgeleenthede, naamlik dié net voor en net na die derde sielkundige inoefeningsessie beduidend beter as die kontrolegroep gevaar. Die resultate van die natoets toon dat die eksperimentele groep nie beduidend beter as die kontrolegroep tydens die uitvoering van die kopwip as geheel gevaar het nie. Die eksperimentele groep het 'n nie-beduidende tendens getoon om beter te presteer tydens die daaglikse evaluering en tydens die natoets. Die voor- en na-onderhoude het getoon dat die kontrolegroep, in vergelyking met die eksperimentele groep, dieselfde hoeveelheid positiewe fisiese simptome, kognisies en emosies na die eksperiment gerapporteer het. Die eksperimentele groep het minder positiewe, fisiese simptome na afloop van die eksperiment gerapporteer, maar verbreding van hul kognisies rakende die korrekte uitvoering van die kopwip en die toon van meer positiewe emosies tydens kompetisies is na afloop van die ondersoek gerapporteer. Die interbeoordelaar-betroubaarheidskoeffisiënte het getoon dat die beoordelaars meer eenvormig tydens die voortoets beoordeel het.

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## 1. **Introduction and motivation for this study**

Sport is becoming more and more competitive for children at an early age. Competitive male gymnasts are being selected for international competitions from the early age of 10 years. This means that the 10-year-old gymnasts are exposed to the competitive international competitions where they are expected to perform their routines with the least possible errors. These gymnasts are normally prepared very well physically, but very little – if any – preparation has been focused on mental training to help enhance their performance.

In the past, very few studies have investigated the effect of mental preparation on young competitive athletes (Li-Wei, Qi-Wei, Orlick & Zitzelsberger, 1992; Murphy & Jowdy, 1992). The reason for this could be that children only recently became more exposed to an extremely competitive environment in sport. This is, however, all the more reason why children should be equipped with the necessary mental preparation to manage in today's competitive world of sport where they are expected to deliver peak performances at an early age.

Competitive male gymnasts start their gymnastics career at an age of at least 4 years. They eventually dedicate 5 to 6 hours of physical preparation every day to perfect the execution and technique of every single element in their routine. Routines on the apparatuses Floor, Pommel Horse, Rings, Parallel Bars and Horizontal Bar normally consist of at least 10 elements that the gymnast has to execute in succession - the exception to this is the Vaulting apparatus where only one element is executed. This means that the elements must also be executed perfectly in combination with each other.

Taken into account that there is currently a minimum of 775 permitted elements available to construct a routine on all six apparatuses, it is understandable that the routines may vary (FIG, 2000). However, gymnastics is also a very dynamic sport where bigger, better and more astounding elements are being invented and executed without any apparent difficulty. Another factor that contributes to the dynamic nature of gymnastics is the Code of Points according to which the gymnasts are being evaluated. The Code of Points is a set of rules, regulations and elements, which are being revised by the International Gymnastics Federation (FIG) on a regular basis to accommodate the changes in gymnastics. World-class male gymnasts can therefore not settle with one routine throughout their gymnastics career, but

new combinations and possibly new elements often need to be incorporated into the routine. This is especially true for the younger gymnasts as they are still in the process of skill development. The younger gymnast's focus is on the acquisition of new basic skills to form a sound base of elements to build on. Should the gymnast be able to perform this base of elements technically correct, it would be easier to learn new, more complex elements technically correct as well (Knirch, 1997).

It is therefore crucial for the young gymnast to use all means possible to master these basic skills in order to perform technically correct executions that lead to least possible errors. Certainly mental practice can contribute to this learning process of the young gymnast. Various research studies have indicated that mental training with adult male gymnasts can contribute to the performance of these gymnasts (Ainscoe & Hardy, 1987; Callow & Hardy, 1997; Hall, Rodgers & Barr, 1990; Hardy & Callow, 1999; Mahoney & Avenier, 1977; Start & Richardson, 1964).

The purpose of this study is to investigate what effect a mental training program had on the performance of young male gymnasts, aged 8 to 9 years, in the acquisition and execution of a basic gymnastic element. The headspring was selected as the new gymnastic skill that needed to be learned and later to be tested in a competition environment (see Appendix A on page 44 for an example of the element). The headspring is an element that is performed on the Floor apparatus. For the purposes of this study, performance was regarded as the correct execution and technique of the headspring as suggested by Knirch (1997).

This experiment was aimed on shaping and strengthening the correct progressive teaching steps for the headspring by using physical practise, relaxation-hypnosis, imagery and progressive behaviour charts that incorporated a reward system for correct technique and execution. As far as literature is concerned, this experiment is the first one in South Africa to investigate the effect of a mental training program on talented young male gymnasts. It will therefore be the first step towards training the young male gymnasts on a cognitive basis as well. This research study will also contribute to a better understanding of the effect of mental training on the performance of children. If the junior gymnasts are allowed to compete at international competitions such as the World Youth Games, the researcher would suggest that they should also be mentally trained to better their chances at peak performance.

## 2. Theoretical basis for the research study

Norman Triplett is regarded as one of the first scientists to conduct a research study in the field of sport psychology (Anshel, 1994; Cox, 1994; Potgieter, 1997; Weinberg & Gould, 1995). Since his first publication in 1898, an interest into the athlete and his environment emerged rapidly. Betts (1909) was one of the first scientists to experiment with the use of imagery. Although his study was not directly conducted in the field of sport psychology, he certainly opened a door to what has become one of the most popular research aspects of mental practice over the last 80 years. According to Martin, Moritz and Hall (1999), there has been over 200 published studies so far that focused on the relationship between mental imagery and relaxation. This is just one of the many aspects of imagery that has received attention over the last couple of years. This study will focus on mental training using imagery with children – an area that has been neglected, according to the researcher, for too long in sport psychology.

In order to form a clear understanding of the focus of this research study, a couple of terms need to be explained. Thereafter the theories that form the base of mental training will briefly be explained, following a discussion about the mental and physical training programs respectively that is based on previous research findings and recommendations.

### 2.1 Terminology

**Mental training:** Corbin (1972, p 94) defines mental training as “the repetition of a task, without observable movement, with the specific intent of learning.” This definition is similar to Cox’s (1994) who also views mental training as practicing a physical skill mentally or cognitively without observable physical or bodily movement. Murphy and Jowdy (1992) views mental training as a technique, which use has been researched for a variety of reasons such as skill acquisition, skill maintenance, arousal regulation, planning, stress management, self-image manipulation, attention control and pain control. For the purposes of this study, mental training consisted of relaxation-hypnosis and imagery. The mental training program used in this study will be discussed in depth on page 7.

**Imagery:** Imagery is a cognitive process where the athlete can re-experience all the sensory and perceptual experiences of an actual event without the original stimulus being present.

This is done by controlling the sensory input of the mind to the extent that the mind believes this cognitive experience to be true (Hall, 1998; Murphy & Jowdy, 1992; Rooney, 1989). Visualization, on the other hand, involves only visual input and not a re-experience of an actual experience (Sargant, 1996). Different kinds of imagery can be used: External imagery refers to the athlete seeing himself performing an activity from a spectator's point of view. Internal imagery, on the other hand, refers to the athlete seeing the activity being performed as he would have perceived it if he had to do the activity in real life himself (Cox, 1994; Hardy & Callow, 1999; Munzert & Hackfort, 1999; Murphy & Jowdy, 1992; Weinberg & Gould, 1995). Kinaesthetic imagery is similar to internal imagery regarding the personal perspective of the performed activity, but it differs in that kinaesthetic imagery also incorporates bodily sensations such as body positions and muscle movement (Hardy & Callow, 1999; Munzert & Hackfort, 1999; Murphy & Jowdy, 1992; Rooney, 1989). Hardy (1997) explained, however, that internal imagery is not always necessary for kinaesthetic imagery, because kinaesthetic imagery can also be practiced from an external point of view.

**Relaxation-hypnosis:** Relaxation normally refers to becoming less tight, tense or anxious (Hawkins, 1988). Relaxation can also be viewed as the complete absence or the reduction of the muscular activity of the voluntary muscles (Harris & Harris, 1984; Orlick, 1980; Ray, & Wiese-Bjornstal, 1999). Chaplin (1985) also viewed relaxation as a state of low tension, but that strong emotions are absent. Relaxation-hypnosis, however, refers specifically to relaxation being used as an induction technique for hypnosis. Suggestions of relaxation, warmth, heaviness, lightness, deep breathing, and pleasant imagery are normally used for relaxation-hypnosis. An example could be where an athlete imagines himself sinking further and further away into a big, soft armchair and becoming more and more relaxed throughout his whole body. Udolf (1987) views relaxation as an effective way of hypnotic induction for children. Relaxation-hypnosis can also be used as a deepening technique for hypnosis (Golden, Dowd & Friedberg, 1987).

**Behaviour modification:** Chaplin (1985) defines behaviour modification as the changing of human behaviour by applying conditioning or other learning techniques. It can therefore be regarded as any attempt to change human behaviour by means of associating a desired behaviour with a previously unrelated stimulus. Learning techniques such as positive reinforcement, negative reinforcement, extinction, shaping, fading or punishment can be used to facilitate the change in behaviour (Martin & Pear, 1992).

**Shaping:** Shaping is a learning technique that originated with Skinner's Operant Conditioning explanation for changing behaviour (Chaplin, 1985). Martin and Pear (1992, p 66) defines shaping as "the development of new behaviour by the successive reinforcement of closer approximations and extinguishing of preceding approximations of the behaviour". It can therefore be used to establish a behaviour that the person is not performing presently, such as learning to hit a tennis ball more accurately, by applying positive and negative reinforcement techniques (Martin & Pear, 1992). Martin and Pear (1992) elaborates on guidelines for the effective application of shaping: Firstly it is necessary to identify a terminal or final desired behaviour, such as learning a new gymnastic element. Secondly selecting a starting behaviour to serve as a building base. Thirdly selecting the shaping steps that needs to be reinforced, and lastly implementing the plan. The physical training program, which will be discussed on page 11, was designed to incorporate these guidelines for the effective application of the training program.

**Headspring:** The headspring is an element in gymnastics that can be performed on the Floor apparatus. It requires the gymnast to use explosive strength, timing and coordination to start in a standing position, put his hands and head on the floor and swing his legs forward over his body while pushing off from the floor and landing in a standing position again (see Appendix A on page 44 for an example of the element). The goal is to perform this element with no apparent danger or difficulty. The headspring is classified as one of the forward acrobatic elements in the Code of Points (FIG, 2000).

## 2.2 Theoretical explanations of mental training

The following theories give possible explanations to the effect that mental training has on improving the learning and performance of a physical task:

According to Weinberg and Gould (1995), the **Psychoneuromuscular theory** originated from Carpenter's proposed *ideo-motor principle* of imagery in 1894. Carpenter's theory states that a vivid imagined activity causes slight neuromuscular impulses that are identical to the impulses being produced when the actual activity is performed. These impulses may be so minor that it does not even produce actual muscular movements. Therefore, imagery could affect the learning and performance of a physical task due to the neuromuscular activity patterns that are being activated during the imagery (Cox, 1994; Murphy & Jowdy, 1992).

The **Symbolic learning theory** was developed by Sackett in the 1930's to explain how imagery can help athletes to understand their movements (Weinberg & Gould, 1995). Sackett's theory hypothesizes that imagery is more likely to effect the physical skill due to the opportunity of cognitively practicing the activity as suppose to the muscular activation during the imagery as proposed by the psychoneuromuscular theory (Cox, 1994; Suinn, 1993; Murphy & Jowdy, 1992; Weinberg & Gould, 1995). It is therefore the cognitive processes that contribute to the learning and performance of a physical activity. According to this theory, it can therefore be inferred that tasks involving high levels of cognitive requirements would benefit more from imagery than tasks involving primarily motor requirements (Suinn, 1993; Murphy & Jowdy, 1992; Weinberg & Gould, 1995).

Cox (1994) views the **Attention and arousal set theory** as a combination between the physiological aspects of the psychoneuromuscular theory and the cognitive aspects of the symbolic learning theory. The athlete's performance would therefore benefit in two ways from imagery: Firstly, from the physiological perspective, the athlete would be able to adjust his or her arousal level to achieve optimal performance. Secondly, from the cognitive perspective, the athlete would be able to focus his or her attention to task-relevant images (Cox, 1994; Suinn, 1993).

Weinberg and Gould (1995) describe the **Psychological skills hypothesis** as another possible explanation for the effect of imagery. According to this theory, imagery works due to the development of different psychological skills such as concentration, anxiety reduction and enhanced confidence. These skills all play an important role in performance enhancement. Imagery can also be viewed as a tool to learn new psychological skills such as stress inoculation training and stress managing training.

According to Murphy and Jowdy (1992), Lang developed the integrative **Psychophysiological information processing theory** to form a better understanding of the psychophysiology of imagery with phobia and anxiety disorders. This theory examines imagery in terms of the information processing mechanisms of the brain. An image is viewed as a "functionally organised, finite set of propositions stored in the brain" (Murphy & Jowdy, 1992, p 238). It is assumed that networks of propositions are stored in the long-term memory of the brain and they are activated through imagery (Suinn, 1993). Describing the images make use of *stimulus* and *response propositions*. *Stimulus propositions* refer to the

description of the content of the situation that needs to be imagined, for example the colours, shapes and textures that the athlete might imagine. *Response propositions* refer to the description of the athlete's response to the situation, for example experiencing the tensing of muscles when the athlete imagines a running scene. These networks of propositions are believed to be prototypes for behaviour. This modal states that both stimulus and especially response propositions need to be activated for imagery to influence the athlete's performance (Murphy & Jowdy, 1992; Suinn, 1993).

Murphy and Jowdy (1992) view **Ahzen's triple code theory** as a recently developed integrative modal of imagery. This theory also recognises the psychophysiological processes of imagery, but it incorporates the meaning of the image to athlete as well. This triple code *Image-Somatic response-Meaning* (ISM) modal states that these three parts of imagery must be incorporated during imagery training. According to ISM, *image* refers to the internal sensory real sensation of the outside world. *Somatic* response refers to the psychophysiological changes in the body that occur due to imagery. *Meaning*, on the other hand, refers to the unique meaning that every individual attributes to a certain image. Since every individual forms his own concept of an image, no set of imagery instructions will produce the same imagery experience for any two individuals (Murphy & Jowdy, 1992).

The above theories illustrated a variety of perspectives on the possible ways imagery can influence the learning and performance of a physical task. Researchers advise not to use only one of the above theories, but to take all into account when working with imagery training (Cox, 1994; Murphy & Jowdy, 1992; Weinberg & Gould, 1995). It is, however, suggested that the information processing theories are currently the most acceptable way of understanding the influence of imagery (Murphy & Jowdy, 1992).

### 2.3 The Mental Training Program

Previous research studies found that imagery in combination with relaxation and physical practice proved to be more effective than imagery, physical practice or relaxation alone (Suinn, 1977; 1993; Weinberg, Seaborne & Jackson, 1981).

The mental training program used in this study was based on visuo-motor behaviour rehearsal (VMBR) as developed by Suinn in 1971 (Suinn, 1980) in combination with the Cognitive-

behavioural hypnotherapeutic approach described by Aroaz (1981, 1982, 1985). Suinn's first publication on VMBR appeared in 1972 (Cox, 1994; Rooney, 1989). VMBR is considered to be "a covert activity whereby a person experience sensory-motor sensations that reintegrate reality experiences, and which include neuromuscular, physiological, and emotional involvement" (Suinn, 1993, p 499). VMBR consists of relaxation followed by imagery (Gray, Haring & Banks, 1984; Suinn, 1984). The difference between VMBR and other mental practice technique is that VMBR is focused on the re-experiencing of the actual event (Suinn, 1993). The imagery used in VMBR is therefore the control of cognitive images that represent an actual experience.

Aroaz's Cognitive-behavioural hypnotherapeutic approach is based on the hypothesis that most psychological disturbances are results of destructive *negative self-hypnosis* where the person's negative thinking and imagining are accepted as truth without a critical evaluation (Golden, Dowd & Friedberg, 1987). The reason why Aroaz's approach was incorporated into this study is twofold: Firstly for the gymnasts to associate positive and successful thoughts with the execution of the headspring as various researchers emphasized the importance of positive affirmation statements that should be included in a mental training program (Cox, 1994; Curtis, 1995; Goldberg, 1989; Orlick, 1986; Sellars, 1996). Secondly to reduce the gymnasts' anxiety while this shaping of a new skill is taking place in order to optimise the imagery (Onestak, 1991). Teaching the gymnasts self-hypnosis during the course of the mental training program reinforced these objectives. Various researchers view self-hypnosis as an effective way to optimise an athlete's ability to perform better (Orlick, 1980; Pulos, 1980; Udolf, 1987). Spencer (2001) also support this hypothesis that self-hypnosis can be used to produce peak performances. Pelissier (2001) hypothesizes that self-hypnosis can be used for skill improvement as well. The cognitive-behavioural model views self-hypnosis as a type of hypnosis where the person initiates the induction himself (Golden et al., 1987; Orlick, 1980); thus the gymnasts were instructed under heterohypnosis, where the induction is initiated by the hypnotherapist, to induce relaxation themselves at the end of each mental training session and at home each day. The gymnasts, therefore, had to practice the headspring mentally at home as well. The mental training script can be viewed under Appendix K (page 96).

Smith (1987) as well as Singer, Murphy and Tennant (1993) made two recommendations for effective imagery in sport: Firstly, they suggested that the image should be colourful, realistic

and involve the appropriate emotions. Secondly, that the athlete should be physically and mentally relaxed. Seeing that both of these recommendations can be fulfilled through hypnosis, it could be expected that hypnosis or self-hypnosis would be a positive manner for practicing imagery. This is yet another reason why Aroaz's Cognitive-behavioural hypnotherapeutic approach was incorporated into this research study.

Weinberg et al. (1982) investigated the difference in the amount VMBR training on the performance of karate students. They found no significant difference in performance between a group that received VMBR training for six weeks daily and a group that received VMBR for one day only. Interestingly enough, the state anxiety of the six-week VMBR group showed a significant decrease whereas the one-day VMBR group showed no observable change. Due to their indications, the mental training program used for this research study, had six mental training sessions of 20 minutes each.

Andre and Means (1986) explored the rate of imagery in mental practice. They differentiated between normal imagery and slow-motion imagery. Normal imagery speed refers to the speed in which the activity is being performed in real life. Slow-motion imagery speed refers to a much slower speed of imagery that enables the athlete to visualise the activity in more technical detail. They hypothesized that slow-motion imagery will lead to higher performance. Their findings indicated no significant difference between the normal mental imagery group and the slow-motion mental imagery group. Slow-motion imagery was incorporated in this study due to two reasons: Firstly, because the mental training was combined with the physical practice, the gymnasts will progress in the imagery as their physical practice progress (see Appendix L on page 103). The headspring physical teaching program was divided into 23 teaching steps in which the gymnasts were stopped or physically taken through different body positions in order to learn the correct timing for the headspring. The gymnasts had to feel and see these body positions during physical practise and the imagery sessions as well. Slow-motion imagery seemed more appropriate for this purpose than normal imagery. Secondly, Suinn (1993, p 508) suggested that novice athletes might require more detailed instructions and pre-imagery preparation "whereby the individual is moved physically through the proper motions and is therefore more able to experience the correct proprioceptive and neuromuscular sensations, to be replicated later in imagery." Slow motion imagery, thus, made it possible to give more detailed instructions to the gymnasts about their body positions.

An important decision in planning imagery training was whether to use internal or external imagery. External imagery means that the athlete sees himself perform an element from a spectator's point of view, whereas internal imagery means that the athlete sees the performance from his own point of view – as in real life (Hardy, 1997; McAuley & Rotella, 1982; Murphy & Jowdy, 1992; Suinn, 1993; Weinberg & Gould, 1995). Suinn (1993) stated that internal imagery would be more appropriate for a novice athlete and that the imagery would be more useful for technique enhancement than for competition situations. The mental training program for this study consisted of both internal and external imagery. It is the researcher's opinion that it was easier for these children to imagine their own performance as a spectator, seeing that they looked at the performance of the other gymnasts as a spectator would. Hardy (1997) suggested that external visual imagery should be used in combination with kinaesthetic imagery where the form or body shape of an activity is important. Internal imagery was also included in the mental training program as it also has the potential to include kinaesthetic imagery where the gymnasts must feel the different body positions as they did in the physical practice session and to associate positive thinking while executing the headspring. Start and Richardson (1964) did not find significant proof that the clarity or control of images could separately predict the performance of a physical skill that has been learned by mental practice alone. They did however find indications that internal imagery correlated with the performance of gymnastic elements. Gray et al. (1984) did, however, find indications that the vividness of imagery is an indication of the athlete's ability to transfer mental rehearsal learning to actual competitive situations.

Hall, Mack, Paivio, and Hausenblas (1998) suggested that novice athletes should use cognitive imagery most, seeing that these novice athletes are predominantly concerned with skill improvement. Martin et al. (1999) describe cognitive specific imagery as the imagery of a specific sport skill such as learning a new gymnastic skill. The hypothesis that cognitive specific imagery supports the acquisition and performance of a motor skill is also recognised by previous researchers (Driskel, Copper & Moran, 1994; Hall, Schmidt, Durand & Buckolz, 1994; Martin, Moritz & Hall, 1999; Munroe, Giacobbi, Hall & Weinberg, 2000). Their suggestion for using cognitive imagery was therefore also incorporated into this study by making use of Aroz's Cognitive-behavioural hypnotherapeutic approach. Udolf (1987) supports this point of view of skill acquisition by stating that hypnosis can be employed to shape new behaviour through posthypnotic suggestions so that a new behaviour is produced,

reinforced and learned. The headspring was the new behaviour that was learned and reinforced by making use of hypnosis-imagery in this study.

Hall et al. (1990) suggested that athletes should use imagery in the training session as well, seeing that imagery was more often used in the competitive environment alone. Therefore the mental training sessions were incorporated into the physical practice program.

It was with the above-mentioned literature and recommendations in mind that the mental training program was developed to consist of six 20-minute sessions of relaxation-hypnosis followed by internal, external and kinaesthetic cognitive specific slow-motion imagery.

#### 2.4 The Physical Training Program

Knirch (1997) analysed numerous gymnastic elements over the last few years and discovered that all elements could be categorised in one of eight different types of elements. This German approach to gymnastics anticipates that, should a gymnast be able to execute the most basic elements in a certain category correctly, the other more complex elements in the same category will be mastered with more ease. The headspring is according to Knirch (1997) one of the forward rotation element types which should follow the more basic forward rotations such as the forward roll. The headspring was therefore ideal for this study, seeing that the gymnasts were all at the level where they have mastered the very basic elements. It was also important that the gymnasts benefit from the experiment, therefore by teaching the headspring correctly the gymnasts would be able to learn similar more advanced elements on Floor faster, for example the handspring, fly-spring or forward salto with a stretched body. A learning technique that was incorporated into this study is positive reinforcement. Positive reinforcement was focused on rewarding the gymnasts for executing the headspring, or progressive teaching steps towards the headspring, correctly. A behaviour chart was also incorporated whereby the gymnasts could see how they progressed throughout the program.

#### 2.5 Summary

This research study was aimed at determining the effect a mental training program would have on the performance of young male gymnasts in the acquisition of a new motor skill. This study can be regarded as a hypno-behaviour modification program by making use of

relaxation-hypnosis and imagery. The headspring was chosen as a new behaviour that needed to be shaped. Suinn (1980) divided skill acquisition into three components: 1) strengthening the correct responses, 2) transferring the correct responses to game or competition situations, and 3) eliminating or controlling the incorrect responses. Two other objectives of this mental training program were to associate positive thinking with the execution of the headspring and to reduce performance anxiety. It was therefore planned that the gymnasts would learn the headspring and then be tested on the headspring during a competition.

### 3. **Literature survey**

Previous research findings have indicated that mental practice, by means of imagery, can be helpful in a variety of situations such as skill acquisition (Suinn, 1993), creating a competitive environment (Mahoney, Avenier & Avenier, 1983) and as a motivational tool (Hall et al., 1998). The use of imagery and the significant effect it has on performance has also been well documented (Cox, 1994; Feltz & Landers, 1983; Ray & Wiese-Bjornstal, 1999; Richardson, 1967a, 1967b; Start & Richardson, 1964). According to Andre and Means (1986) the use of imagery in the acquisition of a new motor skill appears to be more controversial, but a number of studies have indicated that imagery can facilitate the learning of a new motor skill (Corbin, 1972; Feltz & Landers, 1983). The following literature was useful for the purposes of this research study:

Li-Wei et al. (1992) investigated the potential benefit of mental imagery training with young children. They used 40 talented young Chinese table tennis players for their study. The children were aged 7 to 10 years. The group consisted out of 21 males and 19 females. The children averaged 2.7 years of experience in table tennis. The subjects were randomly divided into three groups according to their age and gender. Group 1 received the physical training as well as relaxation, video observation and mental-imagery sessions. Group 2 received the same physical training and video observation, but none of the relaxation or mental-imagery sessions. Group 3 received only the physical training. The experiment was conducted over a period of 20 weeks. Pre- and post-intervention scores were used to measure performance accuracy and technical ratings on both topspin and underspin balls. The researchers concluded that the mental-imagery training did in fact significantly improve the accuracy and technical quality of the 7 to 10-year-old table tennis players. Their findings support the work of other researchers such as Ding (1984), Orlick (1992), Orlick and

McCaffrey (1991), Song, Zhang and Li (1987), Zhang (1984) and Partington (1990) who also found that mental-imagery training with young children can improve their performance. Li-Wei et al. (1992) suggested that future researchers should investigate what the optimal number of repetitions would be to sustain the highest quality of focus during mental-imagery training. They also suggested that future research should engage at least one of the groups in the video observation with a racquet in their hand, picturing and performing the shots themselves as on the video.

Mahoney and Avenier (1977) explored competitive gymnastics by investigating 13 American male gymnasts participating at their last qualifying competition for the Montreal Olympic Team. The 13 gymnasts were given a standard questionnaire 48 hours prior to the competition. The questionnaire inquired about their personality, self-concept and their strategies during training and competition situations. The gymnasts were also verbally interviewed during various stages of the competition itself. Due to their small sample size, no significant conclusion could be made, but their standard questionnaire and interviews found interesting differences between the more successful gymnasts, who qualified for the Olympic Team, and the less successful gymnasts. Mahoney and Avenier (1977) found that the more successful gymnasts correlated with being more self-confident ( $r = .57$ ), and frequently having gymnastics dreams ( $r = .45$ ) in which the gymnasts perform with a moderate degree of success ( $r = .55$ ). They also found that the better gymnasts think more about gymnastics in their everyday situations ( $r = .78$ ). The better gymnasts also talked to themselves during training and competitions ( $r = .62$ ). A very interesting point was that all the gymnasts made use of imagery, but the better gymnasts reported higher frequency of internal imagery use rather than external imagery ( $r = -.51$ ). The more successful gymnasts also reported that they use their anxiety as a stimulant whereas the less successful gymnasts mostly aroused themselves into near-panic states. Interestingly enough, the gymnasts did not rate mental attitude as a significant factor in their success ( $r = -.59$ ). The findings of this exploratory study certainly opened the door for further investigation on the effect of internal imagery on athletic performance. Yet another reason why Aroaz's Cognitive-behavioural hypnotherapeutic approach was incorporated into the current research study.

Start and Richardson (1964) explored the effect of the vividness (clarity) and autonomy (control) of imagery on 32 male athletes, aged 18 to 21 years. The subjects had to perform a new physical skill in either diving or gymnastics by participating in a mental practice program

for six days. No physical practice was done. Start and Richardson (1964) used the Gordon Test for the autonomy of imagery. They found that not all the subjects were able to control their images and therefore were not able to complete the sequence mentally. It became clear that a lack of vivid autonomous imagery could be a handicap in a sport such as gymnastics, seeing that it appears to be necessary to visualise changing body positions in order to perform an element. They concluded that internal imagery was related to the execution of a gymnastic element, but that the vividness, autonomy or controllability of imagery could not separately predict the performance of a physical skill that has been learned by mental practice alone.

Kolonay (1977) studied the effect of visuo-motor behaviour rehearsal (VMBR) on the free throw shooting of basketball players. Seventy-two athletes from eight college basketball teams took part in this study. The athletes were randomly assigned into the following groups: visuo-motor behaviour rehearsal (VMBR) training, relaxation training alone, imagery rehearsal without relaxation, and a training control group. The experiment consisted of 15 training sessions over a period of 6 weeks. Kolonay (1977) found that the VMBR athletes significantly improved their foul shooting accuracy by 7% whereas the results indicated no change in the imagery rehearsal or relaxation groups.

Weinberg et al. (1981) conducted the same study as Kolonay (1977). They used 32 male karate students, randomly assigned to a VMBR group, relaxation alone, imagery alone, and a placebo-control group. The karate students attended 12 training sessions over a period of 6 weeks. Their performance on the following tasks was tested: karate skills, karate skill combinations and sparring. The researchers found that the VMBR group significantly improved their sparring performance. The results for the karate skills and the karate skill combination tasks were not significant, but the VMBR group achieved the highest post-test scores for the karate skill tasks. The VMBR group also achieved the highest amount of improvement on the karate skill combination tasks. These studies support the hypothesis that imagery, in combination with relaxation, results in better performance than imagery alone.

Machlus and O'Brien (1988) studied the competitive performance of the members of six high school track teams. The subjects were randomly selected for one of the following groups: relaxation, behavioural imagery, relaxation plus behavioural imagery with arousal content, relaxation plus behavioural imagery without arousal content, and attention-placebo. The baseline times for all the athletes were used to determine which of the athletes improved their

performance. The results suggested that only the behavioural imagery athletes improved their competitive times in all of their events. The athletes in the behavioural imagery group received images on the motor movements alone, for example: “You hear the gun. Your arms move into an alternating back-and-forth motion” (Suinn, 1993, p 496). The relaxation group appeared to improve their performance in 86% of their events, while the imagery group, which received the arousal content, was only able to improve their performance in 75% of their events.

Nideffer (1971) applied VMBR to competitive divers for one month. The divers practised the relaxation followed by imagery each day for 10 minutes at home and before the practice session. He monitored the total number of dives during each practice session, the number of new dives attempted, as well as the divers’ self-report of anxiety. He found that the divers completed more dives in practice sessions that followed VMBR and that the divers were more willing to attempt new dives. According to Nideffer’s findings, the VMBR training could have increased the self-confidence of the divers and therefore result in a willingness to attempt new dives. Another point was that the divers also reported a decreased in anxiety.

Prediger (quoted in Suinn, 1993) tested the accuracy of 120 seventh-grade field hockey players. He assigned the students into one of three groups: relaxation plus imagery, relaxation plus imagery plus physical practice, and physical practice alone. Pre- and post-tests were used to determine how accurate the hockey players could hit three orange cone targets. The researcher found that the group that received the physical practice alone improved their accuracy by 70%. The relaxation and imagery group improved their accuracy by 68%. As expected, the group that received the physical practice and the relaxation-imagery training performed much better than the other two groups. In fact, this group improved their accuracy by 160%. Prediger’s study supports the hypothesis that relaxation, combined with imagery and physical practice, leads to better performance.

The above literature showed how relaxation and imagery had an effect on the athlete’s performance or accuracy. The following section will focus on literature that examined the effect hypnosis and imagery had on an athlete’s performance.

Stanton (1994) studied the effect of a single session of hypnosis and imagery on the performance of three athletes taking part in golf, cricket and lawn bowling respectively. The

results indicated that the 37-year-old golfer improved his average for an 18-hole round of golf from 84 to 75. A follow-up after one year found his average to have improved to a score of 72. The 24-year-old cricketer improved his average batting score for 10 innings from 31 to 47. A one-year follow-up found a further improvement to an average batting score of 58. The 63-year-old lawn bowler improved her winning percentage from 39% to 59% within one year after the hypnosis imagery. She continued to improve her winning percentage to 72% over the next three years. Stanton (1994) started the mental training session with relaxation followed by suggestions of an inner strength that the athlete can use to enhance their performance. Thereafter age progression or success imagery was implemented. Age progression or success imagery refers to a process where the athlete is projected into a preferred future (Havens, 1986). The aim is to build positive expectations for the future so that the future can be experienced during age progression hypnosis as a success (Stanton, 1994). According to Stanton (1994), this positive experience of the future leads to improved athletic performance as the athlete has, in a sense, already achieved the success.

Liggett (2000) explored the effect that hypnosis has on the enhancement of imagery. Fourteen athletes were asked to imagine activities in their respective sports: distance running, gymnastics, soccer, golf, mountain biking, rugby, tennis and water polo. The Martens' Sport Imagery Questionnaire was used to guide the athletes' imagery in four different situations: practicing alone, practicing with others, watching a teammate, and participating in a competition. The athletes rated the subjective clarity and or intensity of the imagery in each of these situations on four dimensions: 1) Visual (How vividly the athlete sees himself performing the activity during imagery), 2) Auditory (How clearly the athlete hears the sounds of performing the activity during imagery), 3) Kinaesthetic (How the athlete feels himself performing the activity during imagery), and 4) Affective (How clearly the athlete was aware of his mood while performing the activity during imagery). The results indicated that the athletes found imagery under hypnosis to be more intense for each situation and dimension than imagery out of hypnosis. These findings therefore suggest that hypnosis enhances imagery intensity and effectiveness.

Liggett and Hamada (1993) experimented with kinaesthetic imagery of gymnastic elements under hypnosis. The gymnasts used in their study were preparing these elements for more than one year, but did not execute any of the elements before. Their goal was to establish what affect the hypnosis had on the quality of the execution of the gymnastic element. Their

results indicated that the gymnasts were able to eliminate timing errors during the element and to increase flexibility. They also found it possible that the gymnasts were concentrating more on strength. The gymnasts reported the imagery under hypnosis to be more vivid than during relaxation-imagery alone. Liggett and Hamada (1993) hypothesized why imagery and hypnosis may be more effective for enhancing athletic performance. Firstly, hypnosis could cause the athlete to concentrate his attention more effectively as both the internal and external distractions seem to be minimised under hypnosis. Secondly, the athlete could have more control over the speed of imagery under hypnosis. This could benefit the athlete by mentally rehearsing the activity at an optimal speed in order to perform the activity during imagery with perfect form. A third advantage could be that the athlete's imagery could be more vivid, and thus more real, during hypnosis. Stanton (1994) added another possible advantage of hypnotic imagery for competitive athletes by hypothesizing that it enhances the athlete's ability to visualize performing and competing in an actual event; thus making it possible for the athlete to prepare mentally, emotionally and physically for a competition. The research of Liggett and Hamada (1993) supports the research done by Ward (1992) who also experimented with hypnosis-imagery with gymnasts. Ward (1992) also found that the hypnosis-imagery improved 44 gymnasts' performance of an element significantly more than imagery without hypnosis.

Frager and Spector (1979) studied the effect of behavioural and cognitive behavioural techniques on the athletic performance of two swimmers. Hypnosis was implemented to facilitate the relaxation states, imagery and cognitive rehearsal. The two swimmers were trained in three stages: 1) Hypnotic induction, 2) Anxiety reduction and relaxation training, and 3) Cognitive rehearsal. The results showed a positive change in the swimmers' swimming speed. The swimmers and their coaches also reported a positive change in their attitude and concentration.

Although most of the above research was conducted with adult athletes, it was expected that this experiment with young gymnasts would also indicate that the mental training intervention had a positive influence on the gymnasts' performance. Should this study show that the experimental gymnasts performed better and more accurately than their training partners, it would support the hypothesis that relaxation, combined with hypnosis, imagery and physical practise, leads to better performance in children too.

#### 4. **Research Question and Hypotheses**

The research question that has been addressed in this study is:

*Does the application of a mental training program affect the performance of young male gymnasts during the execution of a new gymnastic element?*

The following hypotheses were anticipated:

Hypothesis 0: The proposed mental training program would not show a significant difference in the execution and technique of the headspring between the experimental and control groups.

Hypothesis 1: The proposed mental training program would show that the experimental group performed the headspring significantly better than the control group according to technique and execution.

#### 5. **Research method**

The South African Gymnastic Federation (SAGF), in conjunction with the United School Sport Association of South Africa (USSASA) and the National Sports Council (NSC), launched a talent identification program in 1997 in order to select talented young gymnasts (Kovacs, 1997). The SAGF identified a few gymnastic clubs in South Africa where this program would be presented. The Van der Stel Gymnastic Club in Stellenbosch was appointed the talent identification centre for the Boland Gymnastics Region. The researcher has been head coach at the Van der Stel Gymnastic Club for the last three years and has therefore been involved with the selection and coaching program of the gymnasts used in this study.

##### 5.1 **Subjects**

The subjects were selected for the identification program. A total of 21 schools in the Stellenbosch, Somerset West, Strand and Gordon's Bay area were visited where 2126 boys between the ages of seven to eight years were evaluated. A total of 690 potential gymnasts were identified according to their physique only. These identified boys were invited to the Van der Stel Gymnastic Club where they were tested on their strength, explosive power,

suppleness and speed. The tests were similar to those used by the Europeans to identify their young talented gymnasts.

Two hundred and seventy six (276) boys attended the testing at the Van der Stel Gymnastics Club. The boys were ranked and the top 80 boys were invited to enrol in the Olympic Development Program (ODP). A total of 48 boys started with the ODP. One year later there were still 25 gymnasts that took part in the program. The parents of all these boys signed an indemnity form to take part in this study (see Appendix B on page 45). These boys were all selected for the ODP according to the same physical criteria. By the time that the experiment started, they all had one year of gymnastics experience.

## 5.2 Research design

The gymnasts were randomly assigned to an experimental and a control group respectively. Seeing that the gymnasts were selected for the ODP, they were equal according to gender and physical ability. In order to control the two variables, age and current performance, the following was done: The 25 gymnasts were tested on 4 prerequisite elements such as the forward roll (Appendix C on page 48), backward roll (Appendix D on page 49), napestand (Appendix E on page 50) and the headstand (Appendix F on page 51). Each gymnast had to perform all four prerequisite elements three times. The gymnasts were videotaped and were individually judged from the videotape. The average of the three scores was used as a final mark. The gymnasts were ranked according to their performance scores in each age group. A flip of the coin determined whether the equal or non-equal numbers of age groups 1991 and 1992 were being paired off. After that, a flip of the coin determined which paired off group was assigned as the experimental and control group respectively. Two Brevet qualified judges and one International qualified judge scored the gymnasts' executions. The Brevet judging qualification is the highest qualification in gymnastic judging. Both Brevet and International judges are qualified to judge at international competitions like the World Championships and the Olympic Games.

It was important to choose an element that would benefit these gymnasts in the future. As mentioned earlier, Knirch (1997) explained that the headspring is a very important element in gymnastics as it precedes a number of more complex elements. The researcher developed the headspring program in collaboration with an internationally qualified high level gymnastics

coach. The researcher was the only coach involved with the actual teaching of the headspring. Seeing that the headspring was a new skill to all of these gymnasts, it was a good element that could be used for this study. It was important that the gymnasts would have enough time to learn the new skill, therefore the program was developed for a 16-day training period that stretched over 8 weeks. The headspring was divided into several daily progressive teaching steps (see Appendix G on page 52 for the full physical preparation program). This made it possible to obtain daily goals as suggested by various researchers who focused on the importance of a goal-setting package (McClements & Botterill, 1980; Orlick & McCaffrey, 1991; Sellars, 1996; Wanlin, Hrycaiko, Martin & Mahon, 1997). It also made it possible to identify the shaping steps that needed to be reinforced as suggested by Martin and Pear (1992). This made it possible to monitor the gymnasts' daily progression and reward them for correct executions of the headspring.

As mentioned above, three highly qualified gymnastic judges scored the testing. The program was implemented after the selection of the two groups. There were three types of testing: testing the prerequisites, the daily progression testing, and testing the headspring. During the daily testing at the end of each practice session the gymnasts had three opportunities to perform the teaching step that was practised that day. Every gymnast that performed the teaching step for that particular day correctly for three times received a reward.

After completion of the program, the gymnasts were tested on the headspring. Each gymnast had three opportunities to perform the headspring. The scores of the gymnasts that were present for more than 80% of the training program were used in the statistical analysis. Schomer (1987) suggested that the skill that has been learned should be tested by repetitive executions to ensure that the skill has been learned successfully. The gymnasts were once again videotaped in no specific order and the same three judges scored the gymnasts individually. The headspring was divided into five phases for judging: 1) the position of the head, 2) the pushing of the hips, 3) the hips kip position, 4) the kip action and 5) the flight phase (see Appendix H on page 86 for a description). The average of the three scores for each of these phases was used as a final mark for that phase. The final marks of all of the five phases were added to allocate an average final mark to each of the gymnasts. The judges were not informed on the group selection to ensure that no bias judging would be possible.

Two registered psychologists specialising in hypnotherapy conducted the mental training program. The mental training program consisted of six weekly sessions of relaxation-hypnosis, positive cognition and imagery (see Appendix J on page 90 for the analysis of the movement). A time of 20 minutes was allocated for each session. The mental training sessions were conducted in Afrikaans, because the gymnasts were Afrikaans speaking. The keywords and most important body positions were pronounced in English, because all the gymnasts knew the different body positions and keywords in English (see Appendix K on page 96). The experimental group was divided into two smaller groups of six gymnasts. The mental training was therefore done in a group situation of 6 gymnasts per group.

### 5.3 Measuring instruments

Due to the small sample size, statistical analysis consisted of non-parametrical analysis such as the Mann-Whitney U Test, a multiple baseline design, and qualitative analysis. An inter-judge reliability coefficient was also calculated in order to establish how accurate the three judges evaluated the routines in comparison with each other (see Table 4 and Table 5 on page 30). A multiple baseline design, by means of graphs, indicated how the two groups performed over the 16-day period of the training (see Figure 4 on page 29). Individual interviews were held with all gymnasts before and after the interventions to determine what effect the mental training program might have had on their physical, emotional and cognitive experiences. A summary of each gymnast's physical interpretations, emotions and thoughts during a competition situation was noted (see Appendix I on page 87).

### 5.4 Experimental procedure

The physical program was very detailed to ensure that all the aspects of gymnastics, such as fun, stretching, strength and technique received enough attention. Each training day consisted of a 10-minute playtime. The gymnasts followed a stretching program for 15 minutes and then they had a 15-minute strengthening session. The gymnasts were in one big group for the first 40 minutes of games, stretching and strengthening. They then divided into the experimental and control groups respectively. Both groups had exactly 40 minutes of headspring training and 40 minutes of normal physical training with another coach. The groups alternated so that each group had the opportunity to start with the headspring session one day per week. The experimental group started with the headspring session first on

Tuesdays and then they had the mental training session with the two psychologists. The control group started with the headspring training first on Thursdays. After that the control group had their normal training session with another coach.

## 6. **Results**

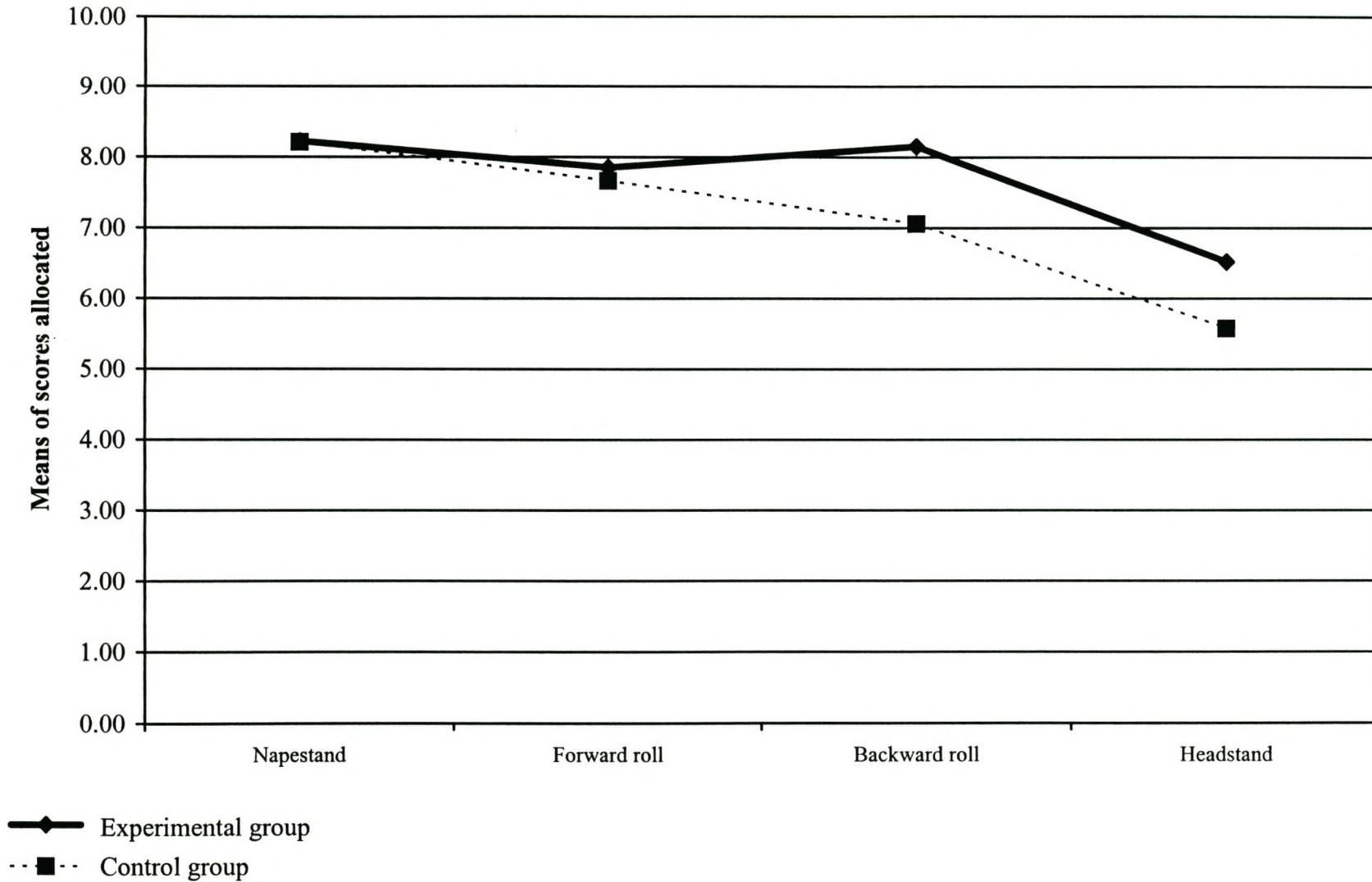
Table 1 below represents the analysis of the scores obtained during the testing of the four prerequisite elements (which are the Napestand, Forward roll, Backward roll and Headstand) according to the Mann-Whitney *U* Test. The Mean rank and number of subjects are listed for both the experimental and control groups respectively. Only gymnasts that were present in more than 80% of the training program were used in the statistical analysis. No statistical significant difference was found between the two groups on any of the prerequisite elements.

**Table 1**

**Analysis of the Results Obtained after Testing the Prerequisite Elements: Napestand, Forward roll, Backward roll and Headstand**

<b>Skill</b>	<b>Group</b>	<b>N</b>	<b>Mean Rank</b>	<b>Mann-Whitney <i>U</i></b>	<b>Z</b>	<b><i>p</i></b>
Napestand	Experimental	9	9.39	39.500	- .766	.444
	Control	11	11.41			
Forward roll	Experimental	9	11.06	44.500	- .382	.702
	Control	11	10.05			
Backward roll	Experimental	9	12.61	30.500	-1.451	.147
	Control	11	8.77			
Headstand	Experimental	9	11.72	38.500	- .839	.402
	Control	11	9.50			

Figure 1 (page 23) depicts the means of all the scores allocated to the experimental and control groups respectively during the testing of the four prerequisite elements (which are the Napestand, Forward roll, Backward roll and Headstand). The experimental group showed a tendency to achieve higher scores out of ten than the control group in all four prerequisite elements. Only gymnasts that were present in more than 80% of the training program were used in the statistical analysis. No statistical significant difference was, however, found between the two groups on any one of the four prerequisite elements.



**Figure 1.** Comparison of experimental and control group on means of prerequisite scores

Table 2 (page 25) depicts the analysis of the scores obtained during the testing of the daily progression over a 16-day period according to the Mann-Whitney *U* Test. The Mean rank and number of subjects are listed for both the experimental and control groups respectively. Only gymnasts that were present in more than 80% of the training program were used in the statistical analysis. The control group performed significantly better than the experimental group during the testing on day three of the training program. This was before the first mental training session. The experimental group, however, performed significantly better than the control group on days seven and eight of the training program. This occurred after the second and third mental training sessions. No other statistical significant difference was found for the remainder of the 16-day training program.

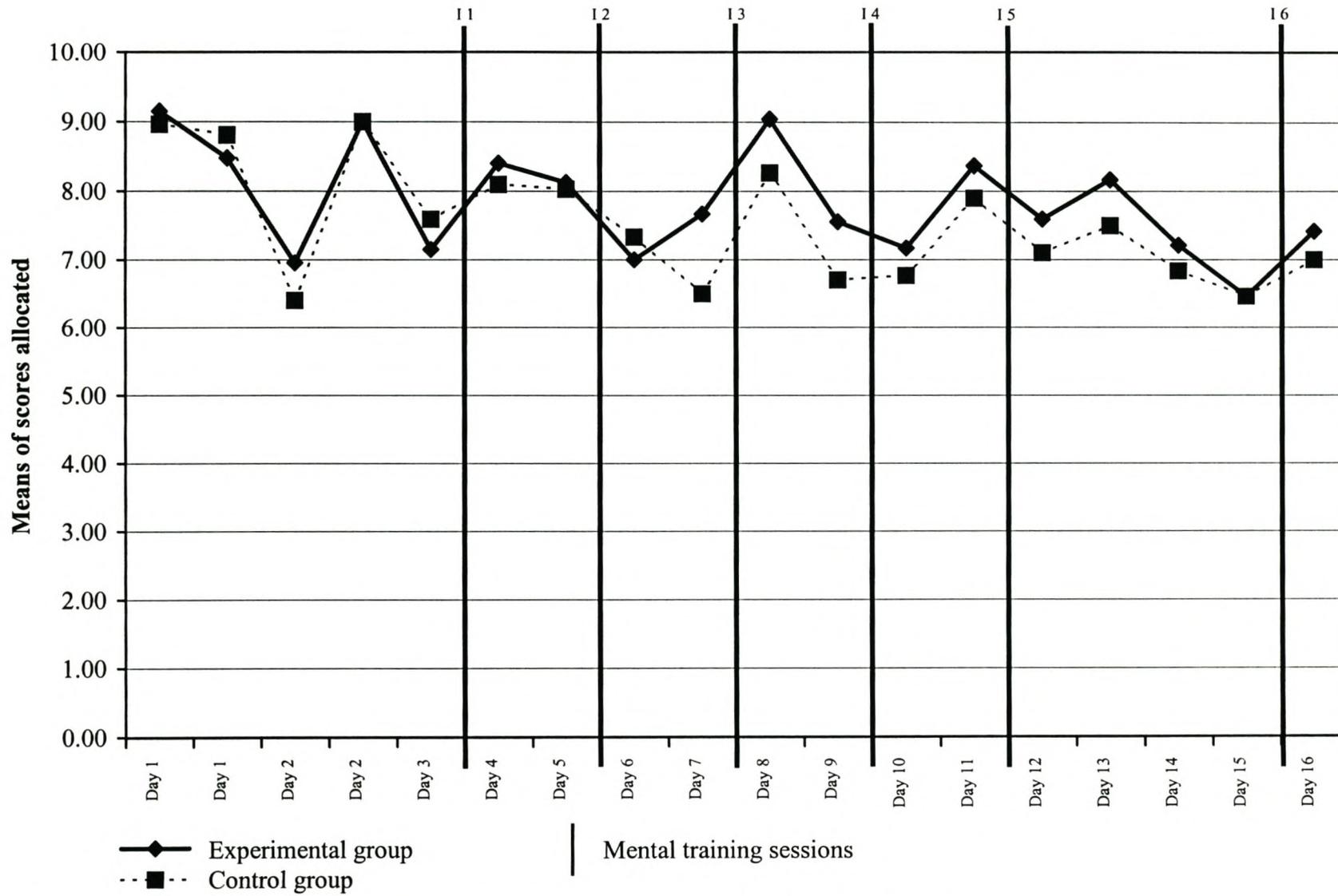
Figure 2 (page 26) represents the means of all the scores allocated to the experimental and control groups respectively during the testing of the daily progression over a 16-day period. The experimental group showed a tendency to achieve higher scores out of ten than the control group – especially after the second mental training session. The control group performed significantly better than the experimental group on day three, while the experimental group performed significantly better on days seven and eight.

Table 3 (page 27) represents the analysis of the scores obtained during the testing of the headspring according to five positions: Head position, Hips vertical line, Hips kip position, Kip action and Flight phase. The Mann-Whitney *U* Test was used to obtain these results. The Mean rank and number of subjects are listed for both the experimental and control groups respectively. Only gymnasts that were present in more than 80% of the training program were used in the statistical analysis. No statistical significant difference was found between the two groups on any one of the five positions of the headspring.

Figure 3 (page 28) represents the means of all the scores allocated to the experimental and control groups respectively during the testing of the headspring. The experimental group showed a tendency to achieve higher scores out of six than the control group in three of the five positions of the headspring: Head position, Hips kip position and Kip action. The control group obtained a higher score out of six during the execution of the Hips vertical line position, while both groups obtained the same score for the Flight phase position. No statistical significant difference was, however, found between the two groups on any one of the five positions of the headspring.

**Table 2****Analysis of the Results Obtained after Testing the Daily Progression According to the 16 Training Days**

<b>Skill</b>	<b>Group</b>	<b>N</b>	<b>Mean Rank</b>	<b>Mann-Whitney U</b>	<b>Z</b>	<b>p</b>
Day 1: F. roll	Experimental	9	10.33	33.000	-	.673
	Control	9	8.67			
Day 1: B. roll	Experimental	9	8.89	35.000	-	.497
	Control	9	10.11			
Day 2: Headstand	Experimental	7	7.57	10.000	-	1.222
	Control	5	5.00			
Day 2: S. jump	Experimental	7	6.71	16.000	-	.252
	Control	5	6.20			
Day 3	Experimental	9	6.94	17.500	-	2.050
	Control	9	12.06			
Day 4	Experimental	9	11.28	33.500	-	.950
	Control	10	8.85			
Day 5	Experimental	8	9.88	37.000	-	.274
	Control	10	9.20			
Day 6	Experimental	8	8.81	34.500	-	.494
	Control	10	10.05			
Day 7	Experimental	9	12.72	20.500	-	2.014
	Control	10	7.55			
Day 8	Experimental	8	12.88	13.000	-	2.441
	Control	10	6.80			
Day 9	Experimental	9	11.11	35.000	-	.821
	Control	10	9.00			
Day 10	Experimental	8	10.44	32.500	-	.675
	Control	10	8.75			
Day 11	Experimental	9	11.28	33.500	-	.946
	Control	10	8.85			
Day 12	Experimental	9	11.11	35.000	-	.826
	Control	10	9.00			
Day 13	Experimental	8	10.88	29.000	-	.984
	Control	10	8.40			
Day 14	Experimental	8	10.38	33.000	-	.627
	Control	10	8.80			
Day 15	Experimental	8	8.81	29.500	-	.266
	Control	10	8.19			
Day 16	Experimental	8	9.88	29.000	-	.683
	Control	9	8.22			

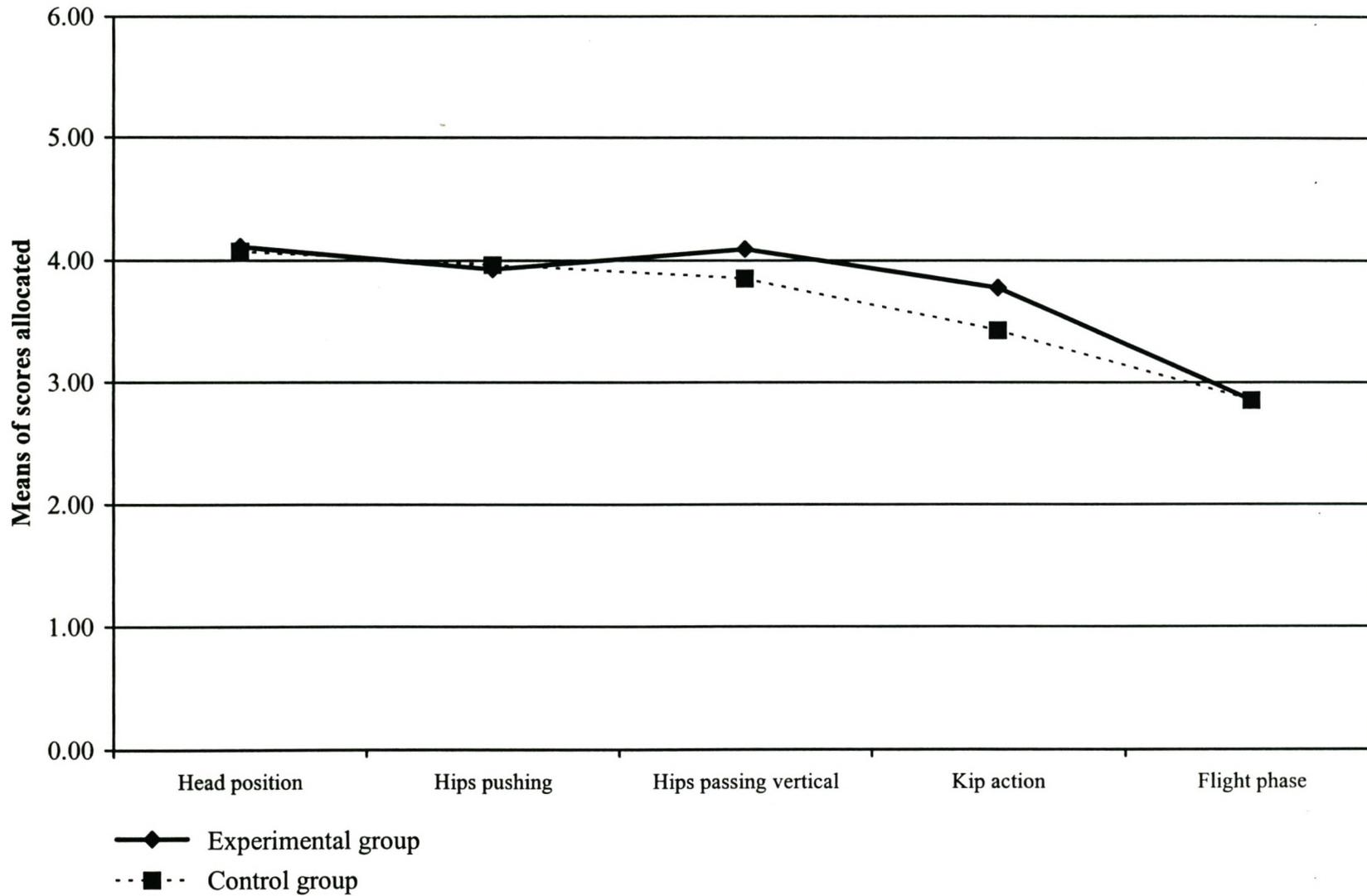


**Figure 2. Comparison of experimental and control group on means of daily test scores**

**Table 3****Analysis of the Results Obtained after Testing the Headspring According to Five Positions: Head Position, Hips Pushing, Hips Passing Vertical, Kip Action and Flight Phase**

Skill	Group	<i>N</i>	Mean Rank	Mann-Whitney <i>U</i>	<i>Z</i>	<i>p</i>
Head position	Experimental	9	9.94	36.500	- .357	.721
	Control	9	9.06			
Hips pushing	Experimental	9	9.00	36.000	- .398	.690
	Control	9	10.00			
Hips pass vertical	Experimental	9	9.83	37.500	- .266	.790
	Control	9	9.17			
Kip action	Experimental	9	9.94	36.500	- .354	.723
	Control	9	9.06			
Flight phase	Experimental	9	9.33	39.000	- .133	.895
	Control	9	9.67			

Figure 4 (page 29) represents a baseline comparison between the means of all the scores allocated to the experimental and control groups respectively during the testing of the daily progression over a 16-day period as well as the headspring. Only gymnasts that were present in more than 80% of the training program were used in the statistical analysis. The experimental group showed a tendency to achieve higher scores out of ten than the control group during the daily progression testing – especially after the second mental training session. The control group performed significantly better than the experimental group on day three, while the experimental group performed significantly better than the control group on days seven and eight. The experimental group showed a tendency to achieve higher scores out of ten than the control group in three of the five positions during the testing of the headspring: Head position, Hips kip position and Kip action. The control group obtained a higher score out of ten during the execution of the Hips vertical line position, while both groups obtained the same score for the Flight phase position. No statistical significant difference was found between the two groups during the testing of the five positions of the headspring.



**Figure 3. Comparison of experimental and control group on means of headspring test scores**

**Figure 4. Baseline comparison of experimental with control group on means of all scores**

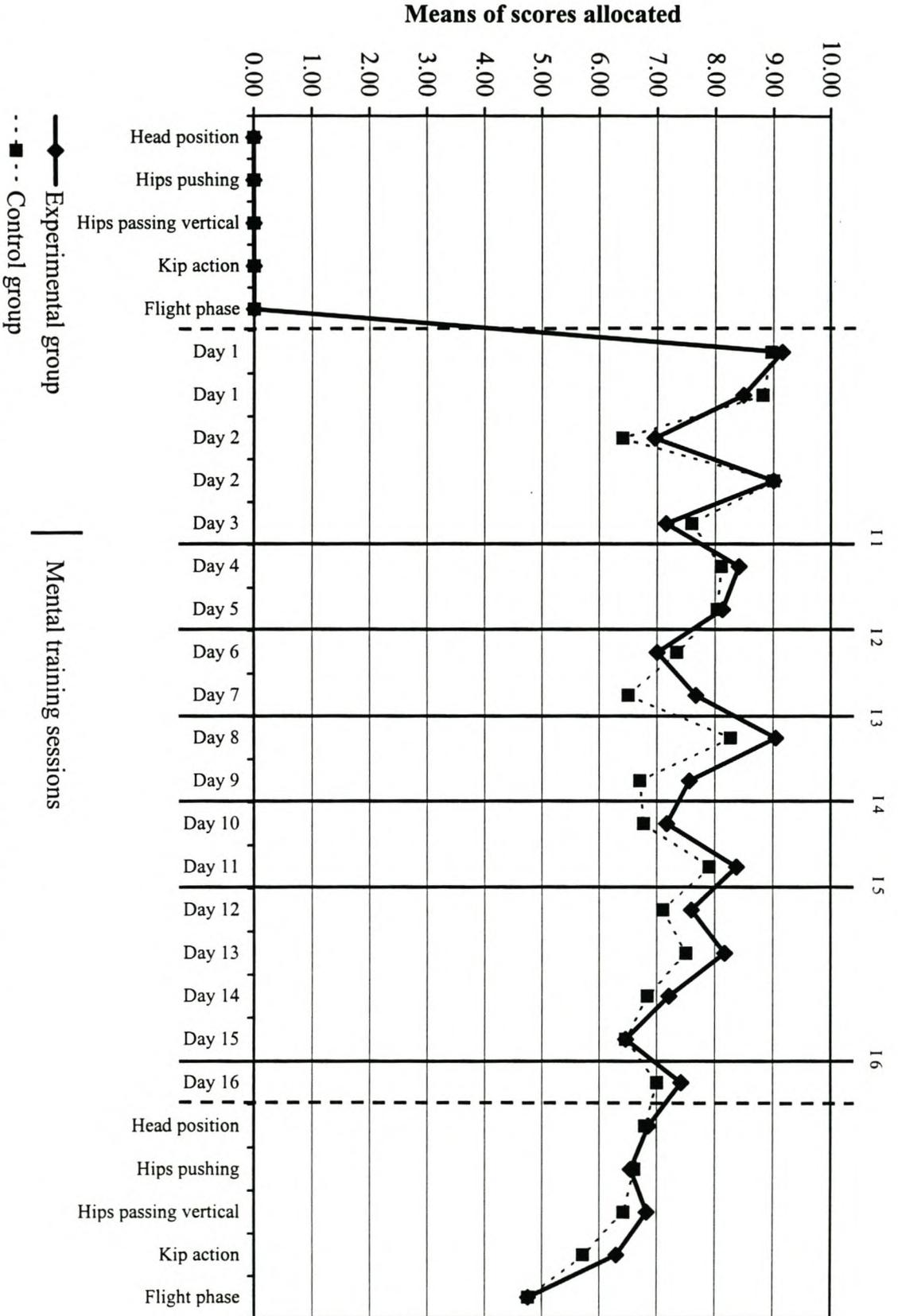


Table 4 below represents the inter-judge reliability coefficients for the scores allocated by the three judges during the evaluation of the four prerequisite elements. The coefficients appear to be well in range from each other with the lowest coefficient being (.657) for the Forward roll and the highest coefficient being (.882) for the Napestand.

**Table 4**

**The Inter-Judge Reliability Coefficient for Evaluating the Prerequisite Elements**

<b>Skill</b>	<b><i>N</i></b>	<b>Reliability coefficient</b>
Napestand	20	.882
Forward roll	20	.657
Backward roll	20	.684
Headstand	20	.822

Table 5 below represents the inter-judge reliability coefficients for the scores allocated by the three judges during the evaluation of the five positions of the headspring. The ranges of the coefficients appear to be diverse with the lowest coefficient being (.325) for the Hips vertical line position and the highest coefficient being (.754) for the Flight phase position.

**Table 5**

**The Inter-Judge Reliability Coefficient for Evaluating the Headspring**

<b>Skill</b>	<b><i>N</i></b>	<b>Reliability coefficient</b>
Head position	18	.513
Hips vertical line	18	.325
Hips kip position	18	.447
Kip action	18	.749
Flight phase	18	.754

## 7. Discussion

The tendency of the gymnasts in the experimental group to perform better and technically more correct than the gymnasts in the control group clearly indicates that the current mental training program can result in the enhancement of performance among 8 to 9-year-old male gymnasts.

Table 2 (page 25) indicates that the control group performed significantly better than the experimental group during the testing of teaching step 4 on **day 3** of the **daily progression testing**. Teaching step 4 is focused on teaching the gymnasts the correct timing for initiating the kip action of the headspring (see Appendix L on page 104). The first mental training session only started on day three after the experimental group had their physical practice session and daily testing. This significant difference therefore appeared before the experimental group received any mental training. Possible explanations for the results of the experimental group on this particular day could be that they might have had some concerns during the physical practice session, as they knew that they were starting a new type of mental training program with two unfamiliar psychologists. The fact that the gymnasts were aware of the presence of the two psychologists during the testing on day 3 might also have influenced the gymnasts' concentration. It is, however, possible that the gymnasts of the control group were more relaxed and able to concentrate on the testing during day 3, as nothing new were added to their program and no spectators were present that could have caused a distraction. It is also possible that the control group formed a better understanding of this particular teaching step and performed it technically more correct as is indicated by the raw scores. It is interesting to note that seven of the nine control group gymnasts received a reward for performing all three attempts of teaching step 4 with a score of 8.00 and higher, while only one experimental group gymnast received a reward.

The experimental group performed significantly better than the control group on days 7 and 8 of the daily progression testing (Table 2, page 25). **Day 7** of the physical practice program was after the second mental training session. The gymnasts were tested on teaching step 11 where they were expected to perform a nape-spring (same as the headspring, but the gymnast puts his neck on the floor instead of his forehead) from a squad standing position. The raw scores indicate that six of the nine experimental group gymnasts received a reward for performing all three attempts of teaching step 11 with a score of 8.00 or higher, while only

one of the ten control group gymnasts received a reward. Since the second mental training session (Appendix L, page 105) focused on the timing of the hips passing through the vertical line and the kip action during the headspring, it was noticed that most of the experimental group gymnasts kept their legs straight during the testing through the kip action, while most of the control group gymnasts bent their legs. The technically correct position of the legs during the kip action should be straight legs; thus the significant difference in scores between the experimental and control groups. Day 7 clearly illustrates that the second mental training session had the effect on the experimental group to keep their legs straight throughout the kip action of the headspring.

**Day 8** of the physical practice program focused on teaching step 14. The gymnasts were expected to go through the headspring starting position and to push their hips through the vertical line (see Appendix L on page 107). The purpose of teaching step 14 was to teach the gymnasts the correct timing of the pushing of their hips through the vertical line, but this time from the headspring starting position. The raw scores indicate that all the experimental group gymnasts received rewards for performing all three attempts of teaching step 14 with a score of 8.00 or higher, while only seven of the twelve control group gymnasts received a reward. Day 8 of the training occurred after the third mental training session. The third mental training session focused on the execution of a nape-spring from a squad standing position. The gymnasts focused, once again, on their hips pushing through the vertical line as well as the timing of the kip action during imagery. It was interesting to note during the testing on day 8 that all the gymnasts of the experimental group waited for their hips to pass the vertical line, while only half of the control group showed the correct timing for the kip action. Day 8 clearly illustrates that the third mental training session had the effect on the experimental group to wait for their hips to pass through the vertical line before initiating the kip action.

Although no further significant differences between the two groups were indicated, Figure 2 (page 26) clearly illustrates that the experimental group performed better than the control group throughout the rest of the daily progression testing. It is also clear from Figure 2 that the two groups performed fairly equal before the mental training sessions started, but after the second mental training session the experimental group continued to perform better than the control group. This is once again a clear indication that the mental training program did in fact enhance the performance of the experimental group gymnasts during the daily progression training.

Table 3 (page 27) indicates that the **headspring testing** did not report any significant differences between the two groups. It is, however, interesting that the experimental group did not perform significantly better during the headspring testing in the two positions *hips passing through the vertical line* and the *kip action*, as these were the two positions of the headspring in which they did perform significantly better during the daily testing as described above. Possible explanations could be that the headspring testing was more difficult for the gymnasts due to the complexity of the headspring. Another explanation for finding the headspring testing more difficult could be that the gymnasts only performed parts of the headspring during the daily testing on days 7 and 8. The results of the inter-judge reliability coefficients for the headspring testing (Table 5, page 30) also indicate that the evaluation of the headspring was more difficult for the judges. The reliability for the *hips passing through the vertical line* position (.447) is low in comparison with the reliability coefficients of the *kip action* (.749) and the *flight phase* (.754). It appears as if the judges had difficulty with the two hip positions, Hips pushing (.325) and Hips passing through the vertical line (.447), during the headspring testing. A possible explanation could be that the judges found it more difficult to evaluate the five positions of the headspring separately due to the speed of execution. Figure 3 (page 28) does, however, illustrate that the experimental group performed better in especially the two positions *hips passing through the vertical line* and the *kip action*. This could again indicate that the mental training did in fact contribute to the experimental group's performance during the headspring testing in the two positions in which there were significant differences during the daily testing.

Figure 4 (page 29) is a baseline graph to illustrate how the shaping of the headspring took place. Figure 4 is a combination of Figures 2 and 3, which has already been discussed. It is once again clearly illustrated in Figure 4 that the experimental group performed better than the control group in most of the **daily progression testing** as well as the **headspring testing**. It is interesting to note that the scores obtained for the headspring testing are much lower the scores for the daily testing. This phenomenon is mainly caused by the complexity of the headspring, since the progressive teaching steps for the headspring became more complex as the training program progressed. The lower scores for the headspring testing does therefore not imply that the gymnasts performed worse, but that the element being performed became more complex and therefore also more difficult to judge. Figure 4 clearly illustrates that the shaping of the headspring was successful, as none of the gymnasts were able to perform any

of the five positions of the headspring before the implementation of the program. Yet, at completion of the program, all the gymnasts in both groups have mastered the headspring.

**Qualitative information** obtained during the current research study indicated that some gymnasts in the experimental group made physical movements during imagery. Thus, it is possible that the images created by these gymnasts were so vivid and clear that it caused the body to participate in physical movement. This phenomenon therefore not only supports the hypothesis that imagery, by means of hypnosis, is more vivid, but it also proves that the kinaesthetic imagery appeared to be effective for the current study. The **individual interviews** (Appendix I, page 87) conducted with each gymnast before and after completion of the program illustrated the control group reported the same number of positive physical symptoms before and after the experiment. The experimental group reported fewer positive physical symptoms after completion of the program. It could be that the experimental group compared their physical symptoms to those positive feelings they experienced during imagery, but that they were not able to apply those positive feelings during imagery to the actual competition situation. The reason for this could be that more attention was focused on skill development during the cognitive specific imagery than on preparation for a competition. The experimental group did, however, report more positive emotions after the completion of the program, but all the gymnasts found it difficult to recall and elaborate on their feelings during the competition. What was most interesting was that seven of the twelve experimental group gymnasts reported thinking about the correct execution of the headspring after completion of the program. Before the program was implemented only three of the experimental gymnasts reported thinking about an element during a competition; thus four gymnasts learned to concentrate on performing the headspring correctly. It can be inferred that the mental training program influenced these gymnasts to concentrate on the element during a competition. This is another indication that the mental training program can lead to the experimental performing better due to better concentration on the activity that needs to be performed.

The question that now arises is whether it was the behaviour modification program or the mental training program that lead to the learning of the headspring. It is the researcher's opinion that the behaviour modification program was essential for both groups in the learning of the new gymnastic skill, but that it was the mental training program that gave the experimental group the advantage to learn the headspring more technically correct, as can be

seen from the scores obtained during the daily progression testing as well as the headspring testing. The mental training program appear to be very effective in training the experimental group the timing for passing their hips through the vertical line as well as the kip action with straight legs. It can be inferred that the experimental group formed a more perfect and stable image of the timing of the *hips passing the vertical line* as well as the *kip action with straight legs* during imagery that lead to a stronger and more perfect motor pattern for actually performing the kip action. These two positions most definitely illustrate better technique and performance on the side of the experimental group. The significant differences for days 7 and 8 therefore support the hypothesis that mental training can lead to enhanced performance. It also supports the Psychophysiological information processing theory of understanding the influence that imagery had on the gymnasts, as it was the cognitive processes during imagery that lead to the enhanced physical performance of the kip action of the headspring.

The current study certainly has limitations despite the indications of the positive influence of the mental training program. Firstly, the number of subjects used in the current study was too few. A bigger sample group might have contributed to more significant differences. Secondly, gymnasts were absent during various parts of the program, which complicated the small sample size even more. Some of the gymnasts in the experimental group therefore did not attend all the mental training session, which could also have influenced the performance of these gymnasts. Thirdly, a behaviour program to monitor the experimental group on their mental training at home was not incorporated into the study. Lastly it can be noted that the individual interview with all the gymnasts might have been too simplistic, as many gymnasts reported no response.

It is with the above limitations and other observations during the course of the current study that the following recommendations for future studies is made:

1. Although gymnastics is a very specialised sport and requires individual attention, it would be beneficial to have more gymnasts involved in a similar study in the future.
2. It is recommended that a behavioural program with a reward system is implemented to monitor the gymnasts' mental training at home.
3. It would be interesting to determine if there is a difference in the performance of competitive children if the mental training is not done at the end of a training session, but forms part of the training so that the gymnasts receive mental training in between the physical training of the element.

4. It is recommended that the experimental group receive mental training immediately before they are tested.
5. It would be interesting to determine if the same results will be found with young female gymnasts, as the female gymnasts are normally technically further advanced than the males.
6. It is recommended that the judges evaluate the video recording of the element in slow motion, as this would enable the judges to evaluate each part of the element critically.
7. The researcher also recommends, from personal coaching experience, that the gymnasts should be video-recorded during every session and that the recordings will be showed to the gymnasts to give them a visual image of what part of the element need to be perfected. This could contribute to their physical performance as well as their ability to picture themselves during external imagery.

In conclusion: The results of the current study indicate that the mental training program, aimed at enhancing the performance of 8 to 9-year-old male gymnasts, did lead to better performance among the gymnasts of the experimental group. Although the experimental group's performance was not significantly better throughout the program, the experimental group still illustrated a clear tendency to perform better than the control group. This study therefore supports the hypothesis that mental practice consisting of relaxation-hypnosis and imagery can enhance the performance of athletes. It also provides support for the hypothesis that relaxation-hypnosis and imagery enhances the performance of competitive children. As the current study is only one way of determining the possible contributions mental training can make to young competitive male gymnasts, further research can focus on the effect that various mental training programs have on competitive children in order to develop effective training programs to help our youth enhance to peak performances.

## 8. Summary

This study examined the effect of a mental training program on the performance of 25 young male gymnasts in the execution of the headspring. The mental training program consisted of a combination of visuo-motor behaviour rehearsal (VMBR) and cognitive-behavioural hypnotherapeutic techniques, which included relaxation-hypnosis followed by internal, external and kinaesthetic cognitive specific slow-motion imagery. The results indicated that the mental training program did enhance the performance of the experimental group – especially during the daily progression testing. The research hypothesis, stating that the relaxation-hypnosis and imagery mental training program will lead to significant enhanced performance, is therefore supported by the significant results obtained during the daily testing. Further research regarding mental training with competitive children appears to be very valuable for the development of effective mental training programs for talented young sportsmen.

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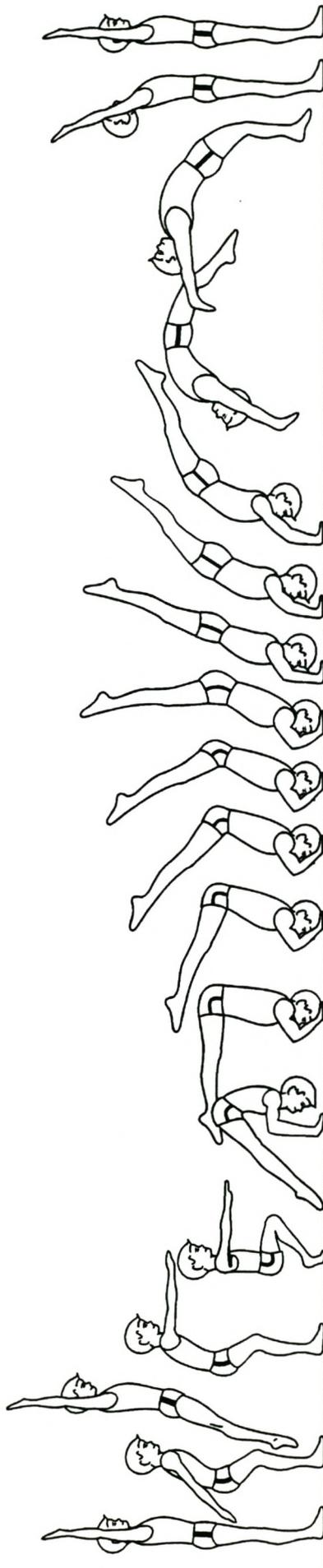
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**Appendix A: The Headspring**



**Appendix B: Letter of consent**



**VAN DER STEL**  
**GYMNASTICS CLUB**

P O Box 1, Stellenbosch, 7599 Tel. (021) 886 4805 / Cell. 082 7709 670 / Fax. (021) 887 2156

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Dear Parents / Guardian

**Research in Psychology**

I recently decided to enroll at the University of Stellenbosch again to further my studies in psychology. Seeing that my Masters degree would consist of a thesis as well, I decided to combine two of my major interests: psychology and gymnastics. My objectives are twofold: Firstly would I like to give something back to the sport that helped to shape me as a person. Secondly, I would like to address the mental aspect of gymnastics, which has been neglected in South Africa for too long.

I decided that it would be best for me to use this ODP group for my research – seeing that they were all selected for the ODP program and therefore are all more or less equal according to age, development and experience in gymnastics.

The purpose of my study would be to determine the effects of a mental training program on a single skill acquisition in gymnastics: the headspring. The headspring is a very important element because it serves as a prerequisite for numerous more complex elements in gymnastics. Gymnasts should be taught a proper headspring by the age of 7 to 9 years to serve as a basic skill for further development in gymnastics. It is absolutely crucial for my research that none of these gymnasts has ever made contact with the headspring before. Fortunately, seeing that we personally selected these boys for the ODP program, I can be sure that the headspring would be a new skill for all of these boys.

The coaching during this program will be done by myself and assisted by Piet Olivier, Craig van Deventer and Jonathan Durand.

Mr. H. M. de Vos and Professor Justus Potgieter, lecturers at the University of Stellenbosch and qualified practitioners in psychology, will apply the mental training program. The mental training program will consist of relaxation and imagery. The purpose will be to help the gymnast learn the new skill by training the headspring in his mind as well.

The gymnasts will be tested on certain prerequisites like the headstand, forward roll, backward roll and napestand. After this testing the gymnasts will randomly be divided into an experimental and a control group. The control group will receive the normal coaching program, while the experimental group will receive the same coaching program as the control group, but also the mental training program. The experimental group will have additional short sessions with Mr. De Vos and Professor Potgieter for about six weeks. The whole program will be completed by the end of this term and all the gymnasts involved will be tested on the full headspring. We should be able to determine the effect of the mental training program after this testing.

I am very excited about this project and I hope you are too. As I have a responsibility towards you and your gymnast, I hereby ask for your permission to make use of all the data gathered about your gymnast during this research study.

Attached you will find a letter of consent which the parent / guardian must sign before I can proceed with the program. I ask of you to please sign the letter and return it to me as soon as possible.

You are welcome to speak to me in person should you have any problems or need any additional information.

Thank you.

Kind regards,

Henk Smith

**Letter of consent**

I, ..... , the parent / guardian of  
Full names of Parent / Guardian

.....  
Full names of gymnast

hereby grant Henk Smith permission to use my son

and all data gathered about my son's progression

in his research study to determine

the effects of a mental training program on

a single skill acquisition in gymnastics: the headspring.

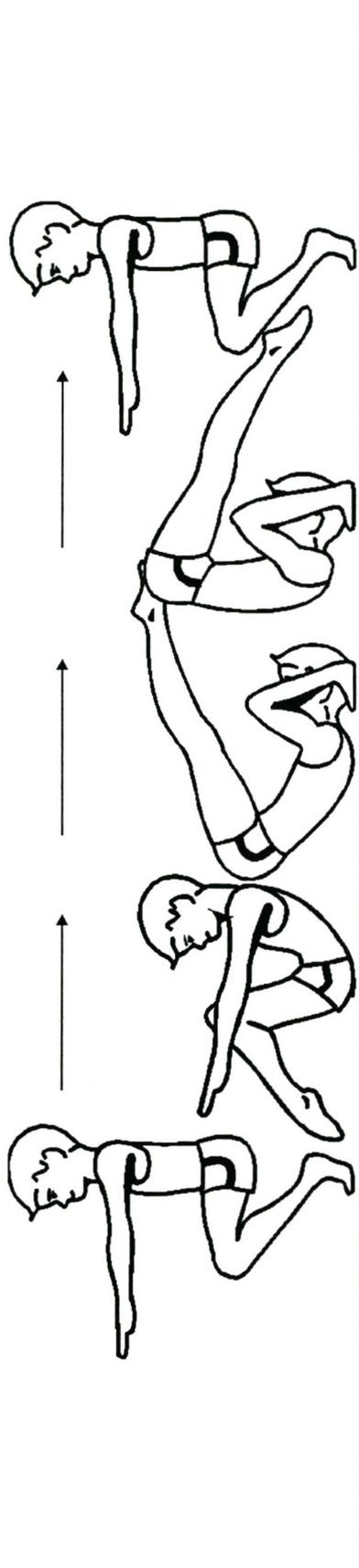
.....  
Signature of Parent / Guardian

.....  
Date

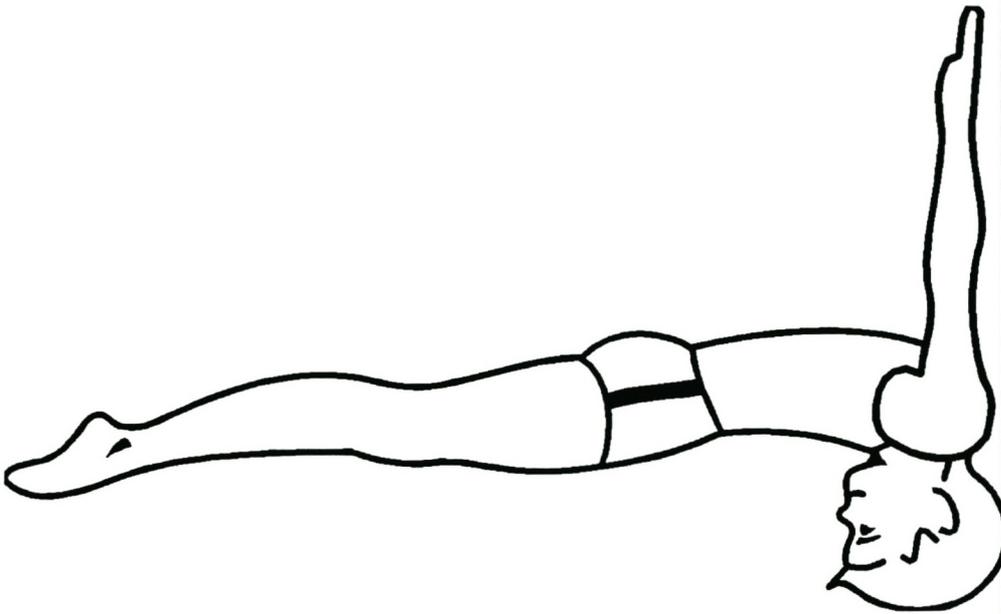
Appendix C: The Forward roll



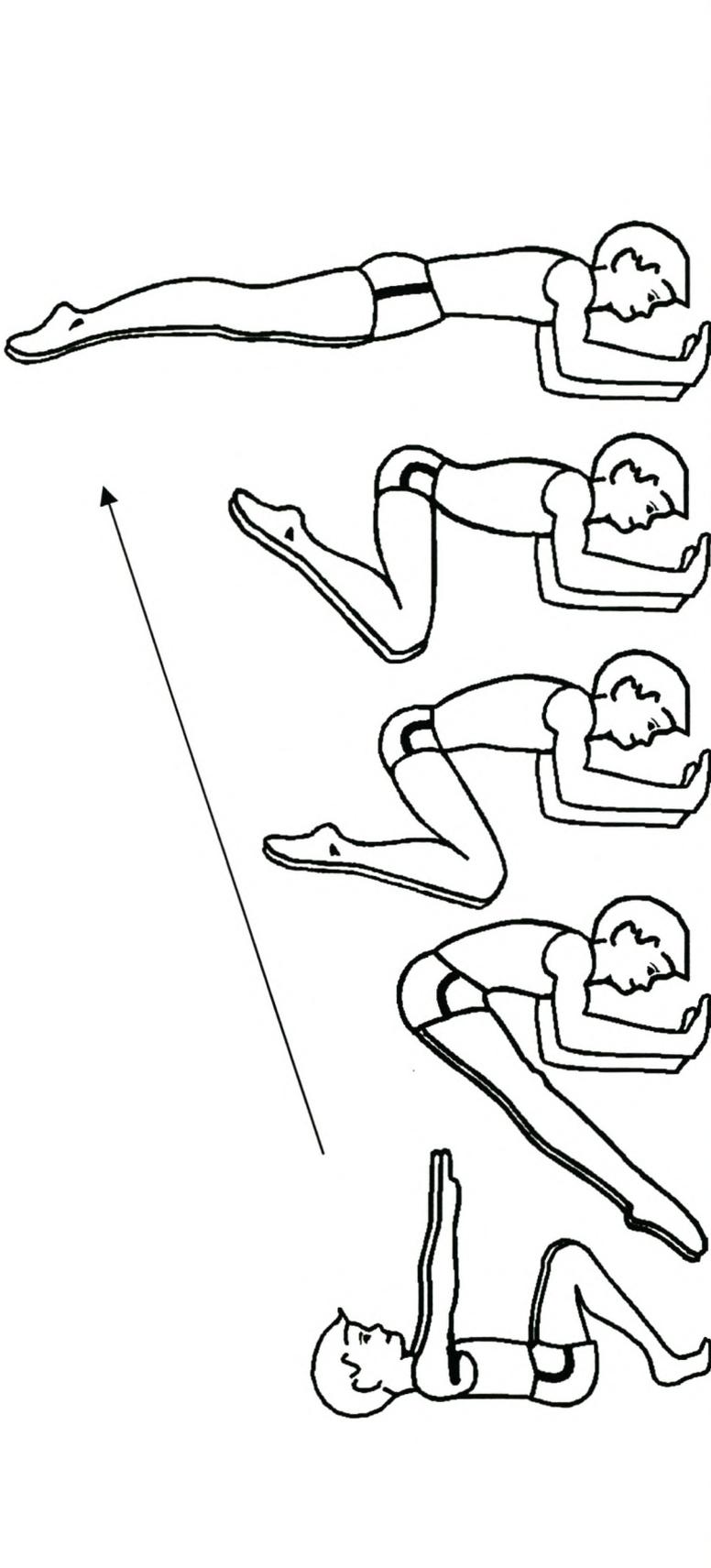
Appendix D: The Backward roll



Appendix E: The Napestand



Appendix F: The Headstand



## **Appendix G: The Headspring daily teaching progression**

<b>Day 1</b>
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1. Explain the program to the gymnasts – 5 minutes
  - The Headspring will be taught over the next 8 weeks
  - They Headspring is demonstrated three times by an older gymnast
  - We are taking it slow and work bit by bit on the Headspring
  
2. Explain the rewards – 5 minutes
  - There will be a poster with all the gymnasts names on it
  - Each day that they attend the practice session they will get a Red Star
  - At the end of each session the progression will be tested and each gymnast must show the element that is being tested 3 times. Each time he executes the element correctly he will receive a Golden Star
  - Every day each gymnast that has executed his element correctly 3 times will receive a small reward
  - After completion of the program the gymnast that has received the most Stars in total will receive a big reward and all the other gymnasts will receive a consolation prize
  
3. Explain the testing – 5 minutes
  - The gymnasts will be tested on the following prerequisites which they should be able to perform by now:
    - a) Napestand
    - b) Forward roll
    - c) Backward roll
    - d) Headstand
  - After the testing they will be divided into two groups, an experimental and a control group and those two groups will stay together for the rest of the term till the program has been completed

4. Roll and stand up with knees together – 5 minutes
  - As many as possible executions (at least 10)

### **TEACHING STEP 1**

1. Forward roll – 5 minutes
  - All the gymnasts will work on the Forward roll for 5 minutes. Each gymnast must show as many as possible (at least 10) technically correct executed Forward rolls.
2. Backward roll – 10 minutes
  - All the gymnasts must show as many as possible (15+) technically correct executed Backward rolls. A total of 10 minutes will be allocated for this element as well.

### **Progression Testing: Forward roll and Backward roll – 5 minutes**

1. All the gymnasts will have an opportunity to show 3 technically correct executed Forward rolls and 3 technically correct executed Backward rolls. Rewards will be handed out for 3 technically correct executions.

**Program:**

		Time in minutes					
		15	15	15	5	15 + 5	40
Physical Preparation	Flexibility		Fixed program				
	Strength			1. Bunny hop keep 2. Crab walking 3. Wheelbarrow 4. Nape stand 5. Nape bridge 6. Lady Push-ups	20 meters 20 meters 10 meters switch 3 x 10 sec. 3 x 10 sec. 3 x 8		
Technical Preparation	Prerequisites	Explain program Explain testing Explain rewards					
	Exercises				1. Roll and stand up with knees together		
	Progression					1. Forward roll 2. Backward roll	
Mental	Experimental						None
	Control						None

<b>Day 2</b>
--------------

1. Forward roll – 2 minutes
  - The gymnasts will execute this prerequisite as many times as possible (5+)
2. Backward roll – 2 minutes
  - The gymnasts will execute this prerequisite as many times as possible (5+)
3. Squad stand – 2 minutes
  - 10+ executions
4. Landing – 4 minutes
  - 10+ executions

### **TEACHING STEP 2**

1. Headstand – 15 minutes
  - The gymnasts will execute 15+ technically correct Headstands and hold each for 5 seconds.
  - It is important that more or less 80% of the weight is supported by the arms and not the head
  - The head must be placed so that the hairline is in contact with the floor
  - The head and the two hands must form a triangle
  - Fingers wide open and facing forward
2. Stretch jump – 10 minutes
  - The gymnasts will execute 20+ technically correct Stretch jumps

### **Progression Testing: Headstand and Stretch jump – 5 minutes**

1. All the gymnasts will execute 3 technically correct Headstands and 3 technically correct Stretch jumps. Rewards will be handed out for 3 technically correct executions.

<b>Program:</b>		Time in minutes					
		15	15	4	6	25 + 5	40
Physical Preparation	Flexibility	Fixed program					
	Strength		1. W/barrow resist 2. Crab walking 3. Wild cat Wild dog 4. Nape pike Nape 5. Nape bridge 6. Lady Push-ups	10 meters switch 20 meters 5 x each x 5 up and down 3 x 10 sec. 3 x 8			
Technical Preparation	Prerequisites			1. Forward roll 2. Backward roll			
	Exercises				1. Squad sit 2. Landing		
	Progression					1. Headstand 2. Stretch jump	
Mental	Experimental						None
	* Control						None

<b>Day 3</b>
--------------

1. Select the groups – 5 minutes
  - The gymnasts will randomly be divided into the experimental and control groups
  - The gymnasts will be explained that they will stay in these group for the rest of the term until the program has been completed
  
2. Napestand – 5 minutes
  - The gymnasts will hold 10+ Napestands for 10 seconds each
  
3. Backward roll to touch toes in pike position to forward roll – 5 minutes
  - 5+ executions

### **TEACHING STEP 3**

1. From pike sit on the floor the gymnast must roll back with straight legs to touch his toes at the back and then extend his hips into the Napestand with a straight body and straight arms on the floor – 10 minutes
  - 10+ executions

### **TEACHING STEP 4**

1. From Napestand fall forward with straight body into Nape bridge position with over extended hips – 10 minutes
  - 10+ executions
  - Hips must stay at 45° and feet must go down to floor
  - The gymnast lies on One Thick Mat (OTM)
  - Explain hips pull through vertical line
  - Look at ceiling
  - The spotter (coach helping the gymnast) supports the gymnast under the lower back

*Progression Testing: Teaching Step 4 – 5 minutes*

1. All the gymnasts will execute 3 correct hip-pulls through the vertical line from the Napestand to land in the Nape bridge with spot. Rewards will be handed out for 3 technically correct executions.

**Program:**

		Time in minutes					
		15	15	15	5	20 + 5	40
Physical Preparation	Flexibility	Fixed program					
	Strength		1. Frog jumps 2. Nape bridge 3. Nape pike Nape 4. Dips chair 5. F/support walk 6. Mary Poppins	20 meters 3 x 10 sec. x 5 x 10 1 L + 1 R circle 3 x 10 sec.			
Technical Preparation	Prerequisites			1. Select groups 2. Napestand			
	Exercises				1. Back roll to touch toes to forward roll		
	Progression					1. Backward roll to Napestand 2. Napestand pull hips through to Nape bridge	
Mental	Experimental						Session 1
	Control						None

<b>Day 4</b>
--------------

1. Napestand – 3 minutes
  - 5+ x 10 seconds hold
  
2. The gymnasts will execute Teaching step 4 – 10 minutes
  - From Napestand fall forward into Nape bridge position with over extended hips
  - 10+ executions
  - make use of OTM (One Thick Mat)

### **TEACHING STEP 5**

1. OTM: Napestand to pike down to pull hips through vertical line – 5 minutes
  - 10+ executions
  - Explain again the hips pulling through the vertical line

### **TEACHING STEP 6**

1. OTM: Napestand to pike down to kip to Nape bridge – 17 minutes
  - Must pull hips through vertical line
  - 15+ executions with spot
  - Look at ceiling

### **Progression Testing: Teaching Step 6 – 5 minutes**

1. All the gymnasts will execute Teaching step 6 correctly for 3 times from the Napestand to pike down and kip into the Nape bridge with spot. Rewards will be handed out for 3 technically correct executions.

**Program:**

		Time in minutes					
		15	15	3	10	22 + 5	40
Physical Preparation	Flexibility	Fixed program					
	Strength		1. Jumps 2. Nape pike Nape 3. Passing stick 4. Knee pushup/clap 5. Dips chair 6. Spider stand	20 meters x 5 x 10 to partner 2 x 7 2 x 6 Hold longest			
Technical Preparation	Prerequisites			1. Napestand			
	Exercises				1. Napestand pull hips through to Nape bridge		
	Progression					1. Nape to pike to pull hips through 2. Nape to pike to flick to Nape bridge on OTM	
Mental	Experimental						None
	* Control						None

<b>Day 5</b>
--------------

1. Headstand – 5 minutes
  - 5+ executions and hold each for 5 seconds
  
2. Teaching step 6 – 10 minutes
  - OTM: Napestand to pike down to kip to Nape bridge.
  - Must pull hips through vertical line
  - 10+ executions with spot
  - Look at ceiling

### **TEACHING STEP 7**

1. Explain hand position in Nape spring – 5 minutes
  - The hands are placed little bit further from to the ears as in the position (Nape pike position) in the forward roll and backward roll
  - The arms will be used to push off powerfully

### **TEACHING STEP 8**

1. OTM: Napestand to pike down with correct hand position to kip to Nape bridge and push off with arms to stand with spotter pulling up – 15 minutes
  - 15+ executions
  - spotter spots the movement until the gymnast is in the Nape bridge position
  - the gymnast must push with arms while spotter supports gymnast under the lower back and under the nape

### **Progression Testing: Teaching Step 8 – 5 minutes**

1. All the gymnasts will execute Teaching step 8 correctly for 3 times from the Napestand to pike down and kip into the Nape bridge with the spotter assisting the push phase. Rewards will be handed out for 3 technically correct executions.

Program:		Time in minutes					
		15	15	5	10	20 + 5	40
Physical Preparation	Flexibility	Fixed program					
	Strength		1. Frog jumps 2. Nape bridge 3. Stomach stable 1 4. Dips P-bars 5. Push-ups pike 6. F/support displace	20 meters 3 x 10 sec. 3 x up for 5 sec. 3 x 3 3 x 5 x 3 displace			
Technical Preparation	Prerequisites			1. Headstand			
	Exercises				1. Napestand flick hips through to Nape bridge		
	Progression					1. Explain hand position 2. Napestand flick to Nape bridge with arms correct	
Mental	Experimental						Session 2
	Control						None

<b>Day 6</b>
--------------

1. Backward roll to Nape pike position – 5 minutes
  - 10+ executions
  
2. Teaching step 8 – 5 minutes
  - OTM: Napestand to pike down with correct hand position to kip to Nape bridge and push off with arms to stand with spotter pulling up; 5+ executions
  
3. Landing position practice with thick mats – 5 minutes
  - The gymnast stands with his back close to a pile of three thick mats and lets his head, shoulders and arms touch the mats
  - The gymnast must go into the stand position by pushing his hips forward and keeping his arms above his head while looking at the ceiling
  - 10+ executions

### **TEACHING STEP 9**

1. Nape pike position on Two Thick Mats (TTM) and kip to Nape spring with correct arm position and land with straight knees on floor with spot – 20 minutes
  - 15+ executions
  - Must go through vertical with hips
  - Keep pushing hips forward when land
  - Keep legs straight
  - Push off with correct arm position from the thick mats
  - Head looking at ceiling
  - Spotter assists the gymnast under the lower back and the nape

### **Progression Testing: Teaching Step 9 – 5 minutes**

1. All the gymnasts will execute Teaching step 9 correctly for 3 times from the Nape pike position and kip into the full Nape spring with the spotter's assistance. Rewards will be handed out for 3 technically correct executions.

Program:		Time in minutes					
		15	15	5	10	20 + 5	40
Physical Preparation	Flexibility	Fixed program					
	Strength		1. Jumps 2. Mary Poppins 3. F/support hops 4. Push-up pike/clap 5. Dips P-bars 6. Back leg lifts	20 meters 3 x 10 sec. 1 L + 1 R circle 3 x 4 3 x 5 x 10			
Technical Preparation	Prerequisites			1. Back roll to Nape pike position			
	Exercises				1. Mat land position 2. Nape to pike to flick Nape bridge		
	Progression					1. Nape pike to full Nape spring to land on TTM	
Mental	Experimental						None
	* Control						None

**Day 7**

1. Forward roll – 5 minutes
  - 10+ executions
  
2. Arms push off practice from Nape bridge to crabstand – 5 minutes
  - 5+ executions
  - Keep the legs open
  - The head must lie the Nape bridge position with his arms bend and hands next to his ears with the fingers facing towards his shoulders
  - The gymnast push off powerfully with his arms to end up in the crab (bridge) position

**TEACHING STEP 10**

1. TTM: Squad stand go into Nape pike position and pull hips through vertical – 10 minutes
  - 10+ executions

**TEACHING STEP 11**

1. TTM: From squad stand go into full Nape spring – 15 minutes
  - 15+ executions
  - Head looking at ceiling
  - Spotter assists the gymnast under the lower back and the nape

**Progression Testing: Teaching Step 11 – 5 minutes**

1. All the gymnasts will execute Teaching step 11 correctly for 3 times from the Squad stand into the full Nape spring with the spotter's assistance. Rewards will be handed out for 3 technically correct executions.

**Program:**

		Time in minutes					
		15	15	5	5	25 + 5	40
Physical Preparation	Flexibility	Fixed program					
	Strength		1. Bunny hops keep 2. W/barrow resist 3. Push-up pike/clap 4. Dips p-bars 5. Knee leg extend 6. Calve raises	20 meters 10 meters switch 3 x 5 3 x 5 3 x 5 each leg x 20			
Technical Preparation	Prerequisites			1. Forward roll			
	Exercises				1. Nape bridge to Crabstand		
	Progression					1. Squad sit to Nape pike and pull hips 2. Squad sit into full nape spring	
Mental	Experimental						Session 3
	Control						None

<b>Day 8</b>
--------------

1. Headstand – 3 minutes
  - 5+ executions and hold for 5 seconds
  
2. Arms push off practice from Nape bridge to crabstand – 3 minutes
  - 5+ executions

### **TEACHING STEP 12**

1. Explain head position in Headspring – 4 minutes
  - The head must also be placed so that the hairline makes contact with the floor
  - The head is slightly closer than it would be for the Headstand

### **TEACHING STEP 13**

1. TTM: Headspring starting position pull hips through vertical and push unto back
  - 10 minutes
  - 15+ executions
  - Spotter assists the gymnast under the Nape and the lower back

### **TEACHING STEP 14**

1. TTM: From squad stand go into Headspring starting position and pull hips through vertical and push unto back
  - 15 minutes
  - 15+ executions
  - Spotter assists the gymnast under the Nape and the lower back

### **Progression Testing: Teaching Step 14 – 5 minutes**

1. All the gymnasts will execute Teaching step 14 correctly for 3 times with spot. Rewards will be handed out for 3 technically correct executions.

<b>Program:</b>		<b>Time in minutes</b>					
		15	15	3	3	29 + 5	40
<b>Physical Preparation</b>	Flexibility	Fixed program					
	Strength		1. Frog jumps 2. F/support tunnel 3. OTM push-ups 4. Dips P-bars 5. Stomack stable 2 6. Back leg lifts	20 meters 10 meters x 7 3 x 7 3 x up for 5 sec. 2 x 7			
<b>Technical Preparation</b>	Prerequisites			1. Headstand			
	Exercises				1. Nape bridge to Crabstand		
	Progression					1. Explain head 2. Headspring start and pull hips 3. Squad to # 2 and pull hips through	
<b>Mental</b>	Experimental						None
	* Control						None

<b>Day 9</b>
--------------

1. Headstand – 5 minutes
  - 5+ executions and hold each one for 5 seconds
  
2. Teaching step 14 – 8 minutes
  - TTM: From squad stand go into Headspring starting position and pull hips through vertical and push unto back
  - 10+ executions
  
3. Landing position practice with thick mats – 2 minutes
  - 3+ executions

### **TEACHING STEP 15**

1. TTM: From squad stand go into full Headspring – 20 minutes
  - 15+ executions
  - Pull hips through the vertical line
  - Spotter assists the gymnast under the lower back and nape
  - Push the hips forward until the gymnast lands
  - The gymnast must keep looking at the ceiling when he lands

### **Progression Testing: Teaching Step 15 – 5 minutes**

1. All the gymnasts will execute Teaching step 15 correctly for 3 times with spot. Rewards will be handed out for 3 technically correct executions.

**Program:**

		Time in minutes					
		15	15	5	10	20 + 5	40
Physical Preparation	Flexibility	Fixed program					
	Strength		1. OTM push-ups 2. Wall push away 3. Shoulder push-out 4. Lower back lifts 5. Flex toes 6. Stand leg extend	2 x 6 x 10 x 10 x 10 3 x 10sec. 3 x 5 each leg			
Technical Preparation	Prerequisites			1. Headstand			
	Exercises				1. Squad to Head start and pull hips through 2. Fall back partner		
	Progression					1. Squad sit into full Headspring on TTM	
Mental	Experimental						Session 4
	Control						None

<b>Day 10</b>
---------------

1. Forward roll – 5 minutes
  - 10+ executions
  
2. Backward roll – 5 minutes
  - 10+ executions
  
3. Landing position practice with thick mats – 5 minutes
  - 5+ executions

### **TEACHING STEP 16**

1. TTM: From standing position go into squad stand and go into full Headspring – 20 minutes
  - 15+ executions
  - Spotter assists the gymnast

### **Progression Testing: Teaching Step 16 – 5 minutes**

1. All the gymnasts will execute Teaching step 16 correctly for 3 times with spot. Rewards will be handed out for 3 technically correct executions.

Program:		Time in minutes					
		15	15	10	5	20 + 5	40
Physical Preparation	Flexibility	Fixed program					
	Strength		1. Jumping 2. Push-up pike/clap 3. OTM push-up 4. Shoulder push out 5. Stand leg extend 6. Mary Poppins	20 meters 3 x 7 2 x 7 2 x 6 3 x 5 each leg 3 x 10 sec.			
Technical Preparation	Prerequisites			1. Forward roll 2. Backward roll			
	Exercises				1. Mat land position		
	Progression					1. Stand to squad to full Headspring	
Mental	Experimental						None
	* Control						None

<b>Day 11</b>
---------------

1. Stretch jump – 5 minutes
  - 10+ executions
  
2. Landing position practice with thick mats – 5 minutes
  - 5+ executions

### **TEACHING STEP 17**

1. TTM: Hop from box (same height as mats) to standing position and go into squad stand and go into full Headspring – 10 minutes
  - 15+ executions
  - Spotter assists the gymnast

### **TEACHING STEP 18**

1. TTM: Hop from box to squad stand and go into full Headspring – 15 minutes
  - 15+ executions
  - Spotter assists the gymnast

### **Progression Testing: Teaching Step 18 – 5 minutes**

1. All the gymnasts will execute Teaching step 18 correctly for 3 times with spot. Rewards will be handed out for 3 technically correct executions.

Program:		Time in minutes					
		15	15	5	5	25 + 5	40
Physical Preparation	Flexibility	Fixed program					
	Strength		1. Frog jumps 2. Calve raises 3. OTM push-up 4. Dips P-bars 5. Shoulder lifts 6. Stomach stable 1	20 meters 2 x 15 2 x 7 3 x 5 x 10 3 x up for 5 sec.			
Technical Preparation	Prerequisites			1. Stretch jump			
	Exercises				1. Mat land position		
	Progression					1. Hop to stand to full Headspring 2. Hop to squad to full Headspring	
Mental	Experimental						Session 5
	Control						None

<b>Day 12</b>
---------------

1. Stretch jump – 5 minutes
  - 10+ executions
2. Teaching step 15 – 10 minutes
  - TTM: From squad stand go into full Headspring
  - 10+ executions

### **TEACHING STEP 19**

1. TTM: Hop from box into full Headspring – 20 minutes
  - 15+ executions
  - No spotting

### **Progression Testing: Teaching Step 19 – 5 minutes**

1. All the gymnasts will execute Teaching step 19 correctly for 3 times without spot. Rewards will be handed out for 3 technically correct executions.

Program:		Time in minutes					
		15	15	5	10	20 + 5	40
Physical Preparation	Flexibility	Fixed program					
	Strength		1. Push-up pike/clap 2. Dips P-bars 3. Shoulder lifts 4. Lower back lifts 5. Mary Poppins 6. Gluts on side	3 x 7 3 x 5 2 x 6 2 x 7 3 x 10 sec. x 5 each side			
Technical Preparation	Prerequisites			1. Stretch jump			
	Exercises				1. Squad to full Headspring		
	Progression					1. Hop from box to full Headspring	
Mental	Experimental						None
	* Control						None

<b>Day 13</b>
---------------

1. Headstand – 3 minutes
  - 5+ executions
2. Stretch jump – 3 minutes
  - 10+ executions
3. Arms push off practice from Nape bridge to crabstand – 4 minutes
  - 5+ executions

### **TEACHING STEP 20**

1. TTM: Hop from box into full Headspring with lifting of landing surface – 30 minutes
  - 10 executions onto floor as in teaching step 19
  - 15+ executions onto One Thin-Thick mat (OTT)
  - No spotting

#### **Progression Testing: Teaching Step 20 – 5 minutes**

1. All the gymnasts will execute Teaching step 20 correctly with the landing onto the OTT for 3 times without spot. Rewards will be handed out for 3 technically correct executions.

**Program:**

		Time in minutes					
		15	15	6	4	25 + 5	40
Physical Preparation	Flexibility	Fixed program					
	Strength		1. Push-up clap 2. Walk Dips Walk 3. Shoulder lifts 4. Back leg lifts 5. Stomach stable 2 6. Nape bridge	3 x 5 x 7 dips 2 x 7 2 x 7 3 x up for 5 sec. 3 x 10 sec.			
Technical Preparation	Prerequisites			1. Headstand 2. Stretch jump			
	Exercises				1. Nape bridge to Crabstand		
	Progression					1. Hop from box to full Headspring and land on OTT	
Mental	Experimental						None
	Control						None

<b>Day 14</b>
---------------

1. Forward roll – 5 minutes
  - 10+ executions
2. Backward roll – 5 minutes
  - 10+ executions
3. Arms push off practice from Nape bridge to crabstand – 5 minutes
  - 5+ executions

### **TEACHING STEP 21**

1. TTM: Hop from box into full Headspring with lifting of landing surface – 20 minutes
  - 5 executions onto OTT as in teaching step 20
  - 15 executions onto Two Thin-Thick mats (TTT)
  - 20+ executions onto OTM and OTT
  - No spotting

#### **Progression Testing: Teaching Step 21 – 5 minutes**

1. All the gymnasts will execute Teaching step 21 correctly with the landing onto the OTT and OTM for 3 times without spot. Rewards will be handed out for 3 technically correct executions.

Program:		Time in minutes					
		15	15	15	5	20 + 5	40
Physical Preparation	Flexibility	Fixed program					
	Strength		1. Push-ups clap 2. Walk Dips Walk 3. Shoulder push-out 4. F/support hops 5. Lower back lifts 6. Flex toes	3 x 5 x 10 dips 2 x 10 1 L + 1 R circle 2 x 10 3 x 10 sec.			
Technical Preparation	Prerequisites			1. Forward roll 2. Backward roll			
	Exercises				1. Nape bridge to Crabstand		
	Progression					1. Hop from box to full Headspring and land on OTT and OTM	
Mental	Experimental						None
	* Control						None

<b>Day 15</b>
---------------

1. Stretch jump from springboard – 5 minutes
  - 10+ executions
  
2. Landing position practice with thick mats – 5 minutes
  - 10+ executions

### **TEACHING STEP 22**

1. TTM: Hop from box into full Headspring with lifting of landing surface – 15 minutes
  - 5 executions onto OTM and OTT
  - 15+ executions onto Two Thick Mats (TTM)
  - No spotting
  
2. OTT: Hop from springboard and go into full Headspring – 10 minutes
  - 15+ executions
  - Spotter can assist gymnast

### **Progression Testing: Teaching Step 22 – 5 minutes**

1. All the gymnasts will execute Teaching step 22 correctly with the hopping from the springboard and landing onto the OTT for 3 times with spot. Rewards will be handed out for 3 technically correct executions.

**Program:**

		Time in minutes					
		15	15	5	5	25 + 5	40
Physical Preparation	Flexibility	Fixed program					
	Strength		1. Push-up clap 2. Walk Dips Walk 3. Shoulder lifts 4. Back leg lifts 5. Stomach stable 1 6. Nape bridge	3 x 8 2 x 6 2 x 7 2 x 10 3 x up for 5 sec. 3 x 10 sec.			
Technical Preparation	Prerequisites			1. Stretch jump from springboard			
	Exercises				1. Mat land position		
	Progression					1. Hop from box and land on TTM 2. Hop springboard and land on OTT	
Mental	Experimental						Session 6
	Control						None

**Day 16**

1. Stretch jump from springboard – 5 minutes
  - 10+ executions
  
2. Landing position practice with thick mats – 5 minutes
  - 10+ executions

**TEACHING STEP 23**

1. OTT: Hop from springboard and go into full Headspring – 25 minutes
  - 20+ executions
  - No spotting

**Progression Testing: Teaching Step 23 – 5 minutes**

1. All the gymnasts will execute Teaching step 23 correctly with the hopping from the springboard and landing onto the OTT for 3 times without spot. Rewards will be handed out for 3 technically correct executions.

Program:		Time in minutes					
		15	15	5	5	25 + 5	40
Physical Preparation	Flexibility	Fixed program					
	Strength		1. Push-ups clap 2. Walk Dips Walk 3. Shoulder push-out 4. F/support hops 5. Lower back lifts 6. Stomach stable 2	3 x 8 2 x 7 dips 2 x 10 1 L + 1 R circle 2 x 10 3 x up for 5 sec.			
Technical Preparation	Prerequisites			1. Stretch jump from springboard			
	Exercises				1. Mat land position		
	Progression					1. Hop springboard and land OTT	
Mental	Experimental						None
	* Control						None

## Appendix H: Testing the Headspring

The gymnasts will be tested on the Headspring (marked out of 10 points): deductions can be taken in 0,50 of a point:

1. Head position - hairline touching floor with the head in triangle with the arms, but the head slightly closer to the hands than in the Headstand – 2 points  
- elbows must be shoulder-width – not open arms
  2. Hips pushing - from the Headspring starting position in the pike, the gymnast must push the hips through the vertical line – 2 points
  3. Hips pass vertical - the gymnast must wait until his hips passed through the vertical before initiating the kip action – 2 points
  4. Kip action - the gymnast must swing his legs upwards and forwards and start pushing off powerfully with his arms – 2 points
  5. Flight phase - the body must be arched during the flight phase until the feet reached the floor – 2 points  
- landing errors can be taken if the gymnast falls back
- The gymnast will hop from the a box unto one thick mat and perform the headspring onto one thin-thick mat (OTT)
  - No spotting will be allowed
  - The gymnasts will have **3 opportunities** to perform the Headspring
  - All the gymnasts will be video taped and judged from the video tape to examine all the technical and execution errors
  - The judges will not know which gymnast belongs to which group
  - After the testing all the data will be used for statistical analysis to determine whether the mental training had an effect on the gymnasts' skill acquisition of the Headspring

**1. How does your body feel when you have to do a testing or competition?**

<i>Gymnast</i>	<i>Before interventions</i>	<i>After interventions</i>
C 1	My stomach aches	Pain in my back
C 3	Weak, nervous and shaky	Don't know
C 5	Shaky	Loose
C 7	Strong	Fine, but a little shaky
C 8	Nervous, but I feel stronger the more we train	So nervous that I wee-wee in my pants
C 12	Not sure	I don't feel anything funny
C 16	Nervous - my arms get tingly	Nervous in my head
C 17	Shaky	Shaky
C 18	My body feels warm	Warm, nice, comfortable
C 20	Warm and weak	I feel funny in my tummy
C 21	My face feels messed up	Don't know
C 22	Don't know	Shaky, nervous
E 2	Don't know	I feel I can move fast
E 4	Nice and strong	I feel good and strong
E 6	My legs and arms feel good and strong	It feels tight in my tummy
E 9	Excited, feel strong for competitions	A little bit shaky and my tummy feels funny
E 10	Pain in upper-body and legs and then later flexible	Shivering
E 13	Don't know	Don't know
E 14	Strong and nice	Nice and warm
E 15	I'm sore	Heavy and shaky
E 19	Warm and a funny feeling in my tummy	Nervous in my tummy, my heart is racing
E 23	Strong	It feels tight in my tummy
E 24	It feels nice - I like flying through the air	Excited through-out my hole body
E 25	I feel strong and nice	Strong and nice, but shaky

**2. What do you think about during a testing or competition?**

<i>Gymnast</i>	<i>Before interventions</i>	<i>After interventions</i>
C 1	I don't know	Think about the elements
C 3	Not much	Don't know
C 5	Think about the element	I must win a prize
C 7	Will I win or lose	I must do it right
C 8	Try my best to come 1st, want my parents to be proud	I will probably do well
C 12	I think what I must do	How well I should do
C 16	Think about end of comp., practice with other coach	I must not fall
C 17	I think that I am good and that I can do this	I must do well
C 18	How we played games at the beginning	I think I'm gonna fall and not make it
C 20	I don't know	How will I do
C 21	I want to do my best	Don't know
C 22	Don't know	I like it, it is fun
E 2	Don't know	Don't know
E 4	What mark I will get, wonder whether I will do well	I think how I must do the element correctly
E 6	I think that I am very good	How I must do the headspring
E 9	Think about the element that I must do	How I must do the headspring
E 10	Try my best, try to tell myself that I do well	Try my best, do it and get it over with
E 13	Don't know	Have to do well
E 14	Don't know - I like doing competitions	I can do well
E 15	Think how I must do the element	How I must do the headspring
E 19	Try my best, get a good mark, stand correctly	Not to get any bad marks
E 23	Element that I must do	How I must do the headspring
E 24	Gymnastics - I have to do my best	Try my best, how I must do the headspring correctly
E 25	Being good and doing well in the headspring	How I must do the headspring

**3. How do you feel (emotions) during a testing or competition?**

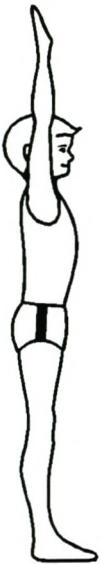
<i>Gymnast</i>	<i>Before interventions</i>	<i>After interventions</i>
C 1	I like doing competitions, afraid to do it incorrectly	Bad
C 3	Happy - I like competitions	Don't know
C 5	Happy - I like competitions	Nice
C 7	Shy, I feel good about myself	Afraid that I will not make it, also happy and nervous
C 8	Afraid of not getting it right, shy and uncertain	Afraid of getting it wrong, afraid of the camera
C 12	I like doing competitions	Excited
C 16	I'm not going to succeed, I want to go to next level	Afraid of getting it wrong
C 17	I am afraid that I can't do the element	Afraid, my heart is racing
C 18	Nice - there is nothing else	Happy because I did well
C 20	I don't know	Nervous
C 21	I am afraid that I don't do the element well enough	Don't know
C 22	Don't know	Happy - I like it
E 2	Don't know	Shy and not so nice
E 4	Afraid, nervous, happy	I am not afraid, I know I can do it, I feel good
E 6	Afraid - the others are making too much noise, like it	Nice - I like gymnastics
E 9	Afraid to do it wrong, a little nervous	Happy and excited, I like gymnastics
E 10	Excited and nervous, my arms are numb	Very good, excited and happy
E 13	Don't know	Don't know
E 14	Happy - I like gymnastics	I like gymnastics
E 15	Happy - I like gymnastics	Nice - I know I can do this
E 19	I feel nice, but nervous	Happy
E 23	Happy, but afraid of getting hurt	Afraid of getting hurt
E 24	Excited	Happy to do as well as possible
E 25	I feel good and happy	I have to try my best then I will be happy

## **Appendix J: The Headspring analysed**

The Headspring can be broken down into the following stages:

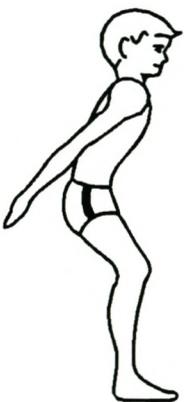
### 1. Stand position

- The gymnast faces forward and stands in an upright position with his feet and legs together, his arms straight up into the air and his hands turned towards each other with the fingers neatly together



### 2. Swing arms down forward to the back

- The gymnast faces forward and while swinging down his arms forward all the way to the back he also bends his knees



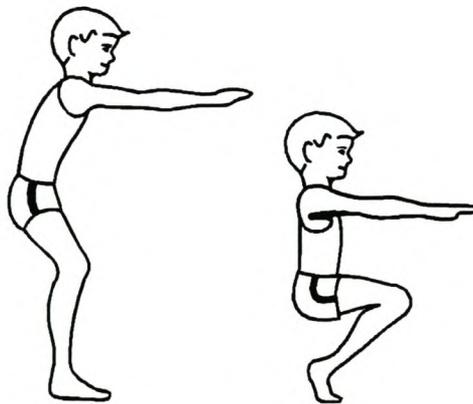
3. The **Stretch jump**

- The gymnast faces forward and while swinging his arms up he jumps up in a forwards direction into a stretched body position



4. Landing in **Squad stand** position

- The gymnast faces forward and lands with his feet and knees together and his arms stretched to the front with his hands facing the green mat and his fingers neatly together. The gymnast bends his knees on impact with the mat and keeps his upper body in a slightly forward position



5. Putting his hands down

- The gymnast faces downwards and takes his hands down to the mat almost one meter in front of his feet. Just before the gymnast puts his hands down he opens his fingers widely and then places his hands shoulder-width apart on the mat

6. Placing his head on the mat

- The gymnast focuses on a spot about fifteen centimeters in front of the middle of his two hands so that his two hands and his head would form a triangle. The gymnast bends his arms and aims to place his head so that his hairline is on the spot. While bending his arms the gymnast also extends his legs in order to shift his kinetic energy to his hips. The gymnasts' elbows are also shoulder-width apart

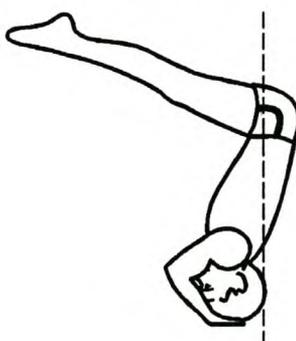
7. The **Headspring pike** position

- The gymnasts' head is on the mat with the hairline touching the mat
- His head and hands form a triangle
- His arms and elbows are shoulder-width
- His arms are bend with the fingers facing forward
- His legs are straight



8. Pulling his hips through the vertical line

- The gymnast keeps his body in the Headspring pike position and uses the kinetic energy to pull his hips through the vertical line. The gymnast's hips will have the necessary potential energy for the upward movement at the stage where his hips go over his shoulders and his upper body is leaning slightly over his head.

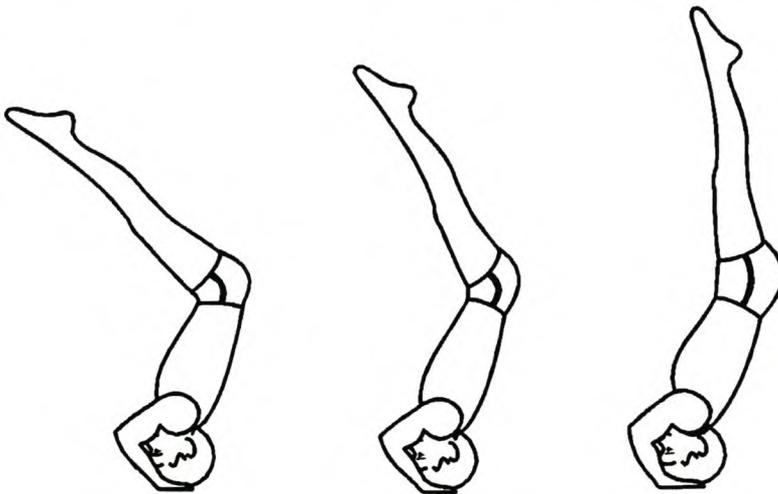


9. The gymnast is still looking at the floor

10. The gymnast must feel his hips going through the vertical line

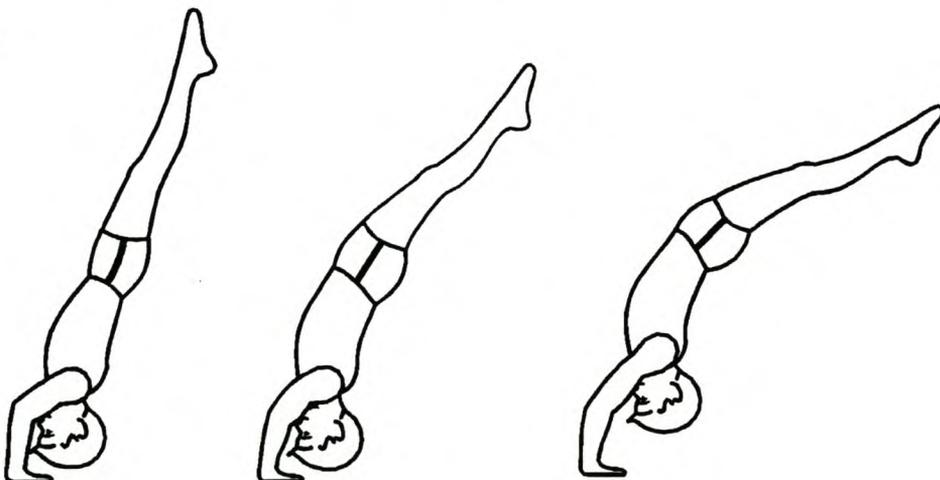
11. The **Kip action** with the legs

- The gymnast waits until his hips are over his shoulder line and then drives powerfully with his feet right over his hips in a forward direction. The gymnast's upper body remains in the same position throughout this kip action.



12. The **Push off** with the arms

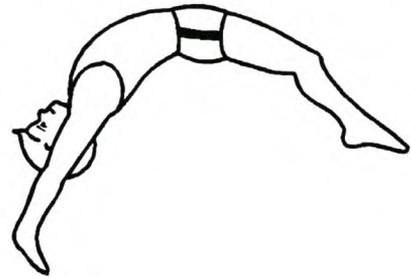
- The gymnast waits until his hips are extended and his body is in a line with his feet and hips over his shoulder line. At this stage the gymnast starts pushing off very powerfully with his arms into a straight arm position.
- The drive action with his feet is now starting to take his feet down while his upper body is lifting up.
- The gymnast keeps on looking at his hands during this stage.



### 13. The **Flight phase**

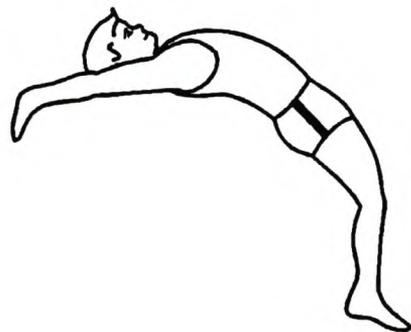
The gymnast is in the air for a split second.

- The powerful push off with the arms is still taking the upper body in an upward direction while the kip action with the legs is still taking the feet downwards.
- The gymnast is in an arched position with his arms straight, his back hollowed, his hips pushed forwards completely, his legs almost straight and his feet neatly together.
- The gymnast is looking at his hands in this position.



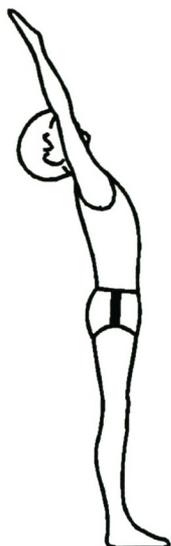
### 14. The **Landing**

- The gymnast's body is still in an arched position as before
- The gymnast is looking at the ceiling
- The gymnast keeps pushing his hips forward
- As his feet make contact with the mat he bends his legs a bit to control the impact and he keeps pushing his hips forward



### 15. Upper body moving forwards

- The powerful push off with the arms as well as the pushing forwards with the hips are bringing the gymnast's upper body more forwards until the gymnast is almost in the standing position so that the gymnast can control his landing
- The gymnast starts to look forwards at this stage



#### 16. Stand position

- The gymnast stops his movement where he faces forward and stands in an upright position as the stand in Stage 1



**Appendix K: The mental training script*****Sessie 1: Sielkundige inoefening van napestand tot nape bridge***

Hallo ... meneer Henk het seker vir julle verduidelik wat julle by my gaan kom doen, né ... vandag gaan ons met prentjies in ons kop te lekker aan ons headspring oefen sodat ons champs kan word en goed kan vaar by kompetisies. Wie van julle wil graag goed doen? Ja, sommer almal ... maar om 'n kampioen te word moet 'n mens luister en vandag gaan ons goed luister en saamwerk ... ons gaan nie tussen in praat nie ... ons praat net deur ons hand te roer, byvoorbeeld as ek vra: "Kan jy jousef sien staan op die houtvloer by die mooi, dik blou mat, dan roer jy jou hand want dan weet ek dat jy jousef kan sien staan by die mat. (Maak seker dat almal verstaan wat bedoel word.) Luister nou mooi en doen mooi wat ek sê. Ons trek ons bolyf se spiere saam (laat almal dit doen ... 7 tellings) en ontspan ... laat die hele bolyf slap word. Trek die onderlyf se spiere saam (7 tellings) en ontspan (x2). Maak die oë toe en sien jou self lê op 'n heerlike sagte mat ... so 'n wollerige mat ... te lekker. Voel hoe sak jy in die heerlike mat weg ... al hoe dieper en dieper en jou spiere word al hoe slapper en slapper. Dit voel asof jy sommer so wegsweef ... te lekker. Ek gaan nou stadig van 1 tot 5 tel en met elke telling gaan jy, nes laas, al hoe dieper in die heerlike mat wegsak. By die telling van 5 gaan jy heerlik in die mat weggesak wees (tel stadig van 1 tot 5 met die gepaardgaande suggesties.) By die telling van 5 sê: "Jy is nou heerlik weggesak en nou gaan jy mooi luister en in jou gedagtes 'n lekker prentjie maak."

Sien jou self staan in die groot saal op die houtvloer voor die dik blou mat met twee sponsmatte wat voor die mat lê. Jy loop nou na die dik blou mat en gaan lê daarop met jou kop en bolyf op die pragtige dik blou mat. Jou voete is netjies bymekaar op die vloer van die saal ... net soos wat jy dit geoefen het ... en jou voete help jou bene en heupe om in die lug te bly, weg van die dik blou mat ... jou arms is reguit langs die boonste gedeelte van jou liggaam (bolyf) op die lekker dik mat. Sodra jy jou self so netjies kan sien lê net soos jy alreeds geoefen het ... wys vir my met jou hand (kyk of almal 'n teken met hulle hande gegee het). Baie mooi ... julle werk pragtig saam. En soos jy daar netjies lê, rol terug sodat jou voete die dik mat raak, strek nou jou heupe na bo in die napestand posisie met 'n reguit liggaam en tone gepunt na die dak, terwyl jyself, die heelyd, na die dak bly kyk ... net soos jou meneer jou geoefen het. Jy druk nou jou heupe liggies vorentoe, terwyl jy jou liggaam steeds gestrek hou ... mooi ... jy val nou vorentoe met jou uitgestrekte onderlyf vanuit die napestand, terwyl jy

jou arms, bolyf en kop op die mat hou ... en soos wat jy nou kan voel hoe jou bene vorentoe en afwaarts (grond toe) val buig jy jou bene en laat jou voete die grond raak terwyl jou heupe uitgestrek bly. Jy land nou in jou nape bridge posisie net soos wat jy geleer en geoefen het ... kop kyk na die plafon, arms is reguit langs die bolyf op die dik mat, jou bolyf is opgelig bo die dik mat omdat jy so lekker met jou heupe druk, jou heupe is uitgestrek en bene is gebuig netjies langs mekaar.

Goed ... maak oop julle oë en kyk na my. Sien julle hoe lekker kan 'n mens die stappe van die nape bridge in jou kop oefen ... sommer al die bewegings van die begin af. Ek wil nou hê dat julle dit nou gou vir my moet oefen ... mooi. Julle moet sommer elke dag by die huis ook oefen, want dan gaan jy goed presteer as jy die bewegings by 'n kompetisie moet doen. Ek gaan nou al die stappe vir jou voor sê en dan doen jy dit self, presies soos ek sê. Kom ons begin: Trek die bolyf se spiere saam ... en ontspan. Trek die onderlyf se spiere saam ... en ontspan ... kom ons doen dit nog 'n keer ... trek bolyf saam en ontspan, trek onderlyf saam en ontspan ... maak jou oë toe en haal tweekeer lekker stadig asem en voel hoe jy in daardie lekker sagte mat in wegsak ... tel stadig en saggies vir jouself van een tot vyf en voel hoe jy nog lekkerder wegsak ... te lekker. En nou gaan jy deur die bewegings soos ek nou-nou met jou gedoen het ... sien jou self staan op die houtvloer ... sien jouself soos jy gaan lê op die dik blou mat ... en doen al jou bewegings in jou kop ... net soos jy geoefen het by mnr. Henk ... doen dit gou in jou gedagtes (gee 'n rukkie tyd dat hul dit doen). Mooi ... sien julle hoe dit werk ... ons oefen ons bewegings in ons kop en so gaan ons dit elke dag by die huis oefen, want ons wil champs word. (Indien die tyd dit toelaat, sê). Goed, kom ons kyk hoe oulik is julle ... doen die oefening self sonder dat ek iets hoef te sê, net soos wat jy dit by die huis gaan oefen ... voor ek julle lekkers vir julle gaan gee. Begin (as hul klaar is) ... mooi.

### ***Sessie 2: Sielkundige inoefening van die nape pike en kip tot die staan posisie***

Sien jou self staan in die groot saal op die houtvloer voor die dik blou mat met twee sponsmatte wat voor die mat lê. Jy loop nou na die dik blou mat en gaan lê daarop met jou kop en boonste lyf op die pragtige dik blou mat. Jou voete is netjies bymekaar op die vloer van die saal ... net soos wat jy dit geoefen het ... en jou voete help jou bene en heupe om in die lug te bly, weg van die dik blou mat ... jou arms is reguit langs die boonste gedeelte van jou liggaam (bolyf) op die lekker dik mat. Sodra jy jou self so netjies kan sien lê net soos jy alreeds geoefen het ... wys vir my met jou hand (kyk of almal hulle 'n teken met hulle hande

gegee het). Baie mooi ... julle werk pragtig saam. En soos jy daar netjies lê, rol terug sodat jou voete die dik mat raak. Buig nou jou arms in sodat jou hande mooi langs jou kop lê met jou vingers na jou skouers toe gedraai. Jy is nou in die nape pike posisie ... jou tone is gepunt op die dik mat met jou voete mooi teen mekaar, jou bene is mooi reguit styf teen mekaar en jou arms is mooi teen jou kop sodat jou elmboë mooi toe is ... soos julle dit geoefen het. Meneer Henk sê nou “pull your hips through” en jy druk nou jou heupe liggies vorentoe, terwyl jy jou liggaam steeds in die nape pike posisie hou. Kan julle voel hoe druk julle die heupe vorentoe ... mooi. Meneer sê nou “kip” en jy swaai jou stywe reguit bene met jou gepunte tone vinnig vorentoe en af ... kan julle voel hoe lekker vinnig julle bene swaai ... mooi. Net voor jou voete grond raak, buig jy jou bene en jy land nou in jou nape bridge posisie net soos wat jy geleer en geoefen het ... kop kyk na die plafon, arms is net langs die kop op die dik mat met jou elmboë toe, jou bolyf is opgelig bo die dik mat omdat jy so lekker met jou heupe druk, jou heupe is uitgestrek en bene is gebuig netjies langs mekaar. Jy druk nou hard en vinnig uit met jou arms totdat jou arms reguit is ... kan julle voel hoe vinnig lig jou bolyf van die mat op ... mooi. Jy is nou in die krapstaan posisie ... jou voete is op die grond met jou bene styf teen mekaar, jou heupe is mooi vorentoe (op na die dak) gedruk, jou kop kyk na jou hande op die dik blou mat en jou arms is mooi reguit omdat jy so sterk en vinnig gedruk het ... kan julle sien hoe julle in die krapstaan posisie staan ... mooi. Meneer kom nou en trek jou agter jou skouers op ... jy hou aan om jou heupe vorentoe te druk en jy bly kyk na jou hande totdat jy in ‘n staan posisie stop. Jy staan nou dood stil op die sponsmatjies op die vloer ... jou voete en bene is teen mekaar, jou heupe is nog vorentoe gedruk, jou kop kyk na jou hande en jou arms is mooi reguit met jou vingers wat gestrek is na die dak toe.

### ***Sessie 3: Sielkundige inoefening van die squad stand tot in die nape spring***

Sien jou self staan in die groot saal op die houtvloer voor die twee dik blou matte met twee sponsmatte wat voor die dik mat lê. Jy loop nou na die dik blou matte en gaan staan in die squad stand posisie in die middel van die pragtige dik blou mat. Jou voete is netjies bymekaar op die mat, jou bene is effens gebuig en jou arms is uitgestrek na voor met jou vingers mooi bymekaar ... net soos wat jy dit geoefen het. Sodra jy jouself so netjies kan sien staan net soos jy alreeds geoefen het ... wys vir my met jou hand (kyk of almal hulle ‘n teken met hulle hande gegee het). Baie mooi ... julle werk pragtig saam. En soos jy daar netjies staan, sit jy jou hande ver voor jou neer met jou vingers lekker wyd oop na vorentoe. Druk

nou jou bene reguit, trek jou kop ver in en buig jou arms in sodat jou hande mooi langs jou kop lê met jou vingers na jou skouers toe gedraai. Jy is nou in die nape pike posisie met jou heupe lekker ver vorentoe ... jou tone is gepunt op die dik mat met jou voete mooi teen mekaar, jou bene is mooi reguit styf teen mekaar en jou arms is mooi teen jou kop sodat jou elmboë mooi toe is ... soos julle dit geoefen het. Meneer Henk sê nou “kip” en jy swaai jou stywe reguit bene met jou gepunte tone vinnig vorentoe en af ... nou druk jy baie sterk af met jou arms sodat jy lekker in die lug in op gaan ... kan julle voel hoe lekker vinnig julle bene swaai en hoe lekker jy deur die lug trek ... mooi. Jy is nou in die lug in die arched posisie ... jou tone is mooi gepunt en teen mekaar, jou bene is reguit en teen mekaar, jy druk jou heupe lekker vorentoe, jy kyk na jou hande met jou arms wat lekker reguit bo jou kop is soos jy so sterk afgedruk het. Net voor jou voete grond raak, buig jy jou bene effens en jy bly aan om jou heupe lekker vorentoe te druk ... mooi. Jy land nou in die staan posisie ... net soos jy dit geleer het. Jy staan nou dood stil op die sponsmatjies op die vloer ... jou voete en bene is teen mekaar, jou heupe is nog vorentoe gedruk, jou kop kyk na jou hande en jou arms is mooi reguit met jou vingers wat gestrek is na die dak toe.

#### ***Sessie 4: Sielkundige inoefening van die squad stand tot in die headspring***

Sien jou self staan in die groot saal op die houtvloer voor die twee dik blou matte met twee sponsmatte wat voor die dik matte lê. Jy loop nou na die dik blou matte en gaan staan in die squad stand posisie in die middel van die pragtige dik blou mat. Jou voete is netjies bymekaar op die mat, jou bene is effens gebuig en jou arms is uitgestrek na voor met jou vingers mooi bymekaar ... net soos wat jy dit geoefen het. Sodra jy jouself so netjies kan sien staan net soos jy alreeds geoefen het ... wys vir my met jou hand (kyk of almal hulle ‘n teken met hulle hande gegee het). Baie mooi ... julle werk pragtig saam. En soos jy daar netjies staan, sit jy nou jou hande ver voor jou neer met jou vingers lekker wyd oop na vorentoe. Druk nou jou bene lekker reguit en sit jou kop op die voorpunt voor jou hande neer sodat jou arms buig. Jy is nou in die headspring pike posisie met jou tone gepunt op die dik mat en jou voete is mooi teen mekaar, jou bene is mooi reguit styf teen mekaar en jou arms is mooi gebuig met jou kop voor jou hande sodat jou elmboë mooi toe is ... soos julle dit geoefen het. Meneer Henk sê nou “pull your hips through” en jy druk nou jou heupe liggies vorentoe, terwyl jy jou liggaam steeds in die headspring pike posisie hou. Kan julle voel hoe druk julle die heupe vorentoe ... mooi. Meneer Henk sê nou “kip” en jy swaai jou stywe reguit bene met jou gepunte tone vinnig vorentoe en af ... nou druk jy baie sterk af met jou arms totdat jou

arms reguit gedruk is sodat jy lekker in die lug in op gaan ... kan julle voel hoe lekker vinnig julle bene swaai en hoe lekker jy deur die lug trek ... mooi. Jy is nou in die lug in die arched posisie ... jou tone is mooi gepunt en teen mekaar, jou bene is reguit en teen mekaar, jy druk jou heupe lekker vorentoe, jy kyk na jou hande met jou arms wat lekker reguit bo jou kop is soos jy so sterk afgedruk het. Net voor jou voete grond raak, buig jy jou bene effens en jy bly aan om jou heupe lekker vorentoe te druk ... mooi. Jy land nou in die staan posisie ... net soos jy dit geleer het. Jy staan nou dood stil op die sponsmatjies op die vloer ... jou voete en bene is teen mekaar, jou heupe is nog vorentoe gedruk, jou kop kyk na jou hande en jou arms is mooi reguit met jou vingers wat gestrek is na die dak toe.

### ***Sessie 5: Sielkundige inoefening van die hop tot in die headspring***

Sien jou self staan in die groot saal op die houtvloer voor die twee dik blou matte met twee sponsmatte wat voor die dik matte lê. Agter die twee dik blou matte staan daar 'n hout springkas. Jy loop nou na die hout springkas en gaan staan in die staan stand posisie op die punt van die springkas. Jou voete is netjies bymekaar op die springkas, jou bene is reguit en jou arms is uitgestrek na bo met jou vingers mooi bymekaar ... net soos wat jy dit geoefen het. Sodra jy jouself so netjies kan sien staan net soos jy alreeds geoefen het ... wys vir my met jou hand (kyk of almal hulle 'n teken met hulle hande gegee het). Baie mooi ... julle werk pragtig saam. En soos jy daar netjies staan, doen jy 'n stretch jump tot in die middel van die dik blou mat ... jy swaai jou arms af, jy buig jou bene, dan swaai jy jou arms vinnig vorentoe en op en spring hoog op in die lug en gaan land in die middel van die dik blou mat. Jy is nou in die squad stand posisie ... kan jy sien hoe jy in squad stand posisie op die dik blou mat staan ... mooi. Jy sit nou jou hande ver voor jou neer op die mat met jou vingers lekker wyd oop na vorentoe. Druk nou jou bene lekker reguit en sit jou kop op die voerpunt voor jou hande neer sodat jou arms buig. Jy is nou in die headspring pike posisie met jou tone gepunt op die dik mat en jou voete is mooi teen mekaar, jou bene is mooi reguit styf teen mekaar en jou arms is mooi gebuig met jou kop voor jou hande sodat jou elmboë mooi toe is ... soos julle dit geoefen het. Meneer Henk sê nou "pull your hips through" en jy druk nou jou heupe liggies vorentoe, terwyl jy jou liggaam steeds in die headspring pike posisie hou. Kan julle voel hoe druk julle die heupe vorentoe ... mooi. Meneer Henk sê nou "kip" en jy swaai jou stywe reguit bene met jou gepunte tone vinnig vorentoe en af ... nou druk jy baie sterk af met jou arms totdat jou arms reguit gedruk is sodat jy lekker in die lug in op gaan ... kan julle voel hoe lekker vinnig julle bene swaai en hoe lekker jy deur die lug trek ... mooi. Jy is nou in die

lug in die arched posisie ... jou tone is mooi gepunt en teen mekaar, jou bene is reguit en teen mekaar, jy druk jou heupe lekker vorentoe, jy kyk na jou hande met jou arms wat lekker reguit bo jou kop is soos jy so sterk afgedruk het. Net voor jou voete grond raak, buig jy jou bene effens en jy bly aan om jou heupe lekker vorentoe te druk ... mooi. Jy land nou in die staan posisie ... net soos jy dit geleer het. Jy staan nou dood stil op die sponsmatjies op die vloer ... jou voete en bene is teen mekaar, jou heupe is nog vorentoe gedruk, jou kop kyk na jou hande en jou arms is mooi reguit met jou vingers wat gestrek is na die dak toe.

### ***Sessie 6: Sielkundige inoefening van die hop tot in die headspring (dun mat)***

Sien jou self staan in die groot saal op die houtvloer voor die twee dun groen matte wat agter mekaar lê en die blou springplank wat agter die dun matte lê. Jy loop nou na die blou springplank en gaan staan in die staan stand posisie op die wit kol op die blou springplank. Jou voete is netjies bymekaar op die springplank, jou bene is reguit en jou arms is uitgestrek na bo met jou vingers mooi bymekaar ... net soos wat jy dit geoefen het. Sodra jy jouself so netjies kan sien staan net soos jy alreeds geoefen het ... wys vir my met jou hand (kyk of almal hulle 'n teken met hulle hande gegee het). Baie mooi ... julle werk pragtig saam. En soos jy daar netjies staan, doen jy 'n stretch jump tot in die middel van die dun groen mat ... jy swaai jou arms af, jy buig jou bene, dan swaai jy jou arms vinnig vorentoe en op en spring hoog op in die lug en gaan land in die middel van die dun groen mat. Jy gaan nou deur die squad stand posisie ... kan jy sien hoe jy deur die squad stand posisie op die dun groen mat gaan ... mooi. Jy sit nou jou hande vinnig ver voor jou neer op die mat met jou vingers lekker wyd oop na vorentoe. Nou druk jy jou bene lekker vinnig reguit en sit jou kop vinnig op die voerpunt voor jou hande neer sodat jou arms vinnig buig. Jy gaan nou deur die headspring pike posisie met jou tone gepunt en jou voete is mooi teen mekaar, jou bene is mooi reguit styf teen mekaar en jou arms is mooi gebuig met jou kop voor jou hande sodat jou elmboë mooi toe is ... soos julle dit geoefen het. Jy druk nou jou heupe vinnig vorentoe, terwyl jy jou liggaam steeds in die headspring pike posisie hou. Kan jy voel hoe druk jy jou heupe vinnig vorentoe ... mooi. Jy kip nou jou stywe reguit bene met jou gepunte tone vinnig vorentoe en af ... nou druk jy baie sterk af met jou arms totdat jou arms reguit gedruk is sodat jy lekker in die lug in op gaan ... kan julle voel hoe lekker vinnig julle bene swaai en hoe lekker jy deur die lug trek ... mooi. Jy is nou in die lug in die arched posisie ... jou tone is mooi gepunt en teen mekaar, jou bene is reguit en teen mekaar, jy druk jou heupe lekker vorentoe, jy kyk na jou hande met jou arms wat lekker reguit bo jou kop is soos jy so sterk

afgedruk het. Net voor jou voete die groen mat raak, buig jy jou bene effens en jy bly aan om jou heupe lekker vorentoe te druk ... mooi. Jy land nou in die staan posisie ... net soos jy dit geleer het. Jy staan nou dood stil op die dun groen mat ... jou voete en bene is teen mekaar, jou heupe is nog vorentoe gedruk, jou kop kyk na jou hande en jou arms is mooi reguit met jou vingers wat gestrek is na die dak toe ... baie mooi.

## **Appendix L: Analyses of the Headspring for the mental training program**

### General:

- The mental training program differed depending on how far the gymnasts progressed with the Headspring teaching program.
- Only one mental training session per week was given to the experimental group.
- Seeing that the first week of teaching only consisted of the prerequisites, the first mental training session started on Day 3, Teaching Step 4.

### Environment:

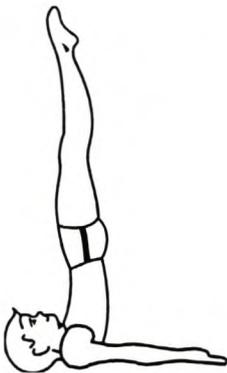
- The gymnasts practiced in the same hall everyday through out the Headspring program
- It was big hall with a wooden floor and it contained no fixed apparatuses
- The gymnasts always practiced on a couple of sponge mats and a variety of thick mats
- They practiced in a group of 12 gymnasts (again divided in 4 groups of 3)

### Apparatuses:

- The following apparatuses were used during the program:
  1. Floor area - a big wooden floor area
  2. Fillers - thin sponge mats
  3. Harder thick mats - big and blue (30 cm thick)
  4. Softer thick mats - big and yellow (30 cm thick)
  5. Thin-thick mats - thin green mats (12 cm thick)
  6. Springboards - blue in colour
  7. Box - wooden boxes which could be staged on top of each other

**Mental Training - Session 1 (Day 3, Training Step 4)**

1. The gymnast trains in the big hall on the wooden floor area.
2. There is a thick blue mat on the floor with two fillers in front of it.
3. The gymnast goes to the thick blue mat and lie down on it so that his head and upper body is on the thick blue mat.
4. His feet are on the floor neatly together and support his legs and hips in the air away from the thick blue mat.
5. His arms are straight next to his upper body on the thick mat.
6. The gymnast rolls back so that his feet touch the thick mat and then he extends his hips upward into the **Napestand** position with a straight body and toes pointed at the ceiling.



7. The gymnast looks at the ceiling the hole time.
8. The gymnast pushes his hips slightly forward, but keeps his body straight.
9. The gymnast falls forward with his straight lower body out of the Napestand.
10. The gymnast keeps his arms, upper body and head (still looking at ceiling) on the thick mat.

11. As soon as he can feel his legs falling forward and downward, he bends his legs and lets his feet go to the ground by keeping his hips in an over extended position.
12. The gymnast is in the air in this Nape bridge position.
13. His feet make contact with the ground.
14. He keeps pushing out his hips into an over-extended position.
15. The gymnast now lands in the **Nape bridge** position.
  - a) His head is looking at the ceiling.
  - b) Arms are straight next to upper body on thick mat.
  - c) Upper body is lifted from the thick mat due to the pushing of the hips.
  - d) Hips are over-extended.
  - e) Legs are bend and neatly kept together.

<b>Mental Training - Session 2 (Day 5, Training Step 8)</b>
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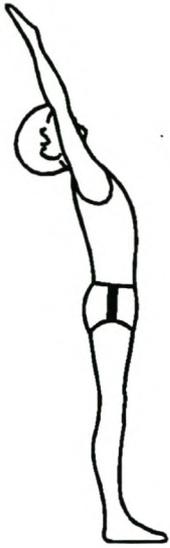
1. The gymnast trains in the big hall on the wooden floor area.
2. There is a thick blue mat on the floor with two fillers in front of it.
3. The gymnast goes to the thick blue mat and lie down on it so that his head and upper body is on the thick blue mat.
4. His feet are on the floor neatly together and support his legs and hips in the air away from the thick blue mat.
5. His arms are straight next to his upper body on the thick mat.
6. The gymnast rolls back so that his feet touch the thick mat and then he extends his hips upward into the **Napestand** position with a straight body and toes pointed at the ceiling.
7. The gymnast looks at the ceiling the hole time.

8. The gymnast pikes down into the **Nape pike** position with his legs so that his toes touch the thick blue mat.



9. In this Nape pike position the gymnast bends his arms and he places his hands so that his fingers (showing to his shoulders) are next to his ears.
10. The gymnast pushes his hips forward and through the **vertical line**, but he keeps his body in the Nape pike position.
11. The gymnast must feel his hips going through the vertical line.
12. The gymnast now **kips** with his legs in a forward and downward direction by extending his hips very fast into an **arched** position.
13. The gymnast keeps his arms and head (still looking at ceiling) on the thick mat.
14. As soon as he can feel his legs falling forward and downward, he bends his legs and lets his feet go to the ground by keeping his hips in an over extended position.
15. The gymnast is in the air in this **Nape bridge** position.
16. His feet make contact with the ground.
17. He keeps pushing out his hips into arched position.
18. The gymnast now lands in the **Nape bridge** position.
19. In this Nape bridge position with his head still looking at the ceiling, the gymnast pushes of with his arms (into straight arms) and the coach pulls the gymnasts' hips so that the gymnast ends up in the arched standing position.

20. The gymnast stands and looks at the ceiling.



**Mental Training - Session 3 (Day 7, Training Step 11)**

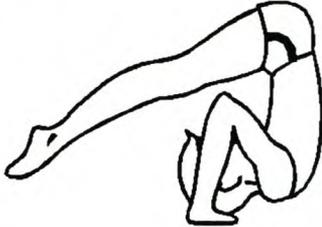
1. The gymnast trains in the big hall on the wooden floor area.
2. There are two thick blue mats on top of each other the floor with two fillers in front of it.
3. The gymnast goes to the two thick blue mats and go sit in a **Squad stand** position in the middle of the top mat.



4. The gymnast faces to the front, his feet are neatly together, his legs are bend, his upper body leans slightly forward and his arms are straightened to the front with the fingers together and his palms facing the thick mat.
5. The gymnast places his hands (fingers spread wide open) shoulder-width on the thick mat and more or less a meter in front of his feet while he looks at his hands.

6. The gymnast does the following three movements simultaneously to end up in the **Nape pike** position:

- a) He bends his arms with his elbows and hands both shoulder-width.
- b) He straightens his legs.
- c) He tucks his head in completely so that he places his nape on the thick mat with his arms bend and his hands next to his ears.



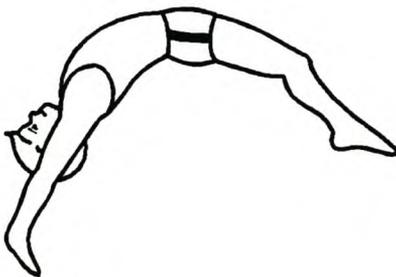
7. The gymnast is now looking at the ceiling.

8. The gymnast pushes his hips forward and through the **vertical line**, but he keeps his body in the Nape pike position.

9. The gymnast must feel his hips going through the vertical line.

10. The gymnast now **kips** with his legs in a forward and downward direction by extending his hips very fast into an **arched** position.

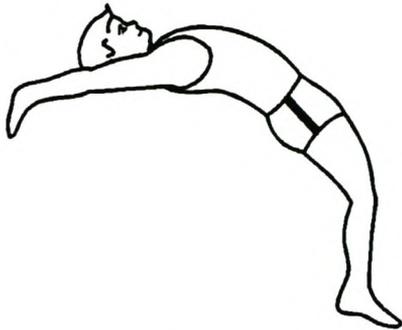
11. The gymnast pushes off powerfully with his arms (into straight arms) and he keeps on looking at the ceiling.



12. For a brief period the gymnast will be in the air in this arched position facing the ceiling, his arms straight next to his ears, his hips pushed forward, his legs (almost straight) and feet neatly together.

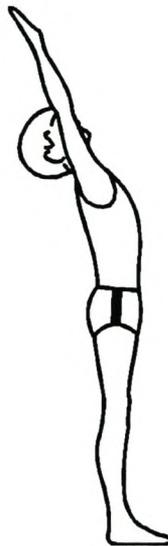
13. His feet make contact with the ground and his body is still in the arched position.

14. He keeps pushing his hips to the front and he lands in the arched position.



15. The force of the kip action and the push off brings his upper body more forward.

16. The gymnast now stands and looks at the ceiling.



**Mental Training - Session 4 (Day 9, Training Step 15)**

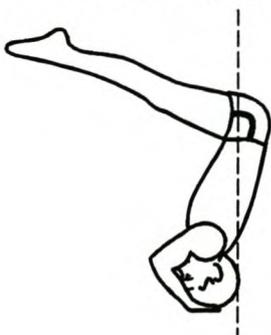
1. The gymnast trains in the big hall on the wooden floor area.
2. There are two thick blue mats on top of each other the floor with two fillers in front of it.
3. The gymnast goes to the two thick blue mats and go sit in a **Squad stand** position in the middle of the top mat.



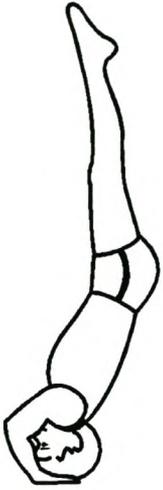
4. The gymnast faces to the front, his feet are neatly together, his legs are bend, his upper body leans slightly forward and his arms are straightened to the front with the fingers together and his palms facing the thick mat.
5. The gymnast places his hands (fingers spread wide open) shoulder-width on the thick mat and more or less a meter in front of his feet while he looks at his hands.
6. The gymnast does the following three movements simultaneously to end up in the **Headspring pike** position:
  - a) He bends his arms with his elbows and hands both shoulder-width.
  - b) He straightens his legs.
  - c) He places his head in a triangle in front of his hands (slightly closer than for the Headstand) with his hairline touching the thick mat.



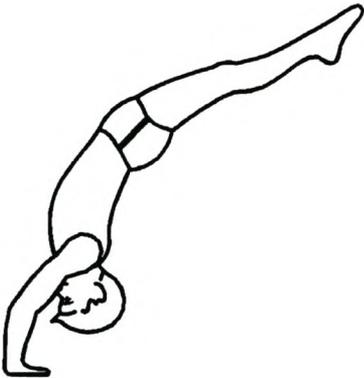
7. The gymnast is now looking at the thick mat.
8. The gymnast pushes his hips forward and through the **vertical line**, but he keeps his body in the Headspring pike position.
9. The gymnast must feel his hips going through the vertical line.



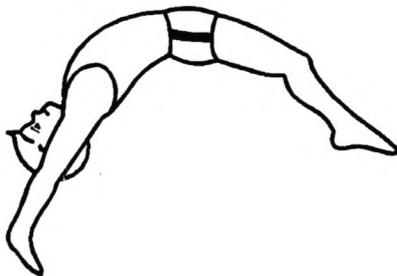
10. The gymnast now **kips** with his legs in a forward and downward direction by extending his hips very fast into an **arched** position.



11. The gymnast pushes off powerfully with his arms (into straight arms) and he keeps on looking at his hands.

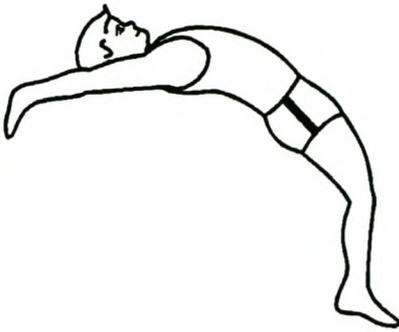


12. For a brief period the gymnast will be in the air in this arched position facing his hands, his arms straight next to his ears, his hips pushed forward, his legs (almost straight) and feet neatly together.



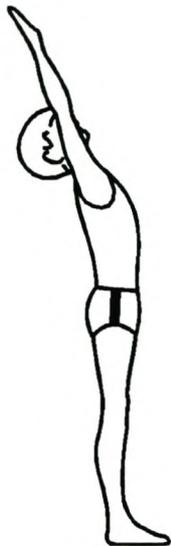
13. His feet make contact with the ground and his body is still in the arched position.

14. He keeps pushing his hips to the front and he lands in the arched position.



15. The force of the kip action and the push off brings his upper body more forward.

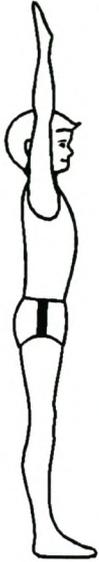
16. The gymnast now stands and looks at his hands that are pointed at the ceiling.



**Mental Training - Session 5 (Day 11, Training Step 18)**

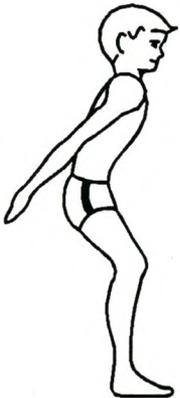
1. The gymnast trains in the big hall on the wooden floor area.
2. There are two thick blue mats on top of each other the floor with two fillers in front of it and two wooden boxes on top of each other behind the thick mats.
3. The gymnast goes to the boxes and stand on the top box on the end closest to the mats and he faces the thick mats.
4. Stand position:

- The gymnast faces forward and stands in an upright position with his feet and legs together, his arms straight up into the air and his hands turned towards each other with the fingers neatly together.



5. He swings his arms down forward to the back:

- The gymnast faces forward and while swinging down his arms forward all the way to the back he also bends his knees.



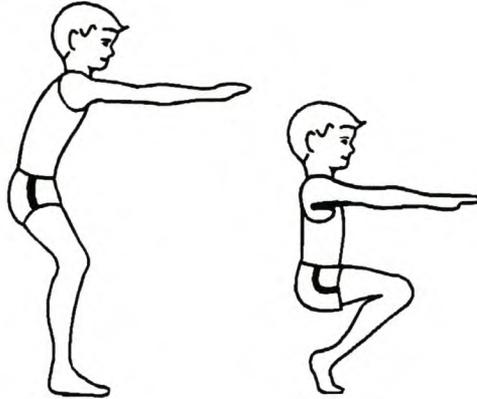
6. The **Stretch jump:**

- The gymnast faces forward and while swinging his arms up he jumps up in a forwards direction into a stretched body position.



7. Landing in **Squad stand** position:

- The gymnast faces forward and lands with his feet and knees together and his arms stretched to the front with his hands facing the mat and his fingers neatly together. The gymnast bends his knees on impact with the mat and keeps his upper body in a slightly forward



8. Putting his hands down:

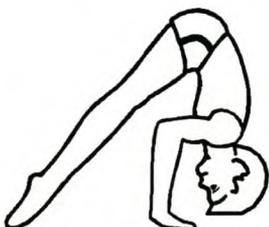
- The gymnast faces downwards and takes his hands down to the mat almost one meter in front of his feet. Just before the gymnast puts his hands down he opens his fingers widely and then places his hands shoulder width apart on the mat.

9. Placing his head on the mat:

- The gymnast focuses on a spot about fifteen centimetres in front of the middle of his two hands so that his two hands and his head would form a triangle. The gymnast bends his arms and aims to place his head so that his hairline is on the spot. While bending his arms the gymnast also extends his legs in order to shift his kinetic energy to his hips. The gymnast's elbows are also shoulder-width apart.

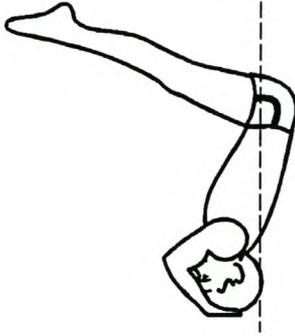
10. The **Headspring pike** position:

- The gymnast's head is on the mat with the hairline touching the mat.
- His head and hands form a triangle.
- His arms and elbows are shoulder-width.
- His arms are bent with the fingers facing forward.
- His legs are straight.



11. Pulling his hips through the vertical line:

- The gymnast keeps his body in the Headspring pike position and uses the kinetic energy to pull his hips through the vertical line. The gymnast's hips will have the necessary potential energy for the upward movement at the stage where his hips go over his shoulders and his upper body is leaning slightly over his head.

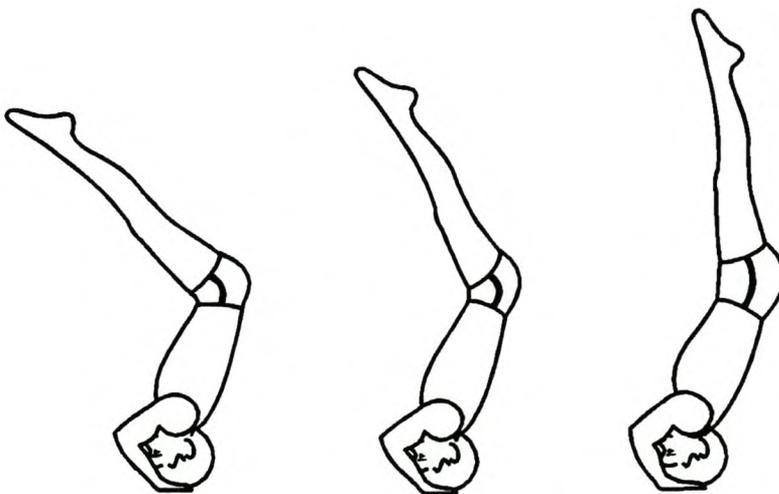


12. The gymnast is still looking at the thick mat.

13. The gymnast must feel his hips going through the vertical line.

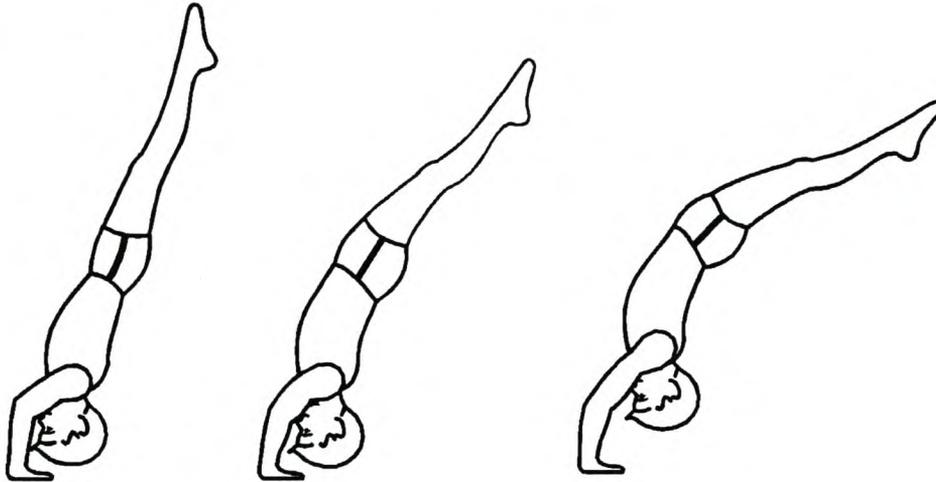
14. The **Kip action** with the legs:

- The gymnast waits until his hips are over his shoulder line and then drives powerfully with his feet right over his hips in a forward direction. The gymnast's upper body remains in the same position throughout this kip action.



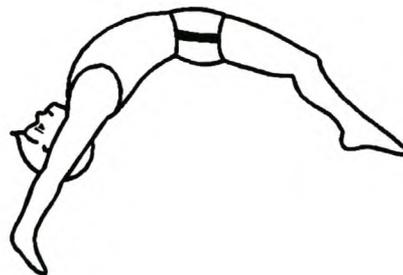
15. The **Push off** with the arms:

- The gymnast waits until his hips are extended and his body is in a line with his feet and hips over his shoulder line. At this stage the gymnast starts pushing off very powerfully with his arms into a straight-arm position.
- The drive action with his feet is now starting to take his feet down while his upper body is lifting up.
- The gymnast keeps looking at his hands during this stage.



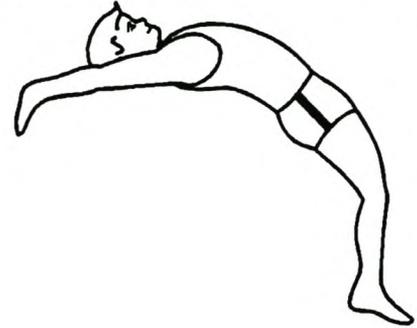
16. The **Flight phase:**

- The gymnast is in the air for a split second.
- The powerful push off with the arms is still taking the upper body in an upward direction while the kip action with the legs is still taking the feet downwards.
- The gymnast is in an arched position with his arms straight, his back hollowed, his hips pushed forwards completely, his legs almost straight and his feet neatly together.
- The gymnast is looking at his hands in this position.



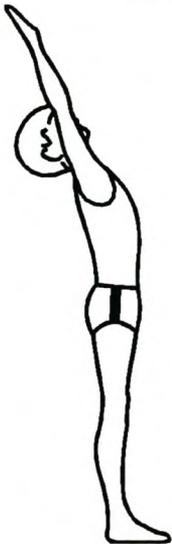
17. The **Landing:**

- The gymnast's body is still in an arched position as before.
- The gymnast is looking at the ceiling.
- The gymnast keeps pushing his hips forward.
- As his feet make contact with the floor he bends his legs a bit to control the impact and keeps pushing his hips forward.



18. Upper body moving forwards:

- The powerful push off with the arms as well as the pushing forwards with the hips are bringing the gymnast's upper body more forwards until the gymnast is almost in the standing position so that the gymnast can control his landing.
- The gymnast starts to look forwards at this stage.



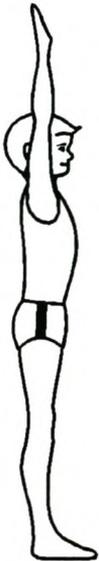
19. Stand position:

- The gymnast stops his movement where he faces forward and stands in an upright position as the stand in Stage 1.



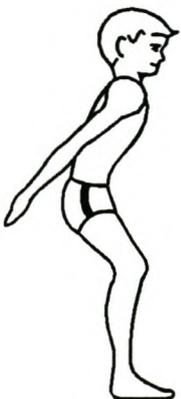
**Mental Training - Session 6 (Day 15, Training Step 22)**

1. The gymnast trains in the big hall on the wooden floor area.
2. There are two thin-thick green mats in front of each other on the floor and a blue springboard behind the green thin-thick mats.
3. The gymnast goes to the springboard and stand on the springboard with his feet on the white dot showing him where to place his feet.
4. Stand position:
  - The gymnast faces forward and stands in an upright position with his feet and legs together, his arms straight up into the air and his hands turned towards each other with the fingers neatly together.



5. Swing arms down forward to the back:

- The gymnast faces forward and while swinging down his arms forward all the way to the back he also bends his knees.



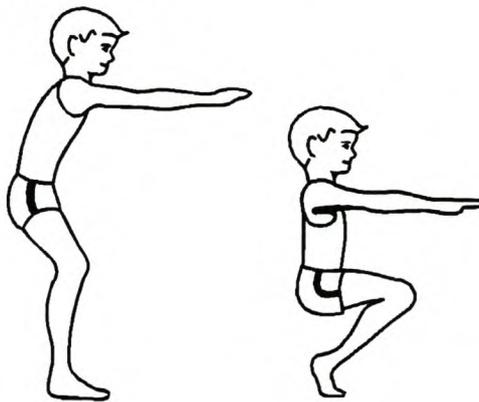
6. The **Stretch jump**

- The gymnast faces forward and while swinging his arms up he jumps up in a forwards direction into a stretched body position



7. Landing in **Squad stand** position:

- The gymnast faces forward and lands with his feet and knees together and his arms stretched to the front with his hands facing the green mat and his fingers neatly together. The gymnast bends his knees on impact with the mat and keeps his upper body in a slightly forward position.



8. Putting his hands down:

- The gymnast faces downwards and takes his hands down to the mat almost one meter in front of his feet. Just before the gymnast puts his hands down he opens his fingers widely and then places his hands shoulder width apart on the mat.

9. Placing his head on the mat:

- The gymnast focuses on a spot about fifteen centimetres in front of the middle of his two hands so that his two hands and his head would form a triangle. The gymnast

bends his arms and aims to place his head so that his hairline is on the spot. While bending his arms the gymnast also extends his legs in order to shift his kinetic energy to his hips. The gymnasts' elbows are also shoulder-width apart.

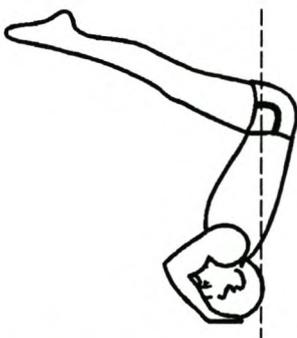
10. The **Headspring pike** position:

- The gymnasts' head is on the mat with the hairline touching the mat.
- His head and hands form a triangle.
- His arms and elbows are shoulder-width.
- His arms are bend with the fingers facing forward.
- His legs are straight.



11. Pulling his hips through the vertical line:

- The gymnast keeps his body in the Headspring pike position and uses the kinetic energy to pull his hips through the vertical line. The gymnast's hips will have the necessary potential energy for the upward movement at the stage where his hips go over his shoulders and his upper body is leaning slightly over his head.

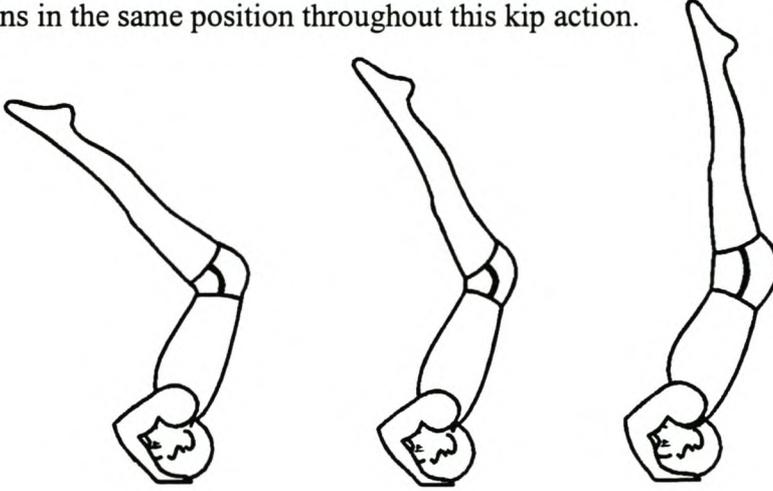


12. The gymnast is still looking at the green mat.

13. The gymnast must feel his hips going through the vertical line.

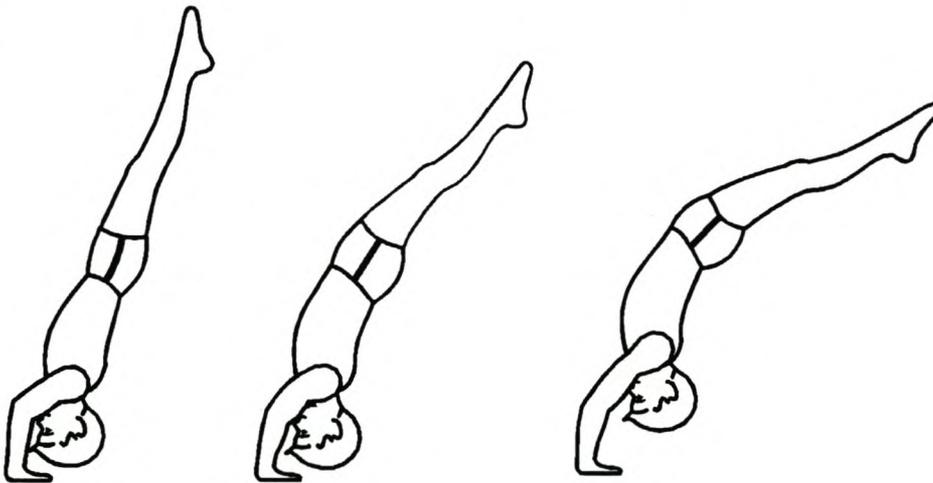
14. The **Kip action** with the legs:

- The gymnast waits until his hips are over his shoulder line and then drives powerfully with his feet right over his hips in a forward direction. The gymnast's upper body remains in the same position throughout this kip action.



15. The **Push off** with the arms

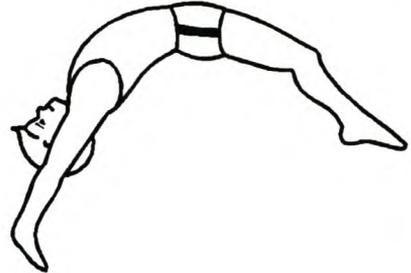
- The gymnast waits until his hips are extended and his body is in a line with his feet and hips over his shoulder line. At this stage the gymnast starts pushing off very powerfully with his arms into a straight-arm position.
- The drive action with his feet is now starting to take his feet down while his upper body is lifting up.
- The gymnast keeps looking at his hands during this stage.



16. The **Flight phase:**

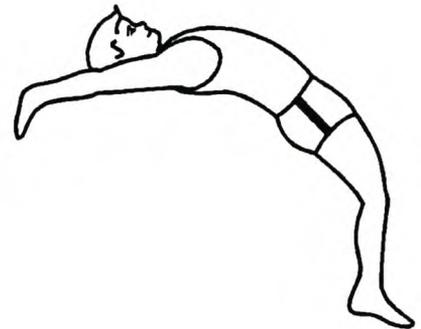
- The gymnast is in the air for a split second.

- The powerful push off with the arms is still taking the upper body in an upward direction while the kip action with the legs is still taking the feet downwards.
- The gymnast is in an arched position with his arms straight, his back hollowed, his hips pushed forwards completely, his legs almost straight and his feet neatly together.
- The gymnast is looking at his hands in this position.



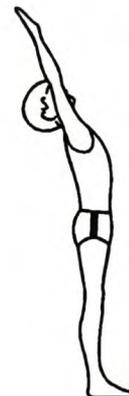
#### 17. The **Landing:**

- The gymnast's body is still in an arched position as before.
- The gymnast is looking at the ceiling.
- The gymnast keeps pushing his hips forward.
- As his feet make contact with the mat he bends his legs a bit to control the impact and he keeps pushing his hips forward.



#### 18. Upper body moving forwards:

- The powerful push off with the arms as well as the pushing forwards with the hips are bringing the gymnast's upper body more forwards until the gymnast is almost in the standing position so that the gymnast can control his landing.
- The gymnast starts to look forwards at this stage.



19. Stand position:

- The gymnast stops his movement where he faces forward and stands in an upright position as the stand in Stage 1.

