

Personality Difference and Strong-Strong Coalition—Experimental Research Based on Punishment Mechanism

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Abstract

Research on social value orientation divides rational people into three categories: individualist, pro-social, and competitor. This kind of research does not focus on network structure. Network exchange theory emphasizes that power comes from an exclusive structure, but it ignores the personality characteristics of people. This paper combines these two studies to explore how punishment mechanisms affect individual coalition strategies in an exclusive structure. The experimental results prove that: (1) when the strong is not in the coalition, there is no significant difference in the benefits of the strong power individualist person and the strong power pro-social person; (2) when two people with different social value orientations are strong-strong coalition, the two will form a “betrayal chain” whose benefit is close to the equilibrium value of the “compromise chain”. The strong power individualists are more likely to “betray” and “take advantage” more than the strong power pro-socialists; (3) the intensity of punishment is inversely related to the frequency of “betrayal”. Analysis of the dialogue data revealed that (4) the strong will properly take care of the weak, and the weak will “approach” the strong; (5) heavy punishment will have a deterrent effect, allowing the actors, especially pro-social to internalize the “punishment mechanism”. This study incorporates both personality and structure into the model, and such studies can explain many power phenomena.

Keywords: social value orientation, network exchange theory, strong-strong coalition, punishment mechanism

1. Introduction

Until September 9, 2017, China has eliminated the drug-bonus of public medical institutions, completely ended the 60-year history of “medical compensation” in one fell swoop, and initially established a new scientific compensation mechanism for public hospitals. Prior to this reform, medical price continued to rise along with medical reformation, and its specific details were inseparable from the communication and “managing” among “pharmaceutical salesman” and various departments of the hospital. If “many” pharmaceutical salesmen want to sell their drugs or medical equipment in a “few” hospitals, they need to get through all the department directors, pharmacy department, warehouse staff, prescription doctors and so on. Hospitals buy low and sell high, doctors get kick-back on terminal drug price, such as 20%-30%, and pharmaceutical salesmen get a commission on total drug sales, such as 10%. Because there are few hospitals and many pharmaceutical salesmen, therefore, the hospitals will have various choices and in a “strong” position, and pharmaceutical salesmen are in a “weak” position. In the specific process, there may be coalitions among various departments of a hospital, which has the power to choose which pharmaceutical salesmen to cooperate with. If there are insatiable people in all links, driven by the interests to “swallow” rebates, that is, betrayal of the “coalition”, it may violate the “fair” and be reported or punished. Due to the possibility of betrayal by allies, there may be punishment for betrayal behavior within the hospital coalition, such as interpersonal isolation and obstacles to the evaluation of job titles. In reality, there are many similar strong-strong coalitions. Based on the Network Exchange Theory (NET), this paper considers the individual characteristics of actors, and analyzes how players with different value orientations play and what are the differences between their payoffs. In addition, a punishment mechanism is introduced to discuss the influence of individual characteristics and punishment mechanism on the coalition.

Four parts are included in this paper. Firstly, raising research questions based on observation and experience, followed by literature reviews on social value orientation, network exchange theory, strong-strong coalition, and

punishment mechanism. Secondly, introducing punishment mechanism and social value orientation into coalition research and putting forward research hypotheses. Using the experimental method to test the hypothesis. The next is to analyze who is more likely to “betray” in the strong-strong coalition, their respective coalition strategies, the difference of their payoffs and the effect of the punishment mechanism, etc. Summary and discussion will be the last part.

2. Literature Review

This research involves social value orientation, network structure, and punishment. The following is literature review.

2.1 Social Value Orientation

When people allocate resources with others, they often show different “personalities”. For example, some people prefer to keep less and give more to others; some people expect to share equally with others; some people only want to make the most of their profits, regardless of others; of course, and only a few people not only keep the most of resources, but also let the least of others. This kind of personality is “social value orientation” (abbreviated as SVO thereafter), which is a relatively stable personal preference (Messick & McClintock, 1968, pp. 1-25). Specifically, researches based on SVO usually divide people into three categories (McClintock & Liebrand, 1988, pp. 217-230):

Competitor: pursuing maximizing the difference between one’s own benefit and the other’s benefit;

Individualist: pursuing the maximization of own benefit;

Pro-social: pursuing the largest sum of benefits between oneself and others, and the smallest difference between them.

There is a fourth category: **Altruistic** which pursue the best benefits of others. This kind of selflessness is rare. Considering that there are relatively few competitors, and for the convenience of research, this paper only studies individualist and pro-social person (McClintock & Liebrand, 1988, pp. 217-230).

Studies have applied SVO to many fields such as cooperation, games, and public resources, and found that SVO affects the behavioral decisions of individuals in social dilemmas. Pro-social person who is responsible, avoiding the negative effects of competition and willing to cooperate, insist on fair distribution more than individualist people. (De Cremer & Van Lange, 2001, pp. 5-18; Bogaert, Boone, & Declerk, 2008, pp. 453-480). The individualist is tough in fighting for interests and rarely compromise.

In real life, we find that people with different SVOs have different benefits under different structures, sometimes “the more people fight, the less they get”, and sometimes “the more people fight, the more they get”. What’s the reason? We believe this is related to the network structure in which “competition” is located. Specifically, how do people with different SVOs exchange with each other? How to cooperate or make an coalition? If there is a punishment mechanism, who will betray the coalition? Answering these questions requires consideration of the network structure, which is briefly reviewed below.

2.2 Network Exchange Theory and Coalition Research

Many theories are used to explain the distribution of power, among which the network exchange theory has the most explanatory power (Willer & Emanuelson, 2008, pp. 165-203).

2.2.1 Network Exchange Theory

Network exchange theory is a theory that explains and predicts the distribution of power embedded in the social relationship structure. Its core consists of three parts: a drawing modeling program, two principles, and two rules (Liu Jun, Willer, & Emanuelson, 2011, pp. 134-166). The theory adheres to the research strategy of decomposing and then synthesizing. It first defines social actors, which include preferences, beliefs, etc., then analyzes the exchange relationship between actors, and finally constructs a network composed of exchange relationships, and predicts power allocation in combination with structural diversity. The relationship emerges from the actors, the structure emerges from the relationships at the same time, and the actors are in the relationship and structure. Actors, relationships and structures are not linear related, but in an emergent relationships. The theory of network exchange (Liu Jun, Willer, & Emanuelson, 2011, pp. 134-166; Liu Jun & Guo Lina, 2013, pp. 95-119) mainly discusses the resource allocation in the structure of the three types of branch networks: inclusive, null and exclusive. The so-called branch network is that a branch has one core actor connected to two or more edge actors, and the edge actors are not connected to each other.

The so-called “exclusive power network” means that the network contains one or more strong power positions

that is directly connected to two or more weak positions. The strong power position is not excluded from the exchange. At least one person in the weak power position is excluded from the exchange. The strong power position thus benefits from the weak ones. In an exchange network, if the actor can only exchange with one person at a time, it is called the “one-shot exchange principle”. When an actor faces multiple exchange partners and must “exclude” some people from the exchange, this “exclusive mechanism” under the one-shot exchange rule generates power. Details of NET is introduced in (Liu Jun, Willer, & Emanuelson, 2011, pp. 134-166). The NET focuses on the network structure, and it has only recently begun to focus on the heterogeneity of actors (Lewis & Wille, 2017, pp. 249-262). This paper attempts to incorporate SVOs of different individuals into the model and introduce a punishment mechanism to explore the power distribution under the combined effect of individual characteristics and strong-strong coalition structure.

2.2.2 Strong-Strong Coalition and Betrayal

In a group or organization, multiple people can unite against others. Willer and Skvoretz (1997a: 5-35; 1997b: 383-385) found that the coalition would create a dilemma of collective action. Bonacich (2000: 353-37) discusses who joins the coalition and with whom in the exclusive connection network. Simpson and Macy (2001: 88-100) define the coalition as “two or more actors in the group join together to give the same initial payoff, and share the payoffs equally after trading with others”. Overall, with a few exceptions, these studies did not consider the heterogeneity of actors and did not examine the coalition of different types of actors (Caldwell, 1976, pp. 273-280).

In the exclusive power network, the strong players play the privilege game, i.e., the coalition can achieve the maximum benefit (Borch & Willer, 2006, pp. 77-111). Once the strong coalition has achieved, it can reduce the negotiation time and exchange failure rate, and achieve the largest collective gains.

Generally speaking, the theory of network exchange focuses on structure and ignores agency. SVO focuses on individual agency while ignores network structure. Both theories ignore the punishment mechanism, which is important for resource distribution. Therefore, it is necessary to combine SVO with the network structure to explore how strong-strong coalition actors are affected by punishment mechanism.

2.3 Punishment Mechanism

In recent years, economics and psychology begun to study how punishment mechanisms affect cooperation and trust. Yamagishi (1986: 110-116; 1988: 265-271; 1995: 311-335) discovered that the reason why Japanese in real life are willing to stay in the group and put group interest above individual is not because of their nature, but because they expect long-term benefits. There are mutual surveillance and punishment mechanisms in team work to eliminate the free rider phenomenon. However, in the context of his laboratory, there is no opportunity for interaction between the subjects, so there is no monitoring mechanism. When the degree of trust is low, people tend to introduce a punishment mechanism to increase trust. Fehr and Gächter (2002: 137-140; 2000: 980-994) found that costly punishment, i.e., altruistic punishment is effective. People are willing to punish those who do unfair behavior even if they have cost, and punishment can promote cooperation and reduce the number of defectors. However, if the external punishment destroys the actor’s internal cognition and motivation, and the punishment of the betrayal is insufficient, the level of cooperation will be reduced. Ostrom proves that collective internal punishment with communication promotes cooperation, because internal punishment has a stigmatizing effect on “betrayers”, condemns behavior that violates the moral bottom line in words, and damages his self-esteem, and make him participate in cooperation under pressure of public opinion (Ostrom, Gardner & Walker, 1994).

These studies rarely take into account the personality characteristics of actors. Inspired by these researches, this paper explores the effects of different levels of punishment on betrayers of different personalities based on NET. Specifically, the following part will analyze how different individuals in SVO seek profits, what are the differences in their payoffs, whether strong-strong coalitions can make greater returns, and how to introduce a punishment mechanism to suppress betrayal and enhance cooperation.

3. Research Hypothesis and Research Design

3.1 Network Structure and Research Hypothesis

3.1.1 Network Structure

Borch and Willer (2006: 77-111) discussed game in the NET43 exclusive network structure: three strong power actors and four weak power actors. They found that the strong actors played the “privilege game” which reach the maximum value. Their research did not consider SVOs. In order to examine this effect, and for simplicity, this study simplified NET43 to NET32 exchange network (Figure 1), where two power positions (A1, A2) will

not be excluded from the exchange, and two of the three weak powers positions (B1, B2, B3) can only be exchanged with two A positions, and one B is always excluded from the exchange. The experiment uses one-shot exchange rule: the actor can only exchange with one person at a time. In this structure, there are 24 points of resources to be allocated between each A and B, and both parties can propose an allocation plan. Experiment also regulate: if and only if the two parties reach an agreement on distribution, they will get their points, and if not, both parties will get nothing.

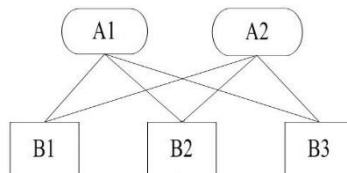


Figure 1. NET32 network

3.1.2 Research Hypothesis

3.1.2.1 Strong-Strong Coalition

The game between strong-actors is not a zero-sum one, so there is a possibility of coalition. The strong actor A1 and A2 may or may not be coalited. If two strong-actors coalited, they will get the most profits, but there may be a traitor, because unless the coalition offer the maximum for each member, otherwise the coalition will limit the two As to obtain greater benefits, and someone will seek more self-interest in naming of coalition.^[1] In more cases, the two will not be an coalition, they can urge the weak actors to bid for each other and profit from it, while not angering the weak to resist.

In strong-strong actors coalition, the two strong actors As generally adopt a “betrayal” strategy. Assuming that original payoff of the coalition offer starts from 12-12. Then when t=0, if Ai thinks that there are 0 or 1 betrayal at this time, he will get 12 points if he “cooperates” and 13 points for betrayal. As can be seen from Figure 2, from t=0 to t=10, the points of the “betrayal” are higher than that of the “cooperator”. But when t=11, no matter cooperation or betrayal, Ai will get 23 points, which means betrayal is no longer a dominant strategy. At the end of the “betrayal chain”, the strong power actor’s payoff reaches 23. The result of the repeated game between the two strong actors is the formation of a “betrayal chain”. If there are “rules” stipulating two strong actors “must” coalitions (called “required coalitions” in this paper) and there is no punishment mechanism, then the betrayal chain will even appear.

^[1] The definition of the strong-strong coalition in this paper is that the two strong actors offer the same amount of “initial payoff” during the initial negotiation with the three weak actors, and the “final payoff” or the benefits of the two insist on different due to different situations below allocation rule: if both final payoff is lower than initial payoff, then both will get half of them; if at least one final payoff is not lower than the initial payoff, both will be “distributed based on labor” and no longer divide equally. The definition of “betrayal” in this paper is as follows: suppose the initial payoff of the two A coalition is 18-6 (that is, both of them reserve 18 points and 6 points to B), if the final exchange result of A1-B1 is 18-6, A2-B2 negotiation result is 20-4, then A2 is a “traitor”. Without punishment, the final gain is A1=18; A2=20. As for how the “weak-weak actors coalition” can even reverse the power, the author will discuss it separately.

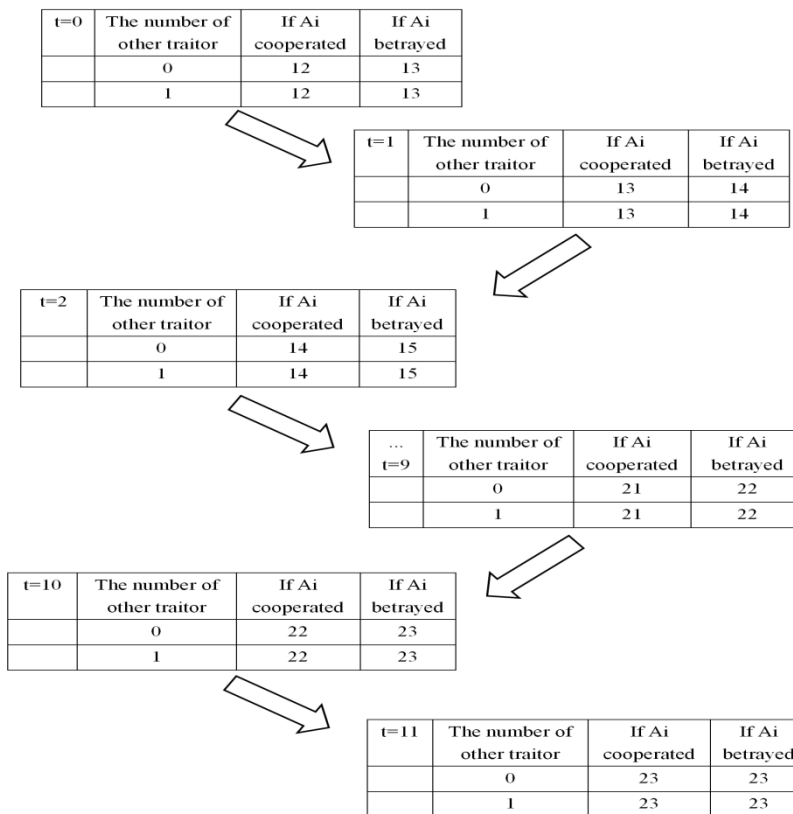


Figure 2. The “Betrayal Chain” of the Strong Power Actors

Let’s examine the game logic of the weak actor. When exchange with the strong actor, the weak can cooperate or not. Figure 3 shows the “compromise chain” of the weak in the NET32 network with multiple payoff matrices.

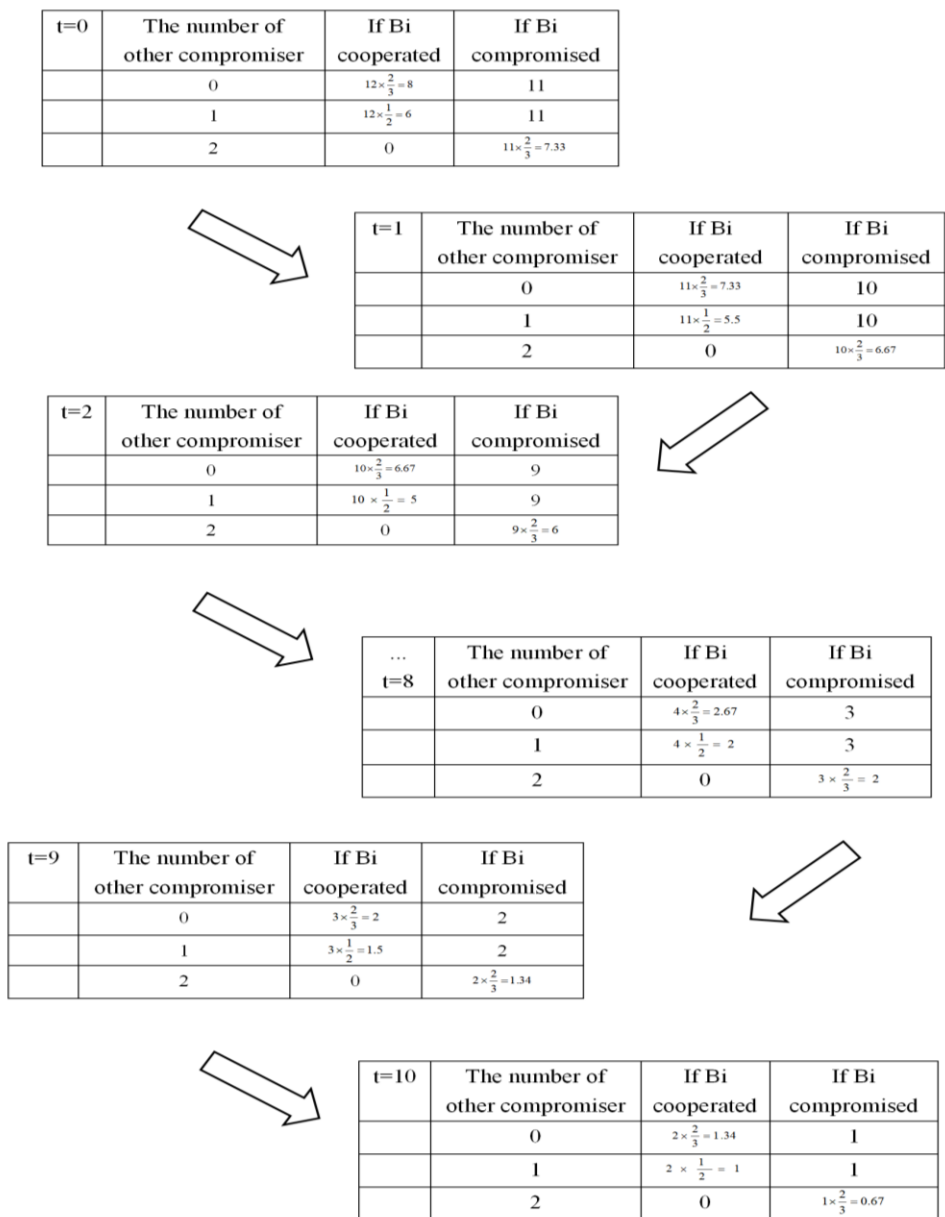


Figure 3. Experiment Rules, Structure, Number of Groups and Rounds

As can be seen from Figure 3, when $t=0$ (the payoff starts from 12-12), if a weaker Bi thinks that no one has compromised, his coalition (i.e. cooperation) will get $12 \times \frac{2}{3} = 8$ points of expected return, and $12 - 1 = 11$ points of return for betrayal or compromise that is, he paid 13 points to an A and retained 11 points, but one of the other two B was excluded by A outside the exchange. When he thinks that there is a B compromise, if he cooperates, he can get $12 \times \frac{1}{2} = 6$ points, and if he compromises, he can also get $12 - 1 = 11$ points. When he thinks that two Bs compromised, and if he still cooperates, he will get nothing. Because the two Bs Will be selected by two A to exchange with, he was excluded from the exchange. If he also compromises, each person gets an “expected return” of $11 \times \frac{2}{3} = 7.33$. $11 > 8 > 7.33 > 6$, which shows that compromise is not the best strategy. From $t=0$ to $t=8$, when there are zero other B compromises, the payoff of Bi compromise is higher than the cooperation gain. But when $t=9$, cooperation and compromise both get 2. When $t=10$, the return of 1.34 points for choosing cooperation is higher than the return of 1 point when compromise, no compromise is needed at this time. It can be seen that when the game proceeds to $t=9$, that is, the game value is 21-3, the “compromise chain” terminates. At this time, the average return of A is 21, and the average return of B is 3. Then the cooperation of the weak is the optimal strategy. The “betrayal chain” of the strong and “compromise chain” of the weak have different end

points, the former ends in 23, the latter terminated at 21.

The question is, what is the final outcome of the strong-weak game? If there is no other coercive force exerted on the strong and weak, then the benefit of the strong will not exceed the situation when the weak compromise. Therefore, for the NET32 network, strategic analysis predicts that the strongman's maximum return is 21 points, not 23 points. For convenience, the "individualist and pro-social persons in power positions" will be referred to as the strong power individualist and the strong power pro-social persons respectively. For the same reason, there are weak power individualist and weak power pro-social persons. If the strong actors don't cooperate, who will earn more? Considering that both are in the position of power, there will be no significant difference in their returns, therefore hypothesis 1 is given.

Hypothesis 1: When there is no coalition between the two strong actors, there is no difference in the benefits of the strong power individualist and the strong power pro-social persons.

If the two strong actors with different SVOs cooperate, they must share the revenue equally. In addition, the premise of the above analysis is that the strong and weak players are homogeneous, without considering their SVO. If we consider SVO, it is conceivable that those with "different way of life" will unite, and pro-socials will lower the benefits of the individualists, so that even if the two are strong, their benefits will not reach the same level as predicted by homogeneous 21 points, we predict it up to 20 points. This gives hypothesis 2.

Hypothesis 2: When two strong-strong coalitions with different SVOs, the average payoff of the stronger is close to 20.

In a strong-strong coalition, what personality is most likely to "betray"? Based on the previous discussion of SVO, hypothesis 3 is given.

Hypothesis 3: when strong-strong actor coalition, the strong power individualists are more likely to betray.

3.1.2.2 Punishment Mechanism in Strong - Strong Coalition

In a strong-strong coalition, the "betrayers" has high returns in the short term, and will erode collective returns in the long run, causing the coalition to break down. For example, for a company that occupies a dual monopoly position, if it raises the point of its own products, it will cause dissatisfaction with another monopolist and consumer. If there are different levels of punishment, how will the betrayers of the strong-strong coalition act?^[2] It is for this reason that this paper imposes a punishment on the power position betrayer, although this seems to be contrary to "common sense". As mentioned in the previous note, this paper does not punish the compromisers of weak-weak coalitions, because once the weak one's coalition, there are no "traitors", and some are only "compromisers".^[3] In the experiment, we design light, medium and heavy punishment mechanisms for the strong players of the coalition (see the "Research Design" section for specific meanings) and predict that the greater the punishment, the more betrayal. This gives the following hypothesis.

Hypothesis 4: In strong-strong coalitions, the strength of punishment is inversely related to the number of "betrayers".

3.2 Research Design

3.2.1 SVO Scale

There are a variety of measurement methods on SVO, we use "slider measure" scale to measure. This method is simple, time-saving and efficient (Murphy, Ackermann, & Handgraaf, 2011, pp. 771-781). The scale contains 6 first-level items, and there are 9 second-level options under each first-level item, all of which are resource allocation combinations (as shown in Table 1). Subjects are asked to choose the distribution plan options they think are appropriate in the six first-level projects according to their actual ideas. Then researcher calculate the average \bar{A}_s of the six benefits left by the subjects and the average \bar{A}_o of the six benefits left to others. Then

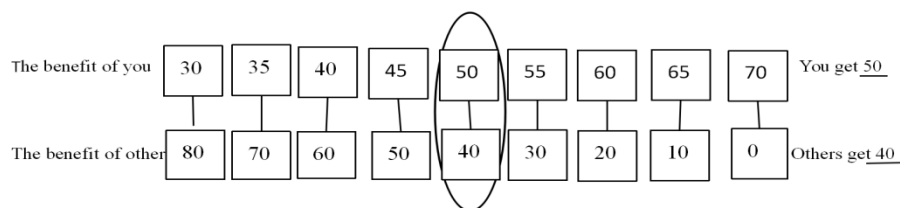
[2] It is for this reason that this paper imposes a punishment on the power betrayer, although this seems to be contrary to "common sense". As mentioned in the previous note, this paper does not punish the "compromisers" of weak-weak alliances, because once the weak ones coalition, there are no "traitors", and some are only "compromisers".

[3]The penalties and possible results are illustrated below. Assume two A alliances and the bid is 20. If the final exchange result is A1-B1: 22-2; A2-B2: 20-4, obviously A1 is a betrayer. When there is no punishment: A1=22, A2=20. After light punishment: A1=21, A2=20. After medium punishment: A1=20, A2=20. After heavy punishment: A1=20, A2=22. If both sides of the alliance betray, that is, A1-B1: 22-2, A2-B2: 22-2, then all the proceeds of the two are confiscated, that is, A1=A2=0.

bring these two values into the SVO measurement formula $SVO^\circ = \arctan\left(\frac{(\bar{A}_b - 50)}{(\bar{A}_s - 50)}\right)$ to calculate the

subjects' SVO type: those with a degree greater than 57.15 are altruists, those with degrees between 22.45 and 57.15 are pro-socials, those with degrees between -12.04 and 22.45 are individualists, and those with degrees less than -12.04 are competitors.

Table 1. A First-Level Project in Social value vector table



First of all, 500 SVO questionnaires were distributed in a university, covering the first grade of university to the first grade of graduate students, and 462 valid questionnaires were recovered. According to the above formula, 9 competitors, 100 individuals, 351 pro-socialists and only 2 altruists are obtained. For the sake of convenience, this study only selected subjects from individuals (denoted by I) and pro-social individuals (denoted by P), and finally invite these two types of subjects to participate in the experiment according to the needs of the study design.

3.2.2 Three Structures of Combining NET32 Network and SVO

In the NET32 exclusive structure, there are 2 types of positions (strong power position and weak power position) with a total of 5 subjects. In view of the different SVOs of the subjects, we should consider how many combinations of SVOs of the 5 subjects could be, and which combinations are more worthy of study. In the NET32 structure, there may be three combinations (I , I), (I , P), (P , P) between the strong, and four combinations (P , P , P), (P , P , I), (P , I , I), (I , I , I) among the weak actors. Therefore, there are 12 possible combinations after combining the NET32 structure with SVO. In the strong-strong coalition, since this paper is to study the coalitions and benefits of people with different SVOs, it is only necessary to examine the strong combination (I, P). Therefore, the final study of this paper is the three NET32-SVO structure combinations of IP-P, IP-PPI and IP-PPP, as shown in Figure 4.

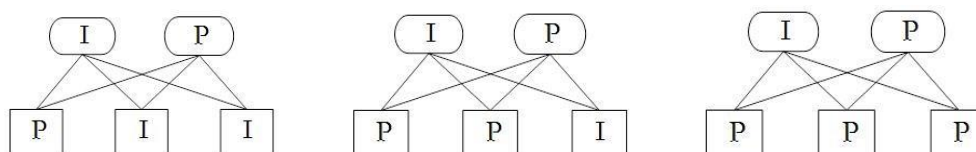


Figure 4. Three Structures of Combining NET32 Network and SVO

3.2.3 Experimental Design

3.2.3.1 Experiment Rule Setting

3.2.3.1.1 Four Types of Experiment Rules

In order to study the relationship between SVO, coalition and punishment, we set up four types of experimental rules, each type of which conduct 7 groups of experiments, each group of experiments is divided into two stages. If the strong actor decides whether to coalition or not, it is called “free coalition”; if the rules stipulate that the strong must have a coalition, it is called “required coalition”. In a strong-strong coalition, if a traitor appears, punishment is imposed. For strong-strong coalitions, rules 3 and rules 4 are set according to the degree of punishment from light to heavy, the purpose is to examine the impact of the coalition’s succession on the benefits of all parties. The four types of experiment rules are shown in Table 2.

Table 2. Experiment Rules, Structure, Number of Groups and Rounds

	Experimental Rules	Experimental Structure	Number of Experimental Groups	Experiment Round ¹ /Group
1	A free coalition	IP-PII (1 group) IP-PPI (1 group) IP-PPP (5 groups)	7 groups	7 rounds, with punishment ²
2	A required coalition	IP-PII (4 groups) IP-PPI (3 groups)	7 groups	7 rounds, with punishment ²
3	The first 4 rounds of A required coalition, after 3 rounds of A free coalition	IP-PII (2 groups) IP-PPI (4 groups) IP-PPP (1 group)	7 groups	7 rounds, with punishment ²
4	First 4 rounds of A free coalition, after 3 rounds of A required coalition	IP-PII (2 groups) IP-PPP (5 groups)	7 groups	7 rounds, with punishment
	Common rules: ban B coalition and punish the traitors in A	IP-PII (9 groups) IP-PPI (8 groups) IP-PPP (11 groups)	28 groups ×7 rounds / group=196 rounds	

¹Each round of experiment does not exceed 10 minutes.

²Refer to Table 3 for the meaning of punishment.

3.2.3.1.2 Three types of punishment

We adhere to the “hot stove rule” of punishment proposed by management expert that offenders must be punished, warning before the punishment, and punishment should be immediate and fair. When designing the punishment mechanism, we also considered the progressive punishment process from light to heavy. Each phase of the experiment is conducted for 7 rounds. In order to test the effectiveness of punishment mechanism, this experiment alternates according to the rules of “no punishment, light punishment, no punishment, medium punishment, no punishment, heavy punishment, and no punishment”, as Table 3 shows.

Table 3. Different Penalties Imposed for Each Round of Experiments

Rounds	Condition	Experimental Rules
Round1	No punishment	Betrayal without punishment
Round2	Light punishment	If one person betrayed, confiscate half of their excess benefit
Round3	No punishment	Betrayal without punishment
Round4	Punishment	If one person betrays, the excess proceeds are all confiscated
Round5	No punishment	Betrayal without punishment
Round6	Heavy punishment	If one person betrayed, confiscate their excess benefit to the non-betrayed
Round7	No punishment	Betrayal without punishment

Note: If both are betrayed, all their proceeds will be confiscated.

3.2.3.2 Experimental Site and Experimental Method

The mainstream man-machine interface cannot collect the psychological information of the subjects in the

exchange. In order to analyze the exchange psychology of the subjects, this experiment uses QQ instant messaging software. In order to prevent a small number of subjects from gamifying the experiment, the examiner repeatedly emphasized the seriousness of the experiment throughout the experiment and reminded the subjects that their benefit was linked to their final points. Therefore, in general, this experiment can simulate the game scenario well and ensure the subjects' sense of participation in the game. The experimental site was selected in the sociology laboratory of a certain university. Each compartment had a computer connected to the Internet. The subjects could not communicate in private orally or in writing. The experiment was completed online via QQ chat. The researcher applies for 6 QQ accounts to create a QQ public discussion group. There are 6 people in group A1, A2, B1, B2, B3, the main experimenter. The information in the group is shared. We also create a discussion group A in QQ, used in strong-strong coalitions. At the same time, private chats between all A and all B are allowed, but relevant information is required to be published in the QQ group within the specified time, including their respective payoffs, who they are in coalition with, whether there is betrayal, and the benefits of the coalition. Based on the dialogue data in QQ, the author analyzes the psychology of the exchange, and further describes, explains or supports the research conclusions and findings.

3.2.3.3 Experimental Steps

10 experimental manuals based on the nature of the network, the location of the structure, and the degree of punishment are prepared before the subjects. The subjects are college students who have been surveyed by SVO before the experiment. They don't know each other. After entering the laboratory, the subjects read their own experiment instructions, conduct pre-experiments, familiarize themselves with the experimental procedures, and then formally participate in the experiment. Each round of experiments takes no more than 10 minutes. After the experiment, some subjects are interviewed to collect their psychological data. The subjects are paid according to their final payoffs, the maximum is 100 yuan.

4. Results and Findings

4.1 *When the Strong Don't Form Coalition, there is No Difference in the Benefits of the Strong Power Individualist and the Strong Power Pro-social*

Strong-strong coalitions can hardly reflect the differences between different SVO strong players. Only when the strong don't form coalition, it is possible to find the difference in revenue and strategy between the two. Strong power pro-social person pays more attention to cooperation and win together with the weak, playing the role of "honest people". When the strong don't cooperate, the average benefits of individualist A1 (I) and pro-social A2 (P) are 9.96 and 9.78 respectively, with no significant difference. In other words, research **hypothesis 1** is supported, and the reasons may be as follows.

4.1.1 Both Are In a Position of Power, and the Benefit Gap Will Not Be Too Large

The strong power individualists are willing to compete for resources, and even adopt a strategy of giving up trading with the weak actor, forcing the weak to give higher payoffs. If you give up, you will get nothing. As a result, the gap between your benefit and those of strong power pro-socialists will be reduced. Especially in the 22nd group of experiments, the strong power individualists give up the exchange several times in succession, which affect their final benefit. Although strong power pro-socialists are also in a strong position, they tend to cooperate, less bargaining, compassionate, etc. (De Cramer, Paul & Van Lange, 2001: 5-18). They can give the weak at least one trading opportunity in turns, sacrificing their "maximum return" and obtaining stable returns. Therefore, even if the powerful pro-social person is in an advantageous position, there will be no bigger benefits. In short, there is not much difference between the strong power individualist and the strong power pro-social.

4.1.2 Powerful Pro-Social Persons Appropriately Give Opportunities to the Weak

Compared with the strong power individualist people, the strong power pro-social person pays more attention to long-term interests and strive to give each weak actor a trading opportunity (Van Lange, Agnew, Harinck & Steemers, 1997: 1330-1344). Please see the conversation log below.

(Group 4. Dialogue between the strong power pro-social person A2 and weak power pro-social person B2)

B2: "we still exchange according to last time? or I can give you a higher point."

A2: "I think a win-win situation is the best. You see that B3 has not been trading, and I will trade with him in this round, because mercilessness will not last long."

B2: "We have so much cooperation experience, and we should deepen it. I can give you more without bargaining."

A2: "I just want to give him a deal, it's not easy for everyone, wait for the next round to deal with you."

The multi-round trading strategy is easy to make the two parties form a path dependence. Sometimes, a weak person has a rare trading opportunity even if he gives a high point to the strong one, which will hurt his confidence to continue trading. “Those who are neglected think that they have lost face, have been hurt, and may even have retaliatory behavior in severe cases. When faced with such a potential result, the interacting individual will form a more flexible strategy on this basis” (Zhai, 1999, pp. 144-157). The flexible strategy implemented by the strong power pro-social is to give each weak one a trading opportunity, which will ease the hostile atmosphere between the strong and the weak and strengthen the confidence of the weak to continue trading, so that the two parties can achieve mutual benefit and win-win results.

The study also find that the strong man will repeatedly negotiate in the exchange due to the pursuit of high returns, which will consume more time and delay the negotiation time. “Delaying time” reflects the trading logic of the strong. First of all, the strong use “delay tactics” to test the psychology of the weak and wear off their patience. Second, sometimes the strong are unwilling to accept a payoff from a weaker, but do not want to give a clear answer, so they delay the time and give the weak enough bidding space to raise the overall point. Again, the strong show their power posture through the “delay tactic”, because in general “the strong can afford it, while the weak can’t”.

4.2 *The Benefit of the Strong is Less Than the Predicted Value*

The experimental results show that the average benefits of the strong A1(I) and A2(P) are 19.15 and 19.13 respectively, which are significantly different from 20 points. Hypothesis 2 does not pass the statistical test. However, we believe that although hypothesis 2 is not “statistically” significant, the benefits of the two powerhouses both exceed 19 points. Therefore, it can be considered that their benefits are not much different from 20 points. Nevertheless, it is necessary to explain why hypothesis 2 has not been statistically confirmed.

4.2.1 Repeated Betrayals by the Strong

First of all, the stronger have repeatedly “betrayed”, and some of the resources will be confiscated in the punished rounds, thus affecting the final benefit.

4.2.2 Different Payoff Logic

The payoff logic of the strong power individualist person and the strong power pro-social person is different, and the two people “check each other out”. The payoff reserved by I is often higher than the payoff of the coalition, and P only needs to reach the payoff of the coalition. He will also take care of the weak. Therefore, the strong power pro-socialist P lowered the overall payoff of the coalition. Once the weaker accepts the low offer from the strong power I, I is the “betrayal” of the coalition. Although the strong power pro-social person P can also betray, compared with I, if P has already dealt with a weak person, even if there are other weak people giving high points, P will still maintain the original exchange. The dialogue illustrates this.

(Group 6. Dialogue between the strong power individualist person A1 and the strong power pro-social person A2)

A1: “We offer 16 as the coalition point, the unified criteria must be high, not low.”

A2: “Let’s divide equally in the first round and see the reaction of group B.”

A1: “No, I just got a B at 14 points. I think it will be increased to 16 points, and then I can reduce the point.”

A1: “If we lower the point, it will be basically gone. It is difficult to increase the point anymore. We must seize the initiative, even if we don’t close the deal.”

A2: “Don’t be so cruel, it’s time to give back to our customers.”

(Group 15. Dialogue between the strong power individualist person A1 and the strong power pro-social person A2)

A1: “I think we set the coalition point a little higher, which is better for trading.”

A2: “So B won’t agree.”

A1: “The three of them, we are two, we can drop down properly, but don’t drop down too hard.”

It can be seen from the dialogue that the words of the strong power individualist person A1 are obviously “strong”, and the words of the strong power pro-social person A2 are obviously “moderate”. The game results of the two on the coalition payoff are shown in Table 4.

Table 4. Payoffs in the Strong-Strong Coalition

Experiment Rounds	Coalition Rounds	Payoff of rounds I and P				
		196 Rounds	157 Rounds	90Rounds I = P (Initial payoff)	50Rounds I > P (Initial payoff)	The final payoff of 33 rounds is close to P The final payoff of 17 rounds is close to I

The above table shows that in the payoffs of the strong-strong coalition, the initial payoff of the strong power individualist I is greater than the initial payoff of the strong power pro-social person P. There are 140 rounds, recorded as $I \geq P$ is 140, accounting for 89.17% of the total number of rounds of the coalition. Among the 50 rounds with $I > P$, 33 rounds have final payoffs close to P, accounting for 66% of the total 50 rounds. This shows that the strong P lowered the coalition offer of the strong I. In layman’s terms, “honest people” reduce the benefit of “profit chasers”. Conversely, the “profit chaser” increases the benefit of the “honest person”, and the two “check each other” because of their different “characters”. It is conceivable that if A1 and A2 are husbands and wives, they may quarrel or even divorce because of the “personality incompatibility” shown in treating others or other things.

4.2.3 The “Close to” Strategy of the Weak

In order to establish a multi-round exchange relationship, the weak often fawn on the stronger in the exchange. Some of the strong (especially pro-socialists) give up asking for higher points and cede a small amount of proceeds to the weak. In strong-strong coalitions, the weak face the risk of being excluded. It is wise to use words to “show good” and “pull relations” to the strong, and establish a stable exchange relationship. The “Close to” strategy makes “cold” stranger trading relationship with a bit of “warming up” of the “emotional” relationship to achieve a certain inequality under the authority of “mutual benefit”. The multi-round trading relationship allows the strong and the weak to eliminate trading uncertainty and reduce opportunistic behavior based on the fragile “emotion”. There are several “close to” strategies of the weak on further analysis of the subjects in the exchange of dialogue. The first is to consult the “background information” of the strong, such as birth place, grade, department, major, etc. The second is through “promise” and “good things” for the strong to maintain the relationship, such as “If you trade with me, I will help you find me at any time in the future”. The third is to give language “tags”, such as “make friends”, “relationships”, “old friends”, “mutual benefit and win-win” with the strong. The “speech” of the weak makes the strong unable to maximize the benefits. Of course, the strong-weak relationship between the two remains unchanged.

There is a certain tension behind the “fawn on” strategy. The weak will not overly believe in the trading promises of the strong, because the strong may go back on their words. The weak will worry that the strong cannot resist the “larger temptation from other weak actor” and refuse to “exchange” with themselves, so try to maintain the “relationship” with the strong. The strong power individualist rarely gives out credible promises in pursuit of gains. However, once the strong loses its multiple rounds of partners for higher benefits, it still needs some communication costs (exchange costs) to find other partners. In order to get more benefits, the strong will also adopt “deception tactics” that is falsely quoted points, misrepresented coalition information, exchanges, etc. After the deception is exposed, the parties to the negotiation often break out and continue until the exchange fails. The following dialogue demonstrates this.

(Group 17. Dialogue between the strong power individualist A1 and the weak power pro-social B1)

B1: “Is it the last point this time?”

A1: “Go up, B3 gives me 20. This is hard to refuse.”

B1: “What about our coalition, we have discussed before?”

A1: “I have so many choices, why not when there is a high point?”

B1: “The profiteer, I asked B3. He didn’t agree at all. You are so insincere. You have given up morals for the benefit. We have cooperated for many times. You want to deceive me for high points. It’s too immoral.”

4.2.4 Strong-Weak Work Together with Like-Minded

The multi-round trading relationship between the strong and the weak is an unequal “collusion”, which results from “collusion” and “win-win”. What type of weak SVO is the strong man more willing to trade with? We find that there is “share same interests” here.

Table 5. Rounds of Trading Partners Selected by the Strong and the Weak

Total number of experiments	Number of groups forming multiple rounds of exchanges	The number of groups of multi-round trading partners consistent with the first round of trading partners	The respective choices of the strong I and P			
			I	Choose I 11 times	P	Choose I twice
28	21	18	I	Choose P 7 times	P	Choose P 13 times

In most experimental groups, the strong have partners in multiple rounds, and tend to form a P-P combination first, and then promote the I-I combination, that is people with the same SVO are more likely to have multiple rounds of communication. What is the reason? From the perspective of SVO, perhaps it can be explained by “homogeneous attraction”. After a few exchanges between strangers and mutual understanding of each other’s personality, people with the same SVO can easily form a stable cooperative relationship. However, we find a detail after analyzing the exchange sequence: the power P often reaches a consensus with the weak power P before the strong power I is “forced” to reach a consensus with the strong power I. That is that there is P-P exchange before I-I exchange. Therefore, this is passive “share same interests”.

4.3 Individualist Persons in Strong-Strong Coalitions are More likely to Betray

In the strong-strong coalition, “betrayal” is the best choice, and the “betrayal chain” results. The question is who would betray more? As can be seen from Table 6, in the four rules of the Strong Free Coalition or the Required Coalition, the number of betrayals of A1 (I) is not lower than the number of betrayals of A2 (P). That means the strong power individualist in the strong-strong coalition are most likely betrayal and **hypothesis 3** is descriptively testified.

Table 6. The Number of Coalitions and Betrayals in the Strong-Strong Coalition (49 rounds)

Rules	Number of coalitions	Number of betrayals	Round of betrayal	Number of betrayals	
				Number of betrayals of A1(I)	Number of betrayals of A2(P)
1	29	9	2, 3, 5, 7	5	4
2	49	21	All 7 rounds	12	9
3	41	12	1, 2, 3, 4, 5	6	6
4	38	10	1, 3, 5, 6, 7	6	4

Under each rule, which type of SVO people are more likely to betray in which round? Table 7 shows this.

Table 7. The Number of Betrayals Per Round of People with Different SVOs Under Each Rule in this Experiment

Experiment round	Rule 1		Rule 2		Rule 3		Rule 4	
	A1 (I) Number of betrayals	A2 (P) Number of betrayals	A1 (I) Number of betrayals	A2 (P) Number of betrayals	A1 (I) Number of betrayals	A2 (P) Number of betrayals	A1 (I) Number of betrayals	A2 (P) Number of betrayals
Round 1	0	0	2	2	2	0	1	2

no punishment								
Round 2 light punishment	0	1	1	0	2	0	0	0
Round 3 no punishment	1	1	3	2	3	2	1	0
Round 4 medium punishment	0	0	1	1	1	0	0	0
Round 5 no punishment	3	1	3	3	0	2	2	0
Round 6 heavy punishment	0	0	1	0	0	0	0	1
Round 7 no punishment	1	1	1	1	0	0	2	1
Total	5	4	12	9	8	4	6	4
	9 times		21 times		12 times		10 times	

It can be seen that no matter under which rules, with or without punishment, betrayers still will appear. In particular, rule 2 (the Required A coalition) brings the most betrayal, because although the rule requires that the two strong men must cooperate, the coalition does not necessarily bring high returns to the individual, so there will be betrayal. Of course, in order to avoid being punished, betrayal occurs mostly in rounds without punishment. Although the betrayer can get higher profits, but it also has a point: the betrayed attracts dissatisfaction and language “punishment” from allies and trading partners. For example, the betrayed power individualist person A1 is often condemned by members of Group B, condemning him as a “profit-maker”, “scammer”, “savvy”, “stingy”, and “crazy”. The strong power pro-social person A2 is often praised by members of group B, such as “kindness”, “kindness”, “good temper” and “generous”. This shows that during exchange, people criticize the strong power individualist who already occupy a position of power but treat the weak more “unfairly”, at the same time appreciate the strong power pro-social person. The following dialogue illustrates this.

(Group 13. Dialogue between the strong power individualist person A1 and the strong power pro-social person A2)

A1: “You just hold on to the payoff and they will compromise.”

A2: “What I want is not high. You are great, but you have betrayed this round. Fortunately, there is no punishment, otherwise the high point is meaningless.”

A1: “You can also ask for such a high point, if you can’t, just give up the deal.”

A2: “It feels like this is bad. We have made enough money. Your ability to compete for benefits is really strong. There is unnecessary. In the end, you are the first, but your relationship with others will become poor.”

(Group 17. Dialogue between the strong power individualist person A1 and weak power individualist person B3)

A1: “You give me a high point. If you can’t give me a little more, I will choose someone else to cooperate.”

B3: “Don’t use this to threaten me, not everyone gives up their interests for trading, and what you want is already higher than your coalition payoff. If you betray, how will your allies look at you? You are giving up the covenant rules for personal gain.”

4.4 Effect of Punishment Mechanism

Coalition means keeping the agreement, not betrayal. However, there is betrayal in the strong-strong coalition, which will disintegrate the coalition. If the traitors are punished, the coalition will be better maintained. It can also be seen from the dialogue that in rounds of punishment, the strong man is cautious and acts to remind the coalition partners that they should not betray. Actors realize that betrayal has not only a material but also a psychological cost: the betrayal is attacked by members of the group’s language, and the heart will not be calm.

In the case of complete information, verbal criticism is a common strategy, and the language criticism for betrayal behavior (such as “betrayal of righteousness”, “black heart”, “selfishness” and “scum”) will spread rapidly in small groups, which will dampen the esteem of the betrayer and make him reshape the sense of rules and regulate their behavior.

“Verbal” criticize has certain “psychological” constraints on the betrayal. This study analyzes the material constraints of the punishment mechanism that is the confiscation of the traitor’s resource points on the traitor. In order to explore the effect of different punishment intensities on betrayal, this paper set three types of punishment: light, medium and severe. This experiment only allows strong-strong coalitions, there are 28 groups of experiments, each group of 7 rounds, a total of 196 rounds, including 157 rounds of coalition rounds. The following table shows the betrayal under different penalties in this experiment.

Table 8. Punishment Intensity and Number of Betrayals

Experiment rounds	Round1	Round2	Round3	Round4	Round5	Round6	Round7
Punishment intensity	No	Light	No	Medium	No	Heavy	No
Number of betrayals of I	5	3	8	2	8	2	5
Number of betrayals of P	4	1	5	2	6	1	2
Total number of betrayals	9	4	13	3	14	2	7

The results show that no matter whether there is punishment or not, there will be betrayal, a total number of betrayals is 52. Among them, there are 43, 4, 3, and 2 times of betrayal in the rounds of no punishment, light punishment, medium punishment, and heavy punishment, respectively. It can be seen that in strong-strong coalitions, the intensity of punishment is inversely related to the number of “traitors”. **Hypothesis 4** was testified descriptively.

In addition, the number of betrayals of I in each round is generally greater than the number of betrayals of P, and the number of betrayals appears with the alternate setting of no and punitive mechanisms. It is also worth noting that as the intensity of punishment increases, the rate of betrayal by individualist people is lower than that of pro-social person, which shows that the intensity of punishment has a greater deterrent effect on pro-social person. In other words, punishment can scare honest people more than selfish people. This conclusion implies: there is always tension between “system” and “people’s mind”.

When only strong-strong coalitions are allowed, there is no punishment for the last round of the game. According to “common sense”, there should be more betrayal here. However, the experimental results find that betrayals occur only 7 times, which is far less than the number of betrayals (14 times) under the previous rule without punishment. We guess for two reasons: first, the penultimate round of heavy punishment has a deterrent effect, making the last round less betrayal without punishment. In other words, the actor may internalize or learn the “punishment mechanism”, and even if there is no punishment, he still acts in accordance with the existence of the punishment mechanism. Statistics show that pro-social person are easier than individualist people “internalization”. Second, a small number of subjects may have forgotten the last round of punishment due to “exhaustion”. Even so, it shows that the behavior of the subjects is not completely linearly related to the “punishment mechanism”. In other words, the subjects are not completely rational. Of course, in the long run, the punishment mechanism is still necessary.

5. Conclusion and Discussion

5.1 Conclusion

NET focuses on network structure and ignores individual heterogeneity; SVO research focuses on individual attributes and ignores structure. This study combines them together experimentally. In the exclusive network NET32, the strong-strong coalition is studied by the experimental method. The main conclusions are as follows:

First, in the strong-strong coalition, the betrayal of the strong is a dominant strategy, and the result is a “betrayal chain”.

Secondly, in order to restrain the betrayal behavior, this study introduces a punishment mechanism for betrayers in the strong-strong coalition, and explores how the SVO and punishment mechanism affect the coalition. Experimental results confirmed that when the two strong actors are not in the coalition, there is no significant

difference in the benefits of the strong power individualist and the strong power pro-socialist; when the strong-strong coalition, the benefits of the two does not reach the equilibrium value of the “compromise chain” 21, and the strong power easier selfish “betrayed”; the intensity of punishment is inversely related to the number of “betrayers”. The study also proves that as the intensity of punishment increases, the number of betrayals by powerful pro-social persons decreases, that is, in strong-strong coalitions, the punishment intensity has a greater deterrent effect on pro-social persons.

The experiments also got some findings. In the strong-strong coalition with an exclusive structure, the aim of communication between the strong is to discuss the coalition payoff. Most of the strong adopt the “exchange at last second” strategy, which reflects that the strong have a strong prediction, negotiation and tolerance ability. In addition, there are a lot of actors in the coalition called “betrayers”, “deceivers”, “disruptors”, and “free riders”, who play a key role in the coalition. These conclusions and findings have practical significance.

In short, this study attempts to combine personality and structure, analyze how people with different SVOs cooperate or betray under punitive conditions, and prove that actors with different SVOs have different benefits under different structures. In other words, “benefit” cannot be reduced to any single factor. This study concerns the classic topic of “the relationship between structure and dynamic”, and it will be better explain power phenomenon and the like.

5.2 Discussion

Of course, this paper also has limitations. First of all, we use QQ chat platform to collect dialogue information, although it can avoid the interference of voices, expressions, and body movements between the subjects, and the dialogue text can also show the real behavior of the subjects, but there is a problem that the information collection and sorting takes a long time.

Secondly, many factors such as negotiation skills, cognitive level, life experience and other factors may also have an interactive effect with SVO, which in turn affects the exchange results. These factors need to be considered in the future. This paper combines people from different SVOs for research. This certainly has a realistic basis, but are the exchange “logic” of different qualities different, and in what sense can they be brought together? This methodological issue requires deep reflection.

Thirdly, this study defines the situation that the final offer accepted by the strong is higher than the coalition offer as “betrayal”. However, in reality, there are many exchanges below the payoff of the coalition will also be punished by allies, this study did not consider this situation. And, when the strong-strong coalition results in a strong-weak benefit gap that is too large, can the weak “join together” to resist? If the strong are not in the coalition, can the weak-weak coalition “cancel out” or even “reverse” the power? What is the strategy of the weak coalition? The author will discuss it separately.

From time to time, similar to most experimental studies, the subjects in this study are college students. They are different from “people on job” in terms of values, life experience, and behavior strategies. Whether the research results based on college students have external validity remains to be further studied.

Finally, there may be a “real” relationship, such as family, friends, enemies, etc. between the stronger. In the future, we can consider combining the real relationship with SVO to discuss the results of the exchange. If we then combine actors, relationships, and structures for research, we can enrich the analysis framework of network exchange theory and find even greater discoveries. For example, “parent-child” generally do not “exchange” according to “formal logic” thinking, but the mother gives all resources to the son or the son gives resources to the loved ones even if he is heavily punished. It shows that the “abstract empiricism” study based on “computational rationality” is difficult to describe and explain the true “life world”, which also means that the explanatory power of this study has its “scope”.

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