

# Formal Representation of Double Bind Situations Using Feeling Rules and Triad Relations for Emotional Communication

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## Abstract

In order to realize more realistic communication between artificial agents and human, this paper proposes to introduce some concepts in family therapy and the sociology of emotions to agent construction. In particular, we focus on a relation between “double bind” and “feeling rules”, and give a formal representation of double bind situations based on feeling rules and the theory of triad relations in social psychology for a model of agent-human communication.

## 1 Introduction

As Senger argued [Senger, 1999], it is considered that behavior-based artificial agents are hard to be friendly to human because of its reductionism for functions in behaviors. In order to overcome this problem and realize more realistic communication between artificial agents and human, we should pay attention to knowledges in research areas of human communication on emotions and construct computational models of emotional communication. For this aim, we focus on family therapy and the sociology of emotions [Kemper, 1990; Okahara *et al.*, 1997], and proposed to verify the validity of computational approach to the areas from the perspective of group dynamics in social psychology [Nomura, 2000].

In this paper, we focus on double bind theory [Bateson, 1972] in family therapy. Double Bind Theory was proposed as a source of schizophrenia from the viewpoint of social interactions in the 1950s. This theory argues that sources of schizophrenia are on not only mental level of individuals such as trauma but also inconsistency in human communication. As shown in humor, human communication is done across several logical types. Although normal people can partition messages from others into the appropriate modes, a person in double bind situations is always given messages inconsistent in lower and higher levels and is prohibited from running away from this inconsistency. As a result, the person becomes be unable to partition messages into the appropriate modes and schizophrenic symptoms happen as a defensive response. The conditions for double bind are formalized

as follows:

1. The existence of one victim (a child in many cases) and some assailants (the mother in many cases).
2. The customization of cognition for double bind structures through the repeated experiences.
3. The first prohibition message with punishment.
4. The second prohibition message inconsistent to the first one at another level.
5. The third message that prohibits the victim from stepping out of the inconsistent situation.

Although double bind theory has been applied to a clinical field as one of basic concepts of family system theory [Foley, 1986], it is pointed out that it has largely not developed in the theoretical sense since 1970s [Ciompi, 1982] and there has not been enough empirical evidence showing that double bind situations are a source of schizophrenia [Koopmans, 1997]. Moreover, in family therapy there has been a movement from system theories based on double bind to narrative approach based on social constructionism [McNamee and Gergen, 1992].<sup>1</sup>

Even if not a source of schizophrenia, however, it is said that double bind situations frequently exist in daily lives. Thus, it is meaningful to formalize double bind situations as computational models and realize them in emotional communication between agents and human, on not only constructing realistic agents but also analyzing influence of computational media to human in the sense of social psychology as Reeves and Nass suggested [Reeves and Nass, 1996]. Furthermore, this type of formalization has a possibility to produce a novel implication of double bind theory for contributing to clinical fields.<sup>2</sup> As a first step for it, this paper gives a formalization of double bind situations by using concepts in the sociology of emotions and group dynamics, in particular, feeling rules [Hochschild, 1979; 1983] and the theory on triad relations in social psychology [Heider, 1958; Newcomb, 1953].

<sup>1</sup>Senger also proposed an introduction of narrative psychology to agent construction [Senger, 1999].

<sup>2</sup>In fact, there are some researches to re-formalize double bind theory based on nonlinear dynamical systems for a novel implication [Koopmans, 1998].

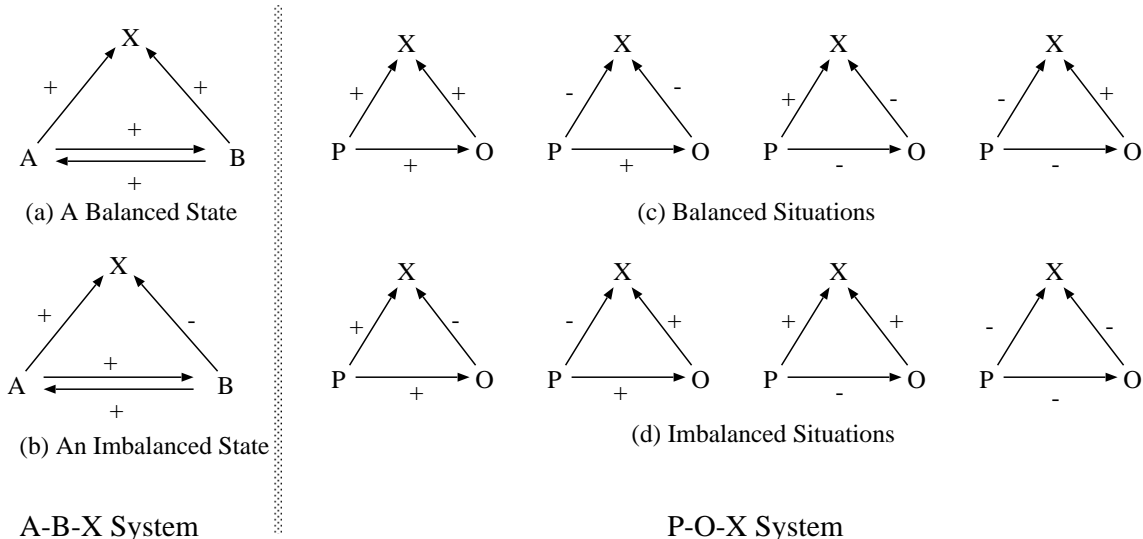


Figure 1: Examples of Balanced and Imbalanced States in the A-B-X and P-O-X Systems

## 2 Some Concepts in the Sociology of Emotions and Social Psychology

### Feeling Rules in the Sociology of Emotions

The sociology of emotions [Kemper, 1990] is an attempt to develop a new perspective in sociology by focusing on emotions. Okahara argued that there are three reasons why emotions can be a subject in sociological research which has actively not dealt with them in the tradition. [Okahara *et al.*, 1997]. First, focusing on emotions leads to a more realistic understanding of social actions. Second, it can become a strategy to develop a new perspective for a paradigm change in sociology. Third, there has been a variety of emotional phenomena that cannot be neglected in modern societies, such as excess and/or deficiency of feelings in families, commercialization of feelings, mental fatigue due to emotion management, and so on. Under this situation, the sociology of emotions appeared to satisfy the requirement of practical efforts.

One of the important concepts in the sociology of emotions is “feeling rules” proposed by Hochschild [Hochschild, 1979; 1983]. From the perspective of symbolic interactionism that Hochschild adopts, an actor generates his emotions after cognitive evaluation and interpretation of his internal state and given situations. However, this interpretation cannot be done based only on subjective arbitrariness. Regularity that exists in emotional experiences and expressions is socially shared and reconstructed beyond individual situations. That is, feeling rules are a set of socially shared guidelines that direct how we want to try to feel and not to feel emotions according to given situations. Based on feeling rules and given situations, emotion management is executed. Emotion management means to evoke an emotion appropriate for a feeling rule but not being felt, or to suppress an

emotion inappropriate for a rule but being felt.

Based on the concepts of feeling rules and emotion management, Hochschild showed a problem of emotional workers such as flight attendants who are required to have a high degree of emotion management [Hochschild, 1983]. Moreover, Yamada pointed out the fact that emotions have become a strategy for social control in modern society. Furthermore, Okahara claimed a cultural trend of extreme desire for emotions and its evil practice in modern society [Okahara *et al.*, 1997].

### Theories on Triad in Social Psychology

In 1950s, some theories on triad in human relations were proposed in the area of social psychology.

In the A-B-X system [Newcomb, 1953], one person (A) transmits information to another person (B) about something (X). The system consists of A’s orientation (equivalent to “attitude” in its more inclusive sense of referring to both cathectic and cognitive tendencies) toward X, A’s orientation toward B, B’s orientation toward X, and B’s orientation toward A. Each orientation can have a positive (+) or negative (-) value, and there is an interdependency between the states of A→B, A→X, B→X, and B→A. That is, when both A’s and B’s orientation toward X is symmetric and the orientations both from A to B and from B to A are positive (as shown in figure 1(a)), the state is balanced. In addition, if the state of the system is not balanced (as shown in figure 1(b)), the system is oriented toward a balanced state through certain forces. In the imbalanced state shown in figure 1(b), this is done by convincing B of positive orientation toward X by A, changing A’s orientation toward X as negative, or changing A’s orientation toward B as negative.

In the balance theory [Heider, 1958], the triad consists of a relation from one person (P) to the other (O), a relation from P to an object (X), and the relation from O to X. Each relation has a positive (+)

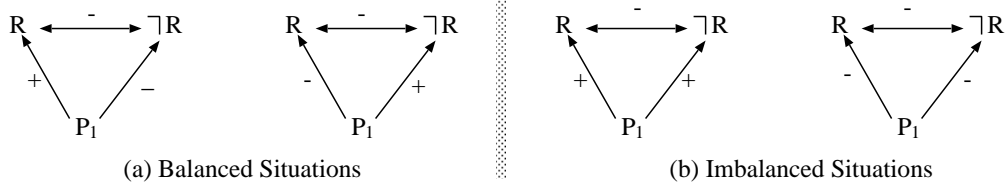


Figure 2: All the Possible Situations of the Triad Consisting of a Person  $P_1$ , a Feeling Rule  $R$ , and the Negation Rule  $\neg R$

or negative (-) value. In the P-O-X system, the situation is balanced if the product of the signs of the three relations  $P \rightarrow O$ ,  $P \rightarrow X$ , and  $O \rightarrow X$  is positive (as shown in figure 1(c)), and imbalanced if it is negative (as shown in figure 1(d)). In addition, if the situation is imbalanced, P feels displeasure or strain, and then modifies the  $P \rightarrow O$  or  $P \rightarrow X$  relations or tries to change the  $O \rightarrow X$  relation so that the situation is balanced.

Common in the above theories is that they are based on the idea of cognitive consistency: that is, humans have a basic requirement to maintain consistency in their beliefs, attitudes, and actions for objects, and if inconsistencies exist, they cause displeasure. Humans are motivated to reduce displeasure. Our proposal in this paper is that double bind situations can be described as a combination of several triads consisting of one person (a victim), other persons (assailants), and some feeling rules, and thus symptoms in double bind situations can be interpreted as states of affairs caused by inconsistencies in these triads. We provide a concrete model in the next section.

### 3 Double Bind as Triads with Inconsistent Feeling Rules

Yamada suggested that concept of double bind can be explained from the viewpoint of feeling rules [Okahara *et al.*, 1997]. Moreover, Hase proposed a concept of the system model of double bind by focusing on positive and negative feedbacks in relations between victims and assailants [Hase, 1989]. According to their suggestions, double bind leads to the problem of gaps between emotions “being felt” in a given situation and “to be felt” according to a feeling rule for the situation. In our model, some triads including feeling rules as nodes are considered.

#### Triad Including One Person and Inconsistent Feeling Rules

Let us assume that there is a feeling rule evoking or suppressing an emotion (e.g., the rule “mothers must not hate their family members” evokes “love” or suppresses “hate”). Now, we consider the feeling rule represented as the negation of it (e.g., “mothers may hate their family members”). We assume that this negation rule suppresses or evokes the emotion which the original rule evokes or suppresses respectively. Moreover, we consider relations that a person has to these rules. In our model, these relations also have positive or negative values, corresponding to “orientations” in

the A-B-X systems and “relations” in the P-O-X systems mentioned in the previous section. The existence of these relations means that the person executes emotion management according to the rules. Furthermore, positive relations mean that the mental resistance of the person for the corresponding emotion management is small, and negative relations mean that it is large.

Figure 2 shows all the possible situations of the triad consisting of a person  $P_1$ , a feeling rule  $R$  and the negation rule  $\neg R$ . Here, note that  $R$  and  $\neg R$  deny each other and the relation between them ( $R \leftrightarrow \neg R$ ) is considered as negative. In the sense of the P-O-X system, the situations where the relations  $P_1 \rightarrow R$  and  $P_1 \rightarrow \neg R$  have the different signs are balanced (figure 2(a)). In the imbalanced situations (figure 2(b)), the person  $P_1$  has an inconsistency in the sense that when only one of the two emotion managements should be done, the opposite emotion managements are done in the same time or any emotion management is refused.

#### Triads Including Two Persons and Inconsistent Feeling Rules

Now, let us assume that there is another person  $P_2$  that has relations to the rules  $R$ ,  $\neg R$ , and the person  $P_1$ . In this situation, we consider what situations are balanced in the relations of  $P_2$  to  $R$ ,  $\neg R$ , and  $P_1$ . In order to measure the balance in this situation including  $P_1$ ,  $P_2$ ,  $R$ , and  $\neg R$ , we should check the balance of all the triads including  $P_2$  ( $P_2-R-\neg R$ ,  $P_2-P_1-R$ , and  $P_2-P_1-\neg R$ ). Here, we can measure the balance by checking the signs of the product of  $P_2 \rightarrow R$ ,  $P_2 \rightarrow \neg R$ , and  $R \leftrightarrow \neg R$ , that of  $P_2 \rightarrow P_1$ ,  $P_2 \rightarrow R$ , and  $P_1 \rightarrow R$ , and that of  $P_2 \rightarrow P_1$ ,  $P_2 \rightarrow \neg R$ , and  $P_1 \rightarrow \neg R$ .

Table 1 shows the balance of each triad in all the possible situations of the relations between  $P_1$ ,  $P_2$ ,  $R$ , and  $\neg R$ . Here, we assume that all the triads equally affect on the total balance of  $P_2$ . In cases that  $P_1$  has no inconsistency for the rules, that is, cases of  $P_1 \rightarrow R = +$  and  $P_1 \rightarrow \neg R = -$ , or  $P_1 \rightarrow R = -$  and  $P_1 \rightarrow \neg R = +$ , the most balanced situations of  $P_2$  on the relations are cases that  $P_2$  has a positive relation to  $P_1$  and the same relations for the rules as those of  $P_1$ , or a negative relation to  $P_1$  and the opposite relations for the rules to those of  $P_1$ , in which all the triads are balanced. Moreover, for any imbalanced situation there uniquely exists one balanced situation that can be transferred by changing only one of relations  $P_2 \rightarrow P_1$ ,  $P_2 \rightarrow R$ , and  $P_2 \rightarrow \neg R$ . In fact, in case of  $P_1 \rightarrow R = +$  and  $P_1 \rightarrow \neg R = -$ , the second situation in

			$P_1 \rightarrow R = +$ and $P_1 \rightarrow \neg R = -$			$P_1 \rightarrow R = -$ and $P_1 \rightarrow \neg R = +$		
$P_2 \rightarrow P_1$	$P_2 \rightarrow R$	$P_2 \rightarrow \neg R$	$P_2 \neg R \neg R$	$P_2 \neg P_1 \neg R$	$P_2 \neg P_1 \neg R$	$P_2 \neg R \neg R$	$P_2 \neg P_1 \neg R$	$P_2 \neg P_1 \neg R$
+	+	+	-	+	-	-	-	+
+	+	-	+	+	+	+	-	-
+	-	+	+	-	-	+	+	+
+	-	-	-	-	+	-	+	-
-	+	+	-	-	+	-	+	-
-	+	-	+	-	-	+	+	+
-	-	+	+	+	+	+	-	-
-	-	-	-	+	-	-	-	+
			$P_1 \rightarrow R = +$ and $P_1 \rightarrow \neg R = +$			$P_1 \rightarrow R = -$ and $P_1 \rightarrow \neg R = -$		
$P_2 \rightarrow P_1$	$P_2 \rightarrow R$	$P_2 \rightarrow \neg R$	$P_2 \neg R \neg R$	$P_2 \neg P_1 \neg R$	$P_2 \neg P_1 \neg R$	$P_2 \neg R \neg R$	$P_2 \neg P_1 \neg R$	$P_2 \neg P_1 \neg R$
+	+	+	-	+	+	-	-	-
+	+	-	+	+	-	+	-	+
+	-	+	+	-	+	+	+	-
+	-	-	-	-	-	-	+	+
-	+	+	-	-	-	-	+	+
-	+	-	+	-	+	+	+	-
-	-	+	+	+	+	+	-	+
-	-	-	-	+	+	-	-	-

Table 1: The Balance of Each Triad in All the Possible Situations of the Relations between  $P_1$ ,  $P_2$ ,  $R$ , and  $\neg R$

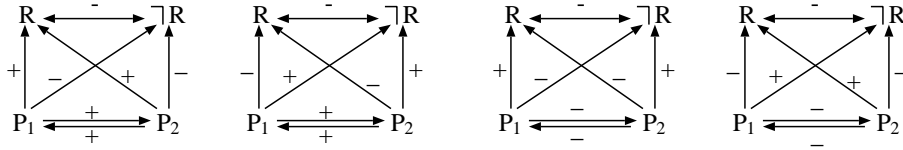


Figure 3: The Completely Balanced Situations in Cases That  $P_1$  Has No Inconsistency for the Rules

table 1 is only one balanced situation that the first, fourth, and sixth situations can transfer by changing only one of relations, and the seventh situation is that for the third, fifth, and eighth situations (it is proved for case of  $P_1 \rightarrow R = -$  and  $P_1 \rightarrow \neg R = +$  in the same way). In this sense, these balanced situations are considered as stable in the dynamics of relation change. Furthermore, as shown by replacing  $P_2$  with  $P_1$  in table 1, if  $P_1$  has the same relation to  $P_2$  as that of  $P_2$  to  $P_1$  then all the triads from the view of  $P_1$  are also balanced. As a result, all the relations including the diad between  $P_1$  and  $P_2$  are balanced in the sense of both the P-O-X and A-B-X systems. Figure 3 shows these completely balanced situations. We consider that these situations are the most sound ones in human communication through feeling rules.

### Double Bind as a Cycle of Structure Change of Triads

On the other hand, as shown in table 1, there is no balanced situation of  $P_2$  in cases that  $P_1$  has an inconsistency for the rules. In other words,  $P_2$  has an inconsistency whatever relations to the rules and  $P_1$  are selected. By regarding  $P_1$  as an assailant and  $P_2$  as a victim, we consider these situations as a formalization of the initial state of double bind where inconsistent messages are given. In other words, these situations mean that since the assailant has the inconsistency for the feeling rules the victim are forced to have the imbalanced relations to the rules and the assailant. However, this formalization does not represent the whole nature of double bind since it does

not include the third message that prohibits the victim from stepping out of the inconsistent situation. In order to represent the third prohibition message, we propose a scenario on dynamics of structures of relations as below.

Figure 4 shows our scenario through which the victim reaches to double bind situations. This scenario formalizes double bind as a cycle of structure change of triads from the view of the victim  $P_2$ .

First, the victim  $P_2$  conceptualizes these situations where the assailant  $P_1$  has the inconsistent relations for the feeling rules  $R$  and  $\neg R$  at a higher level. If  $P_1$  has positive relations to both the inconsistent rules,  $P_2$  conceptualizes it as a situation where these two rules inconsistent each other should be accorded at the same time ( $R$  and  $\neg R$  in the left half of figure 4). If  $P_1$  has negative relations to both the inconsistent rules,  $P_2$  conceptualizes it as a situation where any of these two rules inconsistent each other should be rejected (Not( $R$  or  $\neg R$ ) in the right half of figure 4). In any case,  $P_1$  has a positive relation to the situation.

If  $P_2$  has negative relations to  $P_1$  and the conceptualized situation, these new triads are balanced since  $P_1$  has a negative relation to  $P_2$  based on dynamics of the A-B-X system. This represents a process that  $P_2$  obtains a balanced situation from view in a meta level to avoid displeasure caused by the imbalanced situations at the first level. However,  $P_2$  must have a positive relation to  $P_1$  in relations like children-parents as Hase claimed [Hase, 1989]. Thus, according to dynamics of the A-B-X and P-O-X systems,  $P_2$  is forced to have the positive relation to the relation to the conceptu-

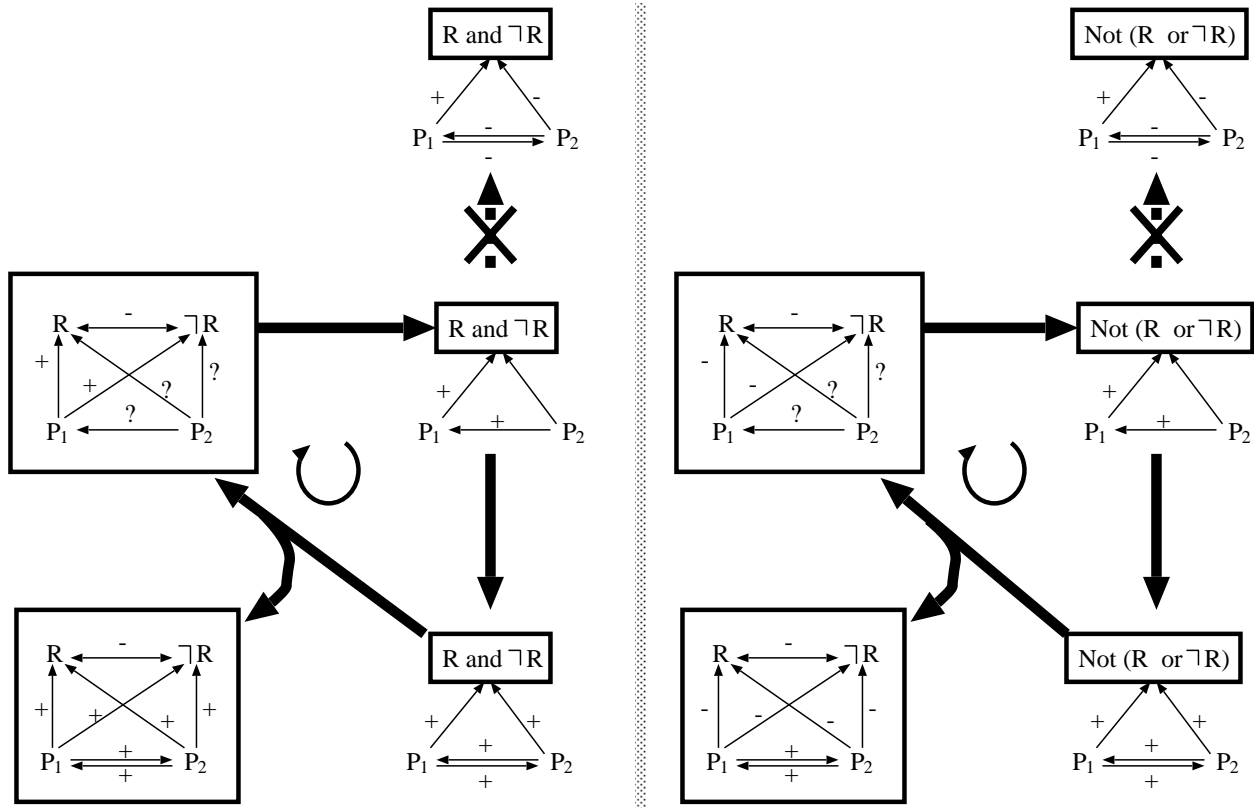


Figure 4: Our Scenario through Which the Victim  $P_2$  Reaches to Double Bind Situations

alized situation mentioned above in order to balance the triad, and to return to the first inconsistent situations. This represents the third message prohibiting  $P_2$  from stepping out of the inconsistent situations.

Furthermore, we can consider an influence of the repetition of this cycle as follows. If we assume that the cycle reinforces the positive relation of  $P_2$  and the triads including  $P_1$  ( $P_2-P_1-R$  and  $P_2-P_1-\neg R$ ) have stronger influences than the triad not including  $P_1$  ( $P_2-R-\neg R$ ), as shown in table 1,  $P_2$  has the same relations to the rules as those of  $P_1$  to obtain more balanced situation. That is,  $P_2$  shares the inconsistent situations with  $P_1$ . This represents the customization of cognition for double bind structures through the repeated experiences. As a result, when only one of the two emotion managements should be done,  $P_2$  are forced to do the opposite emotion managements or to refuse any emotion management in the same way as  $P_1$  does.

The above scenario on double bind has an important implication: that is, a person having an inconsistency forces others to have the same inconsistency.

### Double Bind by More Than Three Persons

In our model of double bind, we can consider influences of more than two persons on a victim.

Let us assume the third person  $P_3$ . The first case we consider important is a situation where  $P_3$  has the

same inconsistency as those of  $P_1$  for the feeling rules,  $P_3$  is in cooperation with  $P_1$  for double bind on  $P_2$ . As shown in figure 5(a), when  $P_1$  and  $P_3$  are in a double bind situation,  $P_2$  are influenced by not only the triads  $P_2-P_1-R$  and  $P_2-P_1-\neg R$  but also  $P_2-P_3-R$  and  $P_2-P_3-\neg R$ . In addition, the diad  $P_1-P_3$  influences the diads  $P_2-P_1$  and  $P_2-P_3$  by balancing the triad  $P_1-P_2-P_3$ . As a result, the inconsistency of  $P_2$  is reinforced and the double bind is maintained more strongly.

The second case is, it may be more important and realistic, a situation where both  $P_1$  and  $P_3$  have no inconsistency for the feeling rules but the opposite relations to them as shown on the right of figure 3. As shown in figure 5(b), the opposite relations are given to each rule from the view of  $P_2$ . Although  $P_2$  is not in double bind for either  $P_1$  or  $P_3$ , all the triads and diads cannot be balanced at the same time, that is,  $P_2$  is forced to be in at least one imbalanced situation.

## 4 Conclusion

In this paper, we provided a formalization of double bind situations as a first step for construction of emotional communication between artificial agents and human. Our model is based on the theories on triad in social psychology and is simple. Its components are summarized as follows: (1) mental instability in the victim by imbalanced triads including the assailant and feeling rules inconsistent each other (the existence



(a) Reinforcement of Inconsistency by Cooperative Assailants (b) Inconsistency by Presons Opposing Each Other

Figure 5: Influences of More Than Two Persons on a Victim

of the inconsistent messages for the victim), (2) construction of a new triad at higher level and change of the relations by positive feedback caused by the instability (the victim's stepping out of the inconsistent situation), (3) suppression of change of the relations by negative feedback caused by the balance of the newly constructed triad (the existence of the message prohibiting the victim from stepping out of the situation), (4) loop of change of the relations by the positive feedback and suppression of the change by the negative feedback (customization of the double bind situation).

As one of the most important future problems, we should verify influences of artificial agents implementing the model to mental states in human by experimental methods. This means not only verifying the validity of the model on constructing realistic communication between agents and human, but also reconfirming influence of double bind situations and artificial agents in human communication. If artificial agents can affect emotional states in human, we should pay attention to possibility that such emotional communication largely influences cultures on emotions, as Turkle suggested [Turkle, 1995].

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