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A Comparative Study of Karate and Non-Karate Students on Cognitive Functioning

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Abstract: **The present study aims to find out the karate and non - karate students on cognitive functioning. In the present study a sample of 60 college students were selected by convenient sampling method. The sample was chosen from the various colleges, in Chennai. The age group of the sample ranged from 18 to 24 years. 30 sample were professional Karate students and 30 sample were non karate students. Data were collected by advanced progressive matrices (APM) for intelligence, Flinder's decision making questionnaire for Decision making, PGI memory scale for memory, The Wallach and Kogan creativity instrument of creativity. To find out the difference between in intelligence, decision making, memory and creativity among karate and non karate was analyzed by mean, standard deviations and "t" test were worked out to identify the difference. At the conclusion of the analysis, it was found that there is no significant difference between karate and non-karate students on cognitive.**

Keywords: **Advanced progressive matrices (APM), karate and non-karate students.**

1. INTRODUCTION

Cognitive abilities are of tremendous importance to every human being. An individual's cognitive skills assist him in thinking sensibly, solving problems effectively and taking the right decisions skillfully. The neuropsychological abilities of the brain which can be summarized into the term cognition, occupies a very important role in one's effective functioning. Any alterations or damage to this important component, can affect a person's ability to function normally. Though there may be plenty of differences between various games, based on the mode of play, its rules and regulations, the essential requirement of a sport requires the player to not only use his physical abilities but also necessitates the utilization of his mental skills to win a game. A few games require the player to depend solely on his mental abilities. Others may require a combination of both skills; physical and cognitive. Games like kabaddi, football, soccer, boxing and karate are physically and mentally demanding. The possibilities of acquiring head injuries in such games are very high and therefore damages to an individual's cognition also do not fall far behind.

The present study intends to find out whether karate champions are also susceptible to cognitive impairment caused due to head injuries. The karate sport involves a large number of physical activities such as breaking bricks and ice bars with their bare heads. Breaking and splitting such hard objects with one's head can increases the chance of incurring serious head injuries. Kicking the opponent on the head or crashing one's own head against the other too are commonly seen in the game. As a result of such frequent unintended physical attacks, the player's cognitive components such as intelligence, memory decision making and creativity may or may not undergo damage. This study is therefore aimed at examining the impact of engaging in karate on the valuable component called cognition.

2. COGNITIVE FUNCTIONING

Cognitive functioning deals with the perception of information (you read the), it deals with understanding (you comprehend the question), it deals with thought (you ask yourself whether you know the answer), and it deals with the formulation and production of an answer (you may say, "Cognitive psychology is the study of thinking"). Cognition touches al parts of the perceptual, memory and thinking process and is a prominent characteristic of all people.

Cognitive psychology is the scientific study of the thinking mind and is concerned with:

- How we attend to and gain information about the world
- How that information is stored and processed by the brain
- How we solve problems, think, and formulate language

Cognitive psychology involves the total range of psychological processes – from sensation to perception, neuroscience, pattern recognition, attention, consciousness, learning, memory, concept formation, thinking, imaging, remembering, language, intelligence, emotions, and developmental processes.

3. ABOUT KARATE

There are four main training areas in karate:

Kihon is the basic training that underpins all of karate. It can be readily identified in class by emphasis on correct technique, proper stances and attention to detail. Generally it is performed in rows facing the instructor.

Kata is a pre-arranged sequence of moves, which can be used to practice particular techniques. In kata, the karate is defending himself/herself against imaginary foes. Each kyu grade is assigned a kata to learn for their grading examination.

Kihon-ippon Kumite is literally "basic one-step sparring". Students use this as a stepping stone to full sparring. Two students face each other; one is the attacker, one the defender. The attacker uses a pre-arranged offensive technique (e.g. punch, kick) and the defender responds with a suitable block and counter. Basic sparring is used to develop distance and timing skills.

Kumite literally "sparring". This is the controlled form of fighting used in competition karate. Each participant can use any legal attack or defensive maneouvres. Not all the techniques are allowed since many are deadly and can cause severe damage if applied.

About the Belts:

Karateka can be divided into two classes; Kyu grade and Dan grade. Kyu grades are beginners and can be identified by non black-belts. There are nine types of kyu grades, each with their own colour of belt. 9th kyu are absolute beginners, whilst 1st kyus are approaching black-belt standard. Dan belts are all black (though some might be so worn as to appear white!), and can be classed as serious students of karate. Dan grades go from1st Dan to 10th Dan, although, in practise, 6th Dan and above are quite rare.

4. INTELLIGENCE

For many years, we have been led to believe that a person's intelligence measures as IQ or Intelligence Quotient. Sir Francis Gal ton, a naturalist and mathematician was interested in individual differences. He invented the correlation co-efficient and developed the ideas behind finger printing and eugenics Galton administered a battery of tests measuring such variables as head size, reaction time, Visual acuity, memory for visual forms breathing capacity, and strength of handgrip to over 9000 visitors to the London Exhibition in 1884.

The Intelligence test as known it to day was formulated by the French psychologist Alfred Binet (1857-1911). He assumed that intelligence should be measured by tanks recurring, and problem solving, rather than perceptual motor skills.

Meaning of Intelligence:

Some psychologists view intelligence as a general capacity for comprehension and rearming that manifests itself in various ways. This was Binet assumption, although his test contained many different types of item, they were all assumed to tap general intelligence. Other psychologist see intelligence as an array of special abilities that tend to be positively correlated. They use the statistical method of factor analysis to provide more precise information about the abilities underlying intelligence. As noted in factor analysis in a technique for determining the minimum number of dimensions or factors that account for the observed relations among subjects responses over a large number of different test.

A latter investigator Louis Thrustone (1938), objected to spearman's emphasis on general intelligence could be broken down into a number of primary abilities. To find there such as differences in height this is the normal distribution.

In the 1960 and subsequent revisions of the stand ford- Binet, the authors introduced a method of computing the IQ from tables. The measures of an IQ remains essentially the same as before. But the tables permit correction to allow the IQ at any age to be interpreted some what more exactly, it is now arranged so that for each age the IQ averages 100 and has a standard deviation of IQ.

A modern IQ is merely a test score adjusted for the age of the person being tested. It is therefore no longer a "Quotient" at all, but the expression of IQ persists because of its familiarity and convenience stability of IQ.

The rate of intellectual growth is relatively stable for most people, once they reach school age. Their IQ does not change radically from test to retest even over fairly long time intervals.

IQ are relatively stable for most people after about age seven, some individuals do abilities he applied the method of factor analysis to results from a large number of tests employing many different types of items.

Intelligence Quotient (IQ):

Terman adopted a convenient index of brightness that was suggested by the German Psychologist William Stern (1871-1983).

This index is the Intelligence Quotient commonly known by its initials IQ. It express intelligence as a ration of mental age to chronological age.

$$IQ = \frac{(MA)}{(CA)} \times 100$$

The 100 is used as a multiplier to remove the decimal point and to make the IQ have a value of 100 when MA equals CA. It is evident that if the MA lags behind the CA, the result IQ will be less that 100, if the MA is above the CA, the IQ will be above 100.

How is the IQ to be interpreted? The distribution of IQ's favours the form of curve found for many differences among individuals ability we need units for measuring mental growth that are to forced to correspond to age. Scores an Thrustorne's Primary abilities tests have been used for this purpose. Although the separate abilities grow at different rates the gain in generally rapid in childhood and slows in the teens.

It masks that fact that some individuals may show an increases in IQ after age twenty six. This confounding create even more of a problem when we look at age changes in intellectual functioning after age forty. The typical study shows a steady decrease in intellectual ability after are forty with a precipitous drop after sixty. But analysis of the data indicates that whether ability declines during middle and old age depends both on the person and the type of ability tested. Individuals who remain physically well and continue to engage in stimulating activities show little decrease in intellectual ability up to age seventy physical disabilities, particularly those resulting from strokes or progressive reduction blood circulated to the brain, usually result show layer large shirts in IQ. If there are major changes in environmental conditions and in the opportunities for learning, either for better or corse there may be marked changes in tests intelligence one longitudinal study that tested a large number of individuals repeatedly fro birth to age thirty – six found shift in IQ of more that 15 points for some case (Bayley, 1970). The variables that produce large changes in IQ for individual children are not always easy to specify, but emotional and motivational factors appear to play a major role. For example. One study found that children whose IQs increased during the early years were more vigorous, emotionally independent, aggressive, and actively engaged in exploring their environment that those whose IQs failed to increase.

Growth of Intelligence Quotient:

Tests using the concept of mental age are so scored that if they are properly standardized an average growth. (MA) averaged over all individuals of a given age will equal (CA) at all ages to look at age changes in intellectual.

Definition of Intelligence:

"Intelligence defined as the global capacity of the individual to think rationally, act purposefully and deal effectively with the environment Alfred Binet (1857-1911).

Characteristics of Intelligence:

The person having IQ above 139 and very superior and having IQ between 120-139 is superior, and IQ between 110-119 is high average and the IQ between 90-109 is average and IQ between 80-89 is low average and having IQ between 70-79 is Borderline and below 70 is Mentally retarded.

Factor Theories:

Factor theories of intelligence use of correlation technique known as factor analysis to discover what makes up intelligence. Verbal, comprehension, spelling, suggestion that some underlying attributes of verbal abilities determines a person's score on those three tests.

Early in this century, Spearman (1863-1945) used factor analysis to show that intelligence really consisted of two parts a general factor affecting all tasks and several specific factors necessary to perform specific tasks. According to spearman, some amounts of both the general specific factors were necessary for the successful performance of any task. This basic approach to intelligence is the two-factor theory of intelligence.

Thurstone (1887-1965) developed Spearman's work further by postulating a general analogous to spearman's as well as seven other factors, each of which represented a unique mental ability. His theory is known as the factor-theory approach to intelligence. He developed a computational scheme for sorting out the seven factors that he considered to be the abilities of human beings; verbal comprehension, word in fluency, number facility, spatial visualization, associative memory perceptual speed and reasoning.

Thurstone's factory-theory approach, with its seven abilities, led to and culminated in Guilford (1958) multifactor approach to intelligence testing. He looked for a structure, a rational scheme of grouping them together and he eventually described a structure-of-intellect model. He described intellectual abilities and activities can be described intellectual abilities and activities can be described in terms of the three major dimensions the metal operation performed, the content of those operation and resulting product of the operation. Guilford (1958) asserts that intelligence should be defined as "a systematic collection abilities or functions for processing information of different kinds in different forms".

Research supports Guilford's theory and suggest that optimally weighted composite scores may be best predictors of achievement, school learning and work performance (Guilford 1985).

Jensen's Two - Level Theory:

Arthur Jenson approach intelligence testing not from the view of a theoretician Jenson (1969, 1970) suggest that intellectual functioning consists of associative abilities and cognitive abilities enable us to correct stimuli and events; they require little information. Questions testing associative abilities on the other hand deal with reasoning and problem solving.

Stern Berg's View:

Robert J. Stern berg takes an information – processing view of intelligence. His view is triarchich, dividing intelligence into three dimensions, componential; experimental and contextual. His aim is to relate a persons intelligence to his or her internal and external work.

Theories of Intelligence:

G Factory theory:

The factor theories of intelligences like the serpent theories, beneath the surface. In one of the earlier and most influential factor theories British Psychologist channels spearman (1927) proposed that a broad general intelligence (G) factor lay beneath the surface. Spear's man views which have come to be called G factor theory are reflected in intelligence tests that yield a single score, such as an IQ.

Multi Factor theories:

In counter to spearman, several theories have concluded that intelligence has multiple components. There theories generally agree with spearman that diverse intellectual tanks are usually correlated with one another the basic fact,

nothing that certain clusters of tests show higher correlation with one another than with other tests. For Ex memory tests to show higher correlations with each other than with and tests that involve calculating number are better considered

Genetic factors:

The heretic factors is one of the factors that contribute the Intelligence. Most of the evidence bearing on the inheritance of intelligence comes from correlating IQ between persons of various degrees of genetic relationship.

In the observed variations in intelligence test scores into four components associated, respectively with in intelligence test scores into four components, respectively with 1. environmental differences between different families 2. genetic difference between families environmental differences between individuals with in families,

Regardless of the habitability estimate one accepter, it is clear that intelligence is influenced by genetic factors. But several important facts must be kept in wind first, habitability estimates apply to populations under quite specific conditions and not to individuals.

Tests and Assessment of Intelligence:

Tests are used not only of determine the present status of the individual but also to make predictions about his future growth and statues. In order to make an effective educational decision, we need to have the best possible measures of intelligence available.

Tests are deraignment on the premise that intelligence cannot be measured directly but is inferred by the observation or evaluation of behaviors. Behaviour has been grouped at various chronological age levels. And decisions have been made an to what a intelligent behaviours for a given age level. The measurements are converted into norms for representative groups of populations, so that eventually individuals can be classified as having intelligence like a typical five years old or eight years old some tests like Kuhlmann – Andresm, used a median score in an attempt to avoid the averaging of scores in determining the norms. Group intelligence tests have been used to measure the general mental maturity of the beginners. Tests used in this manner would include the California test of mental maturity pre primary series, the Detroit beginning first grade intelligence test.

5. MEMORY

Memory (psychology), processes by which people and other organisms encode, store, and retrieve information. Encoding refers to the initial perception and registration of information. Storage is the retention of encoded information over time. Retrieval refers to the processes involved in using stored information. Whenever people successfully recall a prior experience, they must have encoded, stored, and retrieved information about the experience. Conversely, memory failure—for example, forgetting an important fact—reflects a breakdown in one of these stages of memory.

Memory is critical to humans and all other living organisms. Practically all of our daily activities—talking, understanding, reading, and socializing—depend on our having learned and stored information about our environments. Memory allows us to retrieve events from the distant past or from moments ago. It enables us to learn new skills and to form habits. Without the ability to access past experiences or information, we would be unable to comprehend language, recognize our friends and family members, find our way home, or even tie a shoe. Life would be a series of disconnected experiences, each one new and unfamiliar. Without any sort of memory, humans would quickly perish.

Memory and learning are closely related, and the terms often describe roughly the same processes. The term learning is often used to refer to processes involved in the initial acquisition or encoding of information, whereas the term memory more often refers to later storage and retrieval of information. However, this distinction is not hard and fast. After all, information is learned only when it can be retrieved later, and retrieval cannot occur unless information was learned. Thus, psychologists often refer to the learning/memory process as a means of incorporating all facets of encoding, storage, and retrieval.

Memory is an organism's ability to store, retain, and subsequently recall information. Although traditional studies of memory began in the realms of philosophy, the late nineteenth and early twentieth century put memory within the paradigms of cognitive psychology. In recent decades, it has become one of the principal pillars of a new branch of science called cognitive neuroscience.

Processes:

There are several ways to classify memories, based on duration, nature and retrieval of information. From information processing perspective there are three main stages in the formation and retrieval of memory:

- **Encoding** or registration (processing and combining of received information)
- **Storage** (creation of a permanent record of the encoded information)
- **Retrieval** or recall (calling back the stored information in response to some cue for use in a process or activity)

Classification:

A basic and generally accepted classification of memory is based on the duration of memory retention, and identifies three distinct types of memory: sensory memory, short-term memory and long-term memory

Sensory Memory:

Sensory memory corresponds approximately to the initial 200 - 500 ms after an item is perceived. The ability to look at an item, and remember what it looked like with just a second of observation, or memorization, is an example of sensory memory. With very short presentations, participants often report that they seem to "see" more than they can actually report.

Sensory memory refers to the initial, momentary recording of information in our sensory systems. When sensations strike our eyes, they linger briefly in the visual system. This kind of sensory memory is called iconic memory and refers to the usually brief visual persistence of information as it is being interpreted by the visual system. Echoic memory is the name applied to the same phenomenon in the auditory domain: the brief mental echo that persists after information has been heard. Similar systems are assumed to exist for other sensory systems (touch, taste, and smell), although researchers have studied these senses less thoroughly.

Sensory memory systems typically function outside of awareness and store information for only a very short time. Iconic memory seems to last less than a second. Echoic memory probably lasts a bit longer; estimates range up to three or four seconds. Usually sensory information coming in next replaces the old information. For example, when we move our eyes, new visual input masks or erase the first image. The information in sensory memory vanishes unless it captures our attention and enters working memory.

Short-term or Working Memory:

Some of the information in sensory memory is then transferred to short-term memory. Short-term memory allows one to recall something from several seconds to as long as a minute without rehearsal. Its capacity is also very limited.

Short-term memory is believed to rely mostly on an acoustic code for storing information, and to a lesser extent a visual code. Conrad (1964) found that test subjects had more difficulty recalling collections of words that were acoustically similar (e.g. dog, fog, bog, log).

Psychologists originally used the term short-term memory to refer to the ability to hold information in mind over a brief period of time. As conceptions of short-term memory expanded to include more than just the brief storage of information, psychologists created new terminology. The term working memory is now commonly used to refer to a broader system that both stores information briefly and allows manipulation and use of the stored information.

Working memory has a basic limitation: It can hold only a limited amount of information at one time. Early research on short-term storage of information focused on memory span—how many items people can correctly recall in order. Researchers would show people increasingly long sequences of digits or letters and then ask them to recall as many of the items as they could. In 1956 American psychologist George Miller reviewed many experiments on memory span and concluded that people could hold an average of seven items in short-term memory. He referred to this limit as “the magical number seven, plus or minus two” because the results of the studies were so consistent.

Long-term Memory:

The storage in sensory memory and short-term memory generally have a strictly limited capacity and duration, which means that information is available for a certain period of time, but is not retained indefinitely. By contrast, long-term

memory can store much larger quantities of information for potentially unlimited duration (sometimes a whole lifespan). Whilst short-term memory encodes information acoustically, long-term memory encodes it semantically.

Short-term memory is supported by transient patterns of neuronal communication, dependent on regions of the frontal lobe (especially dorsolateral prefrontal cortex) and the parietal lobe. Long-term memories, on the other hand, are maintained by more stable and permanent changes in neural connections widely spread throughout the brain. The hippocampus is essential to the consolidation of information from short-term to long-term memory, although it does not seem to store information itself. Rather, it may be involved in changing neural connections for a period of three months or more after the initial learning.

Models:

Models of memory provide abstract representations of how memory is believed to work. Below do various psychologists propose several models over the years.

Multi-store Model:

The multi-store model was first described in 1968 by Atkinson and Shiffrin.

The multi-store model has been criticized for being too simplistic. For instance, long-term memory is believed to be actually made up of multiple subcomponents, such as episodic and procedural memory. It also proposes that rehearsal is the only mechanism by which information eventually reaches long-term storage, but evidence shows us capable of remembering things without rehearsal.

Working memory Model:

In 1974 Baddeley and Hitch proposed a working memory model which further subdivides short-term memory into a number of sub-stores and processes. In this model, STM consists of three basic stores: the central executive, the phonological loop and the visuo-spatial sketchpad. In 2000 this model was expanded with the multimodal episodic buffer.

The central executive essentially acts as attention, channeling information to the phonological loop the visuo-spatial sketchpad, and the episodic buffer, which act as "slave systems".

The phonological loop stores sound information by silently rehearsing sounds or words in a continuous loop; the articulatory process (the "inner voice") continuously "speaks" the words to the phonological store (the "inner ear"). The phonological loop has a very limited capacity, which is demonstrated by the fact that it is easier to remember a list of short words (e.g. dog, wish, love) than a list of long words (e.g. association, systematic, confabulate) because short words fit better in the loop.

The visuo-spatial sketchpad stores visual and spatial information. It is engaged when performing spatial tasks (such as judging distances) or visual ones (such as counting the windows on a house).

The episodic buffer is dedicated to linking information across domains to form integrated units of visual, spatial, and verbal information and chronological ordering. The episodic buffer is also assumed to have links to long-term memory and semantical meaning.

The working memory model explains many practical observations, such as why it is easier to do two different tasks (one verbal and one visual) than two similar tasks (eg two visual), and the aforementioned word-length effect. However, the concept of a central executive as noted here has been criticized as inadequate and vague.

Levels of processing:

Craik and Lockhart (1972) proposed that it is the method and depth of processing that affects how an experience is stored in memory, rather than rehearsal.

- **Organisation** - Mandler (1967) gave participants a pack of word cards and asked them to sort them into any number of piles using any system of categorisation they liked. When they were later asked to recall as many of the words as they could, those who used more categories remembered more words. This study suggested that the act of organising information makes it more memorable.

- **Distinctiveness** - Eysenck and Eysenck (1980) asked participants to say words in a distinctive way, e.g. spell the

words out loud. Such participants recalled the words better than those who simply read them off a list.

- **Effort** Tyler et al. (1979) had participants solve a series of anagrams, some easy (FAHTER) and some difficult (HREFAT). The participants recalled the difficult anagrams better, supposedly because they put more effort into them.

Classification by information type:

Long-term memory can be divided into declarative (explicit) and procedural (implicit) memories. (Anderson, 1976)

Declarative_memory requires conscious recall, in that some conscious process must call back the information. It is sometimes called explicit memory, since it consists of information that is explicitly stored and retrieved.

Declarative memory can be further sub-divided into semantic memory which concerns facts taken independent of context; and episodic memory, which concerns information specific to a particular context, such as a time and place. Semantic memory allows the encoding of abstract knowledge episodic memory, is used for more personal memories, such as the sensations, emotions, and personal associations of a particular place or time. Autobiographical memory - memory for particular events within one's own life - is generally viewed as either equivalent to, or a subset of, episodic memory. Visual memory is part of memory preserving some characteristics of our senses pertaining to visual experience. We are able to place in memory information that resembles objects, places, animals or people in sort of a mental image. Visual memory can result in priming and it is assumed some kind of perceptual representational system

In contrast, procedural memory is not based on the conscious recall of information, but on learning. Procedural memory is primarily employed in learning motor skills and should be considered a subset of implicit memory. It is revealed when we do better in a given task due only to repetition - no new explicit memories have been formed, but we are unconsciously accessing aspects of those previous experiences. Procedural memory involved in motor learning depends on the cerebellum and basal ganglia.

So far, nobody has successfully been able to isolate the time dependence of these suggested memory structures.

Classification by temporal direction:

A further major way to distinguish different memory functions is whether the content to be remembered is in the past, retrospective memory, or whether the content is to be remembered in the future, prospective memory. Thus, retrospective memory as a category includes semantic memory and episodic memory autobiographical memory. In contrast, prospective memory is memory for future intentions, or remembering to remember (Winograd, 1988). Prospective memory can be further broken down into event- and time-based prospective remembering. Time-based prospective memories are triggered by a time-cue, such as going to the doctor (action) at 4pm (cue). Event-based prospective memories are intentions triggered by cues, such as remembering to post a letter (action) after seeing a mailbox (cue). Cues do not need to be related to the action (as the mailbox example is), and lists, sticky-notes, knotted handkerchiefs, or string around the finger (see box) are all examples of cues that are produced by people as a strategy to enhance prospective memory.

Physiology:

Overall, the mechanisms of memory are not well understood. Brain areas such as the hippocampus, the amygdala or the mammillary bodies are thought to be involved in specific types of memory. For example, the hippocampus is believed to be involved in spatial learning and declarative learning. Damage to certain areas in patients and animal models and subsequent memory deficits is a primary source of information. However, rather than implicating a specific area, it could be that damage to adjacent areas, or to a pathway traveling through the area is actually responsible for the observed deficit. Further, it is not sufficient to describe memory, and its counterpart, learning, as solely dependent on specific brain regions. Learning and memory are attributed to changes in neuronal synapses, thought to be mediated by long-term potentiation and long-term depression.

Disorders:

Much of the current knowledge of memory has come from studying memory disorders. Loss of memory is known as amnesia. There are many sorts of amnesia, and by studying their different forms, it has become possible to observe apparent defects in individual sub-systems of the brain's memory systems, and thus hypothesize their function in the normally working brain. Other neurological disorders such as Alzheimer's disease can also affect memory and cognition.

While not a disorder, a common temporary failure of word retrieval from memory is the tip-of-the-tongue phenomenon.

Impaired memory can be a symptom of hypothyroidism.

6. DECISION MAKING

A problem refers to unpleasant deviation or distortion from what should be happening. Problem solving may be defined as the ability to minimize the intensity of the problem. The steps in problem solving are as follows:

1. Defining the problem
2. Generation of Alternatives
3. Weighing the Alternatives
4. Decision Making
5. Problem Solving

Good thinking leads to Good reasoning. Good reasoning leads to Good decision making. Good decision making leads to good problem solving skill.

Thinking is a flow of ideas. Thinking is mental manipulation of objects (or) events. Thinking refers to highest form of mental activities involving, images, ideas and concepts. There are two type of thinking (a) Logical thinking (b) Intuitive thinking.

a) Step by step process in arriving at a solution. That is definition of steps, final relevant data, the data properly combined and grouped and find the relationship between the group.

b) Intuitive thinking, there is no scientific reasoning. There is no step by step process. It involves emotionality.

Those are two types of Reasoning, Inductive reasoning and Deductive reasoning.

Inductive reasoning refers to solving the problems from particulars to universal or from specific to general.

Deductive reasoning is deducting the problem from Universal to particular from general to specific. Problem solving refers to the ability of individual to reduce the deviations or distortion by making unpleasant experience into pleasant experience.

Decision Making refers to choosing the best alternatives among many other alternatives.

The big question of a decision maker is : how does one choose between two alternatives. A psychologist will conceptualize such choice situations by abstracting the idea of Valence and predicting that the individual will, when faced with two positive Valences, choose the larger, that is the one with greater attractions power. This analysis does not help a great deal if we wait for him to choose and then infer that me object chosen had the larger Valence. The term "Valence, as (negative Valence) a person the magnitude of me Valence. Unfortunately, relatively few choices or real importance in life are so simple. There is likely to be a alternative because this means loss of the other.

A problem that some would be decision making encounter, not surprisingly, is that of resolving this interpersonal conflict. Research it also appears larger and more threatening.

This approach suggests that effective decision – making involves the identification of the significant valences in the situation and the relative potencies involved.

"Field of Forces" Analysis of Decision Situation:

Managerial Decision are made only on the basis of alternatives perceived by the decision – maker, and then are very much a product of situational factors. The situation, including the organization contact of decision – making, will first influence the chances that a certain alternatives will be considered at all and then the weighting is attached to it.

We must at clear that the person making a decisions rarely sits down and consciously evaluates all of the valence present. Much of this goes on at an unconscious level. An impartial observer, however, may not effective influences of which the

decision – maker was not conscious. This becomes particularly obvious if we attempt to influence the outcome of a specific decision.

Consider a situation in which an equilibrium has been reached between positive and negative forces. A classic example involves forces favouring a rise in the level of production of factory employees and forces tending to lower production positive forces might include, for a specific worker, such matters as hopes of higher pay, loyalties to his boss, pride in doing the best job he can, and so on. Negative forces many include fatigue, fear of layoff, or fear of hostile reactions by fellow workers. In the study cited, group discussions substantially reduce the last item (fear of criticism by fellows), and production went up materially. Even though workers may not have been aware of this factors, it had influenced their behaviour. The removed of the negative force made possible a shift to a new level. Attempts to influence decisions therefore concentrate on changing the valences, or field of forces, operating on the executive.

Decision making is the cognitive process of selecting a course of action from among multiple alternatives. Every decision – making process produces a final choice. It can be an action or an opinion. It begins when we need to do something but we do not know what. Therefore decision-making is a reasoning process which can be rational or irrational, and can be based on explicit assumptions or tacit assumptions.

Decision making is said to be a psychological construct. This means that although we can never "see" a decision, we can infer from observable behaviour that a decision has been made. Therefore we conclude that a psychological event that we call "decision making" has occurred. It is a construction that imputes commitment to action. That is, based on observable action, we assume that people have made a commitment to effect the action.

Structured rational decision-making is an important part of all science – based professions, where specialists apply their knowledge in a given area to making informed decisions. For example, medical decision making often involves making a diagnosis and selecting an appropriate treatment.

Due to the large number of considerations involved in many decisions, decision support systems have been developed to assist decision makers in considering the implications of various courses of action. They can help reduce the risk of human errors. The systems which try to realize some human/cognitive decision making errors. The systems which try to realize some human / cognitive decision making functions are called Intelligent Decision Support Systems (IDSS), see for ex. An Approach to the Intelligent Decision Advisor (VDM for Emergency Mangers, 1999",)

1. Decision making style
2. Cognitive and personal biases in decision making
3. Cognitive neuroscience of decision making
4. Decision making in groups
5. Principles
6. Decision making in one's personal life
7. Decision making in health care
8. Path dependency

Decision Making Style:

According to behavior a list Isable Briggs Myers (1962), a person's decision-making process depends to a significant degree on their cognitive style. Starting from the work of Carl Jung, Myers developed a set of four bi-polar dimensions. The termini points on these dimension are: thinking and feeling; extroversion and introversion; judgement and perception; and sensing and intuition. She claimed that a person's decision making style is based largely on how they score on these four dimension. For example, someone that scored near the thinking, extroversion, sensing, and judgement ends of the dimensions would tend to have a logical, analytical, objective, critical, and empirical decision making style.

Cognitive Neuroscience of Decision Making:

The anterior cingulated cortex and orbilofrobtal cortex are brain regions involve in decision making processes. A recent neuroimaging study, Interactions between decision making and performance monitoring within prefrontal cortex, found

distinctive patterns of neural activation in these regions depending on whether decision were made on the basis of personal volition or following directions from someone else.

Decision Making In Groups:

Decision making in groups is sometimes examined separately as process and outcome, Process refers to the interactions among individuals that lead to the choice of a particular course of action. An outcome is the consequence of that choice. Separating process and outcome is convenient because it helps explain that a good decision making processes does not guarantee a good outcome, and that a good outcome does not presuppose a good process.

A critical aspect for decision making groups is that ability to converge on a choice. Politics is one approach to making decisions in groups. This process revolves around the relative power or ability to influence of the individuals in the group. Some relevant ideas include coalitions among participants as well as influence and persuasion. The use of politics is often judged negatively, but it is a useful way to approach problems when preferences among actors are in conflict, when dependencies exist that cannot be avoided, when there ore no super-ordinate authorities, and when the technical or scientific merit of 1 lie options is ambiguous.

In addition different processes to make decisions, groups can also have different decision rules. A decision rule is the approach used by a group to mark the choice that is made.

Unanimity is commonly used by juries in criminal trials in the United States. Unanimity requires everyone to agree on a given course of action, and thus imposes a high bar for action.

- Majority requires support from more than 50% of the members of the groups. Thus, the bar for action is lower that with unanimity, but it can create a group of "losers" in the process.

- Consensus decision-in making tries to avoid "winners" and "losers". Consensus requires that a majority approve a given course of action, but that the minority agree to go along with the course of action. In other words, if the minority opposes the course of action, consensus requires that the courses of action be modified to remove objection able tea lures.

- Sub-committee involves assigning responsibility for evaluation of a decision to a sub-set of a larger group, which then comes back to the larger group which recommendations for action. Using a sub-committee is more common in larger governance groups, such as a legislature. Sometimes a sub-committee includes those in individuals most affected by a decision, although at other times it is useful for the larger group to have a sub-committee that involves more neutral participants.

Less desirable group decision rules are:

- Plurality, where the largest block in a group decides, even if it falls short of a majority.
- Dictatorship, where one individual determines the course of action.

Plurality and dictatorship are less, desirable as decision rules because they do not require (he involvement of the broader group to determine a choice. Thus, they do not engender commitment to the course of action chosen. An absence of commitment from individuals in the group can be problematic during the implementation phase of a decision. There are no perfect decision making rules. Depending on how the rules are implemented in practice and the situation, all of these can lead to situations where either no decision is made or to situations where decisions made arc inconsistent with one another over time.

Decision Making in One's Personal Life:

Some of the decision making techniques that we use in everyday life include:

- Listing the advantages and disadvantages of each option, popularized by Benjamin Franklin
- Flipping a coin, cutting a deck of playing cards, and other random or coincidence methods
- Accepting the first option that seems like it might achieve the desired result
- Tarot cards, astrology, augurs, revelation, or other forms of divination
- Acquiesce to a person in authority or an "expert"

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7. CREATIVITY

Researchers and practitioners alike have been interested in the phenomenon of creativity. Even a cursory glace at the research literature, however, indicates that most work has focused on cognitive components; on creativity in "thinking".

Greater attention is being given to better understanding the human mind. The mind's effectiveness arises directly from the way it organizes information into patters. A distinction has been made between two levels of thinking: Lateral and vertical. Lateral thinking changes; vertical thinking chooses. Vertical thinking says: "This is the best way of looking at things". Lateral thinking says: "Let us try to generate other ways of looking at things: Let us change way of looking at things".

Creativity tends to favor lateral thinking. This type of thinking generates new ideas and new approaches, and escapes from old ones.

In general, creativity is most often associated with the arts – the products being symphonies, paintings, dances and novels – and the great inventions of sciences: These artistic and scientific creations are seldom seen as products of discipline and applied thinking but rather are often crewed as magical creations, derived from the activities of specially gifted individuals.

Different authors and speakers use the term "creativity" in many ways. Often the term is applied very broadly to a whole field of information, a subject pertaining to "inventive people", "inventive acts", and "novel products". Some insist that there must be a tangible product, such as a poem, a work of art, or a scientific theory (Rogers, 1962; Arnold, 1962), and some go so far as to say that the result must be useful (Mednick, 1962).

Creativity is the ability to formulate new combinations from two or more concepts. The creative process is the means to make the combinations. (Paul wasserman, Bowker, 1972).

Rogerus (1976) defined the creative process as "the emergence in action of a novel relational product, growing out of the uniqueness of the individuals on the one hand, and the materials, events, people or circumstances of his life on the other."

Bruner (1967) describes creativity as a "choiceful" act that produces "effective surprise" – recognition of novelty. "The triumph of effective surprise is that it takes one beyond common ways of experiencing the world".

Creative imagination is worth more than mere book knowledge. Education and intelligence are merely the means by which one facilitates the liberation of this creative energy. (Simpson, 1988).

Creativity and Giftedness:

While it is obvious from biographical inspection (e.g., Einstein, Mozart, Picasso, Gauss) as well as from the research of Getzels and Jackson (1962). Those most creative persons are gifted, it is by no means true that most gifted persons are creative. Giftedness then appears to be a necessary condition for verbal creativity of such an order that it is new to the culture, but not a sufficient one.

At this point, it might be well to redefine giftedness as follows: "A gifted child is one who has the potential to become verbally creative; a talented child is one who has the potential to become non-verbally creative". (Gowan, 1978).

Creativity and Imagination:

Some of the most beautiful things that are spoken derive their energy and effectiveness form the creative imagination and the images it produces. Often it is creative imagery that provides the artist or poet with the central idea of for a picture or poem. The creative imagination was to Blake (1978) "some source of spiritual energy" and like Coleridge (1978) he regarded its activity as simulating the creative act of God. The function of the creative imagination has also been thought of as some mysterious mind activity in the act of solving problems. (Khatena, 1978).

Extending the Concept of Creativity:

Humanity has long shown fascination with creativity. In art technology philosophy and all fields of pursuit creativity has been a dominant force. It is one of the essential ways to which human beings "choicefully" extend themselves beyond the ordinary. It is a process that leads to appreciative learning insightful experience and the discovery of the novel. It

underlies the way in one relates to the outer world of objects and events and come together in his own inner world of objects and ideas (Motemedi, 1982).

John-Steiner discovered that some creative individuals use visual thinking as a mode of creativity. He affirms the premise that creativity does not happen by accident but is something applied that can make dynamic differences to the world.

Central to increasing the capacity for creativity is the development of the right side of the brain, which process information in a diffuse nonlinear mode.

8. REVIEW OF LITERATURE

Related Studies On Cognitive Functioning In Soccer Players, Football, Boxers And Atheletss:

MASTER Ej et al (1999) studied Soccer players incur concussions during matches and training sessions, as well as numerous sub concussive blows to the head from impacts with the soccer ball (headers). The combination of soccer-related concussions and the number of headers may be a risk for chronic traumatic brain injury (CTBI). To determine whether amateur soccer players have evidence of CTBI. Cross-sectional study of 33 amateur soccer players and 27 amateur athletes involved in swimming and track (controls) in the Netherlands who underwent interviews and neuropsychological testing. Performance of soccer players vs. controls on 16 neuropsychological tests having 27 outcomes. Compared with control athletes, amateur soccer players exhibited impaired performance on tests of planning and memory Among soccer players, 9 had incurred 1 soccer-related concussion and 7 had had 2 to 5 concussions during their career. The number of concussions incurred in soccer was inversely related to the neuropsychological performance on 6 of the neuropsychological tests Our results indicate that participation in amateur soccer in general and concussion specifically is associated with impaired performance in memory and planning functions. Due to the worldwide popularity of soccer, these observations may have important public health implications.

Downs Ds and Abwender D (2002) studied Soccer reportedly places participants at risk for neuropsychological impairment, although it is unknown if the risk is associated primarily with concussion, sub concussive blows from heading the ball, or some combination thereof. Moreover, the extent to which younger versus older athletes are at risk for soccer-related cognitive impairment is unclear. We hypothesized that soccer athletes, especially older ones, would show poorer neuropsychological test performance than comparable swimmers. Thirty-two soccer and 29 swimmers all involved for at least 4 years in their sport at collegiate or national levels, participated. In a 2 X 2 factorial design, all participants underwent 4 neuropsychological tests with 11 outcome measures assessing motor speed, attention, concentration, reaction time, and conceptual thinking. Soccer athletes performed worse than swimmers on measures of conceptual thinking. The older soccer group in particular performed poorly on measures of conceptual thinking, reaction time, and concentrations. Among non-goaltender soccer athletes, estimates of career exposure to brain trauma predicted significantly poorer test performance on 6 of 11 measures, even after statistically controlling for age Results provide additional evidence that participation in soccer may be associated with poorer neuropsychological performance, although the observed pattern of findings does not specifically implicate heading as the cause. Although deficits were most apparent among older soccer players, serial neuropsychological testing for early detection of impairment is recommended for younger players as well.

Webbe Fm And Witol AD (2003) this study investigated the presence of neuropsychological deficits associated with hitting the ball with one's head (heading) during soccer play. A neuron-cognitive test battery was administered to 60 male soccer players, high school, amateur and professional level, and 12 nonpaying control participants. The effects of currently reported heading behavior as well as that of estimated lifetime heading experience on neuropsychological test performance were examined. Players with the highest lifetime estimates of heading had poorer scores on scales measuring attention, concentration, cognitive flexibility and general intellectual functioning. Players' current level of heading was less predictive of neuro-cognitive level. Comparison of individual scores to age-appropriate norms revealed higher probabilities of clinical levels of impairment in players who reported greater lifetime frequencies of heading. Because of the worldwide popularity of the game, continued research is needed to assess the interaction between heading and soccer experience in the development of neuropsychological deficits associated with soccer play.

Guskiewicz KM, et al (2002) A high incidence of cerebral concussion has been reported among soccer players. We studied whether long-term or chronic neuropsychological dysfunction was present in collegiate soccer players. Two

hundred forty subjects from a National Collegiate Athletic Association division I institution were stratified into three groups: soccer athletes (91), no soccer athletes (96 women's field hockey, women's lacrosse, and baseball players), and controls (53 college students). Subjects completed a concussion history questionnaire and underwent preseason baseline neuropsychological testing before the start of either the freshman or sophomore year. Data were collected on the results of six neuropsychological tests and from a concussion history questionnaire for number of previous concussions, Scholastic Aptitude Test results, and exposure to soccer and heading. Despite an average of 15.3 seasons of soccer exposure and a higher prevalence of previous concussions, the soccer athletes did not demonstrate impaired neuro cognitive function or scholastic aptitude when compared with the nonsmoker athletes or the student no athletes. Additionally, there was no significant relationship between a history of soccer-related concussion and either neurons cognitive performance or scholastic aptitude. Neither participation in soccer nor a history of soccer-related concussions was associated with impaired performance of neuro cognitive function in high-level United States soccer players

Stephens R, et al (2005) studied Footballers run the risk of incurring mild head injury from a variety of sources, including the intentional use of the head to play the ball, known as heading. This paper presents a preliminary exploratory analysis of data collected to examine whether cumulative incidence of mild head injury, or cumulative heading frequency, are related to neuropsychological functioning in male adolescent footballers. In a quasi-experimental cross-sectional design, neuropsychological test scores of school team footballers were compared with those of similarly aged rugby players and noncontact sport players. Cumulative mild head injury incidence was estimated using self-reports, and cumulative heading was estimated using a combination of observation and self-reports. No participants had sustained a head injury within 3 months of testing. There was no relationship between head injury and neuropsychological performance, and there were no decrements in either the footballers or the rugby players in comparison with the noncontact sport players. Within the footballers, cumulative heading did not predict any of the neuropsychological test scores. These findings indicate the absence of neuropsychological impairment arising due to cumulative mild head injury incidence, or cumulative heading. Although these null findings may be reassuring to players, parents, and football organizers, we stress that they are preliminary. Further data is being collected from the same populations to provide more reliable effect estimates.

Master JT, et al (2001) The purpose of this study was to determine the effects of headers and concussions on cognitive impairment in professional soccer players. A group of 84 active professional soccer players from several premier league soccer clubs underwent neuropsychological evaluations. The dose-response relation between the number of headers in one professional season and the number of soccer-related concussions on cognitive functioning was investigated. It was found that the number of headers in one season was related to poorer results on tests measuring focused attention and visual/verbal memory. Soccer-related concussions were related to poorer results on tests measuring sustained attention and visuoperceptual processing. The findings suggest that headers as well as concussions separately contribute to cognitive impairment.

Ravdin LD, et al (2003) To prospectively examine recovery of cognitive function within one month following sub concussive sports related head trauma. A prospective study of New York State licensed professional boxers who underwent testing of cognitive functioning before and after (within days, one week, and one month) a professional bout. Male professional athletes recruited from the New York State Athletic Commission and local boxing gyms. Twenty-six licensed professional boxers were enrolled in the protocol. Data is presented on the 18 participants who completed testing on at least three of the four time points. Serial neuropsychological assessment before and after the athletes engaged in competition. Neuropsychological measures of cognitive functioning, including new learning and memory, information processing speed, and mental flexibility. A series of repeated measures MANOVAS revealed significant within subject differences across testing on complex information processing and verbal fluency. Post hoc analyses indicated significant differences between time 1 (baseline) and time 4 (one month post), with scores one month following the bout indicating significantly improved performance. Memory scores did not change significantly across testing; however, prior boxing exposure measured by total number of professional bouts was associated with poorer memory performance. Cognitive testing one month following participation in a professional boxing bout yielded scores suggestive of recovery to a level above the baseline. We conclude that baseline assessment taken during periods of intense training are likely confounded by other pre-bout conditions (i.e., sparring, rapid weight loss, pre-bout anxiety) and do not represent true baseline abilities. Instability of performance associated with mild head injury may complicate the interpretation of post-injury assessments. Practice effects may also confound the interpretation of serial assessments, leading to underestimation of the

effects of sports related head trauma. Poorer cognitive performance was evident during the presumed recovery period in boxers with greater exposure to the sport (>12 professional bouts). This finding is consistent with reports of a cumulative effect of repetitive head trauma and the subsequent development of chronic traumatic brain injury. These data have implications for assessing recovery of function following head injury in players of other contact sports as well as determination of return-to-play following an injury.

Butler RJ et al, (1993) studied A prospective controlled investigation of the cognitive effects of amateur boxing. Eighty six amateur boxers underwent a series of neuropsychological assessments on three occasions--pre bout, immediate post bout and follow up within two years; 31 water polo players and 47 rugby union players acted as controls. The neuropsychological tests were selected as being sensitive to subtle cognitive dysfunction and formed part of a battery of other neurological and ophthalmic assessments. No evidence of neuropsychological dysfunction due to boxing was found, either following a bout or a series of bouts at follow up. None of a range of parameters including number of previous contests, recovery from an earlier bout, numbers of head blows received during a bout and number of bouts between initial assessments and follows up, were found to be related to changes in cognitive functioning.

J.T. Matser, et al (2004) purpose of this study was to determine the effects of headers and concussions on cognitive impairment in professional soccer players. A group of 84 active professional soccer players from several premier league soccer clubs underwent neuropsychological evaluations. The dose-response relation between the number of headers in one professional season and the number of soccer-related concussions on cognitive functioning was investigated. It was found that the number of headers in one season was related to poorer results on tests measuring focused attention and visual/verbal memory. Soccer-related concussions were related to poorer results on tests measuring sustained attention and visuoperceptual processing. The findings suggest that headers as well as concussions separately contribute to cognitive impairment.

A Collie et al (2001) is a Professional and amateur participants in many sports are at risk of brain injury caused by impact with other players or objects. In many cases, mild cognitive deficits may persist after the common neurological signs of brain injury have passed. In recent years, the athlete's cognitive status after concussion has been measured with conventional "paper and pencil" neuropsychological tests. However, such tests are not ideal for sporting settings, as they are designed for the detection of gross cognitive impairments at a single assessment, not for the identification of mild cognitive deficits on repeated assessment. A number of computerized cognitive assessment tests and test batteries have been developed over the past two decades. These batteries offer major scientific and practical advantages over conventional neuropsychological tests, which make them ideal for the assessment of cognitive function in sportspeople. This review first describes the problems associated with cognitive assessment of people with sports related cognitive deficits, and then critically examines the utility of conventional neuropsychological and computerized cognitive tests in sporting settings.

Hypothesis of the Study:

1. There will be no significant difference between karate and non-karate students on Intelligence.

2. There will be no significant difference in decision-making style among karate and non-karate in their Hyper Vigilance behavior.

3. There will be no significant difference in decision-making among karate and non-karate in their Rationalization behavior.

4. There will be no significant difference in decision-making style among karate and non-karate in their Vigilance behavior.

5. There will be no significant difference in decision-making style among karate and non-karate in their Defensive Avoidance behavior.

6. There will be no significant difference in decision-making style among karate and non-karate in their Buck Passing behavior.

7. There will be no significant difference in decision-making style among karate and non-karate in their Procrastination behavior.

8. There will be no significant difference in memory among karate and non-karate in Remote Memory.
9. There will be no significant difference in memory among karate and non-karate in Recent Memory.
10. There will be no significant difference in memory among karate and non-karatein Mental Balance.
11. There will be no significant difference in memory among karate and non-karate in Attention Concentration.
12. There will be no significant difference in memory among karate and non-karatein Delayed Recall.
13. There will be no significant difference in memory among karate and non-karate in Immediate Recall.
14. There will be no significant difference in memory among karate and non-karate In Verbal Retention.
15. There will be no significant difference in memory among karate and non-karate in Visual Retention.
16. There will be no significant difference in creativity among karate and non karate in their Instances
17. There will be no significant difference in creativity among karate and non-karate in their Alternatives.
18. There will be no significant difference in creativity among karate and non-karate in their Similarities.
19. There will be no significant difference in creativity among karate and non-karate in their Pattern Meaning Task
20. There will be no significant difference in creativity among karate and non-karate in Line Meaning Task.

9. METHOD

The aim of the present study is to find out the Karate and Non-karate students on cognitive functioning.

RESEARCH DESINGS:

The present research is exploratory in nature, since the purpose of this study is that of formulating a problem for more precise investigation it aims to find out the Karate and non karate students on cognitive functioning. It is also experimental in nature as it examines truth of statistical hypothesis.

NATURE OF THE SAMPLE:

In the present study a sample of 60 college students were selected by convenient sampling method. The sample was chosen from various colleges, in Chennai. 18 to 24 years students of the karate group comprised of 13 B.Sc students, 13 M.Sc students, and 4 M.Phil scholars. The non karate group consisted of 14 B.Sc students, 13 M.sc Students and 3 M.Phil scholars.

TOOLS USED IN THE STUDY:

S. No	Variable	Tools	Author	Year
1	Intelligence	Advanced progressive matrices (APM)	John. C. Raven	1947
2	Decision making	Flinder's decision making questionnaire	Janis & Mann	1982
3	Memory	PGI memory scale		
4	Creativity	The wallach and Kogan creativity instrument	Wallach and Kogan	1965

ADVANCELD PROGRESSIVE MATRICES:

Description:

The advance progressive matrices set I & II was developed by John.C. Raven it was originally drafted in 1943 for use at war office officer selection boards in 1947 a revision was prepared for general use as a non-verbal test of the intellectual efficiency with which, at the time of the test, a person is able to form comparisons between figures and develop a logical method of reasoning over verbal tests, it has the advantage that the clarity of a person's thought processes is assessed independently of any educational attainments over performance tests to assess a person's total capacity for observation and clear thinking and the efficiency of his intellectual work.

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DECISION MAKING QUESTIONNAIRE II:

Description:

Decision making questionnaire II measure (It tendency to use different styles of Decision Making with 31 items totally). It consists of six scales measuring, six dimensions namely, Vigilance (V) with 6 items. Hyper vigilance (H) with 5 items. Defensive Avoidance (D) with 5 items. Rationalization (R) with 5 items. Buck passing (B) with 6 items and procrastination (P) with 5 items.

THE WALLACH AND KOGAN CREATIVITY INSTURMENT:

Description:

The Wallach and Kogan creativity instrument developed by Wallach and Kogan in 1965. it has been found to the culture free to a large extent. It aims to measure the creativity of an individual. The visual tasks consists of two parts pattern meaning and line meaning. There were three patterns and three line drawings alone which were used I the present study as stimuli for generating all possible meaning or interpretation.

PGI MEMORY SCALE:

Description:

The PGI memory scale consists of 10 sub-tests: (1) Remote Memory consists of 6 questions pertaining to subjects long term memory, (2) recent memory consists of 5 questions, (3) mental balance consists of 3 sections, i.e., reciting (a) alphabets A-Z, (b) counting backwards 20-0, (c) deducting 3 from 40, (4) test of attention and concentration consists of digit forward (3-8 digits) and digit a ward (2-8 digits), (5) delayed recall consists of 2 list with 5 objects in each list, (6) immediate recall consists of 3 sentences, (7) verbal retention for similar pairs consists of 5 pairs of words, (8) verbal retention for dissimilar airs consists of 5 pairs of words, (9) visual retention consists of 5 cards, (10) visual recognition consists of 2 cards – (a) card I has 10 objects, (b) card II has 20 objects.

STATISTICS USED:

To find out the difference between in intelligence, decision making, memory and creativity among karate and non karate was analyzed mean, standard deviations and "t" test were worked out to identify the difference.

10. RESULT AND DISCUSSION

TABLE – I Showing the mean, SD and't' value of the advance progressive matrices among karate and non-karate students on intelligence.

Variable	N	Mean	SD	t value
Karate	30	19.20	5.39	1.36
Non-Karate	30	17.20	5.95	

- Not significant

Above the is table concludes that the mean score of the intelligence among karate is

19.20 The SD score is 5.39 and the non-karate score is 17.20 and the SD score is 5.95. So the calculated't' value is 1.36. Hence the calculated't' value > the significant level.

Hence the formulated hypothesis is accepted.

TABLE – II Showing the mean, SD and 't' value of the decision making style among karate and non-karate students in the hyper vigilance dimension.

Variable	N	Mean	SD	t value
Karate	30	9.70	16.25	1.13
Non-Karate	30	6.30	1.89	

- Not significant

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Above the table concludes that the mean score of the decision making style among karate is9.70 SD score is 16.25he non-karate score is 6.30the SD score is1.89 the calculated‘t’ value is 1.13Hence the calculated‘t’ value > the significant level.

Hence the formulated hypothesis is accepted.

TABLE – III Showing the mean, SD and ‘t’ value of the decision making style among karate and non-karate students in the Rationalization dimension.

Variable	N	Mean	SD	t value
Karate	30	6.23	2.59	1.56
Non-Karate	30	5.30	1.98	

- Not significant

Above the table concludes that the mean score of the Decision making style among karate is 6.23 theSD score is 2.59and the non-karate score is 5.30and the SD score is1.98. So the calculated ‘t’ value is 1.5 6. Hence the calculated ‘t’ value > the significant level.

Hence the formulated hypothesis is accepted.

TABLE – IV Showing the mean, SD and ‘t’ value of the decision making style among karate and non-karate students in the Vigilance dimension.

Variable	N	Mean	SD	t value
Karate	30	10.20	2.44	0.55
Non-Karate	30	10.50	1.65	

- Not significant

Above the table concludes that the mean score of the Decision making style among karate is 10.20 the SD score is 2.44and the non-karate score is 10.50and the SD score is1.65. So the calculated‘t’ value is0.55. Hence the calculated‘t’ value > the significant level.

Hence the formulated hypothesis is accepted.

TABLE – V Showing the mean, SD and‘t’ value of the decision making style among karate and non-karate students in the Defensive Avoidance dimension.

Variable	N	Mean	SD	t value
Karate	30	5.27	2.87	1.07
Non-Karate	30	4.60	1.79	

- Not significant

Above the table concludes that the mean score of the decision making style among karate is 5.27the SD score is 2.87and the non-karate score is 4.60and the SD score is1.79. So the calculated ‘t’ value is1.07. Hence the calculated ‘t’ value > the significant level.

Hence the formulated hypothesis is accepted.

TABLE –V I Showing the mean, SD and ‘t’ value of the decision making style among karate and non-karate students in Buck passing dimension.

Variable	N	Mean	SD	t value
Karate	30	5.40	1.86	1.23
Non-Karate	30	4.80	1.88	

- Not significant

Above the table concludes that the mean score of the decision making style among karate is 5.40the SD score is1.86 and the non-karate score is4.80 and the SD score is1.88. So the calculated ‘t’ value is1.23. Hence the calculated ‘t’ value > the significant level.

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Hence the formulated hypothesis is accepted.

TABLE – VII Showing the mean, SD and‘t’ value of the decision making style among karate and non-karate students in Procrastination dimension.

Variable	N	Mean	SD	t value
Karate	30	5.67	1.62	
Non-Karate	30	5.10	1.74	1.30

- Not significant

Above the table concludes that the mean score of the decision making style among karate is5.67 the SD score is 1.62and the non-karate score is5.10 and the SD score is1.74. So the calculated ‘t’ value is 1.30. Hence the calculated ‘t’ value > the significant level.

Hence the formulated hypothesis is accepted.

TABLE –VIII Showing the mean, SD and ‘t’ value of the PGI- Memory Scale among karate and non-karate students in Remote Memory dimension.

Variable	N	Mean	SD	t value
Karate	30	5.80	0.48	
Non-Karate	30	5.60	0.68	1.39

- Not significant

Above the table concludes that the mean score of the PGI- Memory Scale among karate is5.80 the SD score is0.48 and the non-karate score is5.60 and the SD score is0.68. So the calculated ‘t’ value is1.39. Hence the calculated ‘t’ value > the significant level.

Hence the formulated hypothesis is accepted.

TABLE – IX Showing the mean, SD and ‘t’ value of the PGI- Memory Scale among karate and non-karate students in Recent Memory dimension.

Variable	N	Mean	SD	t value
Karate	30	4.90	0.30	
Non-Karate	30	4.87	0.34	0.39

- Not significant

Above the table concludes that the mean score of the PGI- Memory Scale among karate is 4.90 the SD score is0.30 and the non-karate score is4.87 and the SD score is0.34. So the calculated ‘t’ value is0.39. Hence the calculated ‘t’ value > the significant level.

Hence the formulated hypothesis is accepted.

TABLE – X Showing the mean, SD and ‘t’ value of the PGI- Memory Scale among karate and non-karate students in Mental Balance dimension.

Variable	N	Mean	SD	t value
Karate	30	6.60	1.83	
Non-Karate	30	6.00	1.57	1.36

- Not significant

Above the table concludes that the mean score of the PGI- Memory Scale among karate is 6.60 the SD score is1.83 and the non-karate score is6.00 and the SD score is1.57. So the calculated ‘t’ value is 1.36. Hence the calculated ‘t’ value > the significant level.

Hence the formulated hypothesis is accepted.

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TABLE –XI Showing the mean, SD and 't' value of the PGI- Memory Scale among karate and non-karate students in Attention Concentration dimension

Variable	N	Mean	SD	t value
Karate	30	8.60	1.40	
Non-Karate	30	8.50	1.90	0.23

- Not significant

Above the table concludes that the mean score of the PGI- Memory Scale among karate is 8.60 the SD score is1.40 and the non-karate score is 8.50and the SD score is1.90. So the calculated 't' value is0.23. Hence the calculated 't' value > the significant level.

Hence the formulated hypothesis is accepted.

TABLE – XII Showing the mean, SD and 't' value of the PGI- Memory Scale among karate and non-karate students in Delayed Recall dimension

Variable	N	Mean	SD	t value
Karate	30	9.60	0.81	
Non-Karate	30	9.60	0.81	0

- Not significant

Above the table concludes that the mean score of the PGI- Memory Scale among karate is 9.60the SD score is0.81 and the non-karate score is9.60 and the SD score is0.81. So the calculated 't' value is0. Hence the calculated 't' value > the significant level.

Hence the formulated hypothesis is accepted.

TABLE –XIII Showing the mean, SD and 't' value of the PGI- Memory Scale among karate and non-karate students in Immediate Recall dimension

Variable	N	Mean	SD	t value
Karate	30	2.77	1.38	
Non-Karate	30	2.47	1.35	0.84

- Not significant

Above the table concludes that the mean score of the PGI- Memory Scale among karate is 2.77 the SD score is1.38 and the non-karate score is2.47 and the SD score is1.35. So the calculated 't' value is0.84. Hence the calculated 't' value > the significant level.

Hence the formulated hypothesis is accepted.

TABLE –XIV Showing the mean, SD and 't' value of the PGI- Memory Scale among karate and non-karate students in Verbal retention dimension

Variable	N	Mean	SD	t value
Karate	30	4.97	0.32	
Non-Karate	30	4.87	0.43	1.01

- Not significant

Above the table concludes that the mean score of the PGI- Memory Scale among karate is 4.97 the SD score is0.32 and the non-karate score is4.87 and the SD score is0.43. So the calculated 't' value is1.01. Hence the calculated 't' value > the significant level.

Hence the formulated hypothesis is accepted.

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TABLE –XV Showing the mean, SD and 't' value of the PGI- Memory Scale among karate and non-karate students in Visual Retention dimension

Variable	N	Mean	SD	t value
Karate	30	4.97	0.32	
Non-Karate	30	4.87	0.34	1.16

- Not significant

Above the table concludes that the mean score of the PGI- Memory Scale among karate is 4.97 the SD score is0.32 and the non-karate score is4.87 and the SD score is0.34. So the calculated 't' value is1.16. Hence the calculated 't' value > the significant level.

Hence the formulated hypothesis is accepted.

TABLE –XV I Showing the mean, SD and 't' value of the Creativity among karate and non-karate students in Instances Dimension.

Variable	N	Mean	SD	t value	Level of significance
Karate	30	29.80	12.92		
Non-Karate	30	22.40	10.51	2.43	0.01

- Significant at .01 level

Above the table concludes that the mean score of the Creativity among karate is 29.80the SD score is12.92 and the non-karate score is a22.40nd the SD score is10.51. So the calculated't' value is2.43. Hence the calculated't' value<the significant level.

Hence the formulated hypothesis is rejected.

TABLE –XVII Showing the mean, SD and 't' value of the Creativity among karate and non-karate students in Alternatives Dimension.

Variable	N	Mean	SD	t value	Level of significant
Karate	30	22.13	12.59		
Non-Karate	30	14.23	7.75	2.92	.005

- significant at .005 level

Above the table concludes that the mean score of the Creativity among karate is 22.13the SD score is 12.59and the non-karate score is14.23 and the SD score is7.75. So the calculated't' value is2.92. Hence the calculated't' value < the significant level

Hence the formulated hypothesis is Rejected

TABLE – XVIII Showing the mean, SD and 't' value of the Creativity among karate and non-karate students in Similarities Dimension.

Variable	N	Mean	SD	t value
Karate	30	19.03	9.22	
Non-Karate	30	14.83	8.04	1.87

- Not significant

Above the table concludes that the mean score of the Creativity among karate is

19.03 The SD score is9.22 and the non-karate score is14.83 and the SD score is 8.04. So the calculated 't' value is1.87. Hence the calculated 't' value > the significant level.

Hence the formulated hypothesis is accepted.

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TABLE –XIX Showing the mean, SD and‘t’ value of the Creativity among karate and non-karate students in Pattern meaning task Dimension

Variable	N	Mean	SD	t value
Karate	30	15.60	7.28	0.54
Non-Karate	30	14.63	6.37	

- Not significant

Above the table concludes that the mean score of the creativity among karate is 15.60the SD score is7.28 and the non-karate score is14.63 and the SD score is6.37. So the calculated ‘t’ value is0.54. Hence the calculated ‘t’ value > the significant level.

Hence the formulated hypothesis is accepted.

TABLE –XX Showing the mean, SD and ‘t’ value of the Creativity among karate and non-karate students in Line Meaning task Dimension

Variable	N	Mean	SD	t value
Karate	30	13.50	3.52	1.12
Non-Karate	30	12.17	5.48	

- Not significant

Above the table concludes that the mean score of the Creativity among karate is13.50the SD score is3.52 and the non-karate score is12.17 and the SD score is5.48. So the calculated ‘t’ value is1.12. Hence the calculated ‘t’ value > the significant level.

Hence the formulated hypothesis is accepted.

DISCUSSION:

It is inferred from the table-1 that the mean score of karate is higher then the non karate, but the “t” value is not significant there will be no significant difference between the karate and non karate in their Advance Progressive Matrices is accepted they have characteristics like high thinking capacity, they have a very clear impression, retain is experience effectively, able to manipulate ideas actively, there mental, cognitive intellectual development is good. Hence the hypothesis is accepted

It is inferred from the table-2 that the mean score of karate is higher then the non karate, but the “t” value is not significant there will be no significant difference between the karate and non karate in their hyper vigilance is accepted they have characteristics like to make decisions impulsively and to look for quick, easy solutions to problems. Hence the formulated hypothesis is accepted

It is inferred from the table-3 that the mean score of karate is higher then the non karate, but the “t” value is not significant there will be no significant difference between the karate and non karate in their Rationalization is accepted they have characteristics like char reality of decisions, there is achieved by ignoring or denying unpleasant aspects of the decision or by concentrating only positive aspects of the choice. Hence the formulated hypothesis is accepted

It is inferred from the table-4 that the mean score of non karate is higher then the karate, but the “t” value is not significant there will be no significant difference between the karate and non karate in their vigilance is accepted they have characteristics like to search carefully for information, to consider information without basis, and to evaluate alternatives carefully before making a choice. Hence the formulated hypothesis is accepted.

It is inferred from the table-5 that the mean score of karate is higher then the non karate, but the “t” value is not significant there will be no significant difference between the karate and non karate in their defensive avoidance is accepted they have characteristics like to try to avoid or escape having to make decisions. Hence the formulated hypothesis is accepted

It is inferred from the table-6 that the mean score of karate is higher then the non karate, but the “t” value is not significant there will be no significant difference between the karate and non karate in their buck passing is accepted they

have characteristics like to have the hard decisions to others when the decision is wrong . Hence the formulated hypothesis is accepted

It is inferred from the table-7 that the mean score of karate is higher then the non karate, but the "t" value is not significant there will be no significant difference between the karate and non karate in their procrastination is accepted they have characteristics like to putt of making decisions by doing other things or thinking about the decision for too long. Hence the formulated hypothesis is accepted

It is inferred from the table-8 that the mean score of karate is higher then the non karate, but the "t" value is not significant there will be no significant difference between the karate and non karate in their remote memory is accepted. Hence the formulated hypothesis is accepted

It is inferred from the table-9 that the mean score of karate is higher then the non karate, but the "t" value is not significant there will be no significant difference between the karate and non karate in their recent memory is accepted. Hence the formulated hypothesis is accepted

It is inferred from the table-10 that the mean score of karate is higher then the non karate, but the "t" value is not significant there will be no significant difference between the karate and non karate in their mental balance is accepted. Hence the formulated hypothesis is accepted

It is inferred from the table-11 that the mean score of karate is higher then the non karate, but the "t" value is not significant there will be no significant difference between the karate and non karate in their attention concentration is accepted. Hence the formulated hypothesis is accepted

It is inferred from the table-12 that the mean score is karate and non karate also same . The "t" value is not significant there will be no significant difference between the karate and non karate in their delayed recall is accepted. Hence the formulated hypothesis is accepted

It is inferred from the table-13 that the mean score of karate is higher then the non karate, but the "t" value is not significant there will be no significant difference between the karate and non karate in their immediate recall is accepted. Hence the formulated hypothesis is accepted

It is inferred from the table-14 that the mean score of karate is higher then the non karate, but the "t" value is not significant there will be no significant difference between the karate and non karate in their verbal retention is accepted. Hence the formulated hypothesis is accepted

It is inferred from the table-15 that the mean score of karate is higher then the non karate, but the "t" value is not significant there will be no significant difference between the karate and non karate in their visual retention is accepted. Hence the formulated hypothesis is accepted

It is inferred from the table-16 that the mean score of karate is higher then the non karate, but the "t" value is significant there will be difference between the karate and non karate in their creativity- instances is rejected. Hence the formulated hypothesis is rejected.

It is inferred from the table-17 that the mean score of karate is higher then the non karate, but the "t" value is significant there will be difference between the karate and non karate in their creativity- alternatives is rejected. Hence the formulated hypothesis is rejected.

It is inferred from the table-18 that the mean score of karate is higher then the non karate, but the "t" value is not significant there will be no significant difference between the karate and non karate in their creativity- similarities is accepted. Hence the formulated hypothesis is accepted

It is inferred from the table-19 that the mean score of karate is higher then the non karate, but the "t" value is not significant there will be no significant difference between the karate and non karate in their creativity-pattern meaning task is accepted. Hence the formulated hypothesis is accepted

It is inferred from the table-20 that the mean score of karate is higher then the non karate, but the "t" value is not significant there will be no significant difference between the karate and non karate in their creativity-line meaning task is accepted. Hence the formulated hypothesis is accepted

11. CONCLUSION

1. There is no significant difference between in karate and non-karate students on Intelligence.
2. There is no significant difference in decision-making style among karate and non-karate in their Hyper Vigilance.
3. There is no significant difference in decision-making style among karate and non-karate in their Rationalization.
4. There is no significant difference in decision-making style among karate and non-karate in their Vigilance.
5. There is no significant difference in decision-making style among karate and non-karate in their Defensive Avoidance.
6. There is no significant difference in decision-making style among karate and non-karate in their Buck Passing.
7. There is no significant difference in decision-making style among karate and non-karate in their Procrastination.
8. There is no significant difference in memory among karate and non-karate In their Remote Memory.
9. There is no significant difference in memory among karate and non-karate In their Recent Memory.
10. There is no significant difference in memory among karate and non-karateIn their Mental Balance.
11. There is no significant difference in memory among karate and non-karate In their Attention Concentration.
12. There is no significant difference in memory among karate and non-karatein their Delayed Recall.
13. There is no significant difference in memory among karate and non-karate in their Immediate Recall.
14. There is no significant difference in memory among karate and non-karate In their Verbal Retention.
15. There is no significant difference in memory between karate and non-karate in their Visual Retention.
16. There is a significant difference in creativity among karate and non karate in their Instances
17. There is a significant difference in creativity among karate and non-karate in their Alternatives.
18. There is no significant difference in creativity among karate and non-karate in their Similarities.
19. There is no significant difference in creativity among karate and non-karate in their Pattern Meaning Task
20. There is no significant difference in creativity among karate and non-karate in their Line Meaning Task

12. IMPLICATION OF THE STUDY

Attention, observation, concentration, memory and decision-making abilities get damaged as a result of head injuries. This can further lead to the players declining performance at the sport he is engaged in as well. Their deteriorating performance can in turn lead to psychological problems such as frustration, stress and anxiety. A sports psychologist can therefore identify these problems and apply the appropriate psychological strategies such as motivational counselling, relaxation therapy and stress management techniques to help the player overcome his difficulties.

Cognitive abilities such as memory, intelligence, creativity and decision making are of particular importance to sports persons and team leaders. It is essential that players and leaders take intelligent decisions in order to rescue the team from failure. It is therefore important to identify a player's cognitive deficits and thereby make the necessary amendments to rectify the damage done.

Need For Further Study:

Separate tools were used for this study. Nero-Cognitive tool can be used for further study.

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