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Initial Study of Core Decisive Modes of Game Theory on Closed Couple Relationships in Conflict Situations †

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Abstract: In life, making a decision is always required. Various situations demanding decision making are encountered in life. We apply the core decisive modes of game theory to closed couple relationships in conflict situations for the following reasons. (1) Life can be explained by the comprehensive decisions in games, as various conflict situations appear in a closed couple relationship. (2) Humans are influenced by diverse factors such as love, sacrifice, intuition, and the benefit of individual personality. (3) Information asymmetry is generated in subjective and objective environments. (4) Human nature is selfish. Based on the results of this research on the three core decisive modes in game theory, there are in-depth considerations and better win-win solutions considering the prisoner's dilemma. Game theory is further assayed in the further research for "Analyzing the research interfering factors of the core decisive modes of the game theory on the closed couple relationships at the conflict".

Keywords: decisive mode; game theory; closed couple relationships

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1. Introduction

Game theory (GT) was induced from the "bad out of the small" theorem of a mathematician, von Neumann, in 1928. GT created the "zero-sum" concept in the individual decision-making process of a game. In the decisive situation of a zero-sum game, the increased remuneration is exactly equal to the increased loss of the opponent, but the sum of the remuneration and loss is always zero. This is the most important theoretical assumption in GT [1]. The concept of "Nash equilibrium (NE)" was the reason for the Nobel Prize in Economics in 1994. NE introduces the best solution in a non-cooperative decisive game [2]. To extend the applicability of GT to economic behavior analysis, von Neumann and Morgenstern addressed the economic behavior for the initial formation of the systematic GT, as GT provides logical mathematic calculations to quantify decision-making activities and offers diversified conditions such as cooperation, decision-making time, and information structure.

In the NE of GT, the basic assumptions are as follows. (1) There are N participants in a decisive game and strategies of (n-1) participants [3]. (2) Each participant in the game pursues the best outcome without considering other participants' maximum profits and potential benefits [4]. If any participant pursues deviating benefits from the current strategies without considering maximized profits or potential benefits, individual decision-making actions or behaviors belong to the non-Nash equilibrium (NNE) in the GT. However, in intimate relationships such as lovers or partners, the economic concepts and mathematic measurements of GT cannot be used. Therefore, we apply the three most popular decisive models to facilitate and promote the development of closed couple relationships and detect

subtle changes in the relationships. The decisive models of GT applied in closed-couple relationships are (1) the prisoner's dilemma, (2) the convergent choice, and (3) divergence selection [4].

2. Literature Review

For the definition of a game, a game is classified according to the competitive or confrontational decision-making behaviors with which different goals or interests are used to obtain profits or benefits. For the profits or benefits, each participant considers the possible decision-making of the opponent to choose the most reasonable strategies [5]. GT is designed to consider and analyze the predicted and actual decision-making behaviors and strategies for individual optimization. In these games and strategies, the familiar incentive structures are constructed and expressed in different interactions in the game category. GT is for the analysis of the interaction between decision-makers through mathematical calculations. The biggest difference between the traditional decisive assessment and the GT analysis is that GT incorporates and considers each decision-maker's knowledge and expectation of the opponent as the opponent tries to maximize remuneration for decision-making payoff. Thus, GT is applied to interdisciplinary research such as biology, economics, international relations, computer science, political science, and military strategy by measuring the interaction in games. GT is a mathematical theory to institute the equilibrium point of a two-person zero-sum game and study decisive phenomena under the struggled situations or hostile conditions. GT is one of the greatest achievements in economics to deal with the psychological factors in complex decision-making processes or games in the 20th century.

3. Research Method

To apply the three core decisive models of GT to the analysis of closed couple relationships in conflict situations, the four research steps (research motivation, research methodology, research evaluation, and research induction) were used [6–12] in this research (Figure 1).

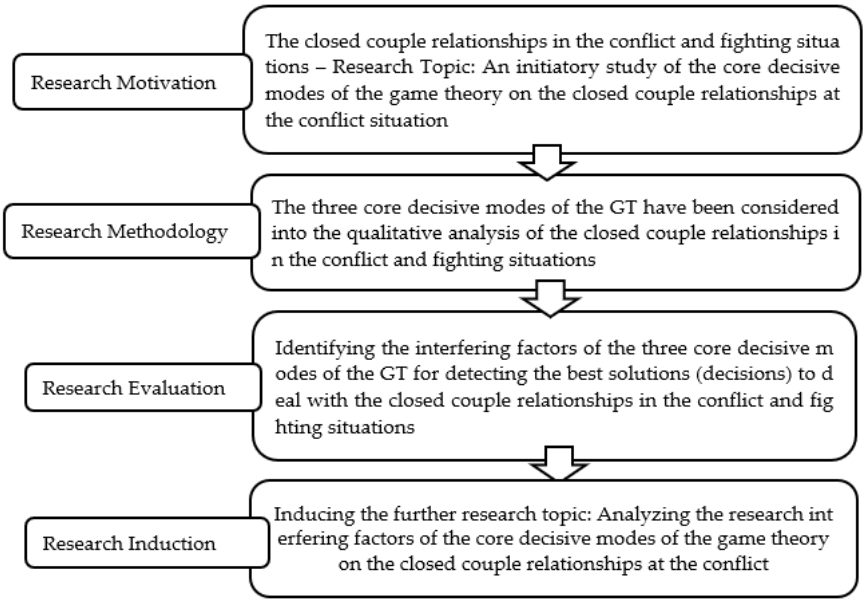

Figure 1. Research method.

4. Results and Discussion

Of the core decisive models, the most famous one is the prisoner's dilemma. The prisoner's dilemma is a typical model for exploring and demonstrating information asymmetry and the best benefits of GT in a dangerous and separate situation. In the beginning, an officer separates two prisoners to construct a situation with information asymmetry between them. Then, the officer implements the prisoner's dilemma to create the prisoner's confession. The best strategy for them is to be in prison for the shortest period. In a closed couple relationship, the "Be frank and lenient; resist and be strict" situation always works for coercing the confession of partners to obtain the truth [13]. Due to separation, two prisoners always have to be in the prisoner's dilemma, in which there are four situations: confession vs. confession, confession vs. no-confession, no-confession vs. confession, and no-confession vs. no-confession as displayed in Table 1.

Table 1. Prisoner's dilemma situation.

Decision	B: Confession	B: No-Confession
A: Confession	5-year sentence	10-year sentence for B Release of A
A: No-Confession	10-year sentence for A Release of B	6-month sentence

Convergent choice is used in daily activities of closed couple relationships because the relationship enforces the couple to choose the same actions for each other even though they are not willing to do so. As a result, there are four situations: favorite activity vs. favorite activity, favorite activity vs. non-favorite activity, non-favorite activity vs. favorite activity, and non-favorite activity vs. non-favorite activity. For example, when a male watches a sports game with his girlfriend, she forces herself to watch the game to make her boyfriend feel happy. The powerful driving force of the convergent choice game is love in the closed couple relationship [14]. The divergent selection (also called the weak chicken or coward game) is employed in conflict situations of the closed couple relationship. The divergence selection is constructed on the two drivers' conflict, too. When two cars speed toward each other on the same street, the one who turns first is a coward. There are four situations, as shown in Table 2. The two drivers do not have enough time to consider each other's choices as the two cars are driving fast and have to choose the best strategy. However, human nature often results in two consequent situations: both turn to be cowards or both go straight to be in a crash. Hence, divergence selection is the opposite of convergent choice.

Table 2. Divergent selection in a two-car crash.

Decision	Driver B: Straight	Driver B: Turn
Driver A: Straight	Crash	A wins B loses
Driver A: Turn	A loses B wins	Tie

In this research, the three decision models in GT were considered to discuss a closed couple relationship in a conflict situation with the main concept of Figure 2.

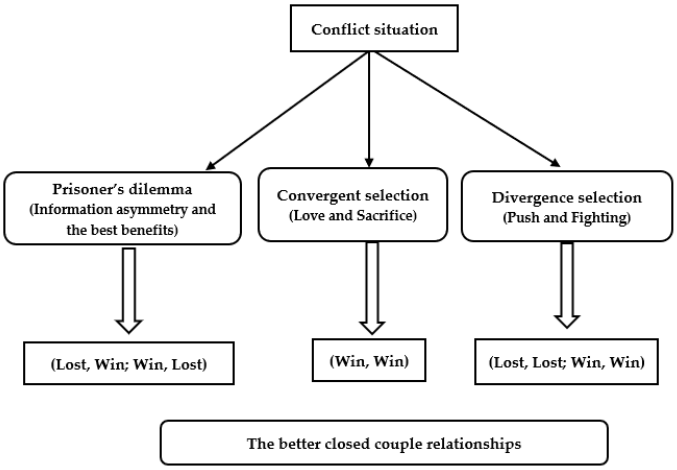

Figure 2. Revaluated method.

5. Conclusions and Recommendations

The core decisive model of GT of a closed couple relationship in a conflict situation is reviewed. Life is full of decisions in games. Various conflicts appear in a closed couple relationship in which love and sacrifice play a dominant role. Information asymmetry is generated by selfish human nature and an objective environment. In the three core decisive models, decisions are based on betrayal and cooperation in the prisoner's dilemma, while decisions are made based on sacrifice in the convergent selection. Life is always to make decisions. Each model explains the various situations for decision making encountered in life. Due to frequent decision-making opportunities, more diversified methods of GT play a critical role in selection and activities. To make the best decision, decision models need to be researched further. To find the best decision, GT can be used as shown in Figure 3 [15–18]. GT is designed and applied to human decision-making processes and the evaluation of a situation to institute the best strategies under the lowest uncertainty and risks. Further discussion is required to research interfering factors of decision-making: information asymmetry, individual traits, emotional impact, love, and sacrifice. To find the best decisions, closed couple relationships can be applied to conflicts.

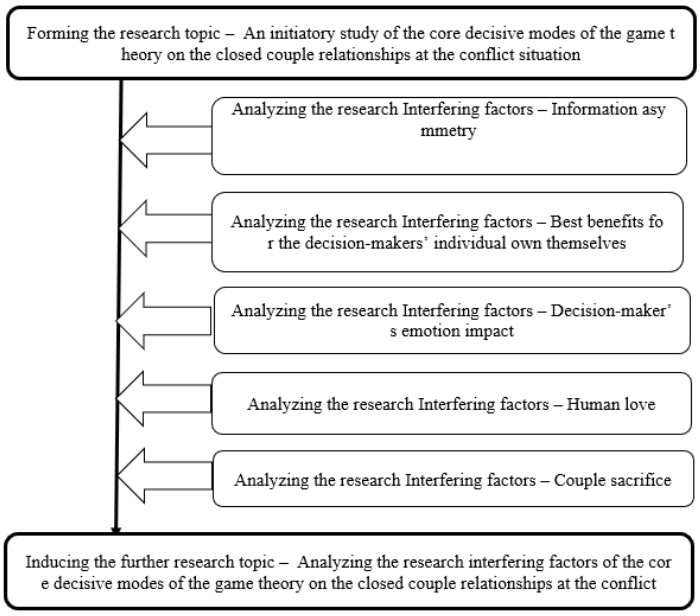

Figure 3. Process of GT application.

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