HOLISTIC FORMAL ANALYSIS OF DILEMMAS OF NEGOTIATION

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ABSTRACT

The purpose of the present paper is to examine dilemmas arising during negotiation process where negotiators claim their positions and threats reciprocally. To obtain a holistic view of the dilemmas, we first define the class of negotiation we will focus on and then argue that inconsistency between the claims leads to dilemmas. Then, after we define and classify six dilemmas rigorously in terms of dramatic model, we show that these six dilemmas are all and only dilemmas arising in negotiation. This is the main finding of the paper. A holistic description of inter-relationship among them is also presented.

Keywords: Negotiation, Drama Theory, Dilemma, Holistic View

1 INTRODUCTION

Negotiation constitutes a crucial part of our life as social human being. We propose one position to the other party, and if accepted, the negotiation process will end in cooperation. But, if neither the other accepts our position nor we accept the other's position, it will end up with conflict. The process of negotiating involves cooperation and potential conflict in the same time.

In negotiation, the negotiators may decide what they want and guess what others will want. Then do the best they can, given what they think the others will do. In the process, however, they are often to face dilemmas.

Kijima (2006) classified negotiation into two styles, positions-and-threats negotiation and assertive negotiation, according to attitudes adopted by the negotiators. Assertive negotiation is negotiation carried out in the spirit of modesty or harmony. Each negotiator tries to get some, but not all of what he/she wants. On the contrary, in positions-and-threats negotiation, each negotiator aims at achieving his/her desire by claiming positions and threats reciprocally in a straightforward way. In this paper, however, we will focus on positions-and-threats negotiation and will not discuss assertive negotiation any further.

2 DRAMATIC PROCESS OF POSITIONS-AND-THREATS NEGOTIATION

2.1 Formulation of Positions-and-Threats Negotiation

It is dramatic model of negotiation that has been argued positions-and-threats negotiation intensively and focused on dilemmas that arise during the process. The model looks at negotiation process as a process along which the involved negotiators increase their energy through the pre-play stage to reach some consistent agreement, which we call it, a dramatic solution. Kijima (2006) rigorously formulated positions-and-threats negotiation in terms of drama.

Let us denote negotiators by i and j and focus on i's behavior, though symmetric arguments are applicable to j. Let X_i and X_j are sets of strategies available for i and j, respectively.

We assume that each negotiator claims a position and a threat simultaneously and repeats the claims until some agreement is achieved. That is, i states: "I will do p_i^i so that you should do p_j^i, otherwise I will do t_i." We call $p^i = (p_i^i, p_j^i) \in X_i \times X_j$ as i's position, while $t_i \in X_i$ is i's threat. i's position consists of commitment to i's own behavior and requirements on j's.

At the same time j insists "I will do p_j^j so that you should do p_i^j, otherwise I will do t_j." We call $p^j = (p_i^j, p_j^j) \in X_i \times X_j$ as j's position, while $t_j \in X_j$ is j's threat.

For avoiding unnecessary confusion, we assume that a strategy on the left hand side of every position represents one available for i, while that on the right hand side shows one for j. Furthermore, we call the pair of the threats by the both, $t = (t_i, t_j)$, threatened future. Threatened future means a future state appearing when the both implement their threats simultaneously.

Assume i and j proposes their position and threat $((p_{i_0}^i, p_{j_0}^i), t_{i_0})$ and $((p_{i_0}^j, p_{j_0}^j), t_{j_0})$, respectively, at time 0. Then, both respond to them by claiming new $((p_{i_1}^i, p_{j_1}^i), t_{i_1})$ and $((p_{i_1}^j, p_{j_1}^j), t_{j_1})$, respectively, at time 1. This process continues until some consensus is achieved.

Another concept that we use in this paper is Nash equilibrium. Indeed, Nash equilibrium is the most well-known concept of rationality for non-cooperative game. In negotiation, a pair of strategies is Nash equilibrium if and only if each negotiator has no incentive to deviate from it. Howard (1996) proposed concept of dramatic solution, but dramatic solution coincides with Nash equilibrium when negotiation involves only two negotiators.

We call that the negotiation reaches consensus at time n^* if i's position $(p^i_{i_{n^*}}, p^i_{j_{n^*}})$, j's position $(p^j_{i_{n^*}}, p^j_{j_{n^*}})$, or the threatened future $(t_{i_{n^*}}, t_{j_{n^*}})$ at that time is Nash equilibrium.

2.3 The Six Dilemmas

Bryant (2003, 2007) claimed that in negotiation, if faced with a dilemma, a negotiator may respond in four ways to it, whatever the dilemma is: (1) by changing its position; (2) by amending its preferences for the possible outcomes; (3) by denying that the dilemmas exist; or (4) by taking irreversible unilateral action. Then, he empirically pointed out six dilemmas. However, his arguments are not formulized rigorously. They are rather *ad hoc* and it is not clear whether they are all and only dilemmas that emerge in negotiation process. In this section we will argue this problem formally.

Based on Bryant's empirical analysis, we begin with formulating them rigorously in terms of our framework of positions-and-threats negotiation. Let $p^i = (p^i_i, p^i_j) \in X_i \times X_j$ and $t_i \in X_i$ be a position and threat of i, while let $p^j = (p^j_i, p^j_j) \in X_i \times X_j$ and $t_j \in X_j$ be a position and threat of j. Also let $t = (t_i, t_j) \in X_i \times X_j$ is the threatened future.

We will explain about the six dilemmas by using an example. In December 2002 it was observed that US would take military intervention against Iraq. President Bush claimed that there were definite reasons why they were eager to change political administrations in Iraq and pointed out Iraq's military threats against the neighbour countries and doubts about development of weapons of mass destruction by Iraq. He also urged that US should examine all kinds of alternatives towards Iraq.

According to newspapers and published data, let us assume that Iraq and US share the frame represented by Table 1 as common knowledge. It shows that US has three strategies; i.e., withdraw of economic sanction, continuation of economic sanction and military intervention. Iraq also possesses three strategies; i.e., acceptance of nuclear inspection by the UN, change government (resignation of Saddam Hussein), and commit international terrorism attack.

Table 1. Negotiation between US and Iraq (as of December 2002)

Iraq US	Accept Nuclear Inspection	Replace President	Commit Terrorism
Withdraw Economic Sanction	4, 9	7, 7	1, 8
Continue Economic Sanction	6, 6	9, 4	2, 5
Military Intervention	5, 3	8, 1	3, 2

Each cell represents an outcome caused by a pair of strategies of the two. In each cell the figure on the left hand side shows payoff of US, while the figure on the right hand side represents that of Iraq. We assume that these figures are ordinal and the bigger the figure is, the more desirable the outcome is.

According to newspapers and publication, we may describe the position of US by "We will withdraw the economic sanction by the UN so that you (Iraq) should expel Saddam Hussein, otherwise we will intervene Iraq militarily". In other words, US's position is (withdraw of economic sanction, change of the government) while US's threat is military intervention (Kijima, 2005b).

On the other hand, we may represent the position of Iraq by "We will accept nuclear inspection by the UN so that you should withdraw the economic sanction, otherwise we will commit international terrorism attack". That is, Iraq's position is (withdraw of economic sanction, acceptance of nuclear inspection by the UN) while the Iraq's threat is international terrorism attack. Hence, (military intervention, international terrorism attack) is the threatened future.

In the example above, the frame has one and only one Nash equilibrium, namely, (continuation of economic sanction, acceptance of nuclear inspection by the UN). However, in the real negotiation, positions and threats are often proposed independently of Nash equilibrium.

Let us define the six dilemmas and then explain about them by using this example.

2.3.1 Dilemma of Cooperation

We say that i faces dilemma of cooperation if j cannot believe with credibility that i will really carry out i's declared position, p_i^i, when j takes p_j^i. Formally,

$$(\exists x_i \in X_i)((x_i, p_j^i) \succ_i p^i)$$

In this case, by taking x_i, i can realize a more preferable outcome as far as j takes p_j^i. Hence, j cannot expect with credibility that i's position p^i is really realized.

Let us see the matrix in Table 1. Iraq does not face cooperation dilemma, because, if US agrees to withdraw the economic sanction, the strategy to accept nuclear inspection is the highest preference than the other two strategies.

In this case, US face dilemma of cooperation because US has a more preferable strategy, which is to (continue economic sanction, replace president) with payoff (9,4). Clearly, US will gain more if US' position is realized and deviate to this strategy. Hence Iraq cannot

believe the credibility of US' position. Meanwhile, Iraq does not have this dilemma because there is no better payoff for Iraq to deviate from (4,9).

2.3.2 Dilemma of Trust

Next, we say i faces dilemma of trust if i cannot trust j's announcement of acceptance of i's position. Formally,

$$(\exists x_j \in X_j)((p_i^i, x_j) \succ_j p^i)$$

This definition implies that i does not propose a future attractive enough to j. In this case, j has no incentive to follow i's position p^i and hence even if j promises i to carry out i's position, i cannot trust j's commitment.

In our example, both US and Iraq face trust dilemma. It means that Iraq cannot trust US will really withdraw the economic sanction if Iraq agrees to accepts nuclear inspection, because to continue economic sanction has a better payoff for US. US face dilemma of trust because Iraq has strategies that more preferable, which are to accept nuclear inspection or to commit terrorism. On the other hand, Iraq cannot trust US's commitment to withdraw economic sanction if Iraq agrees with US's position. US might deviate to continue economic sanction or to intervene militarily. Hence Iraq also faces dilemma of trust.

2.3.3 Dilemma of Positioning

Thirdly, we say i faces dilemma of positioning if i finds that j's position is more attractive than i's own position for i. Formally,

$$p^j \succ_i p^i$$

This dilemma happens because i might have some reasons not to accept j's position; for example, i might see that j's position is unrealistic for i to implement, even though it is desirable.

We can see in Table 1, both US and Iraq do not face dilemma of positioning. This means that either US or Iraq believe that they have a position that is reasonable enough to implemented. This happens quite naturally in negotiation and generates no dilemma. In other words, they have a strong position.

The previous three dilemmas have something to do with credibility of implementation of either of the positions. The following three are related with threats.

2.3.4 Dilemma of Persuasion

We say i faces dilemma of persuasion if i has problem that his/her threat does not lead j under any pressure into acceptance of i's position. Formally,

$$t \succ_j p^i$$

This happens because j has a better payoff with the consequences by letting i implement his/her threat and realizing the threatened future rather than following i's position p^i.

In our example, the threatened future is (military intervention, commit terrorism). Both parties have least payoff if the threatened future is realized. Hence, both parties do not face dilemma of persuasion.

2.3.5 Dilemma of Rejection

Next, we say i faces dilemma of rejection if i prefers j's position to the threatened future. In other words, i has difficulty to force his/her threat, because i see j's position is more attractive. Formally,

$$p^j \succ_i t$$

In this case, it is hard for j to believe that i will really implement his/her threat.

In our example, we see that both US and Iraq face with dilemma of rejection. Iraq has a better payoff if Iraq follow US' position than to realize threatened future. US also prefer Iraq's position rather than to implement US' threat. Both the parties face rejection dilemma. This means that, each has a better payoff, acceptance of the other's position, rather than implementation of the threatened future, if the both fail to insist each own position.

2.3.6 Dilemma of Threat

Finally, we say i faces dilemma of threat if i has a strategy that improves i's payoff from the threatened future. In other words, i has an alternative improvement more preferable to the threatened future. Formally,

$$(\exists x_i \in X_i)((x_i, t_j) \succ_i t)$$

In our example, Iraq faces threat dilemma, while US does not. Even though the threatened future is a result by this negotiation, Iraq might not really implement the threat, because there is one strategy, which is to accept nuclear inspection with a better payoff than to commit terrorism. If we look at Table 1, the payoff for threatened future is (3,2). We also know from the matrix that Iraq will gain more if Iraq move unilaterally to "accept nuclear

inspection" strategy while assuming US still implement US' threat. Hence, in this case, Iraq face dilemma of threat.

3 STRUCTURE OF DILEMMAS IN NEGOTIATION

3.1 Six and Only Six Dilemmas

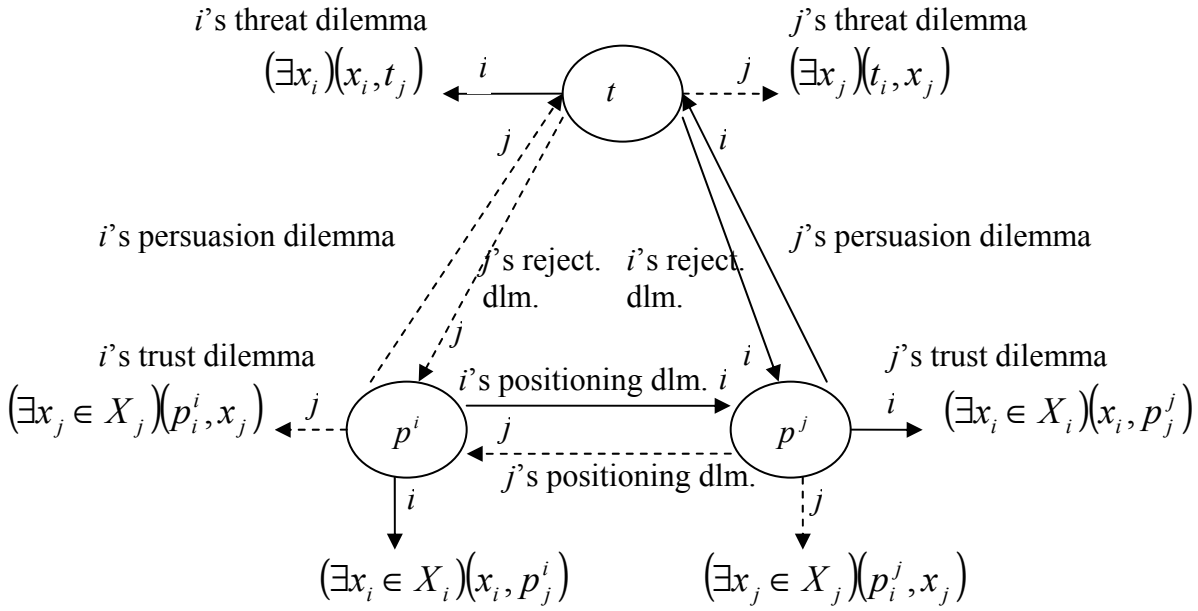
Now let us discuss whether the six dilemmas introduced above are all and only the dilemmas that emerge in negotiation process. According to our definition, negotiation is characterized only by position and threat at each time. It is quite natural to consider some inconsistency among them will generate uneasiness, such as incredibility and unwillingness. There are three elements for each negotiator that may generate dilemmas due to uneasiness about his/her declaration. These are: (1) each negotiator's position; (2) threatened future; and (3) any unilateral improvement (UI) available from the previous elements.

UI is a subset of movements that are preferred and accessible to one negotiator when the other stays at the same strategy (Hipel and Fraser, 1991). In other words, a movement in UI from a particular situation for a negotiator leads to a preferred situation for that negotiator to which he/she can unilaterally move.

3.2 Holistic View of Structure of Dilemmas

Drama theorists have used several kinds of diagrams to support analysis of the negotiation process so far: Howard (1989) adopted strategic maps of the 'tug-of-war' diagram (Howard, 2004). In Bryant (2007) the general model of the 'tug-of-war' diagram is used to show all possible dilemmas in a drama involving two characters. By examining the definition of the six dilemmas and the three elements that generate them we can derive a clear diagram illustrating relationship among the dilemmas as Figure 1. Table 2 shows a summary of the definition of six dilemmas from the both sides.

According to the diagram, we have clearly shown all elements that may generate dilemmas. The analysis implies that there are six and only six dilemmas in negotiation.



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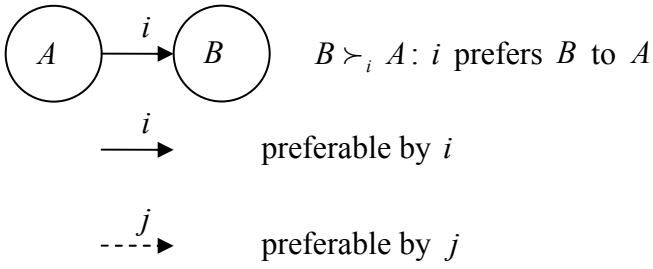

Figure 1. Holistic View of Dilemmas of Negotiation

Table 2. Summary of Definition of Six Dilemmas

Dilemma	i	j
Cooperation	$(\exists x_i \in X_i)((x_i, p_j^i) \succ_i p^i)$	$(\exists x_j \in X_j)((p_i^j, x_j) \succ_j p^j)$
Trust	$(\exists x_j \in X_j)((p_i^i, x_j) \succ_j p^i)$	$(\exists x_i \in X_i)((x_i, p_j^j) \succ_i p^j)$
Positioning	$p^j \succ_i p^i$	$p^i \succ_j p^j$
Persuasion	$t \succ_j p^i$	$t \succ_i p^j$

Dilemma	i	j
Rejection	$p^j \succ_i t$	$p^i \succ_j t$
Threat	$(\exists x_i \in X_i)((x_i, t_j) \succ_i t)$	$(\exists x_j \in X_j)((t_i, x_j) \succ_j t)$

4 CONCLUDING REMARKS

This paper developed a holistic formal analysis of dilemmas in negotiation by focusing on the positions-and-threats negotiation style. Firstly, we analyzed the positions-and-threats negotiation and conducted rigorous analysis of dilemmas in the process by using dramatic framework. We used Iraq War as an example to help clarified the concepts of dilemmas. We theoretically examined that inconsistency between positions and threats generates uneasiness, such as incredibility and unwillingness, and leads to dilemmas. Finally, according to our analysis of relationship in such framework, we have shown that there are six and only six dilemmas in negotiation.

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