

# An Overview to Game Theory, Physical Education and Sports, Its Thirteen Essentials and Categories

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**Abstract:** The study aimed to develop a relationship for Game theory, Physical Education and Sports. The author gathered facts about game theory, physical education and sports to be supported by its foundations through data gathering, observation, immersion and previous experiences. The results showed that there are thirteen essential and categories for game theory, physical education and sports. The completeness and the categorizations may be revised or extended depending on the need and a more diversified, thorough research which the author welcomes.

**Keywords:** Fun, Game Theory, Physical Education, Sports, Wisdom

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## 1. Introduction

Game theory is an interactive decision theory. (Aumann 2008) Games use simple modeling techniques and straight forward explanations to provide an understanding of game theory. (Rasmusen 2007) Principles of game theory may be noncooperative and cooperative. (Myerson 1991) Game theory is used in economics, political science, applied mathematics, operations research (Myerson 1991 & Rasmusen 2007), and psychology, behavioral science (Camerer 2003) as well as logic, computer science, (Halpern 2008) biology (Smith 1974) and philosophy (Bicchieri 1989 & Bicchieri 1993).

*Note: Game theory does not only include man but also computers, animals and other able bodied entities as well.*

Physical education promotes health. It is an educational course related to the physique of the human body, taken during primary and secondary education that encourages psychomotor learning in a play or movement exploration setting. (Anderson 1989)

From those requiring only two participants, through to those with hundreds of simultaneous participants, either in teams or competing as individuals, hundreds of sports exist. There are over 3,000 sport disciplines and sporting games from around the world and more than 8000 indigenous sports. (World Sports Encyclopedia 2003)

### 1.1. The Sport Accord Definition of Sport

- The sport proposed should include an element of competition.
- The sport should not rely on any element of "luck" specifically integrated into the sport.
- The sport should not be judged to pose an undue risk to the health and safety of its athletes or participants.
- The sport proposed should in no way be harmful to any living creature.
- The sport should not rely on equipment that is provided by a single supplier.

Furthermore,

Applications from martial arts and combat sports will be considered with the greatest care due to the complex nature and relatively minor differences between their activities.

Applications from mind games will only be considered after consultation with the International Mind Sports Association (IMSA).

Applications from sports with limited physical or athletic activity will be carefully considered.

Note: Sport Accord is the International Sports Federations. (Sport Accord 2014)

The above paragraphs are all basic definitions of game theory, physical education and sport. They can be represented in this manner:

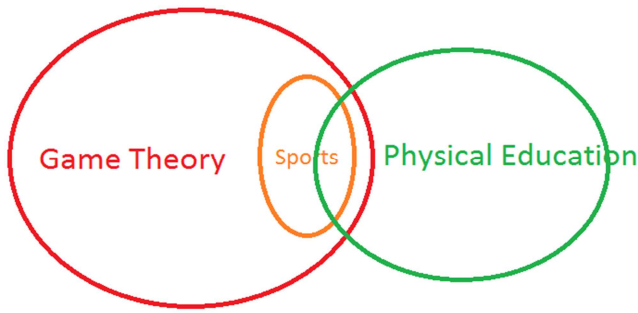


Figure 1. Relationship of game theory, sports and physical education.

- (1) All sports are part of game theory.
- (2) Some sports are incorporated in physical education.
- (3) Some games are not considered sports.
- (4) Some games are incorporated in physical education while some are not incorporated.
- (5) Some physical education activities are not considered sports.
- (6) Some physical education activities are games while some are not.

Note:

- (1) It may be true that more and more sports can be incorporated in physical education.
- (2) It is true that activities in physical education improve capacity for game theory.

### 1.2. Objectives

- (1) To categorize each game, physical activity, sport, play or movement coordination setting.
- (2) To know the importance of each category of games, physical activities and sports.
- (3) To know the essentials about game theory, physical education and sports.

## 2. Methodology

The three subjects are united to arrive to a foundation. Data gathering, observation, immersion and previous experiences were used.

- (1) Game theory is an interactive decision theory. Games use simple modeling techniques and straight forward explanations to provide an understanding of game theory. Game theory uses decision making. Decision making uses the mind. A game may also be based on luck.
- (2) Sports are acknowledged by Sport Accord. It has 8 qualifications to be considered for a game to be considered as a sport.
- (3) As physical education progress, physical education hereis not limited to the subject taught at school but may mean to physical activities and its other aspects. Physical education has four aspects. They are physical, mental, social, and emotional.
- (4) In here, sports are differentiated to physical education by the qualification acknowledge by sports accord.
- (5) In here, sports are separated to other games.
- (6) In here, other games are differentiated to physical

education by their limits. A game has a goal like winning and physical education promotes health.

The thirteen essentials and categories of game theory, physical education and sports are:

#### (1) Luck (game theory)

The definition of Luck (or chance) varies by philosophical, religious, mystical, or emotional context of the one interpreting it. Max Gunther defines it as "events that influence one's life and are seemingly beyond one's control". (Gunther 1977)

Examples: Probability games, card games, toss coins, dices, etc.

#### Reflection and analysis

Some probability games may employ critical thinking. Examples are mahjong and some card games like poker and hearts. Some employ statistics as well. An example is bingo. You may have a lucky card which is constantly winning and may not change it. Luck as defined by Max Gunther is beyond one's control but the statistics could be monitored and be educated upon. There are businesses that are built upon by these foundations and for some they may consider it to be a job. Some are lucky people and uses it to earn. Some are casino owners or lottery owners. Gambling is when you put money to your luck. Gambling may or may not be based on pure luck.

#### (2) Good Health and Fitness (game theory, physical education and sports)

There are good scientific evidences usually in health and medical journals stating that being physically active can help us lead healthier lives. Regular physical activity can reduce the risk of many diseases. (Sport England 2016) Stress can be a factor in our lives. Stress can be good or bad. Distress is the bad type and Eustress is the good type. Stress in general is a response to something about to happen. Some events provoke stress which are called stressors. (Teens Health 2016)

Examples: All games, physical education activities and sports need to have good health and fitness. Persons need to function properly.

It has four categories:

#### A. Rest

When tired, ample rest is needed.

#### B. Sleep

"Eight hours or more has consistently been shown to be hazardous," says Dr. Youngstedt, who researches the effects of oversleeping." The lowest mortality and morbidity is with seven hours," said Shawn Youngstedt, a professor in the College of Nursing and Health Innovation at Arizona State University Phoenix. (Reddy Summathi 2014)

There are studies which can show which is the optimum number of sleeping and waking hours. For adults, it is about at least 7 to 9 sleeping hours. Scientists are closing in to knowing what is the best sleeping hours.

#### C. Proper Nutrition

Commonly recommend is eight 8-ounce glasses, which equals about 2 liters, or half a gallon by health authorities. (Gunnars Kris 2015)

For the body to function properly, proper nutrition is

required. People should eat the right foods, drink enough fluids and take sufficient vitamins and minerals so the body can function properly. People need to be healthy to perform different games, activities and sports.

#### D. Exercise

There is a positive correlation between brain development and exercising. (Reynolds 2013)

Good health and fitness is basically achieved through this together with proper nutrition and enough rest and sleep. Regular exercise is observed. A routine may be observed to be engaged physically.

#### Reflection and analysis

For the body to function properly, it needs ample activities through games, physical education and sports. What is evident is fitness and the other one is longevity. These are the two factors that are considered. That is why it is called good health and fitness. First let us start with good health or longevity. In order to be healthy, the body needs a good habit. Eat the right foods and proper nutrition, ample exercise as stated by Sports England and enough rest and sleep. In order to be fit, we need the proper stressors to motivate us in achieving what we desire. People must be careful for too much distress can lead to imbalances. These two come hand in hand and in balance – being healthy and being fit. One must not be sacrificed for the other.

Too much engagement in a particular game has its pros and cons. Quality time must not be neglected.

Physical education must be enjoyed for people to learn from it. Knowing the ins and outs, knowing the hows and whys about engaging in a particular activity.

Sports are enjoyable and it is shared. Aside from getting healthy and into shape, it has other benefits like friendship and teamwork.

#### (3) Strength (game theory, physical education and sports)

It has five categories:

##### A. Physical

Physical strength is necessary to make actions and move objects.

##### Examples

Game theory: Obstacle courses and carrying games.

Physical education: exercises such as Daily Dozen which includes jumping jacks, push-ups, etc.

Sports: Weightlifting, ball games, etc.

##### B. stability, emotional,

It is necessary for a person to act in a rational manner. All ill feelings must be taken care of.

Examples: Games, sports and physical education activities have emotional challenges that a person must overcome.

Note: Only persons have emotional stability. Animals may also exhibit this.

##### C. Social consciousness

This is necessary to know the whereabouts of a society. To know persons and society is necessary for games, sport and physical activities to develop.

Examples: Games, sports and physical education activities do develop along with the society. They do promote social awareness.

Note: Only persons have emotional stability. Animals may also exhibit this.

#### D. Mental

The ability of a person to retain information, analyze situations, ... and to use his mind to have an advantage.

##### Examples

Game theory: Mind games, puzzles, mazes, etc.

Physical education: Remembering tasks.

Sports: Chess, speed reading, e-sports, etc.

#### E. Sportsmanship

Moral uprightness is necessary for people. In winning and losing times, games, sports and physical activities promote the development of the people.

Examples: Games, sports and physical education activities require sportsmanship which may be better than winning.

#### Reflection and analysis

There are five classifications for strength namely physical, emotional, social, mental and moral. People need to be productive to help themselves and others. One of the human goals is independence and in order to achieve this he needs strengths. Humans are the highest forms of beings and considered to be the caretaker of his surroundings.

Some may be blessed to have these strengths and they must be put to good use. One of the uses of strengths is through work. People work to develop his surroundings and himself.

#### (4) Stamina (game theory, physical education and sports)

##### Examples

Game theory: Obstacle courses

Physical education: Monitored exercise, jogging, etc.

Sports: Rowing, boxing, tennis, etc.

##### Reflection and analysis

This primarily concerns physical strength though the term endure may also refer to other strengths. As discussed in categories 2 and 3, the human body needs rest and has physical strength. These two things must go hand in hand. This is also a reason why a person needs practice and training. Mental training is also essential for stamina to boost for the body does not act alone. It also uses the mind.

#### (5) Dexterity (game theory, physical education and sports)

##### Examples

Game theory: Hitting games

Physical education: Hitting activities

Sports: Archery, soccer, basketball, etc.

##### Reflection and analysis

This is the accuracy and precision of persons or able bodied entities. Persons use their eyes primarily and motor functions to hit their target. They can also use other senses. Computers on the other hand, have a definitive degree of adjustable dexterity. Dexterity is essential in achieving goals. Without a physical target, many things would be unknown and unrealized.

#### (6) Teamwork (game theory, physical education and sports)

##### Examples

Game theory: Partner games

Physical education: Activities may promote teamwork to

finish the task earlier.

Sports: Standard basketball game, 2 against 2 Beach volleyball game, etc.

Reflection and analysis

It is said that two are better than one (Ecclesiastes 4:9). Games may be cooperative. Teamwork uses the skills of each individual and uses it as an edge. Teams may cover each weakness of individuals and use individuals' strengths to win. It is defined that group of persons produces teamwork but it is also true that animals such as dogs may exhibit good teamwork potentials.

(7) Motor Coordination (game theory, physical education and sports)

Examples

Game theory: Piko or hopscotch

Physical education: physical activities especially exercise

Sports: Gymnastics, dancing, etc.

Reflection and analysis

Physical activities use this to allow the person to perform specific tasks such as walking, running, jumping, gliding, skipping, ...repeated actions. Some works are repetitive in nature. Some requires balance. Able to control oneself has advantages. Able to move in a particular manner has advantages. Some works are physical in nature.

(8) Strategy (game theory and sports)

Examples: All games and sports require a good strategy in order to win. Preparedness is a factor.

Reflection and analysis

It is a continuous effort to make actions successful. Strategies are necessary to make no or little mistakes and win to a particular situation. Strategy is necessary to make tasks easier. What will be the easiest way to win? People need a credible strategy.

(9) Control (game theory, physical education and sports)

It has four categories:

A. Resources

Resources are necessary to make an improvement in a particular game. In basketball, we need a basketball ball and a playing court. Resources are necessary for us to practice.

Examples: Fields, courts, balls, etc.

Note: Computer, animals and other nonhuman able bodied entities may also be helpful.

B. Human Support

In many games, we need a training partner to coach us, to instruct us, to motivate us, etc.

Examples: Partners, coaches, etc.

C. Other Support

Some sports are predominantly motorised such as Formula 1 or power boating.

Examples: Cars and boats.

Some sports are primarily animal-supported such as equestrian sport and vinkensport

Example: Horses and birds.

D. Time

The more time you give in practice, the more perfect your actions to become.

Note: Ample preparation time is necessary for a player to

succeed.

Reflection and analysis

People need control over things and places. We must analyze how to control not just situations but also the things that is included in our activities. We must master handling things and knowing places. For other support, we must be one with things and animals that we have control. We have control over time. Where will we be depends on our preparations. These four things are the things we have control of.

(10) Potential (game theory, physical education and sports)

Example: World records may be conquered.

Reflection and analysis

It is the capability of being or becoming. It is the excellence one may achieve. Some people recognize the potential of other persons. They choose the best persons to train. Hard work pays off.

(11) Education (game theory, physical education and sports)

It has two categories:

A. Determination

There is dedication given by a person to enhance his potential.

Note: It is not giving up even if hardships may come.

B. Skills

Reflection and analysis

With these two, one cannot fail. A determined skillful person is to be admired. Skills are earned. Determination is also acquired. New techniques are taught. Some may be blessed having these two.

(12) Beauty (sports)

Examples

Sports: dancing, gymnastics, figure skating, etc.

Reflection and analysis

Singing and writing contests have a competition theme but does not fall directly to game theory. Gardening on the other hand is a physical activity but does not fall directly to physical education. Fitness and being healthy may sometimes vary among beholders. Perfection is a comprehension of people. Culture may also affect wisdom.

(13) Fun (game theory, physical education and sports)

Examples: Games, sports and physical education activities should be fun to do.

Reflection and analysis

This element brings the kid in every person. People enjoy what they are doing even it is repeated. Belongingness is one of the elements of fun. Thrill and blood rush is sometimes an entertainment. Happiness is a profound longing of man.

### 3. Results and Discussions

(1) In the vastness of games, sports and physical education, the author concluded that there are thirteen categories or essentials.

(2) A reiteration, one game, physical activity or sport may fall to many categories.

(3) The thirteen categories may or may not have sub-categories.

(4) The categorizations may be revised or extended depending on the need.

## 4. Conclusion

Game theory, physical education and sports have a wide acceptance world-wide. Educators on different fields employ some of the disciplines that are taught by the three subjects. Above-stated are the thirteen categories on which they are founded upon. Only Luck has a basis in game theory but not in physical education and sports. Good health and fitness is one of the main purpose of Games, activities and sports. Strength is assumed to be a core value. Stamina is cherished. Dexterity uses direction. Teamwork is very useful. Motor Coordination is a sustained effort. Strategy is widely known in games and sports. Control seems to be an advantage. Potential is sometimes a rare credential. Education is learning determination and skill. Beauty is a tomorrow's discussion. Fun is very essential. Games, activities and sports may include animals, computers and other able bodied entities.

## References

- [1] Anderson, D. (1989). *The Discipline and the Profession. Foundations of Canadian Physical Education, Recreation, and Sports Studies*. Dubuque, IA: Wm. C. Brown Publishers.
- [2] Aumann, R. J. ([1987] 2008). "game theory," Introduction, *The New Palgrave Dictionary of Economics*, 2nd Edition. Abstract.
- [3] Authority Nutrition (2016). "How Much Water Should You Drink Per Day?" Retrieved from <http://authoritynutrition.com/how-much-water-should-you-drink-per-day/> on March 5, 2016
- [4] Bicchieri, Cristina (1989). "Self-Refuting Theories of Strategic Interaction: A Paradox of Common Knowledge", *Erkenntnis* 30 (1–2): 69–85, doi:10.1007/BF00184816
- [5] Bicchieri, Cristina (1993) *Rationality and Coordination*, Cambridge University Press, 1993, ISBN 0521381231
- [6] Camerer, Colin F. (2003). *Behavioral Game Theory: Experiments in Strategic Interaction*, pp. 5–7
- [7] Ecclesiastes 4:9 Two are better than one.
- [8] Gunther, Max 1977. "The Lucky Factor" Harriman House Ltd. ISBN 9781906659950
- [9] Halpern, Joseph Y. (2008). "computer science and game theory," *The New Palgrave Dictionary of Economics*, 2nd Edition.
- [10] Myerson, Roger B. (1991). *Game Theory: Analysis of Conflict*, Harvard University Press, p. 1. Chapter-preview links, pp. vii–xi.
- [11] Rasmusen, Eric (2007). *Games and Information*, 4th ed. Description and chapter-preview.
- [12] Reynolds, Gretchen (18 April 2013). "Phys Ed: Can Exercise Make Kids Smarter?" *The New York Times*.
- [13] Smith, Maynard, J. (1974). "The theory of games and the evolution of animal conflicts". *Journal of Theoretical Biology* 47 (1): 209–221.
- [14] Sport Accord (2014). Definition of Sports. <https://web.archive.org/web/20111028112912/http://www.sportaccord.com/en/members/index.php?idIndex=32&idContent=14881>
- [15] Sport England (2016). "Health and Physical Health and Fitness" Retrieved from <http://www.sportengland.org/research/benefits-of-sport/health-benefits-of-sport/> on March 5, 2016
- [16] Teens Health (2016). "Handling Sports Pressure and Competition" Retrieved from <http://kidshealth.org/en/teens/sports-pressure.html> on March 5, 2016
- [17] The Wall Street Journal (2016). "Why Seven Hours of Sleep Might Be Better Than Eight - Sleep experts close in on the optimal night's sleep" Retrieved from <http://www.wsj.com/articles/sleep-experts-close-in-on-the-optimal-nights-sleep-1405984970> on March 5, 2016
- [18] World Sports Encyclopedia (2003). *Sport Discipline and Sporting Games*