12-15-2014

A Theory of Reward Stability, Justice Evaluations and Group Cooperation

Hyomin Park
University of South Carolina - Columbia

A THEORY OF REWARD STABILITY, JUSTICE EVALUATIONS AND GROUP COOPERATION

by

Hyomin Park

Bachelor of Arts
Sungkyunkwan University, 2003

Master of Arts
Sungkyunkwan University, 2005

Submitted in Partial Fulfillment of the Requirements

For the Degree of Doctor of Philosophy in

Sociology

College of Arts and Sciences

University of South Carolina

2014

Accepted by:

David Melamed, Major Professor

Barry Markovsky, Committee Member

Shane Thye, Committee Member

Jeongkoo Yoon, Committee Member

Lacy Ford, Vice Provost and Dean of Graduate Studies

DEDICATION

To our parents

ACKNOWLEDGEMENTS

The experiments were supported by grants from the National Science Foundation (SES-1332428) and the Support to Promote Advancement of Research and Creativity (SPARC) from the University of South Carolina. I would like to express my gratitude to my committee members. My biggest thanks go to David Melamed. I have been privileged to have an advisor who encouraged my idea and sincerely helped me to develop it. Without his help, comments and patience, this dissertation would not be possible. I also thank Barry Markovsky, Shane Thye and Jeongkoo Yoon for helpful comments and encouragement of this dissertation. It was my honor to share my idea with a group of eminent social psychologists. I am also very grateful to Hyunho Seok who has been being my professor, boss, mentor, and role model. He guided me to the field of sociology and showed the way of the scholar's dedication to the uncompromising pursuit of truth. Many friends have stood with me sharing joy and sorrow through those years. Their support helped me to stay focused on my graduate study. None of this would have been possible without the love and patience of my family. My parents, Youngki Park and Meyoungsuk Kim, who always been *very* supportive to my decisions and encouraged me to pursue my dreams. I would like to express my heart-felt gratitude to my wife Miyoung for her love, sacrifice, devotion and patience throughout the years in U.S. Last, I thank our precious daughter Bona who has always been the source of pleasure and happiness during the hard time.

ABSTRACT

The objective of this dissertation is to introduce a theory of the stability of rewards, justice evaluations and group cooperation with the results from three empirical tests of the theory. According to justice theory, rewards from exchange relations produce justice evaluations among individuals, leading to emotional and behavioral reactions. Specifically, unjust rewards cause lower levels of justice evaluations, positive emotions, and cooperative behaviors. Prospect theory and research on negativity bias posit the asymmetry between negative and positive events: negative events have a stronger effect than the same size of positive events on individuals' perception. Combining the previous arguments, the theory introduced in this dissertation maintains that in repeated rewards events, the instability of rewards itself has a negative effect. That is, unstable rewards lower justice evaluations, positive emotions, and willingness to cooperate.

The theory is tested with three mixed quantitative methodologies. Results from analyses of nationally representative sample survey data show that the stability of rules in workplaces has a positive effect on justice evaluations, willingness to work hard and willingness to stay in current workplaces among employees. Next, a controlled laboratory experiment tests the theory more rigorously. The results reveal the positive effect of the stability of rewards on justice evaluations, positive emotions, and cooperative behaviors. The second experiment replicates the results from the first experiment and confirms the effectiveness of the theory. The experiment also tests the effect of the presenting order

of instability of rewards and shows that reward instability occurring earlier has a stronger effect than that which occurs later. The implications of findings on sociological theory and other various areas are discussed.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1
INTRODUCTION

People frequently face situations where their efforts in groups yield unstable rewards. For example, a referee in a sporting event can make bad calls. Some of these calls will be advantageous to one team, while others will be advantageous to the other team, but the calls will not be biased overall. Or in a company, an arbitrary boss can downplay an employee's performance at one time and praise it at another, even though the employee's performance is the same objectively in the two cases. In these situations, the outcome of the baseball game or the employee's reward may not be affected by this instability in absolute terms since a disadvantageous event at one time can be canceled out by an advantageous event at another time. However, this dissertation expects that the athletes and the employee will perceive their situations as unjust. Even more, they may perceive that the final allocation of rewards (the outcome of the game or the salary paid) is unfavorable for them because the experience of under-reward is felt more keenly than the experience of over-reward (e.g., Homans 1974).

In this dissertation, I explore the effects of *reward stability* on group cooperation through justice evaluations and emotional reactions to rewards. *Reward stability* refers to the extent to which repeated rewards stay invariant over time. If a series of rewards is unstable, therefore, the level of its outcome fluctuates over time. Empirically, instability of rewards is conflated with unfairness of rewards in many situations because unstable

rewards frequently cause an unjust distribution of rewards. However, those two concepts are clearly distinguishable theoretically. The former focuses on the invariability of rewards in the time dimension, while the latter only considers the result of distribution at a specific point in time. Instability of rewards does not necessarily result in injustice of the outcomes in absolute terms; for example, if one incongruent reward is compensated for by another incongruent reward. On the other hand, a series of stable rewards can be unjust if they are invariably higher or lower over time than the just level of rewards would be. A large volume of previous research has investigated the consequences of injustice. But little of this has dealt with the effect of stability of rewards on human reactions and behaviors.

To examine the net effect of stability of rewards on human behaviors, this research brings together justice theories and elements from cognitive psychology. Justice theory explains the various sources of justice evaluations and their emotional and behavioral consequences (Jost and Kay 2010). Cognitive psychology, specifically prospect theory and the concept of "negativity bias," predicts individuals' asymmetrical responses to events with opposite valences and explains why negative events are experienced more keenly than positive events. On the basis of combining these two lines of research, the theory presented in this dissertation predicts that the stability of a reward system has a positive effect on justice evaluations and emotional reactions, and consequently on cooperation among group members in exchange relations. On the other hand, rewards that are not stable but fluctuate between under-rewarding and over-rewarding are predicted to reduce justice evaluations, positive emotions and cooperation

among people. Based on this reasoning, as well as previous research, I have built a theory about how the stability of rewards affects group cooperation.

In presenting this theory, I first review justice theory. The theory of distributive justice has been developed since the 1960s. It is called equity theory since the researchers were mostly interested in the equity distribution rule in work situations (e.g., Adams 1963). The theory examined how individuals perceive fairness in a situation and suggested that an allocation is fair if its rewards correspond to people's contributions to a task (Adams 1965). The theory also explored the consequences of perceived fairness among people. Considerable research has shown that perceived injustice causes emotional, cognitive, and behavioral responses among the reward recipients (e.g., Homans 1961; Walster et al. 1973).

Later research pointed out the limitations of existing equity theory and expanded the theory. Scholars suggested the necessity of multidimensionality within the fairness rule and maintained that people use equality or the need-based fairness rule as well as the equity rule when they evaluate the fairness of a situation. Another line of research revealed that justice evaluations are not made solely on the basis of comparisons of actual rewards among proximate individuals, but also on the basis of comparisons between actual rewards and their subjective reward expectation levels (e.g., Berger et al. 1977). Researchers working on the theory also investigated the various sources that affect people's justice evaluations, and they consistently found that personal factors, e.g., status or social-value orientations, and situational factors, e.g., power position or network, affect justice evaluations. (See Hegtvedt 2006 for a recent review.) These studies show that justice evaluations profoundly depend on subjective factors.

On the subjectivity of justice evaluations, previous research has shown that the effects of under-rewards on justice evaluations are stronger than the effects of the same amount of over-rewards on justice evaluations (Austin and Walster 1974; Jasso 1978, 1980; Markovsky 1985). If there were no asymmetric effect of unjust rewards on justice evaluations, one might expect that a lower level of reward (say, 10% less than expected) could easily be canceled out by compensation at another time (10% more than expected). However, assuming the effect is not the same, the sum of the justice evaluations made about two unjust rewards in opposite directions with the same intensity should be lower than the sum of the justice evaluations made about two just rewards. This suggests that if the rewards are not stable but fluctuate between being higher and lower than an individual's expectation level over time, the instability itself can reduce people's justice evaluations.

In addition to justice theory, cognitive psychology also posits a general tendency called "negativity bias" which shows how negative events have a stronger influence than positive events on individuals' perceptions in various human relationships (Baumeister et al. 2001). Prospect theory also posits that gains below the reference point (under-rewards) loom larger than corresponding gains above the reference point (over-rewards) because people are *loss averse* (Kahneman and Tversky 1979; Tversky and Kahneman 1991). These findings provide the theory of reward stability presented in this dissertation with the theoretical background necessary for explaining the asymmetric effects of unjust rewards, and the effect of stability of rewards on justice evaluations. The current research examines how repeated under- and over-rewards affect the justice process.

The theory of procedural justice is deeply relevant to the role of stability of rewards on justice perceptions over time. This theory argues that not only the results of allocation, but the individuals' experiences through the allocation process itself, affect justice evaluations. Research on procedural justice reveals that people are more likely to be satisfied with the results when the reward allocation process fulfills certain fairness criteria. Those studies also suggest that the consistency rule is one of the criteria used to evaluate the fairness of distribution procedure, and they show the role of stability of procedure in justice procedures with extensive empirical evidence (Leventhal 1980). However, this argument does not offer any explanation for how the inconsistency of rules affects justice evaluations.

Lastly, in regards to the consequences of justice evaluations, a great deal of research shows that perceived injustice causes emotional distress among individuals. The research also reveals that individuals use cognitive and behavioral reactions to reduce the distress that results from unfairness. Equity theorists predict that unjustly rewarded employees will change their contribution to or their rewards from the company, either actually or conceptually, in order to restore equity. It is also expected that they may quit their relationships with the group. More recent research shows that unfair company decisions cause employees to try to dissolve the relationship between themselves and their organizations through such methods as leaving the company, calling in sick, coming to work late, or pursuing their own interests (VanYperen et al. 2000).

On the basis of previous research, this dissertation develops a theory about the effect of *rewards stability* on group cooperation. The theory assumes that among repeated rewards over time, under-reward at one particular time cannot be fully compensated for

by the same amount of over-reward at another time; whereas over-reward at one particular time can be canceled out by smaller under-reward at another time. Through this mechanism, the instability of a reward system has a negative effect on justice evaluations. This theory also holds that the decreased justice evaluations can produce emotional distress, which in turn reduces cooperation among group members. Consistent with this argument, prior research on justice evaluations shows the causal relation between evaluated (in)justice and emotional, cognitive and behavioral reactions (Hegtvedt 2006).

To this end, this research considers fluctuation of rewards through time as an important factor in shaping justice evaluations. Although many studies have investigated the antecedents and consequences of the justice process, researchers have not taken into account the history of repeated rewards in examining the principles of justice evaluations. Instead, most studies on distributive justice have treated an individual's investments into a group and rewards from the group as a single event, and focused on the results of the allocation of rewards. Therefore, they have not accounted for reward stability. Since most relationships in human society are embedded in a lager social context and last for a while (Granovetter 1985), it is necessary to examine justice evaluations in the dimension of time.

In exchange relations in human society, however, transactions do not occur just once; on the contrary, people mostly belong to groups, contribute their resources to those groups, and get rewards repeatedly over time (Greenberg and Scott 1996; Wayne et al. 1997). Justice evaluations, therefore, should not be viewed as independent from one another but rather as highly contingent upon each other. For this reason, it is necessary for justice theories to consider rewards as repeated events (Cosier and Dalton 1983).

Based on this fact, the theory states that an unstable reward system affects group cooperation through justice evaluations and concomitant emotional reactions. More specifically, this study proposes that greater stability in the reward system will (i) enhance justice evaluations by group members, (ii) arouse more positive emotional reactions toward the rewards, and consequently (iii) increase members' cooperation within the group.

To evaluate this theory empirically, I use mixed quantitative methodologies. In the first study, I analyze secondary data from the 2009 Korean General Social Survey (KGSS). This is an analysis of the relationship between stability of rewards and group cooperation. Though this study does not rigorously test the theory of this dissertation, nationally representative survey data show that stability of rules in an organization will affect members' evaluations of rewards from the group; the stability of reward principles in an organization is thus positively related to group commitment.

In the second study, a controlled laboratory experiment tests the theoretical arguments more rigorously. The experiment manipulates the stability of rewards at three levels and measures both subsequent justice evaluations of the rewards and emotional reactions to them. Finally, cooperation levels are measured as behavioral consequences. Multi-level analysis reveals that the stability of rewards is positively related to justice evaluations, positive emotional reactions, and group cooperation. The results also confirm the asymmetrical effect of unjust rewards more directly: the influence of under-rewards is greater than that of over-rewards of the same size.

For the third empirical study, another controlled laboratory experiment is performed to replicate the results of the experiment in the previous chapter and see how

serial positioning or sequencing effects justice evaluations among group members (Lilly et al. 2010). Specifically, this study manipulates the order of reward instability in four ways (stable or unstable reward first × under-reward or over-reward first) and tests the effect of the manipulation on justice evaluations, emotional reactions, and levels of group cooperation. This experiment shows how sequencing and appearance patterns of unstable rewards affect justice evaluation and its consequences.

The rest of this dissertation is organized as follows. In chapter 2, I review the literature that serves as a background for developing the central theory of this research. Based on this background, in chapter 3, I present the theory of reward stability, justice evaluations and group cooperation. I describe the causal relationship between the stability of rewards and group cooperation via justice evaluation and emotional reactions. Chapters 4, 5, and 6 comprise empirical studies which test the theory that is developed in chapter 3. In chapter 4, I analyze secondary survey data set to test how the stability of organizational rules over time affects employees' commitment level at work. In chapter 5, a controlled laboratory experiment tests the theory more rigorously and shows the effect of stability of rewards on justice evaluations, emotional distress and group cooperation. Chapter 6 introduces an additional laboratory experiment that examines the effect of unstable rewards in different presentation orders. In the last chapter, I pull together the results of the empirical analysis and address the implications of this study for academic areas and its applicability to practical areas.

CHAPTER 2
THEORETICAL BACKGROUND

In this chapter, I review the theoretical background central to this dissertation. Individuals in cooperative relations are sensitive to the rewards they receive from the cooperation. The key factor in motivating individuals to participate in cooperative relations is their perception of the rewards they will receive from cooperating in comparison with the contributions they will make to the cooperative relation. People cooperate when they expect to receive greater profit from doing so than from pursuing the same endeavor individually. If cooperation is not viewed as profitable enough for group members, they are reluctant to cooperate.

This dissertation is based on theories of distributive and procedural justice, and on prospect theory. Distributive justice focuses on the processes through which individuals make justice evaluations based on reward allocations, and on the consequences of justice evaluations, while procedural justice investigates the consequences of variations in the rules regulating reward allocations (e.g., Clay-Warner et al. 2005). Negativity bias and prospect theory show the asymmetry of effects between gains and losses (e.g., Kahneman et al. 1991). Research on asymmetries suggests that if over-rewards can be regarded as gains while under-rewards can be regarded as losses in justice processes, justice evaluations can be biased toward injustice based on the asymmetry. The last part of this chapter revisits justice theory to examine the consequences of justice evaluations on

group cooperation. The effects of justice evaluations are extensive in that they cause emotional, behavioral, and cognitive reactions.

2.1. DISTRIBUTIVE JUSTICE

Distributive justice theory (Hegtvedt and Cook 2001) focuses on the "fairness in the distribution of a set of outcomes to a defined circle of recipients" (Clay-Warner et al. 2005, p 90). Research on distributive justice has investigated the antecedents and the consequences of justice evaluations among people. (For reviews, see Bierhoff et al. 1986; Cook and Hegtvedt 1983; Hegtvedt 2006; Hegtvedt and Markovsky 1995.) In investigating how people produce justice evaluations in given situations, researchers of early distributive theory set down the equity rule as a criterion of fairness evaluation. According to this rule, individuals evaluate an allocation as fair when people are rewarded in accordance with their contributions to the group, which includes things such as time, effort, and indirect contributions such as educational achievements and seniority.

The extensions to the theory look for factors other than objective reward levels that affect justice evaluations. A good deal of research shows that personal factors such as status (Berger et al. 2002) affect individuals' justice evaluations. On the other hand, situational factors such as the presence of an anchor (Markovsky 1988a), a power position (Hegtvedt 1990; Hegtvedt et al. 1993) or a comparison network (Melamed et al. 2014) have been pointed to as important elements that importantly affect justice evaluations. Another line of research suggests multi-dimensionality in distribution rules (Deutsch 1985; Lerner 1977; Leventhal 1980). Distribution rules specify criteria for

allocating rewards among individuals in a social system (Cook 1975; Markovsky 1985). Individuals produce justice evaluations based on the distribution rule suitable for the situation (e.g., equity, equality, or needs-based). Researchers argue that justice evaluations will vary with the distribution rules which are applied to the situations. For instant, justice evaluations based on equal distribution of outcomes across group members will be different from justice evaluations based on the rule which stresses more outcomes for group members with more needs. Regarding the results of justice process, the research shows that perceived inequality leads individuals to emotional distress, and it also reveals that they engage in further cognitive and behavioral reactions to get rid of the uncomfortable feelings.

2.1.1 Equity Theory and the Proportionality Rule

In the 1960s, Adams (1963, 1965) first developed modern distributive justice theory. Adams' theory is also called equity theory because it suggests that equity is a main rule for evaluating fairness of reward allocation.[1] According to the equity rule, an individual should get rewards or burdens from the group based on his/her input or contributions to the group. Equity theory assumes that people evaluate a situation to be fair when an individual who contributes more to the group's performance gets more rewards from the group. The equity rule is most salient in work situations where productivity or efficiency is a central concern. Based on the equity rule, the theory posits proportionality of rewards as a general principle in evaluating the justice of rewards in

[1] Leventhal (1980) pointed out that, in everyday language, "equity" is used in a broad sense and encompasses a whole different type of justice rule. However, justice theorists use the term in narrow a sense and defined "equity" as a merit- or contribution-based allocation of resources. In this dissertation, "equity" is used in the narrow sense.

exchange relations (Adams 1965). According to the proportionality principle, a situation is equitable (or just) when the investment-to-reward ratio for one person is equal to the investment-to-reward ratio for another person, whereas inequity (or injustice) occurs when the ratios of investments to rewards are not identical between two actors.

Distributive justice theory also investigates how individuals respond to perceived injustice in emotional, cognitive, and behavioral ways. Emotionally, perceived injustice arouses distress among the individuals in the group (see Turner 2007 for a review). The distributive justice theory states that there is a positive relationship between the perceived intensity of the injustice and the emotional distress of the individual; the distress increases as the perceived injustice becomes more severe (Homans 1974). Distributive justice research also discovered that not only under-reward but also over-reward causes emotional distress among its recipients (Anderson et al. 1969; Walster et al. 1973). That is, individuals feel bad about results where their own rewards are higher than the expected level, as well as when their rewards are lower than the expected level. The type of emotions produced by over-reward and under-reward are not the same, however. In terms of types of emotions, when individuals face unfair rewards it mainly causes anger, disappointment, and ingratitude, while over-rewards mainly causes guilt and feeling of indebtedness (Adams 1963; Homans 1961; Leventhal et al. 1969; Walster et al. 1973).

Importantly for the current study, Adams pointed out that under-reward causes greater emotional reaction than over-reward (Adams 1963). Based on the evidence from Adams' studies, Homans held that under-rewarded individuals are much more likely to claim injustice than are over-rewarded individuals (Homans 1974). Austin and Walster (1974) also performed an experiment to examine the effect of inequity on levels of

contentment. The research showed that the contentment level was higher when the subjects were fairly rewarded than when they were unfairly rewarded. They are more content and less stressed when they are over-rewarded than when they are under-rewarded.

Another major contribution of equity theory is the finding that the effects of perceived injustice are not limited to emotional reactions, but extend to cognitive and behavioral responses. Adams (1963) argued that facing unjust rewards, individuals will suffer from discomfort. Following dissonance theory (Festinger 1954), he also maintained that the individuals will change their investments and/or rewards in either behavioral or cognitive ways to eliminate the distress. Through these changes, individuals can restore equity to their relationships in which they contribute resources to get rewards. If inequity is not reduced by behavioral or cognitive means, the actor is more likely to leave the relationship. Put differently, if inequity remains, the individual become less committed to the relationship (This will be discussed in more detail later).

2.1.2 Extension of Equity Theory and Distributive Justice

Though the early distributive justice theory (equity theory) suggested equity as a reward allocation rule and explained its applications, the theory was applicable only to quite restricted situations because it assumed that individuals evaluate the fairness of their rewards only in term of their contributions to the outcomes (e.g., Leventhal 1980). Equity theory was, therefore, pertinent to locally isolated economic exchanges such as workplace situations. The theory was difficult to use in explaining justice processes in situations where the equity rule is not salient or where local comparison is not applicable.

One limitation of the equity theory is that it addresses uni-dimensionality of justice evaluation rules (Cook and Hegtvedt 1983; Deutsch 1985; Komorita and Chertkoff 1973; Lerner 1974). Equity theory posits that individuals evaluate the fairness of their rewards based only on the equity distribution rule. However, many studies pointed out that equity is only one rule that may be used to evaluate the fairness of various situations. Walzer (1983) argued that there are various spheres in the real world and those different spheres need different criteria of justice evaluations. For example, friends prefer equal distributions (see Cook and Hegtvedt 1983 for a review).

To explain the justice process in various situations, researchers introduced the multi-dimensional model. They classified the rules for justice evaluations into three concepts: equity, equality, and need; and they maintained that each rule is directed toward different objectives. Specifically, equity rule stresses on contributions. Therefore, if equity is used for justice evaluations, the recipient will focus on the ratios between contributions and rewards among people. The equity rule is more likely applied when group members try to promote productivity in their groups. Therefore it is more relevant to workplace settings than to other situations. The equality rule, which is different from equity, focuses on rewards that are distributed identically among recipients. Equality is relevant to groups who try to enhance harmony among members. The third distribution rule is based on needs, which justifies greater rewards to people facing greater necessities, such as giving tax credits to people with many children or taking affirmative action to promote the opportunities of minorities in a society. The needs-based rule is supposed to attend to the welfare of members of the group (Deutsch 1985).

Justice evaluations, even those in the same situation, should not be the same across individuals if each of them gives different weight to different justice rules. Justice judgment theory argued that individuals combine multiple rules when they evaluate fairness of a situation[2] (Leventhal 1980). Since each individual may view the same situation differently from how others view it, justice evaluations of rewards from the situation should vary across individuals. For example, the justice evaluations of a person who is most concerned with the efficiency of the group should be different from those of a person who places greater stress on the harmony of the group, because the former places more value on the equity rule while the latter places more value on equality. The multi-dimensionality of justice evaluation rules presents the possibility that justice evaluations can be affected by the subjective application of justice evaluation rules.

Another identified weakness of equity theory is that it relies solely on a local comparison (Berger et al. 1972a; Berger et al. 1972b). Equity theory assumes that people produce justice evaluations based on comparisons of the ratios between contributions and rewards with proximate others. A just distribution is then achieved when the ratios between contributions and rewards are the same across all recipients. For instance, if a colleague whose performance is the same as mine is paid $10/hr, I would have to be paid $10/hr to evaluate the reward as fair. If I were paid $8/hr or $11/hr instead of $10/hr, I would perceive the situation to be unfair. Under this formulation neither recipient can

[2] Leventhal suggested the rule-combination equation as,

$$Deserved\ Outcome = w_c D_{by\ contributions} + w_n D_{by\ needs} + w_e D_{by\ equality} + w_o D_{by\ other\ rules}$$

where, w is a weight, D is deservingness, w_c, w_n, w_e, and w_o are the weights on the rules for contributions, needs-based, and equality, and any other aspects, respectively (Leventhal 1980, p. 30).

make correct justice evaluations because the ratios between the contributions and the rewards are congruent between two people even if both of the recipients are unjustly rewarded. If two actors are under-rewarded to the same extent (e.g., if both get $8/hr in the above illustration), both of them will perceive that their rewards are just according to equity theory, despite a collective state of injustice. Furthermore, a slightly under-rewarded individual may perceive herself to be over-rewarded if she compares her reward with more severely under-rewarded colleagues (e.g., if one is paid $9/hr while other is paid $8/hr) (Zelditch et al. 1970).

Berger and this colleagues also pointed out that equity theory cannot grasp the effect of status in reward distributions and showed how status shapes performance expectations in working groups (Berger et al. 1977). Equity theory explains unequal distributions of rewards in terms of quality and quantity of contributions to group tasks. According to this theory, therefore, not only the effort or time that a person puts directly into the group, but also things such as status characteristics (e.g., education level or seniority) can be regarded as investments that lead to higher rewards. However, this theory cannot explain the effects of ascribed statuses such as age, race, ethnicity, and gender, on unequal rewards since those status characteristics cannot be achieved by individuals' efforts.

To overcome those limitations, the status value theory of distributive justice proposed a referential comparison (Anderson et al. 1969; Zelditch et al. 1970). The theory explained how differences in status characteristics shape patterns of reward distributions via reward expectations. In the referential comparison, individuals formulate reward expectations which is defined as beliefs about their own rewards from socially

validated expectations for rewards for people “like me” (Berger et al. 1972b). Based on referential information about associations between states of status characteristics and reward levels, individuals each develop their own concepts of deserved reward levels based on their own status. If an individual’s own reward is lower than the socially shared expectation, that individual will perceive him/herself to be under-rewarded, whereas if the reward is higher than the socially acceptable expectation, the individual will perceive him/herself to be over-rewarded. The theory shows the role of reward expectations resulting from an association between status and an unequal distribution of rewards in a group over time.

In sum, distributive justice theory explains the justice evaluation process and the consequences of justice evaluations. Early distributive justice theory suggested the equity rule and showed emotional, cognitive, and behavioral responses arising from justice evaluations among recipients. Researchers extended distributive justice theory by overcoming the limitations of equity theory. In so doing, they provided the multi-dimensional justice evaluations rule and the idea of referential comparisons. This line of development suggests that the feeling of (in)justice is not the product of a comparison between actual and objectively just rewards, but a product of a comparison between actual and subjectively expected rewards. In more recent justice theory, therefore, injustice is defined as incongruence between the actual and the expected reward level, not as incongruence between the actual and objectively fair reward (Cook 1975; Jasso 1980; Markovsky 1985). Thus, an objectively fair allocation may not appear to be fair from a subjective point of view (Hegtvedt et al. 2003). In the next section I will discuss the role of subjectivity in justice evaluations more deeply.

2.2. JUDGMENTAL BIAS AND ASYMMETRY

The previous section reviewed distributive justice theory, focusing on equity theory and the ways in which the subjective aspects of justice evaluations become important in justice theory. As was discussed earlier, justice evaluations are influenced by many subjective factors, such as the justice rules each individual uses to evaluate a situation, or the expectation level produced from referential comparisons. Research has also found that the effects of unjust rewards on justice evaluations are unbalanced and that under-rewards are more powerful than over-rewards of the same magnitude (e.g., Austin and Walster 1974). Following this line of reasoning, this dissertation examines the asymmetric effects of under-rewards and over-rewards on justice evaluations in repeated reward events.

Generally, the asymmetric effect is that evaluations of differences between two objects are affected by the reference point (Vogelaar and Vermunt 1991). In other words, people pay more attention to an event below the reference point than to an event above the reference point. Applied to justice theory, this finding explains how under-rewards come to have a stronger effect than the same sized over-rewards on individuals' perceptions. This asymmetry between the effects of unjust rewards in opposite directions is, however, not predicted only by justice theories. A line of study in cognitive psychology found judgmental bias in a wide range of human behaviors, and provides a theoretical argument explaining the asymmetry of justice evaluations.

Tversky and Kahneman developed prospect theory, which holds that gains below the reference point (under-rewards) loom larger than corresponding gains above the reference point (over-rewards) because people are *loss averse* (Kahneman et al. 1991; Kahneman and Tversky 1979, 1984). Their experiments showed that in an exchange relation, each bargaining party places more value on what they currently possess than on a target utility that would replace their current possessions. In one experiment, participants were randomly assigned to be sellers or buyers of a mug. The experimenter asked each seller to decide the minimum price at which he/she would sell the mug, and also asked each buyer to decide the maximum payment he/she would buy the mug. On average, the buyers were willing to pay at most $2.87, while the sellers would not give up the same mug for less than $7.12 (Kahneman et al. 1990). The researchers explained that the disparity occurred because the individuals overestimated the losses they would suffer in the exchange, as compared to their prospective gains (Carmon et al. 2003; Dhar and Simonson 1992; Kahneman and Tversky 1979). In other words, the loss from the exchange looms larger than the gain.

Researchers have found a general tendency towards perceptions of asymmetric events, called negativity bias (Baumeister et al. 2001). With this bias, people pay more attention to negative entities than positive entities in various types of human relations. Rozin and Royzman (2001) maintained that negativity bias is manifested in four more specific types of biases. Negative potency is the tendency to perceive a negative event as being more potent subjectively and therefore more salient than its positive counterpart. The greater steepness of negative gradients shows that the marginal effects of negative events grow faster than the marginal effects of equivalent positive events. Negativity

dominance states that the overall evaluation of integrated negative and positive events is more negative than the sum of the subjective values of all the events. Lastly, greater negative differentiation posits that negative entities yield more sophisticated and elaborate perceptual differentiation than positive entities. This extensive review of the negativity bias also revealed that it occurs in a wide range of human behaviors.

The asymmetry between under-reward and over-reward has not drawn much attention from justice theorists as a main topic in the justice evaluation process. However, this phenomenon has long been noticed by justice researchers (Adams 1963; Austin and Walster 1974; Jasso 1980; Markovsky 1985). Researchers have argued that under-reward has a stronger effect than the same amount of over-reward on justice evaluations. If there are two actors, A and B, in an exchange relation, and one (A) is over-rewarded and the other (B) is under-rewarded at the same intensity, B's justice evaluation level will be lower than A's (Adams 1965; Homans 1974). Although justice researchers have argued theoretically for this asymmetry, very little empirical evidence of it has been reported. Walster and colleagues (1973) performed a laboratory experiment and showed that the level of perceived fairness is highest among people who are rewarded at the expected level. Moreover, in comparisons between different unjust situations, justice evaluations are higher in the over-reward situation than in the under-reward situation when the intensity of the injustice is the same. Jasso (1980) formulized the asymmetry using survey data (Jasso and Rossi 1977). She postulated that the effect of injustice perceptions on justice evaluations is logarithmic: the effect of under-rewards gets stronger as the disparity becomes more severe, while the effect of over-reward lessens when the disparity becomes more severe (Jasso 1980). In subsequent research, Markovsky (1985)

confirmed the logarithmic function of the effects of unjust reward with a controlled lab experiment.

Regarding the source of the asymmetry in the justice process, research suggests that it arises because of individuals' mixed motivations in justice evaluation situations. That is, individuals are strongly concerned with the fairness of a given situation and try to achieve fairness in the situations that they face (Lerner 1977). Therefore, as stated earlier, when individuals experience unfairness, they feel uncomfortable and try to restore justice to the situation. However, justice theory also assumes that individuals in relations try to maximize their profits in relationships, and that the self-interest motivation is a powerful determinant of human behavior (Miller 1999; Walster et al. 1973). For this reason, when individuals are under-rewarded, the negative perception caused by the self-interest motivation strengthens the negative perception caused by the fairness concern, and intensifies the effect of the unjust reward. On the other hand, when individuals are faced with over-rewarded, the self-interest motivation cancels out (a portion of) the perception of injustice produced by the fairness consideration. Adams observed that "the threshold would be higher presumably in [the] case of over-reward, for a certain amount of incongruity in this case can be acceptably rationalized as 'good fortune' without attendant discomfort" (Adams 1965, p.282). Van den Bos and his colleagues (1997) showed that when overpaid, people experience a conflict between the fairness motivation (feeling guilty) and the egocentric motivation (preference for the rewards), and that those mixed motivations lead them to moderate levels of satisfaction regarding their rewards. Van Prooijen and his associates (2008) investigated the effects of social value orientation (SVO) and fairness-based responses to procedural justice. The results from their

experiments and a field study reveal that individuals with pro-self orientations are more affected by procedural justice than individuals with pro-social orientation. This research shows how egocentric motivation affects justice evaluations.

Previous justice research has not examined the asymmetric effect in sequential rewards over time (Cosier and Dalton 1983). Due to this limitation, the existing research does not address the asymmetric effect of unjust rewards over time, and assumes that only the final states of reward allocations are used to evaluate the fairness of a situation. To overcome this problem, this dissertation assumes that the sum of justice evaluations of each reward event will not be the same as the justice evaluations of the aggregate reward. In testing this assumption, I examine the causal effects of unstable reward systems on justice evaluations through time.

2.3. PROCEDURAL JUSTICE

Although this study is based distributive justice theory, procedural justice also provides the current study with several useful implications. The research shows that justice evaluations of procedural aspects also affect people's emotional and behavioral responses to their group. Procedural justice points out the limitations of the outcome-centered model of distributive justice, which assumes that individuals are motivated solely by concern for receiving favorable outcomes from their group. In contrast to this approach, research on procedural justice maintains that individuals also care about the fairness of the procedures by which outcomes are allocated and decisions are made when they evaluate the fairness of authorities (Tyler 2010). Importantly to this dissertation,

procedural justice shows that justice evaluations are not made entirely on the basis of the distribution, but are also affected by individuals' experiences during the allocation process.

Thibaut and Walker (1975) were the first scholars to demonstrate that the fairness of a decision-making procedure affects people's satisfaction level with legal authorities independently of the favorability or fairness of the outcomes it produces. They assumed that people value having some control over the decision-making process because they expect that their control of the process will bring them favorable results In multiple laboratory experiments, the researchers tried to find situations in which disputants were most likely to be satisfied with the results of conflict resolutions involving third-party intervention (Thibaut and Walker 1978; Thibaut et al. 1974). Their results showed that people are more satisfied with a result when the process that generates it includes their voices or choices in the decision-making process, even if the result itself is opposed to their interests. On the other hand, disputants' satisfaction levels are the lowest when both the decision-making process and the decision itself are fully controlled by the third party.

This model is called the instrumental model because procedural justice serves as an instrument that ensures fair or favorable outcomes for the reward recipients (van Prooijen et al. 2008). The instrumental model of procedural justice enriches justice theory by showing that not only the outcomes of allocations, but also experiences throughout the allocation process, influence people's justice evaluations. However, this theory does not consider the long-term relationships between allocators and recipients of rewards. Rather, this model only considers one allocation occasion and does not take into account repeatedly occurring reward situations over time (Tyler 1989).

Tyler and Lind developed the group-value model of procedural justice which focuses more on non-instrumental motivation in justice evaluations. The group-value model explains that people pursue procedural justice not for instrumental reasons, but based on symbolic and psychological mechanisms (Lind and Tyler 1988; Tyler 1989). This model assumes that people look to group membership for their long-term social relations because it provides them with self-identity. Individuals value fairness in the decision-making process because the way they are treated by their group shows how much they are valued and respected by that group. Lind and Tyler suggested three aspects of procedures – the neutrality of the decision-making procedure, trust in the decision-making authority, and the information about individuals' standings in the group as the criteria of procedural justice and confirmed the effectiveness of these criteria with an experiment.[3]

Researchers consistently found that when individuals perceive that they are treated with fairness in decision-making procedures by authorities, they are more likely to comply or cooperate with the authorities in various settings (Sunshine and Tyler 2003; Tyler 2010). In recent years, research has also shown the effects of procedural justice on emotions such as happiness, disappointment, anger, and frustration, etc. (Krehbiel and Cropanzano 2000). However, this model does not focus on the variability of rewards over time.

[3] To investigate the effect of reward stability, this dissertation includes controlled laboratory experiments in which reward allocation procedures are equated by design. In the experiments, the procedures may be perceived by the subjects as unjust in terms of Tyler and Lind's three aspects, but those affect all conditions the same and hence issues of procedure are controlled by design. See Chapter 5.

Leventhal (1980) proposed six rules by which individuals can evaluate the fairness of procedures: consistency, bias suppression, accuracy, contractibility, representativeness, and ethicality. Among these, the consistency rule is most closely related to the present research. The consistency rule states that the allocation process should be consistent across actors and times. Consistency across actors requires that a similar allocation rule should be applied regardless of the recipient and it should not be more advantageous to some people than to others. Consistency across times dictates that an allocation rule should be stable over time. Based on previous studies, Leventhal predicted that violation of the consistency rule would harm procedural justice evaluations, and a few recent studies provide empirical evidences that consistent application of standards is indeed one of the factors for evaluating procedural justice (Barrett-Howard and Tyler 1986; Greenberg 1986). However, these studies are rare, and most of them do not distinguish consistency across times from consistency across recipients (Folger and Konovsky 1989), or else they lean more toward consistency across actors than consistency over time (Folger and Bies 1989; Niehoff and Moorman 1993).

Procedural justice research widened the horizon of justice theory by moving its focus from reward allocation results to the ways in which the results were arrived at (Cropanzano and Folger 1989). Introducing the concept of a consistency rule, this research has started to consider time in justice evaluations. However, procedural justice research differs from the current study on some points. First, although it suggests the concept of consistency as one criterion for procedural justice evaluations, only a handful of studies have empirically tested the effectiveness of consistency so far. Secondly, the empirical research examining the impact of consistency has only focused on consistency

across actors (e.g., employees). Therefore, the effects of fluctuations of allocation rules through time have not been tested rigorously. More importantly, while procedural justice investigates the factors that regulate the distribution of rewards, the current study tries to explain how instability in the distribution of rewards affects justice perceptions. Procedural justice examines the influence of procedures independently of their outcomes for justice evaluations.

2.4. CONSEQUENCES OF JUSTICE EVALUATIONS

Justice research predicts three types of reactions resulting from justice evaluations: emotional, cognitive, and behavioral. Equity theory proposes that the results of allocation provoke emotional reactions among people such that they will be satisfied with equitable rewards but will feel distress from inequitable rewards (Adams 1965). Further, theories predict that the intensity of this distress is proportionate to the magnitude of the perceived inequity of the situation, and that the thresholds are lower for under-reward than over-reward (Austin and Walster 1974; Homans 1974). Researchers have therefore predicted that in order to avoid unpleasant feelings employees will a) change their actual contributions or rewards, b) psychologically distort either their own or others' contributions or rewards, c) change their reference others, or d) leave the relationship (Adams 1965; Walster et al. 1978). Empirical studies do offer supporting evidence for hypotheses derived from Adams' theory. (See Goodman and Friedman 1971 for a comprehensive review of the evidence for Adams' theory).

More recently, researchers have argued that reacting to unfair distributions is one of the fundamental features of humans by showing that children effectively react to unfair situations from as early as age three, and that by around age six they have moderate levels of competence in requesting fairness (LoBue et al. 2011). One vein of research found that individuals care about fair distributions and take actions to restore fairness to situations even when it is costly for them to do so (e.g., Fehr and Gachter 2002), and that their actions to restore fairness to the situation are mediated by emotions (Chebat and Slusarczyk 2005).

2.4.1 Emotional reactions

Justice theory has paid attention to emotional reactions since the early stages of justice research (Turner 2007). Many studies have tested the prediction that perceived injustice produces emotional distress among individuals in that situation and confirmed the effects: people are more content when they are fairly rewarded than when they are under- or over-rewarded. Adams (1965) reported anger and guilt as the main emotional reactions to under-reward and over-reward, respectively. Homans (1974) also maintained that justice evaluations produce emotional responses. People are satisfied with fair results. But when they are unjustly rewarded, people react unfavorably: under-rewards produce anger, while over-rewards produce pleasure and guilt. Homans also predicted that the magnitude of the emotional reactions would be proportionate to the intensity of the evaluated injustice: the greater the evaluated injustice, the greater the emotional distress.

Considerable research has empirically established the relationship between justice evaluations and emotional responses. Cropanzano and Folger (1989) manipulated the autonomy of the decision and reference points of their rewards in their experiment, and they found that unfair outcomes, when coupled with unfair processes, produced negative emotions among participants. Similarly, Weiss and his associates (1999) found that effects of positive emotions (e.g., happiness) were highly dependent on distributive justice, while negative emotions (anger, guilt) were influenced by a combination of distributive and procedural justice. Krehbiel and Cropanzano (2000) and Hedgtvedt and Killian (1999) also observed that unfair outcomes produce negative emotions and that procedural justice plays a little role.

While most studies have measured emotional distress using self-report questionnaires after injustice occasions (e.g., Jasso and Rossi 1977), other research adopts neuro-scientific approaches to directly measure participants' reactions. Markovsky measured physiological arousal right after participants received results using a galvanic skin response measure and found that perceived unjust rewards produced higher skin conductance than perceived just rewards (Markovsky 1988b). Tabibnia and her associates (2008) used functional magnetic resonance imaging (fMRI) to test the impact of fairness on positive emotions. Consistent with Markovsky's research on the emotional impact of fairness, this research confirmed that the reaction is instant, automatic and intuitive without delay. Focusing on the positive emotional impact of fairness, their results reveal that not only unfair situations produce negative emotions, but also fair situations produce positive emotions; fairness of rewards leads to happier individuals.

Emotions arising from justice evaluations mediate behavioral responses. VanYperen and his associates (2000) found that perceived injustice causes negative emotions among individuals, which in turn causes destructive behavioral reactions such as exit, neglect, and aggressive voice in the workplace. Murphy and Tyler also found that negative emotions produced by violations of procedural justice played a mediating role in resistance to authorities (Murphy 2009; Murphy and Tyler 2008).

2.4.2 Behavioral reactions

Observable behavioral reactions to perceived injustice have also drawn justice researchers' attention. Justice theory assumes that individuals who suffer from emotional distress aroused by perceived injustice will tend to eliminate the distress by restoring the fairness of allocation (Walster et al. 1978). To reduce their distress, that is, individuals can attempt to change the allocation pattern, actually or perceptually: over-rewarded people are expected to increase their contribution relative to under-rewarded people, decrease their productivity within the group, or take more profit from the group. If these methods are not available or they are too costly, the individuals are expected to leave the relationship.

Though previous justice research has been interested in the roles of emotion in justice process, emotion had not been a main topic in exchange process until 1990s. It is mainly because exchange theory traditionally assumes that individuals are motivated by instrumental reasoning and they make decisions based on rationality. Therefore, exchange theory views emotion as a residual. However, researchers show that individuals' behaviors are guided not only by reason but also by emotions (e.g., Frank

1988), and emotions are widely influenced by context, process and the outcomes of exchange (Lawler and Thye 1999). Relational cohesion theory clarifies the role of emotions in group cooperation (Lawler and Yoon 1993, 1996; Lawler et al. 2000). According to this theory, frequent exchange promotes group cohesion, which is mediated by positive emotion. That is, the positive emotions generated from exchange relations lead individuals to a higher level of commitment to the group, which results in behaviors such as gift giving, staying in the group and contributing more to the group. In this line of reasoning, it is expected that individuals feel positive emotions based on having received fair rewards from groups, so they are more likely to cooperate with those groups.

Social science provides abundant evidence of how unfairness harms organizations. Studies have shown that unjust actions by their company lead employees to be uncooperative or even destructive by leaving the organization, acting irresponsibly, and aggressively expressing their voice to pursue their own interests (VanYperen et al. 2000). The same study showed that injustice induces those destructive impulses in organizations through negative emotions such as distress, hostility, and irritability. Empirical evidence also shows that under-paid workers are more likely to have poor work attitudes (Folger and Konovsky 1989) and to engage in theft from their companies to make up for the under-payment (Greenberg and Scott 1996). Chebat and Slusarczyk (2005) investigated behavioral responses to unfair treatment in customer relations in the service industry and found that perceived injustice leads to customers having lower levels of loyalty to the company.

2.5. CONCLUSION

Distributive justice theory offers a wide range of theoretical implications for this dissertation. It explains the antecedents of justice evaluations and its consequences. In particular, based on the equity rule, the early distributive theory explains how justice evaluations are produced among individuals and explains the emotional and behavioral responses to perceived injustice. This research also found that under-reward has a stronger effect than an equivalent over-reward.

Distributive justice theory was developed by taking into account the subjectivity of justice evaluations. It shows that justice evaluations are not based only on absolute ratios of investments to outcomes. Rather, justice evaluations can be biased by individuals' subjective preferences (such as different justice rules) by which individuals evaluate their rewards, or the referents they use for evaluating their reward levels. Among the judgmental biases in justice evaluations, this study focuses on the asymmetry between under-rewards and over-rewards.

Prospect theory and negativity bias explain the asymmetry in the effects of unjust rewards with different valences. According to this theory, a negative event has a stronger effect on human perception than a positive event of the same intensity. This theory explains the findings from equity theory that under-rewards have stronger effects than over-rewards in justice evaluations and on emotional distress.

Research on procedural justice also provides us with theoretical insights. The research shows that individuals evaluate situations not only based on their outcomes but also based on their own experiences of the procedures that regulate the outcome allocation. Importantly for the present research, procedural justice also considers the

justice process through time. Research also suggests that consistency over time and across actors are important criteria.

Recent research on justice has been focusing more on the consequences of justice evaluations. Justice evaluations produce emotional distress among individuals and lead to behavioral responses. Researchers have also discovered that emotion plays a mediating role between justice evaluations and behavioral consequences.

Based on the theoretical background reviewed above, I present a theory of reward stability, justice evaluations and group cooperation in the next chapter. In doing so, I also present the scope conditions to which the theory can be applied. Then I introduce the body of the theory. Lastly, I present several hypotheses derived from the theory.

CHAPTER 3
A THEORY OF REWARD STABILITY, JUSTICE EVALUATIONS AND GROUP COOPERATION

This chapter presents a theory that draws upon and integrates the literature reviewed in Chapter 2. Previous research illustrated the subjectivity of justice evaluations, and the emotional and behavioral consequences of justice evaluations. This literature also suggests the asymmetric effects of unjust rewards, that is, that under-rewards are more keenly experienced than over-rewards. A theory of reward stability, justice evaluations and group cooperation will explain the impact of reward stability on the justice process. At the heart of the theory is a path that suggests that the instability of the reward system *itself* decreases justice evaluations among individuals, leading to increased emotional distress and subsequently lower levels of cooperation within the group.

3.1 SCOPE CONDITIONS

The phenomena predicted by the presented theory do not manifest in every context of social relations. Rather, like other scientific theories, the theory presented in this study can be applied to a limited set of scope conditions (Walker and Cohen 1985).

First, individuals are motivated to invest in exchange relations with the expectations of better returns on their investments than if they were to pursue the outputs individually (Axelrod 1984; Walster et al. 1978). Justice theory, especially distributive

justice theory, is based largely on exchange theory, which regards maximizing self-interest as a main motivation for cooperation (Homans 1961; Walster et al. 1978). Though not every real-world relationship is founded on maximizing self-interest, in most forms of human cooperation, the participants pursue profits. The current theory examines human relations where individuals try to maximize the profits they receive from their exchange relations.

Second, the theory presented here applies to exchange relations, in which individuals are to be rewarded for their investments and contributions directly from the recipients of their contributions, for example direct exchange or productive exchange relations (Emerson 1972; Lawler et al. 2000; Molm 1994). In this type of exchange, individuals can track their investments and rewards from the group more accurately. This condition is quite different from that of indirect exchange relations, such as generalized exchange. In a generalized exchange, individuals' rewards do not return directly to the contributor but return to other individuals in the group. In such a situation, the contributor cannot keep precise track of the history of rewards. Thus, the effect of the history of rewards will not be prominent.

Third, this theory applies to social exchange relations characterized by repeated transactions over time among group members as opposed to one-time economic transactions between strangers (Molm et al. 2001). Many social exchange relations occur in groups that are stable over time and space and individuals interact with each other multiple times in the groups. Under these circumstances, the justice evaluations of exchange relations come not only from immediate rewards but also from past reward experiences.

3.2 REWARD STABILITY, JUSTICE EVALUATIONS AND GROUP COOPERATION

At the heart of a theory of reward stability, justice evaluations and group cooperation is a path that addresses the way that the *stability of rewards* produces a higher level of *justice evaluations* and a lower level of *emotional distress,* and subsequently affects *group cooperation* positively. Before I go further, however, the concept of stability of rewards needs to be clarified. The stability of rewards is defined as the extent to which a series of rewards stays invariable over time. In many cases, the instability of rewards is conflated with the unfairness of an allocation of rewards because unstable rewards can produce an unjust distribution of rewards. However, a series of unstable rewards does not result necessarily in an injustice of outcomes if one incongruent reward can be compensated by another incongruent reward. Conversely, a series of stable rewards could produce an unjust allocation of rewards if those rewards are invariably higher or lower than the just level of rewards over time. Though instability of rewards and injustice of allocations are closely related empirically, this theory demarcates the instability of rewards from unjust rewards and tries to investigate the net effect of reward stability.

Considerable previous research has studied the conditions that maintain higher levels of justice evaluations in groups (see Hegtvedt 2006 for a review). According to the research, both fair procedures and the fair distribution of rewards in the allocation of rewards affect justice evaluations among group members. However, past research on justice evaluations did not consider time in explaining the process of justice evaluations (Lilly et al. 2010). Rather, the research was interested mostly in the result of a single

reward (e.g., Austin and Walster 1974). As a result, the researchers ignored the role of the history of rewards in the justice process and assumed that only the final state of rewards matters in producing justice evaluations.

One reason that justice evaluations through time should be addressed is that in everyday life, exchange relations among individuals are not one-time transactions. On the contrary, individuals usually belong to groups and repeat exchange relationships with others in the same groups. From relationships with intimate partners or close friends to economic transactions, individuals frequently sustain repetitive relationships. Sometimes, certain exchange relationships last for large periods of a person's lifetime. In those situations, individuals' justice evaluations about their groups are not independent but are highly contingent upon each other.

Though the time dimension in human relations has been neglected widely, a few researchers showed the history of exchanges and the shadow of the future play critical roles in shaping individuals' responses to their groups or to other group members. Literature on trust shows that people build trust relations through a series of risk-taking behaviors over time (e.g., Cook et al. 2005). Therefore, without experiences of repeated exchange relations, individuals cannot establish trust relations with others. Axelrod (1984) showed that the "shadow of the future" promotes cooperation in the prisoner's dilemma (PD). Individuals who rationally pursue self-interest cannot cooperate with each other in the PD game because mutual defection is a dominant strategy of the game (Komorita and Parks 1996). This causes a social dilemma, where collective interests are at odds with individual interests. According to Axelrod, however, if they think the

exchange relationship will last with the same partner, they perceive the characteristics of the game as the assurance game instead of the PD game and then they can cooperate.

Another reason that time should be considered in the justice process is that when they make justice evaluations, individuals focus on both the overall result of reward allocations and on changes in the rewards. Prospect theory challenges the common assumption that only the final state matters when people make a decision. The theory asserts that individuals focus more on changes or differences than on the state of the situation itself (Kahneman 1994; Kahneman and Tversky 1979; Novemsky and Kahneman 2005). Moreover, the theory shows that individuals take into account the gains and losses relative to their reference point to evaluate a situation and that losses loom larger than gains of the same size. This suggests that the aggregation of all the justice evaluations of individual rewards will not be the same as the justice evaluation of the aggregation of a series of rewards at the final stage, when rewards are repeated over time. It is also predicted that the variability of the rewards itself affects justice evaluations among the members, irrespective of the eventual objective reward levels. Extending the idea of asymmetry into justice evaluations through time allows us to theorize about the relationship between over-reward and under-reward at different times and about how much reward is needed to compensate for an unjust reward to keep the individuals' justice evaluations at a desirable level.

The present theory begins with the assumption that instability of rewards over time produces the feeling of being under-rewarded among individuals. In turn, the feeling of being under-rewarded lowers justice evaluations. This is consistent with the findings of justice theory and prospect theory. As stated above, both justice theory and prospect

theory show that unjust rewards have a negative effect on justice evaluations among group members regardless of the direction of the injustice. To remedy the damaged justice evaluations, an opposite direction of unjust reward (compensation) is necessary. However, because of the asymmetry in the effects of under-reward and over-reward on justice evaluations, an over-reward of the same amount as a previous under-reward cannot fully cancel out the negative effect of the under-reward. On the other hand, an under-reward at one time can more than fully offset the effect of the same size of over-reward at another time. In fact, it will have a net negative effect on justice evaluations. Therefore, if the intensity of incongruence is the same in both cases, justice evaluations made in light of either an under-reward followed by an over-reward, or of an over-reward followed by an under-reward, should be lower than those made in response to two just rewards.

Let's assume that two unjust rewards are equally incongruent with the socially expected reward level, but in opposite directions. The first one is an under-reward, $A_{-,}$ at one time, t_1, and the other is an over-reward, A_+, at another time, t_2. The individual is expecting a just level of reward, A_0 in both cases. In terms of actual reward levels, an under-reward at one time, A_-t_1, can be canceled out by the same size of an over-reward at another time, A_+t_2. In this situation, the overall actual reward will be the same as the just reward at $t_{2,}$ A_0t_2, in objective terms: $A_-t_1 + A_+t_2 = A_0t_2$. Thus, the instability of rewards has no effect on the reward system in absolute terms. In other words, he/she is justly rewarded overall.

However, when it comes to justice evaluations, they are not experienced the same way as an objective reward level is perceived. Because of the asymmetric effects of

rewards of opposite directions, the level of evaluated injustice of an under-reward, $E_{-}t_1$, will be greater than that from an over-reward at a later time, $E_{+}t_2$. In other words, the effect of under-rewards is stronger than that of over-rewards of the same size: $|E_{-}t_1| > |E_{+}t_2|$. Therefore, the overall justice evaluation of the situation is lower than the justice evaluation from a just reward situation: $E_{-}t_1 + E_{+}t_2 < E_0t_2$. As a result, the justice evaluation will be lower than it would be if there were no asymmetries between unjust rewards at all. The situation is the same if over-reward comes first $E_{+}t_1$ and the under-reward $E_{-}t_2$ is presented later. The under-reward deletes the incongruence from the former over-reward. But the evaluated overall justice level from those rewards is lower than the justice evaluation level from a just reward: $E_{+}t_1 + E_{-}t_2 < E_0t_2$.

In turn, the present theory asserts that justice evaluations from unstable rewards lead to emotional reactions in predictable ways. Early justice studies have shown that evaluated injustice will cause emotional reactions and that the intensity of those reactions is positively related to the level of evaluated injustice (Adams 1965; Anderson 1965; Walster et al. 1973). The present theory assumes that unstable reward structures cause perceptions of injustice despite the fact that just rewards "average out" over time. If this is true, then individuals in unstable reward systems should feel distress even though they are rewarded at a just level overall, and the level of distress is proportionate to the evaluated injustice.

The present theory is complete with consideration of the effect of instability on cooperation levels, which is mediated through justice evaluations. Based on rational choice theory, research on exchange relations has long neglected the role of emotion in social actions (Lawler and Thye 1999). However, researchers have investigated the effect

of emotion on individuals' behaviors. Relational cohesion theory (Lawler and Yoon 1993, 1996) and the affect theory of social exchange (Lawler 2001) explain how emotional arousal affects members' group-oriented behaviors. These theories assert that positive emotion toward the group, produced by structural power and exchange frequency, leads individuals to enhance their commitment to the group via a higher level of cohesion. A relational model of procedural justice also reveals that a feeling of being valued by group leads individuals to compliance with the authority of the group (Tyler 1990, 2010; Tyler and Lind 2001).

3.3 ASSUMPTIONS

Moving forward, I derive a series of logically interrelated assumptions from the conceptual system introduced in section 3.2. The core of the theory is a causal model that suggests the effect of *stability of rewards* on *justice evaluations* and accompanying *emotional distress* and subsequent *group cooperation* (see Figure 3.1).

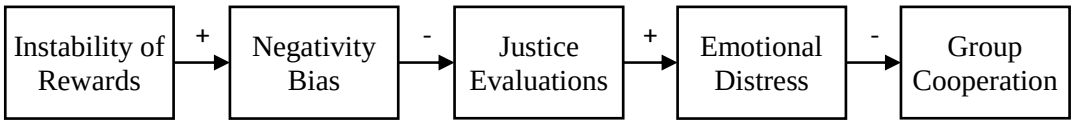

Figure 3.1 Theoretical Model of Reward Stability and Group Cooperation

The first assumption addresses the relation between the *stability of rewards* and the degree of *negativity bias*. Prospect theory suggests the asymmetric effects of unjust rewards in opposite directions (Kahneman and Tversky 1979). Research on negativity bias also postulated that the negativity of negative entities grows faster than the positivity

of positive entities (Rozin and Royzman 2001). Based on those arguments, this theory assumes that individuals produce feelings of being under-rewarded when they experience unstable rewards and the intensity of the feelings are proportionate to the intensity of the instability of rewards. Based on the previous studies, Assumption 1 of the present theory states that,

Assumption 1: The more unstable the reward system, the more strongly it produces negativity biases in perception of rewards.

The main argument of justice theory is that feelings of being under-rewarded will lead individuals to negative justice evaluations and that the size of (in)justice evaluations will be proportionate to the amount of negativity bias. Thus, the second assumption of the present research asserts that,

Assumption 2: The stronger the negativity biases on perception of rewards, the stronger the injustice evaluations among the actors.

The third assumptions of the theory states the positive relationship between justice evaluations produced by unstable rewards and emotional distress:

Assumption 3: The stronger the injustice evaluation, the stronger the emotional distress.

The last assumption of the present theory asserts the behavioral consequences resulting from the emotional distress among individuals. The theory focuses especially on the level of cooperation as a behavioral reaction:

Assumption 4: The stronger the emotional distress, the less the members of a group will cooperate.

Together, these assumptions constitute a theory explaining how reward stability is related to cooperation in groups. The logical relationship between the assumptions allows for the derivation of several hypotheses that will be tested in subsequent chapters. Specifically, three empirical studies were designed to test the theory presented in this dissertation. The first empirical study analyzed secondary survey data to test how the stability of the rules that determine rewards in workplaces influences employees' willingness to cooperate with the company (beyond their motivation toward self-interests). In the second empirical study, I performed a controlled laboratory experiment to test the theory more rigorously. This experiment tested the hypotheses that trace the path from reward stability and group cooperation via justice evaluations and concomitant emotional distress. In the last empirical study, I examined how presentation orders of reward stability affect justice evaluations.

CHAPTER4
ANALYSIS OF SECONDARY SURVEY DATA

In the previous chapters, I reviewed the theoretical background and presented the basic assumptions of the theory presented in this dissertation. This theory suggests a relationship between the stability of rewards and group cooperation through justice evaluations and concomitant emotional distress. Based on justice theory and prospect theory, I assume that unstable rewards decrease the level of justice evaluations, positive emotions within a group, and willingness of group members to cooperate. In the next three chapters, I introduce empirical studies that test the effectiveness of the presented theory.

Using a nationally representative sample survey from South Korea, the first empirical study aims to show how the stability of rules in organizations affects employees' justice evaluations and commitment to their companies. Employees are usually in long-term exchange relationships within their organizations and are mostly motivated by self-interest (Wayne et al. 1997). Therefore, a workplace setting is well suited to the scope conditions of the theory presented in Chapter 3.

In this chapter, I investigate the effects of stability of rules on justice evaluations and attitudes towards the organization. The theory developed in this dissertation predicts the effect of the stability of rewards on subsequent reactions. However, in many cases, the instability of rewards comes from the instability of rules that decides the distribution

of resources in groups. Although the empirical study in this chapter does not test directly the arguments of the theory presented in this dissertation, it serves as a preliminary empirical test of the phenomena predicted by the theory with a large probability sample.

4.1 HYPOTHESES

Based on the assumptions stated in the previous chapter, this study developed a set of hypotheses. First, I assume that unstable rules in workplaces cause instability of rewards in those workplaces. Of course, not all unstable rewards result from unstable rules. For instance, instability of rewards can be caused by individual characteristics or by the noise of the rewards system (Kollock 1993). But if rules are unstable in a group, they inevitably produce unstable rewards in the group. Derived from the first and the second assumptions of the theory introduced in the previous chapter, the first hypothesis states that,

> *Hypothesis 1 (H1): The more stable the employees perceive their workplace rules to be, the more likely the employees will be to think that their payments from the companies are just.*

The theory tested in this research predicts behavioral reactions from the stability of rewards. To test this process, the first study measures the effect of the stability of rules on staying behavior and intention to work hard, both of which are indicative of cooperation. Though it does not test every causal step of the theory, this study investigates the main path of the theory, which asserts a relationship between justice evaluations and group cooperation. The second hypothesis states pertains to the relationship between the stability of rules and willingness to stay.

Hypothesis 2 (H2): The more stable the employees perceive their workplace rules to be, the more likely the employees will be to stay at their current workplaces, even if better payments are available from other companies.

The third hypothesis states the relationship between the stability of rules of the company and employees' intentions to work hard for their company.

Hypothesis 3 (H3): The more stable the employees perceive their workplace rules to be, the more likely the employees will be to work harder than they have to.

4.2 DATA

The study analyzes nationally representative survey data from the 2009 Korean General Social Survey (KGSS). The KGSS is an annual nationwide survey conducted by the Survey Research Center (SRC) at Sungkyunkwan University since 2003. Adopting the latest GSS of the National Opinion Research Center (NORC) as a model, each wave of the KGSS consists of replicated core questions, the International Social Survey Program (ISSP) annual topic module, and special modules. In 2009, the special module was "Inequality and Fairness," which encompasses various questions on peoples' justice perceptions and wageworkers' attitudes toward their workplaces, both relevant items for testing the hypotheses in this study.

To meet the rigorous requirements of the ISSP, the KGSS used full probability sampling procedures across the country. The population was defined as household residents aged 18 or over who live in South Korea. From this population, the three-stage

area probability sampling method selected 250 sample blocks, and 10 individuals are sampled from each block. The 2009 KGSS consists of 1,599 respondents with an overall response rate of 64%.[4] This study analyzes data from 657 wage-earning respondents working for someone else.

4.3 MEASUREMENT AND ANALYSES

Dependent variables – The main interest of this study is the effect of rule consistency on workers' justice evaluations and their group commitment levels. To test H1, the dependent variable is the employees' justice evaluations regarding their payments from their workplaces. The survey question asked how just they perceived the payments from their companies to be. Their answers were measured in five-point Likert scales (see Appendix A for the details of the questionnaire).

The other hypotheses predict that stability of rules affects individuals' cooperation levels within their groups. To measure the cooperation level within their groups, I use two questions. One question measured employees' intentions of staying with the company by asking how willing they would be to turn down another job opportunity that offered them a little bit more pay than their current company. The other question measured their willingness to work harder than they have to in order to help their company. Both of these variables were measured on five-point Likert scales.

[4] Further information on KGSS and the data set is available at the Korea Social Science Data Archive (KOSSDA, www.kossda.or.kr) or at the Inter-university Consortium for Political and Social Research (ICPSR 34665, www.icpsr.umich.edu).

Independent variables – The independent variables, predicted to affect justice evaluations and cooperation levels within the company, were measured in two different questions. The first question asked how free from arbitrariness employees thought their company's rules were. The other question asked how stable respondents perceived the rules in their companies to be over time. Both sets of answers were measured on a five-point Likert scale.

Control variables – The KGSS data contain comprehensive demographic variables used for controlling variables. Each statistical analysis controls for respondents' gender, age, education level, wage from the job, subjective social class, and marital status.

Gender is coded as 0 for "male" and 1 for "female." Marital status was originally asked in six categories: married, widowed, divorced, separated, never married, and cohabitating. For the purpose of this study, marital status was recoded as a dichotomous variable using 0 for "currently not married" and 1 for "currently married." In both the original survey and this study, educational achievement was measured in eight categories ranging from 0- no formal school to 7- Graduate school (Ph. D). Respondent income was defined as the monthly wage from respondents' workplaces and measured in South Korea won (KRW). Subjective social class was measured in a 10-point Likert scale that ranges from 1- bottom to 10- top. Table 4.1 presents the descriptive statistics of the variables included in the study.

Analysis – All the dependent variables (justice evaluations, willingness to work hard, willingness to stay) are measured in five-point Likert scales. Those categorical variables cannot meet the basic assumption of OLS regression, which requires

Table 4.1 Descriptive Statistics of the Variables

Variable	N	Mean	Std. Dev.	Min	Max
Female[1]	657	.429	–	0	1
Age	655	39.736	11.227	18	84
Education	657	4.061	1.353	0	7
Married[2]	657	.661	–	0	1
Income	653	5.342	3.142	0	21
Social Class	657	4.700	1.524	1	9
No Arbitrariness	615	2.418	.996	1	5
Consistency	615	2.863	1.047	1	5
Justice Evaluation	654	2.416	.723	1	5
Work Hard	623	3.856	.819	1	5
Stay	624	2.946	1.247	1	5

[1] Male is the reference category.
[2] Currently unmarried is the reference category.

dependent variables to be measured in continuous form. The typical measure to handle categorical variables in regression analysis is to use logistic regression. Among the various logistic regression models, “ordered logit” analysis is the most useful when the categories of each variable can be ranked in order and the distances between the various categories are not the same (Long 1997) (see Appendix B for the tests of the proportional odds assumption).

4.4 RESULTS

The first analysis tests Hypothesis 1 (H1) which describes the relationship between the stability of rules and justice evaluations of employees’ payments (see Table 4.2). After

Table 4.2 Summary of Ordered Logistic Regression Estimating Justice Evaluations

	Model 1		Model 2		Model 3	
	Odds Ratios	Std. Err.	Odds Ratios	Std. Err.	Odds Ratios	Std. Err.
Female[1]	1.163	(.200)	1.146	(.198)	1.144	(.197)
Age	.993	(.009)	.990	(.009)	.992	(.009)
Education	.913	(.069)	.918	(.069)	.926	(.070)
Income	1.002	(.001)**	1.002	(.001)***	1.002	(.001)**
Class	1.324	(.084)***	1.311	(.084)***	1.309	(.083)***
Married[2]	.793	(.151)	.836	(.162)	.810	(.156)
No Arbitrariness			1.234	(.102)*		
Consistency					1.272	(.098)**
N			609			
Log Likelihood	– 627.083		– 623.807		– 622.131	
Pseudo R^2	.037		.042		.045	
LR Chi^2	48.000		54.560		57.910	

*$p \leq .05$, **$p \leq .01$, ***$p \leq .001$
[1] Male is the reference category.
[2] Currently Unmarried is the reference category.

list-wise deletion for all three models, 609 cases are used in this analysis. Overall, the results from the test support H1. Model 1 is the baseline model and includes only control variables. Comparisons with the baseline model show the net effect of the independent variables. Models 2 and 3 include the main effects: no arbitrariness and consistency, respectively. Statistics for model fit show that Models 2 (Likelihood-Ratio $Chi^2_{(1)} = 6.56$, $p = .010$) and 3 (Likelihood-Ratio $Chi^2_{(1)} = 9.91$, $p = .002$) are significantly better than Model 1 (the baseline model), which includes only control variables. In Model 1, respondents' incomes and subjective social class are positively related to respondents' justice evaluation levels.

Model 2 tests the effect of arbitrariness in rules regarding their companies' pay on employees' justice evaluations. The result shows a positive effect of the independent variable; each unit increase in perceptions of non-arbitrary application of company rules results in a 23.4% increase in the odds of reporting a fairer income. Model 3 shows that consistency of rules in employees' workplaces is also positively related to their justice evaluations of their payments from the companies. Each unit increase in perceptions of the consistency of workplace rules results in a 27.2% increase in the odds of reporting a fairer income.

The second analysis tests H2 that describes the effect of stability of reward on staying behavior when better alternatives are available (see Table 4.3). Model 1 (baseline model) presents the effects of control variables and shows that age, income, and class are positively related to employees' staying behaviors.

Model 2 tests the effect of arbitrariness on staying behavior. The statistics for model fitness show that the models with the main effect variables are significantly improved over Model 1, which only includes the control variables (Likelihood-Ratio $Chi^2_{(1)} = 5.61$, $p = .018$). Model 2 shows that while age, income, and subjective social class still have significant effects on staying behavior; each unit increase in perceptions of non-arbitrary application rules of their workplaces associates with a 20.1% increase in the odds of staying with their current workplaces, even when better alternatives are available from other companies than their counterparts. Model 3 also supports H2 in that each unit increase in perceptions the consistency of workplace rules results in a 23.7% increase in the odds of staying with the current workplace. A likelihood ratio test reveals

Table 4.3 Summary of Ordered Logistic Regression Estimating Willingness to Stay

	Model 1		Model 2		Model 3	
	Odds Ratios	Std. Err	Odds Ratios	Std. Err	Odds Ratios	Std. Err
Female[1]	1.228	(.198)	1.210	(.196)	1.211	(.196)
Age	1.033	(.009)***	1.031	(.009)***	1.033	(.009)***
Education	.961	(.067)	.967	(.068)	.984	(.069)
Income	1.001	(.001)*	1.001	(.001)*	1.001	(.001)**
Class	1.150	(.067)*	1.139	(.066)*	1.131	(.066)†
Married[2]	1.216	(.216)	1.283	(.230)	1.246	(.222)
No Arbitrariness			1.201	(.093)*		
Consistency					1.273	(.092)***
N			611			
Log Likelihood		– 928.518		– 925.713		– 922.995
Pseudo R^2		.029		.032		.035
LR Chi^2		55.750		61.360		66.800

†$p \leq .1$, *$p \leq .05$, **$p \leq .01$, ***$p \leq .001$
[1] Male is the reference category.
[2] Currently Unmarried is the reference category.

that Model 3 is significantly different compared with the baseline model ($Chi^2_{(1)} = 11.05$, $p < .001$).

The third analysis tests H3 which describes the relationship between the stability of rewards and employees' willingness to work harder than they are required to help their organizations' success (see Table 4.4). Model 1 (the baseline model) shows that age and income are positively related to willingness to work hard. In terms of model fit, a likelihood-ratio test reveals that the Model 2 (Likelihood-Ratio $Chi^2_{(1)} = 4.16$, $p = .041$) significantly improves over the Model 1. Model 3 is marginally improved over the Model 1 (Likelihood-Ratio $Chi^2_{(1)} = 3.54$, $p = .059$).

Table 4.4 Summary of Ordered Logistic Regression Estimating Willingness to Work Hard

	Model 1		Model 2		Model 3	
	Odds Ratios	Std. Err	Odds Ratios	Std. Err	Odds Ratios	Std. Err
Female[1]	.912	(.154)	.904	(.153)	.899	(.152)
Age	1.019	(.009)*	1.016	(.009)†	1.018	(.009)*
Education	.918	(.066)	.921	(.067)	.924	(.067)
Income	1.001	(.001)*	1.001	(.001)*	1.001	(.001)*
Class	.976	(.060)	.969	(.060)	.971	(.060)
Married[2]	1.102	(.208)	1.152	(.219)	1.115	(.211)
No Arbitrariness			1.178	(.095)*		
Consistency					1.152	(.086)†
N			610			
Log Likelihood		– 714.304		– 712.222		– 721.535
Pseudo R^2		.015		.018		.018
LR Chi^2		22.290		26.450		25.830

$^{\dagger}p \leq .1$, $^{*}p \leq .05$, $^{**}p \leq .01$, $^{***}p \leq .001$
[1] Male is the reference category
[2] Currently Unmarried is the reference category

The second model strongly supports H3. Each unit increase in perceptions of non-arbitrary application of company rule associates with a 17.8% increase in the odds of working harder than they have to work. Though the significance is not as strong (p = .060) as Model 2, Model 3 shows the marginal effectiveness of the independent variable; each unit increase in perception of the consistency of workplace rules results in a 15.2% increase of the odds of working harder than they are required from their company. Overall, the third analysis also supports H3.

4.5 DISCUSSION

This study tests a theory about the relationship between reward stability and group cooperation using data from a national sample survey. The survey asked wageworkers in South Korea about their perceptions of the stability of rules that decide the reward distribution in their companies. The respondents also answered questions regarding their justice evaluations and their willingness to stay in their current companies and work hard for them. Three sets of logistic regression analyses support the hypotheses. Net of other variables, employees who believe that their workplace rules are not arbitrary and are applied consistently over time evaluate their payments from the company to be more just than employees who believe otherwise. Moreover, the former is more willing to stay at their current jobs, even though higher monetary incentives are available from other organizations, and they are willing to work harder than they are required to work.

These results are consistent with the theory in this dissertation and support the hypotheses stated in section 4.1. Assuming that the stability of rewards in a group originates with the stability of rules that regulate the pattern of resource distribution in the group, this study shows that arbitrary and inconsistent application of rules lowers justice evaluations of rewards and cooperation levels within the group. The results of this study show that the stability of rules will affect people's justice evaluations and behavioral reactions, as predicted in previous research (Leventhal 1980).

This study has its limitations. First, despite the strengths of the representative sample survey, the analyses of survey data are not enough to test a theory rigorously, especially when the theory has not been tested previously. Though cross-sectional sample data provide external validity to the results, from this methodology, it is difficult to infer

a causal relationship among theoretical components, particularly when psychological measurements are included in the analysis (Singleton and Straits 2005). Second, this study tests the effect of the stability of *rule* as a proxy measurement for the stability of rewards. In the real world, the stability of allocation rules and the stability of rewards rules are closely related empirically. Logically, however, those two concepts are clearly distinguished. Therefore, it does not directly test the effect of the stability of rewards on justice evaluations and its consequences, which the theory of this dissertation states.

Considering the limitations, the next chapter introduces a controlled laboratory experiment that tests the causal relationship suggested in the theory more rigorously. In the controlled laboratory experiment, objective reward level will be manipulated to directly test the effect of reward stability on group cooperation.

CHAPTER 5
AN EXPERIMENTAL TEST OF THE EFFECT OF REWARD STABILITY

The results from the study detailed in Chapter 4 demonstrated that employees' justice evaluations of the payments from their companies and their commitment to their companies are positively related to the stability of rules which allocate rewards in the organizations. However, more scrupulous testing is needed to investigate the causal relationship among the variables. Thus, the second study of this dissertation uses a controlled laboratory experiment to test the foregoing theoretical discussion. By controlling other factors in the real world, the experimental method is the best way to confirm the effects of the manipulated factors predicted in a theory, deprived of possible alternative explanations (Thye 2007). The aim of the experiment is not to replicate any naturally occurring situation in the real world, but to test a theory-driven argument on the relationship between reward stability and group cooperation. Provided the theory is supported, it may then be applied to explain real world phenomenon (Zelditch 1969).[5]

The main purpose of this experiment is to test the basic theoretical argument discussed in the previous chapters. Combining justice theory and negativity bias, I predict that the stability of rewards is positively related to a higher level of justice evaluations among group members. This experiment tests the prediction empirically. The effect of unjust rewards on justice evaluations over time has yet to be tested empirically, whereas

[5] There has been criticism on the external validity of experiments in social sciences, and Thye (2007) among others provided a justification for experimental methods.

many researchers have tested the emotional and/or behavioral consequence of justice evaluations. Therefore, it is necessary to test whether and how instability in rewards affects justice evaluations. This experiment tests novel implications of justice theory and prospect theory.

The second purpose of the experiment is to test the entire sequential process from reward stability to group cooperation, by way of justice evaluations and emotional reactions. The theory asserted in this dissertation predicts the emotional and behavioral consequences of the perceived justice evaluations. Therefore, this experiment measures emotional reactions, behavioral decisions, and justice evaluations to test the whole process of the theory.

5.1 HYPOTHESES

To test the theory, the current experiment tests a set of hypotheses derived directly from the assumptions stated in Chapter 3. First, the presented theory assumes that the instability of rewards causes negative bias in the justice evaluation process and consequently decreases justice evaluations among group members. Combing Assumptions 1 and 2, this study hypothesizes the following:

Hypothesis 1: The stability of the reward structure is positively related to justice evaluations.

Assumption 3 asserts a negative relationship between justice evaluations and emotional distress. Conversely, it suggests a positive relationship between the instability of rewards and emotional distress. The second hypothesis of this study is as follows:

Hypothesis 2: The instability of the reward structure is positively related to emotional distress.

Assumption 4 explains low levels of group cooperation as a result of emotional distress. If Hypotheses 1 and 2 are correct, we can also hypothesize the following:

Hypothesis 3: The stability of the reward structure is positively related to group members' cooperation.

5.2 EXPERIMENTAL DESIGN

The experiment took place in the University of South Carolina's Laboratory for Sociological Research. The experiment was a completely randomized single factor design, manipulating the stability of rewards. The stability of rewards was manipulated at three levels: a stable-reward condition (control condition with very little variability), a low-instability condition, and a high-instability condition.

Subjects – Undergraduate students at the University of South Carolina were asked to participate for pay in this study. A project assistant contacted volunteers through a web-based subject pool management system to schedule a session in the laboratory. The experiment had 30 subjects in each of three conditions for a total of 90 subjects in the experiment.

General Procedures – Subjects were placed in isolated rooms with the personal computers on which they completed the experiment. The experimental protocol was completely computer mediated, which minimizes interaction between the participants and the experimenter while recording the participant's attitudes and behaviors. This

procedure was designed to reduce the possibility of demanding characteristics (Orne 1962) and other sources of bias.

Upon arrival, research assistants guided the subjects to separate computer-equipped rooms. The subjects were informed that the study addresses reward satisfaction in a group task and asked to complete a consent form. After completing the consent form, the subjects read a description about a group cooperation situation. They were asked to take part in artificially controlled group tasks that guaranteed more profits through collaboration than through individual achievement.

Specifically, the instructions explained that the subjects were in a four-person task group that consisted of one manager (M) and three programmers (P1, P2, and P3). They were told that the role of each subject was randomly assigned, and that only one subject was assigned to the manager's position while the other three people were assigned to the programmers' roles. However, all the subjects were assigned to one of the programmers' roles (P2), and the manager and other programmers were simulated by the computer program.

The cover story stated that there was demand for new computer programs in the marketplace. Each computer programmer was able to develop his or her own program to meet the demands. However, if the programs were developed and marketed in-house, both the programmer and the company could save on indirect costs, such as advertisement. Thus, the company was asking freelance programmers to develop the software cooperatively. The company promised to distribute the profits according to the contributions of each programmer. The company expected that the invested resources would bring 1.5 times higher revenue from the market.

According to the company's guidelines, the manager is supposed to return 1.3 times the investment made by the programmer and keep 0.2 times the investment for profit. The programmers were told that despite the guidelines, their rewards would be decided by their manager at the end of every contribution opportunity. That is, although the manager was supposed to distribute rewards based on the company's guidelines, the final decisions were up to the manager. The subjects could not participate in the reward allocation process, but they could express their reactions to their reward levels by answering the questionnaires presented after each investment opportunity (Refer to Appendix C for the instructions and survey questions for the experiment). The participants could decide the amount of resources they invested in subsequent investment opportunities.

At the end of the instructions, several quizzes were administered to make sure that the subjects understood the structure of the experiment. Then the subjects participated in the investment opportunities (exchange sessions). The subjects engaged in 14 rounds of investment-reward trials. Each experiment took about 30–50 minutes for subjects to complete. After the subjects finished the experiment, they were debriefed and paid in cash.

Reward Stability Manipulation – Prior to starting the group task, subjects were informed in detail about the processes that determined reward levels, and they were primed to expect 1.3 times higher rewards than their investments in each round from the company. Depending on the condition, subjects engaged in a number of investment-reward events. Upon completion of each round of investments, each subject received a share of the group product as a reward.

In the stable-reward condition, rewards from the company varied between 1% and 3%. In the low-instability condition, reward levels deviated from the promised reward level within 30% (20% on average), either positively or negatively, according to predetermined parameters. This enabled the researcher to test the net effect of instability of the reward system.

In the high-instability condition, all situations were the same as in the low-instability situation except for the rate of incongruence between subjects' expected rewards and their actual rewards. In this condition, rewards deviated more than 30%, but the deviation did not exceed 50% (40% on average) from the expected reward level. It is important to note that in both the slightly and severely unstable situations, at the end of the group task, the overall reward level was the same as the expected level. Except for the fair reward trials (trial 7, 14), the levels of incongruence in each trial were randomized. However, the pattern of the fluctuation of rewards is identical across the conditions (see Figure 5.1), and so any biases resulting from this pattern are constant between conditions.

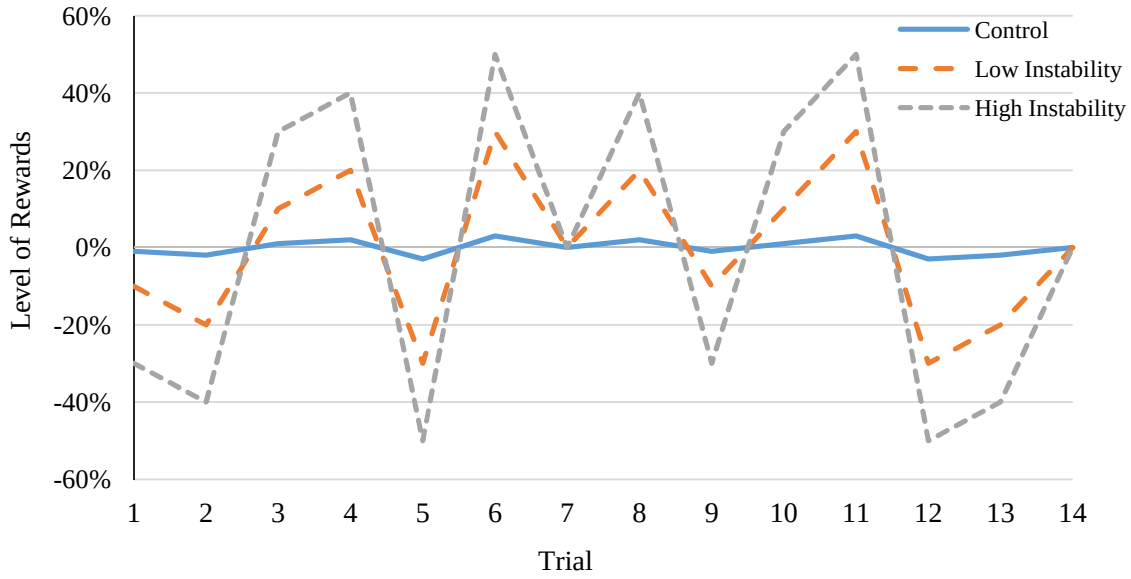

Figure 5.1 Manipulation Schedule for the Reward Level

Debriefing – After the experiment, the subjects were debriefed to ensure that they understood fully all instructions and had no suspicions of the manipulation or the deception. The subjects were also informed of the overall purpose of this research, the hypotheses being tested, and so on. Before leaving, they were paid $10 in cash, regardless of their performance in the experiment.

5.3 MEASUREMENT AND ANALYSES

Measurement – Three sets of dependent variables were measured in this experiment: justice evaluations, emotional reactions, and behavioral responses. To measure justice evaluations, the questionnaire asked about subjects' evaluations of the reward from their group after each exchange session. They evaluated their overall reward level using a 10-point Likert scale, with anchors of just/unjust (Molm et al. 2003). Emotional distress measures how strongly subjects feel various positive or negative emotions about their payment (e.g., anger, disappointment, and resentment). These items were also measured with 10-point Likert scales (α=.77 in a previous study; Hegtvedt and Killian 1999). Along with negative emotions, the subjects' level of satisfaction was also measured.

Cooperation levels are a critical part of the endogenous process predicted in the theory. This was measured in two ways. First, to assess cooperation levels directly, subjects' investments of their resources in the group were measured. Second, subjects were asked how much they would like to stay in their exchange network if offered to move to another exchange network that ensures higher profit. Staying behavior is a previously used indicator of commitment to the group (Lawler et al. 2008).

Analyses – The experiment consisted of 14 trials and measured the changes in individuals' reactions based on fluctuation of rewards over trials. Since an array of trials is nested in each subject, I use a multi-level model for the analyses. Using an individual growth model (Singer 1998), the analyses decompose fixed and random effects using a maximum-likelihood estimator. To specify the statistical model, which estimates the effect of reward stability on justice evaluations, emotional reactions, and group cooperation, I compare multiple empirical models using tests of nested models and goodness-of-fit indices, such as the Bayesian Information Criterion (BIC) (Appendix D). Then I estimate a statistical model with which to make inferences based on the preferred model specification.

5.4 RESULTS

The analyses reports data from 90 participants. A total of 109 participants were recruited in the experiment and 19 were excluded from the analyses for reporting being suspicious or not understanding the manipulations. The participants were randomly distributed across the three conditions. Each condition has 30 participants, and each participant completed 14 rounds in the experiment, making a total sample of 1,260 participant-rounds.

Univariate Statistics – Table 5.1 shows the descriptive statistics of the control variables. Subjects' gender, age, race, and school year in college were measured as control variables. Race was originally coded in five categories: white, African

Table 5.1 Descriptive Statistics of the Participants' Demographics

Variable	# of Participants	# of Observations	Mean	Std. dev.	Min	Max
Female	90	1260	.500	–	0	1
Age	90	1260	19.856	1.603	17	28
White	90	1260	.778	–	0	1
College Year	90	1260	2.356	1.149	1	5

American, Hispanic, Asian, and other. Since the majority of participants were white (77.8%), race was recoded into a dichotomous variable using "white" and "non-white." Tables 5.2, 5.3, and 5.4 present the descriptive statistics of the justice evaluations, the four emotional responses, and the two behavioral reactions, respectively. All the indicators were measured in 10-points Likert scales. These tables also offer the basic statistics of the measurements across the conditions. The tables show that the level of justice evaluations is highest in the control condition, followed by the low-instability condition, and then by the high-instability condition. Emotional responses show the same patterns: negative emotion is the highest in the high-instability condition, followed by the low-instability condition and then by the control condition. When it comes to positive emotion, the level of satisfaction is highest in the control condition and lowest in the high-instability condition. Behavioral reactions show a pattern similar to the previous measurements: the level of cooperation measured in investments to the group and willingness to stay in the current group is higher in the control condition than in the experiment conditions.

Table 5.2 Descriptive Statistics of Justice Evaluations

Variable	# of Participants	# of Observations	Mean	Std. dev.	Min	Max
Justice Evaluation	90	1260	6.350	3.025	1	10
High-Instability	30	420	5.912	3.347	1	10
Low-Instability	30	420	6.176	3.180	1	10
Control	30	420	6.962	2.364	1	10

Table 5.3 Descriptive Statistics of Emotional Responses

Variable	# of Participants	# of Observations	Mean	Std. dev.	Min	Max
Anger	90	1260	3.749	2.986	1	10
High-Instability	30	420	4.412	3.310	1	10
Low-Instability	30	420	3.688	3.034	1	10
Control	30	420	3.148	2.414	1	10
Disappointment	90	420	4.075	3.138	1	10
High-Instability	30	420	4.617	3.412	1	10
Low-Instability	30	420	4.202	3.226	1	10
Control	30	420	3.405	2.602	1	10
Resentment	90	420	3.662	2.908	1	10
High-Instability	30	420	4.136	3.181	1	10
Low-Instability	30	420	3.602	2.935	1	10
Control	30	420	3.248	2.505	1	10
Satisfaction	90	1260	6.202	3.159	1	10
No-Instability	30	420	6.824	2.648	1	10
Low-Instability	30	420	6.133	3.256	1	10
High-Instability	30	420	5.648	3.417	1	10

Table 5.4 Descriptive Statistics of Behavioral Reactions

Variable	# of Participants	# of Observations	Mean	Std. dev.	Min	Max
Investment	90	1260	364.615	121.238	0	500
High-Instability	30	420	336.243	132.579	0	500
Low-Instability	30	420	354.645	116.853	0	500
Control	30	420	402.957	102.734	70	500
Staying Behavior	90	420	6.141	3.199	1	10
No-Instability	30	420	6.536	3.020	1	10
Low-Instability	30	420	6.517	3.306	1	10
High-Instability	30	420	5.371	3.132	1	10

Justice Evaluations – The main argument of this dissertation is that the instability of rewards decreases justice evaluations among group members. Figure 5.2 presents a trend of the means of justice evaluations over trials with confidence intervals in each condition. As seen, levels of justice evaluations exactly follow the fluctuations of reward manipulations described in Figure 5.1.

A global F-test reveals a significant effect of the reward stability on the level of justice evaluations ($F_{(2, 87)} = 3.78$, $p = .027$) (Table 5.5). The result also shows that the variation of the actual reward level (a level of manipulations) has a significant effect on justice evaluations ($F_{(2, 87)} = 52.43$. $p < .001$).

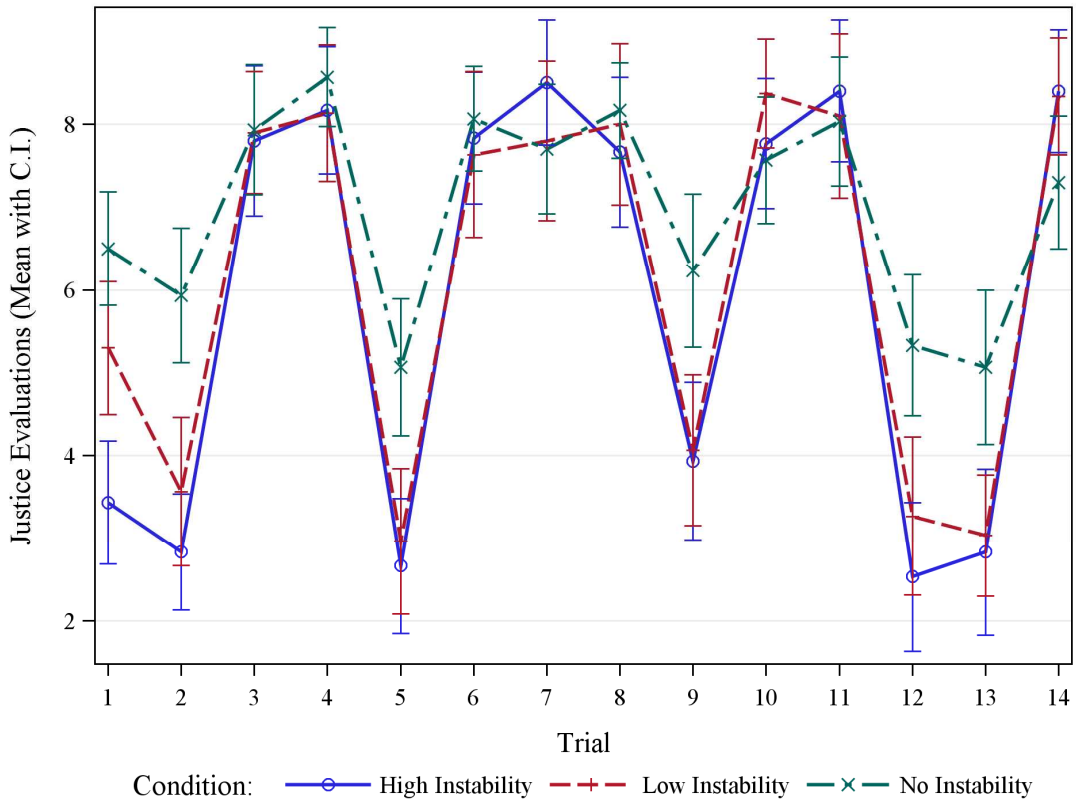

Figure 5.2 Justice Evaluation over Trials in Each Condition

Table 5.5 Test of Fixed Effects on Justice Evaluation

	F-value	*p*-value
Condition ($F_{2, 87}$)	3.78	.027
Reward Level ($F_{1, 87}$)	52.43	< .001
Condition x Reward Level ($F_{2, 87}$)	13.35	< .001
–2LL	4823.00	
BIC	5295.50	
$Chi^2_{(104)}$	939.53	< .001

Table 5.6 Comparisons of the Level of Justice Evaluation[1, 2]

Effect	Condition	Estimate	Std. Err.	t-value	*p*-value
Condition[3]	High-Instability	–.8171	.2976	–2.75	.002
	Low-Instability	–.4458	.2976	–1.50	.069
Reward Level		.4305	.0753	5.72	< .001

[1] 1 – "not just at all," 10 – "very just"
[2] This model controls for the interaction between reward level and condition.
[3] Control condition is the reference category

The parameter estimates for the fixed effects (Table 5.6) show that the justice evaluations in the experimental conditions are lower than the justice evaluations in the control condition (low-instability condition, $t_{(86)} = –1.50$, one-tailed, $p = .069$; high-instability condition, $t_{(86)} = –2.75$, one-tailed, $p = .002$). The results also show that the actual reward level is positively related to justice evaluations: the higher the actual rewards compared with expected rewards, the higher the perceived justice evaluations ($t_{(86)} = 5.72$, one-tailed, $p < .001$). The results support Hypothesis 1 which predicts a positive relationship between the stability of rewards and justice evaluations.

To determine the effect of reward level on justice evaluations, I compared the justice evaluations in each of the unjust reward trials with the justice evaluations in the just reward trials (Table 5.7). The result shows that the reward level is positively related to justice evaluations among the under-reward trials (under-rewarded by 1~50%). However, in the over-reward trials (over-rewarded by 1~50%), the effect of the reward manipulations is not significantly related to justice evaluations. That is, the effect of an under-reward is considerably stronger than the effect of an over-reward of the same size.

Table 5.7 Comparison of Justice Evaluations across Manipulation Levels

Reward Level (%)		Δ in Est. Means	Std. Err.	*t*-Value	*p*-Value
Under-rewards	–50	–5.718	.358	–15.98	< .001
	–40	–5.329	.328	–16.23	< .001
	–30	–4.634	.279	–16.64	< .001
	–20	–4.742	.292	–16.26	< .001
	–10	–3.324	.277	–12.02	< .001
Control	–3	–2.655	.395	–6.72	< .001
	–2	–2.484	.373	–6.66	< .001
	–1	–1.697	.335	–5.07	< .001
	1	.356	.325	1.09	.277
	2	–.334	.368	–.91	.367
	3	–.134	.384	–.35	.728
Over-rewards	10	.112	.281	.40	.690
	20	.324	.303	1.07	.288
	30	.472	.269	1.76	.082
	40	.045	.334	.13	.893
	50	.016	.354	.05	.963

This confirms the asymmetry between under-rewards and over-rewards. This result also shows that even a very small amount of instability (1~3%) affects justice evaluations.

Emotional Reactions – The second hypothesis predicts a positive relationship between the instability of rewards and negative emotions. To test the hypothesis, emotional reactions are measured along four dimensions: anger, disappointment, resentment, and satisfaction.

Anger: Anger is the one of the main emotions that accompanies unjust rewards (Dalbert 2002). An omnibus model test from a multi-level model shows that the fixed effect of condition ($F_{(2, 87)} = 7.17$, $p = .001$) and reward level ($F_{(1, 87)} = 72.83$, $p < .001$) are significantly related to anger (Table 5.8). The parameter estimates for the fixed effects (Table 5.9) show that there are significant differences between the control condition and the high-instability condition. Anger is higher in the high-instability condition than in the control condition ($t_{(86)} = 3.26$, one-tailed, $p = .002$). Actual reward level shows a negative effect on anger ($t_{(86)} = –7.08$, one-tailed, $p < .001$). The results are consistent with Hypothesis 2.

Table 5.8 Test of Fixed Effects on Anger

	F-value	*p*-value
Condition ($F_{2, 87}$)	7.17	.001
Reward Level ($F_{1, 87}$)	72.83	< .001
Condition × Reward Level ($F_{2, 87}$)	20.07	< .001
–2LL	4583.80	
BIC	5056.20	
$Chi^2_{(104)}$	998.01	< .001

Table 5.9 Comparisons of the Level of Anger[1, 2]

Effect	Condition	Estimate	Std. Err.	*t*-Value	*p*-Value
Condition[3]	High-Instability	.9031	.2766	3.26	< .001
	Low-Instability	–.0292	.2661	–0.11	.456
Reward Level		–.3464	.0489	–7.08	< .001

[1] 1 – "not angry at all," 10 – "very angry"
[2] This model controls for the interaction between reward level and condition.
[3] Control condition is the reference category.

Disappointment: An omnibus F-test from a multi-level model reveals a significant effect of condition ($F_{(2, 87)} = 11.63$, $p < .001$) and reward level ($F_{(1, 87)} = 95.13$, $p < .001$) on the level of disappointment (Table 5.10) on disappointment. The parameter estimates for the fixed effects (Table 5.11) show significant differences between the control condition and the experimental conditions. Among the three conditions, disappointment is highest in the high-instability condition ($t_{(86)} = 4.76$, one-tailed, $p < .001$), followed by the low-instability condition ($t_{(86)} = 1.56$, one-tailed, $p = .062$). Actual reward level also shows a negative effect on disappointment ($t_{(86)} = –7.67$, one-tailed, $p < .001$).

Table 5.10 Test of Fixed Effects on Disappointment

	F-value	*p*-value
Condition ($F_{2, 87}$)	11.63	.001
Reward Level ($F_{1, 87}$)	95.13	< .001
Condition × Reward Level ($F_{2, 87}$)	23.75	< .001
–2LL	4677.00	
BIC	5149.50	
$Chi^2_{(104)}$	887.89	< .001

Table 5.11 Comparisons of the Level of Disappointment[1, 2]

Effect	Condition	Estimate	Std. Err.	t-Value	*p*-Value
Condition[3]	High-Instability	1.2847	.2701	4.76	< .001
	Low-Instability	.3990	.2565	1.56	.062
Reward Level		–.3937	.0513	–7.67	< .001

[1] 1 – "not disappointed," 10 – "very disappointed"
[2] This model controls for the interaction between reward level and condition.
[3] Control condition is the reference category

Resentment: The last negative emotion measured in this experiment is resentment. An omnibus F-test from a multi-level model reveals a significant difference in resentment between conditions ($F_{(2, 87)} = 4.20$, $p = .002$) and reward levels ($F_{(1, 87)} = 27.95$, $p < .001$) (Table 5.12). The parameter estimates for the fixed effects (Table 5.13) show that there are significant differences between the control condition and the high-instability condition ($t_{(86)} = 2.60$, one-tailed, $p = .005$). Actual reward level shows a negative effect on disappointment ($t_{(86)} = –4.33$, one-tailed, $p < .001$).

Table 5.12 Test of Fixed Effects on Resentment

	F-value	*p*-value
Condition ($F_{2, 87}$)	4.20	.002
Reward Level ($F_{1, 87}$)	27.95	< .001
Condition × Reward Level ($F_{2, 87}$)	7.33	.001
–2LL	4728.50	
BIC	5201.00	
$Chi^2_{(104)}$	967.91	< .001

Table 5.13 Comparisons of the Level of Resentment[1, 2]

Effect	Condition	Estimate	Std. Err.	*t*-Value	*p*-Value
Condition[3]	High-Instability	.8735	.3363	2.60	.005
	Low-Instability	.0391	.3232	.12	.452
Reward Level		–.2826	.0653	–4.33	< .001

[1] 1 – "not resentful," 10 – "very resentful"
[2] This model controls for the interaction between reward level and condition.
[3] Control condition is the reference category

Satisfaction: Satisfaction is the only positive emotion measured in the experiment. An omnibus F-test from a multi-level model shows that there are statistically significant differences among the conditions ($F_{(2, 87)} = 9.51$, $p < .001$) and the effect of actual reward manipulation ($F_{(1, 87)} = 145.39$, $p < .001$) (Table 5.14). The parameter estimates for the fixed effects (Table 5.15) show that there are significant differences between the control condition and the experimental conditions. Satisfaction in the high-instability condition ($t_{(86)} = –4.25$, one-tailed, $p < .001$) and the low-instability condition ($t_{(86)} = –2.97$, one-tailed, $p = .002$) are significantly lower than the satisfaction level in the control condition. Actual reward level shows a positive effect; that is, the higher the actual reward the

Table 5.14 Test of Fixed Effects on Satisfaction

	F-value	*p*-value
Condition ($F_{2, 87}$)	9.51	< .001
Reward Level ($F_{1, 87}$)	145.39	< .001
Condition × Reward Level ($F_{2, 87}$)	39.66	< .001
–2LL	4745.70	
BIC	5218.20	
$Chi^2_{(104)}$	754.90	< .001

Table 5.15 Comparisons of the Level of Satisfaction[1, 2]

Effect	Condition	Estimate	Std. Err.	*t*-Value	*p*-Value
Condition[3]	High-Instability	–1.0602	.2495	–4.25	< .001
	Low-Instability	– .7367	.2482	–2.97	.002
Reward Level		.4859	.0518	9.38	< .001

[1] 1 – "not satisfied," 10 – "very satisfied"
[2] This model controls for the interaction between reward level and condition.
[3] Control condition is the reference category

higher the satisfaction level ($t_{(86)} = 9.38$, one-tailed, $p < .001$).

The results from the analyses of the effect of the instability of rewards on four emotional reactions reveal that individuals are more likely to feel negative emotions, such as anger, disappointment, and resentment when their rewards are unstable. At the same time, the instability of rewards also decreases positive emotions. Moreover the intensity of emotional reactions is proportionate to actual reward levels. Overall, the results confirm that the instability of rewards produces emotional distress and decreases positive emotions among the individuals in a group. Hypothesis 2 is supported.

Behavioral Reactions – Hypothesis 3 predicts that unstable rewards decreases group cooperation. In this experiment, group cooperation is measured in two ways: the level of investments to the group, and the willingness to stay in the current relationship despite better alternatives.

Investment: Investments were measured by participants' decisions of how much they wanted to invest in their company on each experimental round.[6] An omnibus F-test from a multi-level model shows that investments are influenced by both condition ($F_{(2, 80)} = 6.14$, $p = .003$) and trial ($F_{(13, 80)} = 6.75$, $p < .001$) (Table 5.16). A multi-level model which estimates the effects of condition, trials and their interaction, along with the controls, offers a comparison of investments between conditions. The results show that investments are significantly higher in the control condition than the low-instability condition ($t_{(80)} = –2.83$, one-tailed, $p = .006$) and high-instability condition ($t_{(80)} = –3.20$, one-tailed, $p = .002$) (Table 5.17)

[6] Comparisons between mixed models shows that "trial" explains investments better than "reward level." Thus, I included "trial" instead of "reward-level" to specify a multi-level model (see Appendix D for the specification of this model).

Table 5.16 Test of Fixed Effects on Investment

	F-value	*p*-value
Female ($F_{1, 80}$)	6.26	.015
Age ($F_{1, 80}$)	.16	.689
White ($F_{1, 80}$)	5.14	.026
Year ($F_{1, 80}$)	2.98	.024
Condition ($F_{2, 80}$)	6.14	.003
Trial ($F_{13, 80}$)	6.75	< .001
Condition × Trial ($F_{26, 80}$)	1.93	.014
–2LL	14444.80	
BIC	14917.30	
Chi2 $_{(104)}$	598.98	< .001

Table 5.17 Comparisons of the Level of Investment[1]

Effect	Condition	Estimate	Std. Err.	*t*-Value	*p*-Value
Condition[2]	High-Instability	–61.0881	19.2900	–3.20	.002
	Low-Instability	–55.0551	19.4496	–2.83	.006

[1] Ranged from 0 to 500
[2] Control condition is the reference category

Staying: The willingness to stay in the current exchange relationship despite better alternatives is another indicator of the level of group cooperation. It was measured in a 10-point Likert scale which ranges from 1- "definitely move to other company" to 10 – "definitely stay in the current company." An omnibus F-test from multi-level model shows that condition ($F_{(2, 83)} = 5.67$, $p = .005$) and actual reward level ($F_{(1, 83)} = 18.72$, $p < .001$) significantly affect the level of willingness to stay (Table 5.18). Among control

Table 5.18 Test of Fixed Effects on Staying Behavior

	F-value	*p*-value
Female ($F_{1, 83}$)	.21	.647
Age ($F_{1, 83}$)	.40	.528
White ($F_{1, 83}$)	7.10	.009
Year ($F_{1, 83}$)	.02	.896
Condition ($F_{2, 83}$)	5.67	.005
Reward Level ($F_{1, 83}$)	18.72	< .001
Condition × Reward Level ($F_{2, 83}$)	5.89	.004
–2LL	4912.20	
BIC	5384.60	
Chi2 (104)	1324.50	< .001

Table 5.19 Comparisons of Staying Behaviors[1, 2]

Effect	Condition	Estimate	Std. Err.	*t*-Value	*p*-Value
Condition[3]	High-Instability	–1.3757	.5070	–2.71	.004
	Low-Instability	–1.5355	.4995	–3.07	.002
Reward Level		.2328	.0624	3.73	< .001

[1] 1 – "definitely move," 10 – "definitely not move"
[2] This model controls for the interaction between reward level and condition.
[3] Control condition is the reference category

variables, race influences staying behavior: white people are more likely to stay in current exchange relations than are non-whites.

The parameter estimates for the fixed effects (Table 5.18) show that there are significant differences between the control condition and the experimental conditions in willingness to stay in the current group. The level of willingness to stay in the high-instability condition ($t_{(86)} = –2.71$, one-tailed, $p = .004$) and the low-instability condition

($t_{(86)} = -3.07$, one-tailed, $p = .002$) is significantly lower than the control conditions. There is also a positive effect of actual reward on an individual's willingness to stay ($t_{(86)} = 3.73$, one-tailed, $p < .001$).

This experiment shows that the stability of rewards from groups is positively related to group cooperation among individuals. Based on these results, I conclude that Hypothesis 3 is supported by this experiment. The effect of instability on group cooperation is highly significant both in terms of investment levels and in terms of willingness to stay in the current group despite the presence of better alternatives.

5.5 DISCUSSION

In this chapter I described a controlled laboratory experiment which tested the predicted relationships among variables as described in Chapter 3. The theory predicts that the instability of rewards decreases justice evaluations, increases emotional distress, and decreases the willingness of group members to cooperate. The results from a controlled laboratory experiment with three conditions clearly and consistently support the hypotheses derived from the theory. As expected, the stability of rewards is positively related to justice evaluations and to positive emotional reactions, which are measured along four different dimensions (anger, disappointment, resentment, and satisfaction) among the group members. Furthermore, the stability of rewards leads individuals to higher cooperation levels: the more stable the rewards from the group, the more likely the individuals are to invest their resources and to stay in the current group, even though better profits are available from other groups.

The theory assumes that the negative effect of reward instability on justice evaluations comes from an asymmetry between unjust rewards in opposite directions (e.g., Austin and Walster 1974). The results from the experiment reveal that justice evaluations in all under-reward trials are significantly lower than the justice evaluations in the just-reward trials, while justice evaluations in all the over-reward conditions are not significantly different from justice evaluations in just-reward trials. In other words, although under-rewards reduce justice evaluations among people, the same extent of over-rewards cannot cancel out the effect of under-rewards. This confirms the assumption of asymmetry between under-rewards and over-rewards.

It is also noteworthy to see the strength of the effect of unstable rewards on the justice evaluations of the control condition. Theoretically, the control condition was supposed to have no fluctuations of rewards over time. However, to create a more realistic experiment, I implemented a very small amount of instability in the control condition (1~3%) compared with the low-instability (10~30%) and high-instability (30~50%) conditions. I expected that the effect of instability between 1% and 3% would have almost no effect on justice evaluations. However, the results show that even such a small amount of instability lowers justice evaluations. This demonstrates how powerful the effect of unstable rewards on justice evaluations can be.

In sum, the experiment presented in this chapter tests the main arguments of the theory introduced in this dissertation. The results consistently and clearly support the hypotheses directly derived from the theory. The results also reveal the asymmetry between under-rewards and over-rewards in justice processes and show the influence of the instability of rewards. The next chapter introduces another controlled laboratory

experiment that aims to replicate the results of this chapter and to test for possible order effects (e.g., recency) of the instability.

CHAPTER 6
EVALUATING THE EFFECT OF THE EXPERIENCE OF THE INSTABILITY OF REWARDS

The results in Chapter 5 demonstrate the influence of the stability of rewards on group cooperation via the asymmetrical effects of unjust rewards on justice evaluations. The results also revealed that the instability of rewards increases emotional distress among individuals. As an extension to that experiment, in this chapter, I discuss a test for the moderating effects of the "presentation order" of unstable rewards on justice evaluations.

There are two objectives of this study. First, it aims to replicate the results of the first experiment. The main purpose of this dissertation is to introduce a theory explaining the effect of reward stability on justice evaluations which has never been tested empirically before. Unlike the previous experiment, the control condition of this experiment does not implement any fluctuations in the level of rewards. Therefore, the control condition of this experiment shows the baseline of the justice evaluations and contrasts the effect of the instability of rewards more clearly. The second objective of this experiment is to show the effect of the presentation order of unstable rewards. To do this, I conducted another controlled laboratory experiment with five conditions that presents the instability of rewards in different orders. Previous research showed that the order in which people experience events shapes their judgments (e.g. Murdock 1962). There have been two lines of research on the effect of the presentation order. Research on the

primacy effect maintains that information presented first has a stronger effect on judgments and is more likely to change individuals' judgments than information that is presented last (Forgas 2011; Lund 1925). On the other hand, other researchers have found a recency effect, which suggests that information presented last has a stronger effect than the information that is presented first (Furnham 1986; Panagopoulos 2011). Though both the primacy effect and the recency effect show the power of serial positioning effects, the evidence is contradictory.

Prospect theory explains the role of an initial reference point and an anchor in individual's judgments. The endowment effect explains that individuals value the goods that they already possess more and evaluate the goods of others to be less valuable (Thaler 1980). For example, Kahneman and his colleagues (1990) showed that people who already possessed a mug were willing to sell it for around $7, while people who did not possess a mug were willing to pay only around $3 to buy the same one. Tversky and Kahneman (1974, 1981) also found an anchoring effect on judgments, which explains that variation of the reference point of judgments can change the evaluations of gains and losses. The theory suggests that a starting point and a variation of the reference point over time play an important role in producing evaluations among individuals.

Markovsky (1988a) demonstrated that justice evaluations are shaped by social contexts or framing information. Based on the results from five vignette experiments, he showed that justice evaluations could be biased either toward (assimilation effect) or away from (contrast effect) the anchor when the anchor is salient in the situation. Furthermore, the study shows that the information presented first can serve as an anchor

for the information that follows. Markovsky's research suggests that the order of evaluations.

Based on previous research, here I assume that the order of the stability (or instability) of rewards also has a net effect on justice evaluations. If justice evaluations are affected more strongly by the reward events that come first (primacy effect), the instability of rewards at an early time point will have a stronger effect on justice evaluations than unstable rewards of the same degree which come later. By contrast, if reward events experienced more recently affect justice evaluations more strongly (recency effect), the instability of rewards that come later will have a stronger effect on the justice processes than unstable rewards of the same degree presented at an early stage.

If the presentation order of rewards affects justice evaluations, the presentation order between under-rewards and over-rewards will cause bias in evaluating justice of rewards. The experiment in Chapter 5 shows that an under-reward has a stronger effect that an over-reward of the same size. Based on the result, it is predicted that if the primacy effect is prominent, the justice evaluations will be lower when under-rewards appear prior to over-rewards than when over-rewards appear first and are followed by the same size of under-rewards. By contrast, if the recency effect is stronger than the primacy effect in an unstable rewards situation, the justice evaluations will be lower if over-rewards appear prior to under-rewards. In this experiment I predict a primacy effect will be salient for justice evaluations and that the rewards presented earlier will have a stronger effect than the reward presented later. Therefore, the justice evaluations will be lower in the primacy conditions (conditions 1 and 2) compared to the recency conditions (conditions 3 and 4). Also, the justice evaluations in under reward first conditions

(conditions 1 and 3) will be lower compared to the over-reward first conditions (conditions 2 and 4).

6.1 HYPOTHESES

The main purpose of this experiment is to test the effect of presentation order under the unstable reward situation. This study tests hypotheses expecting primacy effects which explains that the information or events come earlier are more influential than those presented later on individuals' judgments. Therefore, the hypotheses state that:

Hypothesis 1 (Primacy effect) (H1): The negative effect of unstable rewards on justice evaluation is stronger when they appear earlier.

Hypothesis 1a (H1a): The effect of the instability of rewards on justice evaluation is stronger when unstable rewards appear earlier than stable rewards.

Hypothesis 1b (H1b): The effect of the instability of rewards on justice evaluation is stronger when under-rewards appear earlier than over-rewards.

The other purpose of this study is to confirm the results from the previous chapter. Since the effect of the instability of rewards has never been tested empirically, it is necessary to test the effect in multiple experiments to confirm the effectiveness of the theory. Therefore, this experiment tests the same hypothesis as in the previous chapter: that stability of rewards is positively related to justice evaluations.

Hypothesis 2 (H2): The stability of the reward structure is positively related to justice evaluations.

In addition to testing the hypothesis from the previous experiment in Chapter 5, In addition, this study aims to replicate the results from the previous studies.

6.2 EXPERIMENTAL DESIGN

Most of the procedures, including the cover story, of this experiment were the same as the procedures in the previous experiment, except for the stability manipulation schedule, the number of conditions, and the number of rounds. This experiment manipulated the instability of rewards in two ways (2 × 2): the order of unstable reward (primacy vs. recency) and the order of incongruence (under-reward first vs. over-reward first). To establish a baseline of justice evaluations, I added a control condition which does not include any incongruence of rewards throughout the experiment. There is, therefore, a total of five conditions. Each condition consisted of 18 rounds. There were four more rounds per condition than in the previous experiment, and the rounds were divided evenly into three sub-phases as explained in the next section.

Stability Manipulation – The experiment was a 2 × 2 design that crossed the presentation order of unstable rewards and the presentation order of unjust rewards. In the primacy conditions (conditions 1 and 2), twelve unstable rewards were presented first and followed by six stable rewards (Figure 6.1). Whereas, in the recency conditions (conditions 3 and 4), stable rewards appeared in the first six rounds and unstable rewards were presented in the next twelve rounds (Figure 6.2). In the unstable reward rounds, the rewards from the group deviated from the expected reward level by between 10-30%.

Each of the primacy conditions and recency conditions consisted of two sub-conditions: an under-reward-first condition and an over-reward-first condition. In the under-reward-first condition, rewards from the first six rounds among the twelve unstable reward rounds were *lower* than the expected level, and the rewards fluctuated *above* the expected level in the following six rounds. On the other hand, in the over-reward-first

condition, the rewards fluctuated *above* the expected level in the first six rounds among the twelve unstable reward rounds, and followed by six rounds in which the rewards fluctuated *below* the expected level. In addition to four experimental conditions, there was a control condition in which the rewards from the group were stable throughout the experiment.

In respect of the hypothesis, H1a predicts that the justice evaluations in the primacy conditions will be lower than the justice evaluations in the recency conditions (conditions 1 and 2 < conditions 3 and 4). In addition, H1b predicts that the justice evaluations in the under-reward-first conditions will be lower than the justice evaluations in the over-reward-first conditions (conditions 1 and 3 < conditions 2 and 4). When it comes to the presentation order effect, H3 predicts that justice evaluations in the control condition (condition 5) will be higher than the justice evaluations in the other four experimental conditions (conditions 1–4).

Measurement – To test the hypotheses, which are stated above, this experiment measured justice evaluations with a 10-point Likert scale after each investment opportunity. In addition, subjects' gender, age, race, and school year in college were measured as control variables.

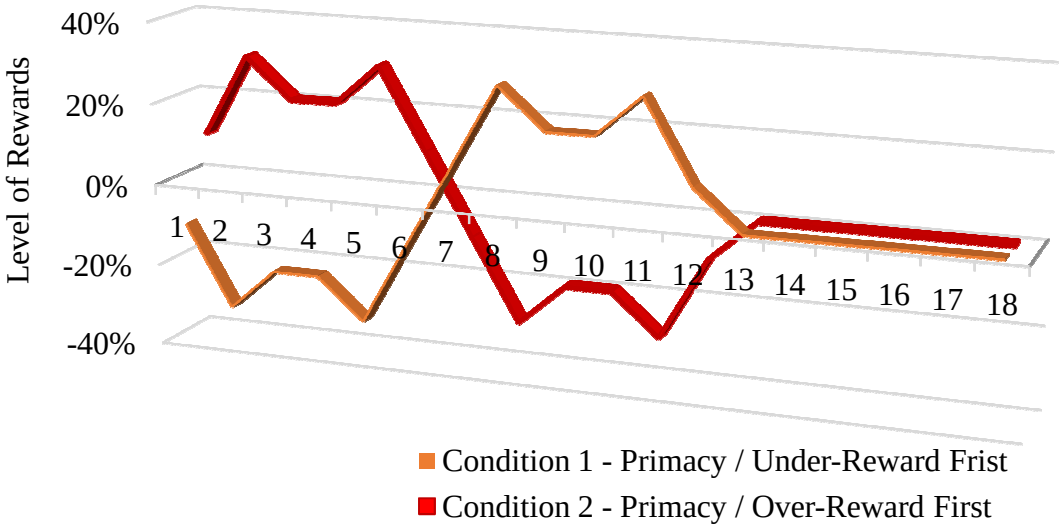

Figure 6.1 Manipulation Schedule of the Primacy Conditions

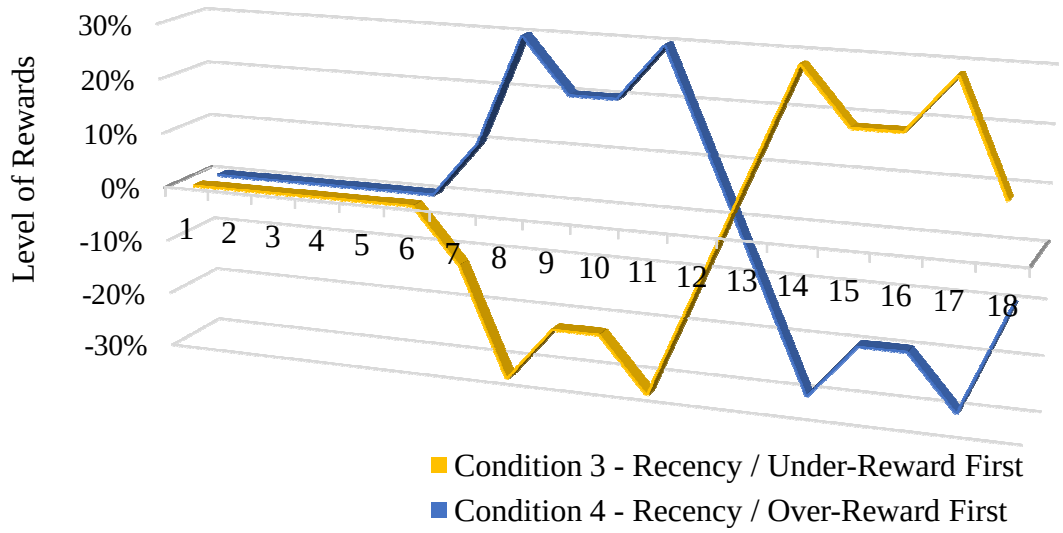

Figure 6.2 Manipulation Schedule of the Primacy Conditions

6.3 RESULTS

The analyses reports data from 150 participants. A total of 164 participants were recruited in the experiment and 14 were excluded from the analyses for reporting being suspicious or not understanding the manipulations. The participants were randomly distributed across the five conditions. Each condition has 30 participants, and each participant completed 18 rounds in the experiment, making a total sample of 2,700 participant-rounds. Table 6.1 shows the descriptive statistics for the control variables. As in the previous experiment, subjects' gender, age, race, and year in college were measured.

Table 6.1 Descriptive Statistics of the Participants' Demographics

Variable	# of Participants	# of Observations	Mean	Std. dev.	Min	Max
Female	150	2700	.500	–	0	1
Age	150	2700	20.407	2.167	17	34
White	150	2700	.640	–	0	1
College Year	150	2700	2.533	1.094	1	5

Table 6.2 presents the descriptive statistics of justice evaluations. Consistent with H2, justice evaluations are higher in the control condition than the experimental conditions. In regards to the experimental conditions, the recency conditions show a higher justice evaluation compared to the primacy conditions. Figure 6.3 plots a trend of the means of justice evaluations over trials with confidence intervals in each condition. The graph shows that the justice evaluations reflect the reward manipulations over trials.

Table 6.2 Descriptive Statistics of Justice Evaluation

Condition		# of Participants	# of Obs.	Mean	Std. dev.	Min	Max
Total		150	2700	7.642	2.902	1	10
	Subtotal	60	1080	7.146	2.990	1	10
Primacy	condition 1	30	540	7.467	2.996	1	10
	condition 2	30	540	6.824	2.951	1	10
	Subtotal	60	1080	7.475	3.048	1	10
Recency	condition 3	30	540	7.215	2.961	1	10
	condition 4	30	540	7.735	3.112	1	10
Control	condition 5	30	540	8.969	1.839	1	10

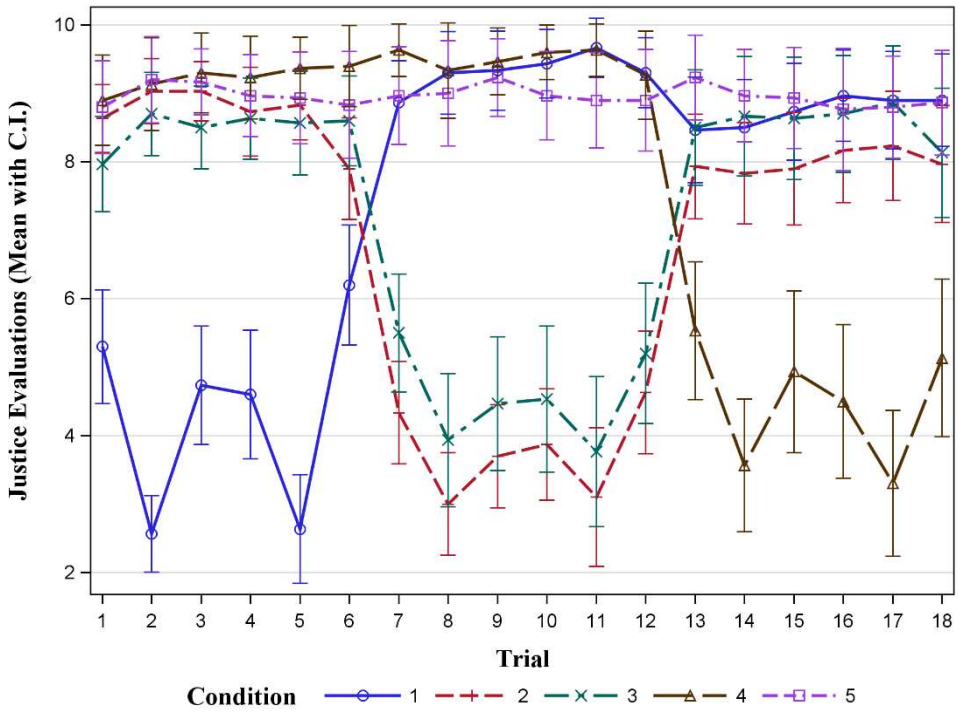

Figure 6.3 Justice Evaluations over Trials in Each Condition

In particular, the justice evaluations in under-rewards trials exactly follow the manipulation schedule. However, it shows that the differences of justice evaluations between just-rewards and over-reward trials are not as large as the differences of justice evaluations between just-rewards and under-rewards trials.

Table 6.3 and Figure 6.4 show the asymmetric tendency more clearly. According to the results from the comparison of the justice evaluations across different reward levels, under-rewards have a negative effect on justice evaluations (–5.338 ~ –3.367) while over-rewards have a positive effect on justice evaluations (+.275 ~ +.608). However, the differences of the justice evaluations from the just-reward trials are larger in the under-rewards trials compared with the over-rewards conditions. Figure 6.4 shows the asymmetries in justice evaluations across the different reward levels.

Table 6.3 Comparison of Justice Evaluations across Manipulation Levels

Reward Level (%)		Est. Means	Std. Err.	Δ of Means[1]	*t*-Value	*p*-Value
	–30	3.329	.140	–5.388	–32.51	< .001
Under-rewards	–20	4.656	.139	–4.060	–24.86	< .001
	–10	5.349	.141	–3.367	–21.35	< .001
Just-rewards	0	8.716	.114			
	10	8.991	.141	.275	1.74	.042
Over-rewards	20	9.271	.139	.555	3.40	.001
	30	9.324	.140	.608	3.67	< .001

[1] Just-rewards is the reference category.

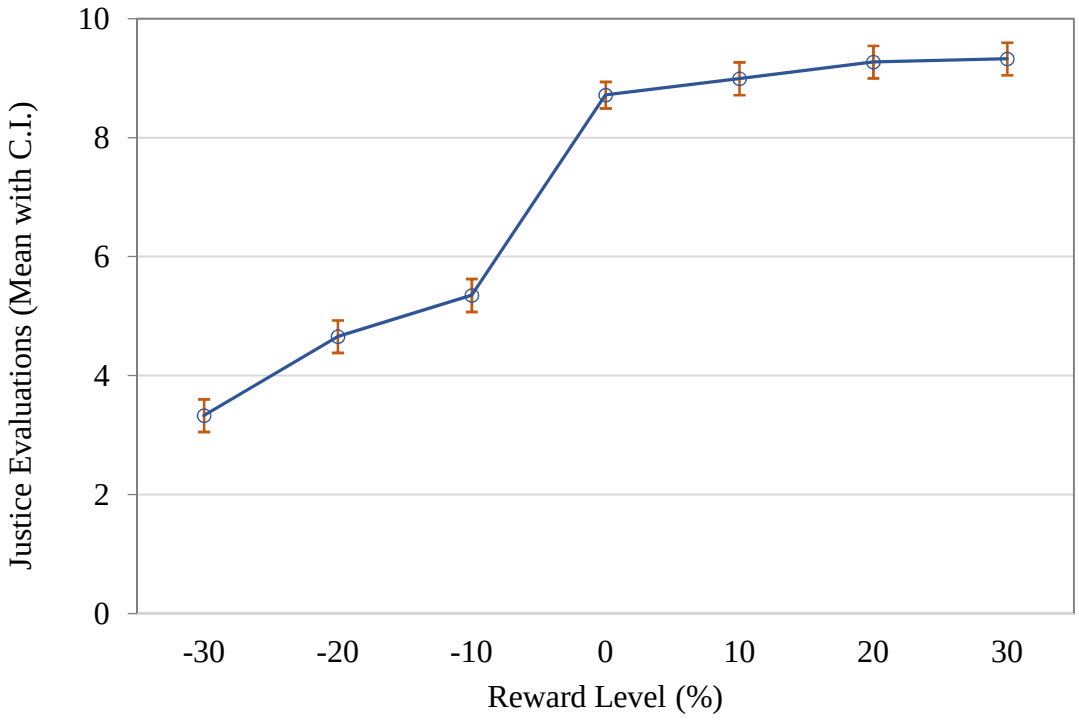

Figure 6.4 Justice Evaluations across the Level of Rewards

To test the hypotheses, a multi-level model with trials nested in participants was used (see Appendix D for the model specifications). First, I tested H1 which argued for primacy effects of the unstable rewards on justice evaluations. To test the hypothesis, I specified the effect of the presentation order of unstable rewards (primacy vs recency), the presentation order of unjust rewards (under-rewards-first vs. over-reward-first), and the interaction effect of the two manipulations. An omnibus test from the multi-level model reveals a significant effect of the presentation order of unstable rewards ($F_{(1, 145)}$ = 22.96, p < .001) and the presentation order of unjust rewards ($F_{(1, 145)}$ = 8.27, p = .005) on justice evaluations. The results also reveal a significant interaction between manipulations ($F_{(1, 116)}$ = 5.94, p = .016) (Table 6.4).

Table 6.4 Test of Fixed Effects on Justice Evaluation

	F-value	*p*-value
Recency effect ($F_{1, 116}$)[1]	22.96	< .001
Over-Rewards-First effect ($F_{1, 116}$)[2]	8.27	.005
Recency × Over-Rewards First ($F_{1, 116}$)	5.94	.016
–2LL	8391.0	
BIC	9209.6	
$Chi^2_{(170)}$	2498.4	< .001

[1] Primacy condition is the reference condition
[2] Under-reward-first condition is the reference condition

Comparisons among conditions show that the estimated justice evaluations are higher in the recency conditions (conditions 3 and 4) (M = 7.555) than the primacy conditions (condition 1 and 2) (M = 6.671) and the difference is statistically significant ($t_{(116)}$= –4.79, two-tailed, p < .001) (Table 6.5). That is, unstable rewards have a stronger negative effect on justice evaluations when they appear earlier in a series of rewards than when they appear later. Therefore, the results support H1a.

Table 6.5 Justice Evaluation of the Primacy Conditions and the Recency Conditions

Condition	Est. Means	Std. Err.	Δ of Means[1]	*t*-value	*p*-value
Primacy conditions	6.671	.130	.884	4.79	< .001
Recency conditions	7.555	.130			

[1] The primacy conditions are the reference category.

Table 6.6 Justice Evaluation of the Under-reward-first conditions and Over-reward-first conditions

Condition	Est. Means	Std. Err.	Δ of Means[1]	*t*-value	*p*-value
Under-reward-first conditions	6.848	.130	.530	2.88	.005
Over-reward first conditions	7.379	.130			

[1] The under-reward-first conditions are the reference category.

To test H1b, I compared the justice evaluations in under-reward-first conditions (conditions 1 and 3) to over-reward-first conditions (conditions 2 and 4). The result shows that the over-reward-first conditions have higher justice evaluations (M = 7.379) than the under-reward-first conditions (M = 6.848) and the difference is also statistically significant ($t_{(116)}$= –2.88, two-tailed, p = .005) (Table 6.6). The result supports the H1b. In sum, the results from the analyses support H1. This results suggest that unstable rewards have a stronger negative effect when they are presented in an earlier stage of a reward sequence. It also indicates that unstable rewards have a stronger effect when under-rewards come first than when over-rewards come first.

The results of the omnibus test presented in Table 6.4 show that the interaction between the presentation order of unstable rewards and the presentation order of unjust rewards is significant. Table 6.7 presents the main and interaction effects of the manipulations on justice evaluations. The coefficients confirm that the recency manipulation and over-reward-first manipulation have positive effects on justice evaluations, as stated above. It also reveals that the recency manipulation (β = 1.333) has a stronger effect than the over-reward-first manipulation (β = .980). When it comes to the interaction effect, the result shows a positive interaction effect between the manipulations

Table 6.7 Estimated Fixed Effects of the Manipulations and the Interaction

	β	Std. Err.	*t*- value	*p*-value
Interception	8.045	.184	43.63	< .001
Recency effect[1]	1.333	.261	5.11	< .001
Over-Rewards-First effect[2]	.980	.261	3.76	.003
Recency × Over-Rewards First	.898	.369	2.44	.016

[1] The primacy conditions are the reference category.
[2] The under-reward first conditions are the reference category.

(β = .898). This suggests that the effect of over-reward-first manipulation is stronger in the recency effect conditions than in the primacy effect conditions.

Table 6.8 presents the justice evaluations for each experimental condition. Consistent with Table 6.7, justice evaluations are highest in condition 4 (M = 8.045) and second highest in condition 3 (M = 7.066). Between the primacy conditions, condition 2 (M = 6.712) shows higher justice evaluations than condition 1 (M = 6.631).

Table 6.8 Estimated Means of Justice Evaluations across the Conditions

Condition		Est. Means	Std. Err.
Primacy	condition 1	6.631	.184
	condition 2	6.712	.184
Recency	condition 3	7.066	.184
	condition 4	8.045	.184

Lastly, I tested H2, which hypothesized the negative effect of the instability of rewards on justice evaluations to replicate the result of the previous experiment. To do this the justice evaluations between the experimental conditions and the control conditions are compared. An omnibus test from the multi-level model reveals a

Table 6.9 Test of Fixed Effects on Justice Evaluation

	F-value	*p*-value
Condition ($F_{1, 148}$)	77.58	< .001
Reward Level ($F_{1, 148}$)	850.15	< .001
–2LL	9986.40	
BIC	10843.20	
$Chi^2_{(104)}$	2026.77	< .001

significant effect of condition ($F_{(1, 148)} = 77.58$, $p < .001$) and reward level ($F_{(1, 148)} = 850.15$, $p < .001$) on justice evaluations (Table 6.7) (see Appendix D for the model specifications).

A comparison between the control condition and the experimental conditions reveals that the control condition shows higher justice evaluations than the experimental conditions and the difference is statistically significant ($t_{(116)} = –8.81$, two-tailed, $p < .001$) (Table 6.8). This shows that the stability of rewards has a positive effect on justice evaluations and supports H2.

Table 6.10 Justice Evaluation of the Experimental conditions and Control condition

Condition	Est. Means	Std. Err.	Δ of Means[1]	*t*-value	*p*-value
Experimental conditions	7.145	.100	–1.967	–8.81	< .001
Control condition	9.113	.200			

[1] The experimental conditions are the reference category.

6.4 DISCUSSION

In this chapter, I introduced another experiment that tests the hypothesis supported in the previous experiment. The hypothesis predicted a positive relationship between the stability of rewards and justice evaluations. The results from this experiment supported the hypothesis again. Consistent with the results from the previous experiment in Chapter 5, the current experiment showed that stable rewards are associated with a higher justice evaluations. Though the current experimental study did not report the emotional and behavioral responses resulting from the instability of rewards, the same consequences were expected based on the results from the previous experiment.

The results of the current experiment also confirmed the asymmetric effects between under-rewards and over-rewards. The theory presented in this dissertation assumes that the negative effect of the instability of rewards on justice evaluations comes from the asymmetry of unjust rewards (under-reward is worse than over-reward). Different from the previous experiment, the control condition of this experiment had no instability at all. This design allowed us to check the baseline of the justice evaluations and to test the net effect of the instability of reward on justice. The results showed that the effect of under-rewards is stronger than the effect of the same size of over-rewards.

The results also showed the effect of over-rewards on justice evaluations. Earlier research on justice theory has argued that not only under-rewards but also over-rewards reduce justice evaluations (e.g., Austin and Walster 1974; Homans 1961). However, other empirical studies found a logarithmic function between reward levels and justice evaluations (Jasso 1980; Markovsky 1985). In those studies, over-rewards increase, not decrease justice evaluations, though the steepness decreases as the extent of over-rewards

gets larger. The results from this experiment confirm the findings from the studies that showed over-reward is positively related to justice evaluations, though the effect is not as strong as under-reward.

Another objective of the experiment presented in this chapter is to examine the effect of the presentation order of unstable rewards on justice evaluations. Between the competing predictions associated with primacy effects and recency effects, this experiment supported the primacy effect of the instability of rewards. The results showed that the negative effect of unstable rewards is more salient when the unstable rewards are presented earlier than stable rewards than vice versa. Furthermore, the results confirmed the effect of the presentation order of unjust rewards on justice evaluations: unstable rewards have a stronger effect when under-rewards are presented prior to over-rewards than vice versa.

In brief, the second experiment of this dissertation confirmed the results from experiment 1 and consistently supported the theory presented in Chapter 3. It also showed the asymmetrical effects between under-reward and over-reward in terms of the directions, as well as the intensity. The experiment also revealed that the effect of the instability of rewards on justice evaluations varies according to the presentation order of the instability of rewards. Between the two serial positioning effects: primacy effects and recency effects, the results supported the primacy effects hypothesis by showing that the effect of the instability of rewards is stronger when it appears earlier than when it appears later.

CHAPTER 7
CONCLUSION

This dissertation introduces a new theory of reward stability, justice evaluations and group cooperation, and also provides empirical evidence for the theory. In establishing the theory, I combined justice theory, prospect theory, and the notion of negativity bias from cognitive psychology. Integrating theoretical backgrounds from previous research, this dissertation investigates the judgmental, emotional, and behavioral consequences of unstable rewards in repeated exchange relations. In doing this, I introduced a set of novel theoretical assumptions that postulate the effect of the stability of rewards on justice evaluations and cooperation. The results from three empirical studies demonstrated the effectiveness of this theory, both in the lab and in the "real world."

Justice has been described as "the first virtue of social institutions" (Rawls 1971: p. 2), and scholars have addressed justice problems for a long time (Solomon and Murphy 2000). Over the last five decades since the seminal studies of modern justice theory (Adams 1963; Homans 1961), researchers from various disciplines have investigated the factors and consequences of justice evaluations (see Jost and Kay 2010 for a review). Distributive justice theory underpins this dissertation with a wide range of implications. It maintains that incongruence between the expected level of rewards and the actual rewards causes emotional distress, in turn individuals try to remove the negative feeling by changing their inputs to and/or outcomes from the group in actual or perceived ways.

The theory also argues that, if changing the input and/or outcome is not possible or is too costly, individuals may also leave the relationship (Adams 1965).

This dissertation focuses on a limitation of previous justice research. Specifically, most research on justice theory has assumed that the allocation of rewards at one time is independent from the allocation of rewards at other times (e.g., Adams 1963; Austin and Walster 1974). Thus, only a few studies considered the history of rewards over time when investigating the justice process. In most exchange relations in uncontrolled environments, however, people are involved in long-term repeated investment-reward sequences (Granovetter 1985). In these situations, each reward event is interdependent and affects justice evaluations of other rewards. Therefore, the process of justice evaluations should be understood as evolving through time. Moreover, according to the research on procedural justice, individuals' justice evaluations are affected by the fairness of the decision-making process as well as the results of the decision itself. According to the argument about procedural justice put forth by Leventhal (1980), consistent application of rules over time and across people is an important factor in producing justice evaluations.

Research on negativity bias (Baumeister et al. 2001) and prospect theory (Kahneman and Tversky 1979) showed how individuals' judgments are affected by subjectivity. These theories maintained that a negative event (e.g., loss) is perceived as stronger than the same magnitude of a positive event (e.g., gain). Justice theory (Adams 1965) also posited an asymmetric effect between under-rewards and over-rewards (Jasso 1980). According to this theory, under-reward has a stronger effect on justice evaluations than the same amount of over-reward.

Extending this line of reasoning, I present a theory of reward stability, justice evaluations and group cooperation. According to this theory, when individuals experience an unstable reward system in which rewards fluctuate between under-rewards and over-rewards though time, they will produce a lower level of justice evaluations than when they experience repeated stable rewards through time. The theory also postulates that the resulting lower justice evaluations decrease positive emotions and cooperative behaviors in groups.

Three empirical studies were conducted as a part of this work, aiming to test the effectiveness of the theory. The first empirical study was based on a nationally representative survey from South Korea. In this empirical study, I hypothesized that an unstable application of rules in workplaces has a negative effect on employees' willingness to work harder than expected and on their willingness to stay in their companies despite a better offer. In this empirical study, I analyzed the 2009 KGSS data using logistic regression. The results revealed that if the employees perceived the rules in their workplaces as being applied consistently through time, then there was an increase in their justice evaluations of wages. This perception is also associated with an increase in employees' willingness to work hard and stay in their current company.

The second empirical study of this dissertation was a controlled laboratory experiment with three conditions, which aimed to test the theoretical predictions directly derived from the theory. In the experiment, the control condition had relatively stable rewards over time, whereas in the experimental conditions, rewards from the group fluctuated either mildly (low-instability condition) or severely (high-instability condition). Results from multi-level models supported the hypotheses that unstable rewards have a

negative effect on justice evaluations, emotional responses, and behavioral reactions. In the experiment, the participants who experienced unstable rewards showed significantly lower justice evaluations and higher distress than those in the stable rewards condition. The former group also showed a lower level of cooperation, which was measured as level of investment and wiliness to stay in their current groups.

The results from the experiment also confirm the asymmetric effect between under-rewards and over-rewards. Based on prospect theory and research on negativity bias, the current theory assumes that the net effect of unstable rewards on justice evaluations originates from the asymmetry between under-rewards and over-rewards; the effect of under-rewards is stronger than the same amount of over-rewards. The results of the experiment yielded support for this assumption. In addition, the results indicated that a very small amount of instability in rewards decreases justice evaluations, especially when the reward is below the expected level. The findings from this experiment are critical in refining our understanding of the processes by which justice evaluations form in exchange relations.

Another controlled laboratory experiment was introduced in Chapter 6. The experiment aimed to replicate and extend the results obtained in the previous experiment. As this experiment also tested the effect of the presentation order of unstable rewards on justice evaluations, two competing predictions from the former research were tested. The primacy effect predicted that unstable rewards that appear at an earlier stage in a reward sequence have a stronger influence on justice evaluations than those which appear at a later stage of the reward sequence. On the other hand, the recency effect predicted that unstable rewards have a stronger effect when received at a later stage.

The results of this experiment confirmed the primacy effect of unstable rewards. Among the experimental conditions, justice evaluations are higher in the recency conditions than in the primacy conditions. In other words, the unstable rewards at the starting point of a repeated rewarding sequence linger in individuals' justice perceptions stronger than when the unstable rewards appear later. Once unstable rewards lower individuals' justice evaluations, the same extent of compensation at a later point in time cannot cancel the effect of unstable rewards perceived earlier. Regarding the presentation order between under-rewards and over-rewards, the results revealed that the under-reward-first condition resulted in a lower level of justice evaluations that the over-reward-first condition.

In the control condition, which did not implement any instability of rewards, the justice evaluations were higher than the justice evaluations in the other experimental conditions. This confirmed the results of the former experiment in this dissertation and demonstrated the effectiveness of the theory yet again. The results also confirmed the asymmetry in the effects of under-reward and over-reward in their magnitudes and directions.

This dissertation demonstrates the importance of the stability of rewards in maintaining justice evaluations and group cooperation. Cooperation among members is one of the most important features in upholding groups in human society. Thus, many social scientists examine how to maintain an appropriate level of cooperation in human society (e.g., Axelrod 1984). Using mixed quantitative methods, this dissertation suggests that the stability of rewards is one factor which motivates members to cooperate, while the instability of rewards reduces justice evaluations, positive feelings, and cooperative

behaviors among individuals, especially when it appears at an early stage of a reward sequence.

This research has implications beyond sociological theory. Specifically, the study provides those who determine rewards in formal organizations with empirically validated knowledge to enhance investment-reward efficiency without the sacrifice of members' cooperation levels. According to this research, the instability *in a reward system itself* increases costs for organizations wishing to maintain group members' cooperation levels. For instance, in a company that adopts an unstable system of rewards, levels of cooperation among employees will be lower than in another company with a stable system of rewards. Therefore, the first company will either suffer from lower productivity, or it will expend more resources to maintain a desirable level of productivity among the employees.

With respect to customer relations and management, researchers have found that justice evaluations play a key role in shaping customers' satisfaction levels in the service recovery process after the customers have experienced a service failure from the company (e.g., del Río-Lanza et al. 2009). This dissertation suggests that, if the company wants to raise the damaged satisfaction level among customers after a service failure, the compensation for the service failure should be greater than the losses resulting from it, because the negative effect of the service failure will be greater than the positive effect of the same amount of compensation from the service recovery process. These examples illustrate that the instability of rewards will cause overall inefficiency in the organization.

This research also promises to aid those who are involved in social policy by offering the perspective that not only the result of the allocation of resources and burdens

at one point in time, but also the experiences of the stability of the allocation patterns over time, is a key factor in establishing justice evaluations regarding social institutions or government policy among people. Previous research on law compliance showed that government policies or political authorities depend upon the people's voluntary cooperation for their prosperity and that the appearance of fairness is an important antecedent of cooperation (Tyler 1990, 2010). Findings of the present research demonstrated that the stability of rewards from a group affect people's justice evaluations and willingness to comply with the group.

Many social policies regulate the allocation of burdens and benefits among people in society. Therefore, changes in social policies will be advantageous to some individuals and disadvantageous to others. If social policies are changed too frequently, more individuals will feel that the policies are unfavorable to them and will perceive the policies or social institutions as unjust. Therefore, governmental policy and social intuitions need to avoid unnecessary change and should aim for stability, as long as the stability of social policy does not conflict with the overall social justice.

In summary, this research investigated the role of stability of rewards in groups and its findings suggest that the instability of rewards itself has a negative effect on justice evaluations, emotional reactions, and cooperation among group members. This confirms the importance of reward stability on group cooperation. In addition, the results reported here suggest that not just the results of an allocation at one time, but also the history of the allocation of rewards, should be considered in justice research.

REFERENCES

Adams, J. Stacy. 1963. "Towards an understanding of inequity." *The Journal of Abnormal and Social Psychology* 67:422-436.

_____. 1965. "Inequity in Social-Exchange." *Advances in Experimental Social Psychology* 2:267-299.

Anderson, Bo, Joseph Berger, Morris Zelditch, and Bernard P. Cohen. 1969. "Reactions to Inequity." *Acta Sociologica* 12:1-12.

Anderson, Norman H. 1965. "Averaging versus adding as a stimulus-combination rule in impression formation." *Journal of Experimental Psychology* 70:394-400.

Austin, William and Elaine Walster. 1974. "Reactions to confirmations and disconfirmations of expectancies of equity and inequity." *Journal of Personality and Social Psychology* 30:208-216.

Axelrod, Robert. 1984. *The Evolution of Cooperation*. New York, NY: Basic Books.

Barrett-Howard, Edith and Tom R. Tyler. 1986. "Procedural justice as a criterion in allocation decisions." *Journal of Personality and Social Psychology* 50:296-304.

Baumeister, Roy F., Ellen Bratslavsky, Catrin Finkenauer, and Kathleen D. Vohs. 2001. "Bad is stronger than good." *Review of General Psychology* 5:323-370.

Berger, J., H. Fisek, Z Norman, and M. Zelditch. 1977. *Status characteristics and social interaction: an expectation-states approach*. New York, NY: Elsevier Scientific Pub. Co.

Berger, Joseph, Bernard P. Cohen, and Morris Zelditch, Jr. 1972a. "Status Characteristics and Social Interaction." *American Sociological Review* 37:241-255.

Berger, Joseph, Cecilia L. Ridgeway, and Morris Zelditch. 2002. "Construction of Status and Referential Structures." *Sociological Theory* 20:157-179.

Berger, Joseph, Morris Zelditch, Bo Anderson, and Bernard P. Cohen. 1972b. "Structual Aspects of Distributive Justice: A status value formulation." Pp. 119-146 in *Sociological Theories in Progress*, vol. II, edited by R. M. Emerson, J. Berger, M. Zelditch, and B. Anderson. Boston, MA: Houghton Mifflin.

Bierhoff, Hans-Werner, Ronald L. Cohen, and Jerald. Greenberg. 1986. *Justice in social relations.* New York, NY: Plenum Press.

Carmon, Ziv, Klaus Wertenbroch, and Marcel Zeelenberg. 2003. "Option Attachment: When Deliberating Makes Choosing Feel like Losing." *Journal of Consumer Research* 30:15-29.

Chebat, Jean-Charles and Witold Slusarczyk. 2005. "How emotions mediate the effects of perceived justice on loyalty in service recovery situations: an empirical study." *Journal of Business Research* 58:664-673.

Clay-Warner, Jody, Karen A. Hegtvedt, and Paul Roman. 2005. "Procedural Justice, Distributive Justice: How Experiences with Downsizing Condition Their Impact on Organizational Commitment." *Social Psychology Quarterly* 68:89-102.

Cook, Karen S. 1975. "Expectations, Evaluations and Equity." *American Sociological Review* 40:372-388.

Cook, Karen S. and Karen A. Hegtvedt. 1983. "Distributive Justice, Equity, and Equality." *Annual Review of Sociology* 9:217-241.

Cook, Karen S., Toshio Yamagishi, Coye Cheshire, Robin Cooper, Masafumi Matsuda, and Rie Mashima. 2005. "Trust Building via Risk Taking: A Cross-Societal Experiment." *Social Psychology Quarterly* 68:121-142.

Cosier, Richard A. and Dan R. Dalton. 1983. "Equity Theory and Time: A Reformulation." *Academy of Management Review* 8:311-319.

Cropanzano, Russell and Robert Folger. 1989. "Referent cognitions and task decision autonomy: Beyond equity theory." *Journal of Applied Psychology* 74:293-299.

Dalbert, Claudia. 2002. "Beliefs in a Just World as a Buffer Against Anger." *Social Justice Research* 15:123-145.

del Río-Lanza, Ana Belén, Rodolfo Vázquez-Casielles, and Ana Ma Díaz-Martín. 2009. "Satisfaction with service recovery: Perceived justice and emotional responses." *Journal of Business Research* 62:775-781.

Deutsch, Morton. 1985. *Distributive Justice: A Social-Psychological Perspective*. New Haven, CT: Yale University Press.

Dhar, Ravi and Itamar Simonson. 1992. "The Effect of the Focus of Comparison on Consumer Preferences." *Journal of Marketing Research* 29:430-440.

Emerson, Richard. M. 1972. "Exchange Theory, Part II: Exchange Relations and Network." Pp. 58-87 in *Sociological Theories in Progress*, vol. 2, edited by J. Berger, M. Z. Jr., and B. Anderson. Boston, MA: Houghton Mifflin.

Fehr, Ernst and Simon Gachter. 2002. "Altruistic punishment in humans." *Nature* 415:137-140.

Festinger, Leon. 1954. "A Theory of Social Comparison Processes." *Human Relations* 7:117-140.

Folger, Robert and Robert J. Bies. 1989. "Managerial Responsibilities and Procedural Justice." *Employee Responsibilities & Rights Journal* 2:79-90.

Folger, Robert and Mary A. Konovsky. 1989. "Effects of Procedural and Distributive Justice on Reactions to Pay Raise Decisions." *The Academy of Management Journal* 32:115-130.

Forgas, Joseph P. 2011. "Can negative affect eliminate the power of first impressions? Affective influences on primacy and recency effects in impression formation." *Journal of Experimental Social Psychology* 47:425-429.

Frank, R.H. 1988. *Passions Within Reason: The Strategic Role of Emotions*. New York, NY: W.W. Norton.

Furnham, Adrian. 1986. "The Robustness of the Recency Effect: Studies Using Legal Evidence." *Journal of General Psychology* 113:351.

Goodman, Paul S. and Abraham Friedman. 1971. "An Examination of Adams' Theory of Inequity." *Administrative Science Quarterly* 16:271-288.

Granovetter, Mark. 1985. "Economic Action and Social Structure: The Problem of Embeddedness." *American Journal of Sociology* 91:481-510.

Greenberg, J. and K. S. Scott. 1996. "Why do employees bite the hands that feed them? Employee theft as a social exchange process." *Research in organizational behavior* 18:111-166.

Greenberg, Jerald. 1986. "Determinants of perceived fairness of performance evaluations." *Journal of Applied Psychology* 71:340-342.

Hegtvedt, Karen A. 1990. "The Effects of Relationship Structure on Emotional Responses to Inequity." *Social Psychology Quarterly* 53:214-228.

_____. 2006. "Justice Frameworks." in *Contemporary Social Psychological Theories*, edited by P. Burke. Stanford, CA: Stanford University Press.

Hegtvedt, Karen A., Jody Clay-Warner, and Cathryn Johnson. 2003. "The Social Context of Responses to Injustice: Considering the Indirect and Direct Effects of Group-Level Factors." *Social Justice Research* 16:343-366.

Hegtvedt, Karen A. and Karen S. Cook. 2001. "Distributive Justice: Recent Theoretical Developments and Applications." Pp. 93-132 in *Handbook of Justice Research in Law*, edited by J. Sanders and V. L. Hamilton. New York, NY: Springer.

Hegtvedt, Karen A. and Caitlin Killian. 1999. "Fairness and Emotions: Reactions to the Process and Outcomes of Negotiations." *Social Forces* 78:269-302.

Hegtvedt, Karen A. and Barry Markovsky. 1995. "Justice and Injustice." Pp. 257-280 in *Sociological Perspectives on Social Psychology*, edited by K. S. Cook, G. A. Fine, and J. S. House. Needham Heights, MA: Allyn and Bacon.

Hegtvedt, Karen A., Elaine A. Thompson, and Karen S. Cook. 1993. "Power and Equity: What Counts in Attributions for Exchange Outcomes?" *Social Psychology Quarterly* 56:100-119.

Homans, George C. 1961. *Social behavior: its elementary forms*. New York, NY: Harcourt.

_____. 1974. *Social behavior; its elementary forms* (Rev. ed). New York, NY: Harcourt.

Jasso, Guillermina. 1978. "On the Justice of Earnings: A New Specification of the Justice Evaluation Function." *American Journal of Sociology* 83:1398-1419.

_____. 1980. "A New Theory of Distributive Justice." *American Sociological Review* 45:3-32.

Jasso, Guillermina and Peter H. Rossi. 1977. "Distributive Justice and Earned Income." *American Sociological Review* 42:639-651.

Jost, John T. and Aaron C. Kay. 2010. "Social Justice: History, Theory, and Research." Pp. 1112-1165 in *Handbook of Social Psychology*, vol. 2, edited by S. T. Fiske, D. T. Gilbert, and G. Lindzey. Hoboken, NJ: John Wiley and Sons.

Kahneman, Daniel. 1994. "New Challenges to the Rationality Assumption." *Journal of Institutional and Theoretical Economics* 150:18-36.

Kahneman, Daniel, Jack L. Knetsch, and Richard H. Thaler. 1990. "Experimental Tests of the Endowment Effect and the Coase Theorem." *Journal of Political Economy* 98:1325-1348.

_____. 1991. "Anomalies: The Endowment Effect, Loss Aversion, and Status Quo Bias." *The Journal of Economic Perspectives* 5:193-206.

Kahneman, Daniel and Amos Tversky. 1979. "Prospect Theory: An Analysis of Decision under Risk." *Econometrica* 47:263-291.

_____. 1984. "Choices, values, and frames." *American Psychologist* 39:341-350.

Kollock, Peter. 1993. ""An Eye for an Eye Leaves Everyone Blind": Cooperation and Accounting Systems." *American Sociological Review* 58:768-786.

Komorita, Samuel. S. and Jerome M. Chertkoff. 1973. "A bargaining theory of coalition formation." *Psychological Review* 80:149-162.

Komorita, Samuel. S. and C. D. Parks. 1996. *Social Dilemmas*. Boulder, CO: Westview Press.

Krehbiel, Patricia J. and Russell Cropanzano. 2000. "Procedural Justice, Outcome Favorability and Emotion." *Social Justice Research* 13:339-360.

Lawler, Edward J. 2001. "An Affect Theory of Social Exchange." *American Journal of Sociology* 107:321-352.

Lawler, Edward J. and Shane R. Thye. 1999. "Bringing Emotions into Social Exchange Theory." *Annual Review of Sociology* 25:217-244.

Lawler, Edward J., Shane R. Thye, and Jeongkoo Yoon. 2008. "Social Exchange and Micro Social Order." *American Sociological Review* 73:519-542.

Lawler, Edward J. and Jeongkoo Yoon. 1993. "Power and the Emergence of Commitment Behavior in Negotiated Exchange." *American Sociological Review* 58:465-481.

_____. 1996. "Commitment in Exchange Relations: Test of a Theory of Relational Cohesion." *American Sociological Review* 61:89-108.

Lawler, Edward J., Shane R. Thye, and Jeongkoo Yoon. 2000. "Emotion and Group Cohesion in Productive Exchange." *American Journal of Sociology* 106:616-657.

Lerner, Melvin J. 1974. "The justice motive: 'Equity' and 'parity' among children." *Journal of Personality and Social Psychology* 29:539-550.

_____. 1977. "The justice motive: Some Hypotheses as to its origins and forms." *Journal of Personality* 45:1-52.

Leventhal, Gerald S. 1980. "What Should Be Done with Equity Theory?" Pp. 27-55 in *Social Exchange*, edited by K. Gergen, M. Greenberg, and R. Willis. New York, NY: Springer.

Leventhal, Gerald S., Thomas Weiss, and Gary Long. 1969. "Equity, reciprocity, and reallocating rewards in the dyad." *Journal of Personality and Social Psychology* 13:300-305.

Lilly, Juliana, Meghna Virick, and Michael Hadani. 2010. "The Dynamic Nature of Justice: Influential Effects of Time and Work Outcomes on Long-Term Perceptions of Justice." *Social Justice Research* 23:37-59.

Lind, E. Allen and Tom R. Tyler. 1988. *The Social Psychology of Procedural Justice.* New York, NY: Springer.

LoBue, Vanessa, Tracy Nishida, Cynthia Chiong, Judy S. DeLoache, and Jonathan Haidt. 2011. "When Getting Something Good is Bad: Even Three-year-olds React to Inequality." *Social Development* 20:154-170.

Long, J.Scott. 1997. *Regression Models for Categorical and Limited Dependent Variables*. Thousand Oaks, CA: Sage Publications.

Lund, Frederick Hansen. 1925. "The psychology of belief: A study of its emotional, and volitional determinants." *The Journal of Abnormal and Social Psychology* 20:174-196.

Markovsky, Barry. 1985. "Toward a Multilevel Distributive Justice Theory." *American Sociological Review* 50:822-839.

_____. 1988a. "Anchoring Justice." *Social Psychology Quarterly* 51:213-224.

_____. 1988b. "Injustice and arousal." *Social Justice Research* 2:223-233.

Melamed, David, Hyomin Park, Jingwen Zhong, and Yue Liu. 2014. "Referent Networks and Distributive Justice." Pp.241 - 262 in *Advances in Group Processes* (vol. 31), editied by Shane R. Thye , Edward J. Lawler. Emerald Group Publishing Limited.

Miller, Dale T. 1999. "The norm of self-interest." *American Psychologist* 54:1053-1060.

Molm, Linda D. 1994. "Dependence and Risk: Transforming the Structure of Social Exchange." *Social Psychology Quarterly* 57:163-176.

Molm, Linda D., Gretchen Peterson, and Nobuyuki Takahashi. 2001. "The Value of Exchange." *Social Forces* 80:159-184.

_____. 2003. "In the Eye of the Beholder: Procedural Justice in Social Exchange." *American Sociological Review* 68:128-152.

Murdock, Bennet B., Jr. 1962. "The serial position effect of free recall." *Journal of Experimental Psychology* 64:482-488.

Murphy, Kristina. 2009. "Procedural Justice and Affect Intensity: Understanding Reactions to Regulatory Authorities." *Social Justice Research* 22:1-30.

Murphy, Kristina and Tom Tyler. 2008. "Procedural justice and compliance behaviour: the mediating role of emotions." *European Journal of Social Psychology* 38:652-668.

Niehoff, Brian P. and Robert H. Moorman. 1993. "Justice as a Mediator of the Relationship between Methods of Monitoring and Organizational Citizenship Behavior." *The Academy of Management Journal* 36:527-556.

Novemsky, Nathan and Daniel Kahneman. 2005. "The Boundaries of Loss Aversion." *Journal of Marketing Research* 42:119-128.

Orne, Martin T. 1962. "On the social psychology of the psychological experiment: With particular reference to demand characteristics and their implications." *American Psychologist* 17:776-783.

Panagopoulos, Costas. 2011. "Timing Is Everything? Primacy and Recency Effects in Voter Mobilization Campaigns." *Political Behavior* 33:79-93.

Rawls, John. 1971. *A theory of justice.* Cambridge, MA: Harvard University Press.

Rozin, Paul and Edward B. Royzman. 2001. "Negativity Bias, Negativity Dominance, and Contagion." *Personality and Social Psychology Review* 5:296-320.

Singer, Judith D. 1998. "Using SAS PROC MIXED to Fit Multilevel Models, Hierarchical Models, and Individual Growth Models." *Journal of Educational and Behavioral Statistics* 23:323-355.

Singleton, Royce A. and Bruce C. Straits. 2005. *Approaches to Social Research*. New York, NY: Oxford University Press.

Solomon, Robert C. and Mark C. Murphy. 2000. *What Is Justice?: Classic and Contemporary Readings*: Oxford University Press, Incorporated.

Sunshine, Jason and Tom R. Tyler. 2003. "The Role of Procedural Justice and Legitimacy in Shaping Public Support for Policing." *Law & Society Review* 37:513-548.

Tabibnia, Golnaz, Ajay B. Satpute, and Matthew D. Lieberman. 2008. "The Sunny Side of Fairness: Preference for Fairness Activates Reward Circuitry (and Disregarding Unfairness Activates Self-Control Circuitry)." *Psychological Science* 19:339-347.

Thaler, Richard. 1980. "Toward a positive theory of consumer choice." *Journal of Economic Behavior & Organization* 1:39-60.

Thibaut, John and Laurens Walker. 1975. *Procedural Justice: A Psychological Analysis.* Hillsdale, NJ: Lawrence Erlbaum Associates.

_____. 1978. "A Theory of Procedure." *California Law Review* 66:541-566.

Thibaut, John, Laurens Walker, Stephen LaTour, and Pauline Houlden. 1974. "Procedural Justice as Fairness." *Stanford Law Review* 26:1271-1289.

Thye, Shane R. 2007. "Logical and Philosophical Foundation of Experimental Research in the Social Science." in *Laboratory Experiments in the Social Sciences,* edited by M. Webster and J. Sell. Burlington, MA: Elsevier.

Turner, Jonathan. 2007. "Justice and Emotions." *Social Justice Research* 20:288-311.

Tversky, Amos and Daniel Kahneman. 1974. "Judgment under Uncertainty: Heuristics and Biases." *Science* 185:1124-1131.

_____. 1981. "The Framing of Decisions and the Psychology of Choice." *Science* 211:453-458.

_____. 1991. "Loss Aversion in Riskless Choice: A Reference-Dependent Model." *The Quarterly Journal of Economics* 106:1039-1061.

Tyler, Tom R. 1989. "The psychology of procedural justice: A test of the group-value model." *Journal of Personality and Social Psychology* 57:830-838.

_____. 1990. *Why People Obey the Law*. New Haven, CT: Yale University Press.

_____. 2010. *Why People Cooperate: The Role of Social Motivations*. Princeton, NJ: Princeton University Press.

Tyler, Tom R. and E. Allen Lind. 2001. "Procedural justice." Pp. 65-92 in *Handbook of Justice Research in Law,* edited by J. Sanders and V. L. Hamilton. Dordrecht Netherlands: Kluwer Academic Publishers.

van den Bos, Kees, E. Allan Lind, Riël Vermunt, and Henk A. M. Wilke. 1997. "How do I judge my outcome when I do not know the outcome of others? The psychology of the fair process effect." *Journal of Personality and Social Psychology* 72:1034-1046.

van Prooijen, Jan-Willem, David De Cremer, Ilja van Beest, Tomas Ståhl, Marius van Dijke, and Paul A. M. Van Lange. 2008. "The egocentric nature of procedural justice: Social value orientation as moderator of reactions to decision-making procedures." *Journal of Experimental Social Psychology* 44:1303-1315.

VanYperen, Nico W., Mariët Hagedoorn, Michiel Zweers, and Saapke Postma. 2000. "Injustice and Employees' Destructive Responses: The Mediating Role of State Negative Affect." *Social Justice Research* 13:291-312.

Walker, Henry A. and Bernard P. Cohen. 1985. "Scope Statements: Imperatives for Evaluating Theory." *American Sociological Review* 50:288-301.

Walster, Elaine, Ellen Berscheid, and G. William Walster. 1973. "New directions in equity research." *Journal of Personality and Social Psychology* 25:151-176.

Walster, Elaine H., G. William Walster, and Ellen Berscheid. 1978. *Equity: theory and research*. Boston, MA: Allyn and Bacon.

Walzer, Michael. 1983. *Spheres of Justice: a Defense of Pluralism and Equality*. New York, NY: Basic Books.

Wayne, Sandy J., Lynn M. Shore, and Robert C. Liden. 1997. "Perceived Organizational Support and Leader-Member Exchange: A Social Exchange Perspective." *Academy of Management Journal* 40:82-111.

Weiss, Howard M., Kathleen Suckow, and Russell Cropanzano. 1999. "Effects of justice conditions on discrete emotions." *Journal of Applied Psychology* 84:786-794.

Zelditch, Morris. 1969. "Can You Really Study an Army in the Laboratory?" in *Sociological Reader on Complex Organizations*, edited by A. Etzioni. New York, NY: Holt, Rinehart & Winston.

Zelditch, Morris, Joseph Berger, Bo Anderson, and Bernard P. Cohen. 1970. "Equitable Comparisons." *The Pacific Sociological Review* 13:19-26.

APPENDIX A – KGSS 2008 QUESTIONNAIRE

Demographic Variables

Now I would like to ask about your family members. Please include all family members who are living in your house and who are temporarily living somewhere else. Answer the following questions beginning with yourself.
(Write down the person's relationship to the respondent first, and then ask the person's sex, age, marital status, co-residence status, the reason for living elsewhere, employment status, and the reason for not working. make sure to ask about each and everyone counted in questions 34, 35 and 36 above.)

1) Relation to respondent
2) Is [PERSON] male or female?
3) How old is [PERSON]?
4) Is [PERSON] now married, widowed, divorced, separated, cohabiting, or never married?
5) Is [PERSON] living in your house, or is [PERSON] staying somewhere else?
6) (IF [PERSON] IS TEMPORARILY STAYING ELSEWHERE) What is the primary reason for not living together?

What is the highest level of school you have attended?

0) No formal school
1) Elementary school
2) Junior high school
3) High school
4) Junior college
5) College (Four-year course)
6) Graduate school (Masters)
7) Graduate school (PhD)

Do you work for someone else?

1) Yes
2) No

Before taxes and other deductions, what is your total monthly average income from this job? This includes your base pay, bonuses, and other allowances. (If the respondent does not have a regular monthly income (ex. farmer), then divide the estimated annual income by 12. About _____ (10,000) won (88) don't know

Social Class

In our society there are groups which tend to be towards the top and groups which tend to be towards the bottom. Below is a scale that runs from top (10) to bottom (1). Where would you put yourself now on this scale?

_____

Arbitrariness

To what extent do you agree or disagree that the decisions on personnel policy (e.g., pay and promotions) occur in the following ways in your company?

The decision making is affected by decision makers' prejudices and sentiments.

1) Strongly agree 2) Agree
3) Neither agree nor disagree 4) Disagree
5) Strongly Disagree

The rules and principles of decision making are not consistent.

1) Strongly agree 2) Agree
3) Neither agree nor disagree 4) Disagree
5) Strongly Disagree

Justice Evaluation

Is your pay just? I am not asking about what you do earn, nor what you would like to earn--but what you feel is just given your skills and effort. If you are not working now, please tell about your last occupation

1) Much less than is just 2) A little less than is just
3) About just for me 4) A little more than is just
5) Much more than is just

Willingness to work hard

I am willing to work harder than I have to in order to help the firm or organization I work for succeed.

1) Strongly agree 2) Agree
3) Neither agree nor disagree 4) Disagree
5) Strongly Disagree

Willingness to Stay

I would turn down another job that offered quite a bit more pay in order to stay with this organization.

1) Strongly agree 2) Agree
3) Neither agree nor disagree 4) Disagree
5) Strongly Disagree

APPENDIX B – THE RESULTS OF BRANT TEST FOR THE PROPORTIONAL ODDS ASSUMPTION

Table B.1 Brant Test for Table 4.2 – Model 2

Justice Evaluations	Chi^2	$p > Chi^2$	d.f.
All	13.23	.584	15
Age	2.25	.522	3
Education	2.48	.480	3
Income	1.11	.774	3
Social Class	4.95	.176	3
No Arbitrariness	.62	.892	3

Table B.2 Brant Test for Table 4.2 – Model 3

Justice Evaluations	Chi^2	$p > Chi^2$	d.f.
All	12.59	.634	15
Age	1.00	.800	3
Education	1.61	.657	3
Income	1.38	.711	3
Social Class	4.42	.219	3
Consistency	.79	.852	3

Table B.3 Brant Test for Table 4.3 – Model 2

Staying	Chi^2	$p > Chi^2$	d.f.
All	39.11	.022	21
Female	3.27	.352	3
Age	1.91	.591	3
Education	1.84	.606	3
Income	1.88	.597	3
Social Class	.31	.312	3
Married	.42	.419	3
No Arbitrariness	2.35	.861	3

Table B.4 Brant Test for Table 4.3 – Model 3

Staying	Chi^2	$p > Chi^2$	d.f.
All	39.55	.008	21
Female	3.38	.336	3
Age	2.12	.549	3
Education	2.08	.555	3
Income	1.93	.587	3
Social Class	3.5	.321	3
Married	3.05	.384	3
Consistency	7.18	.066	3

Table B.5 Brant Test for Table 4.4 – Model 2

Working Hard	Chi^2	$p > Chi^2$	d.f.
All	22.36	.379	21
Female	1.23	.745	3
Age	.96	.812	3
Education	2.03	.567	3
Income	2.36	.501	3
Social Class	11.98	.007	3
Married	2.69	.448	3
No Arbitrariness	.47	.924	3

Table B.6 Brant Test for Table 4.3 – Model 3

Working Hard	Chi^2	$p > Chi^2$	d.f.
All	22.42	.376	21
Female	1.26	.738	3
Age	.98	.805	3
Education	2.03	.567	3
Income	2.49	.476	3
Social Class	11.90	.008	3
Married	2.66	.447	3
Consistency	.64	.886	3

APPENDIX C – THE COVER STORY AND THE QUESTIONNAIRE FOR THE EXPERIMENTS

Instructions

We are members of a research team of social scientists who are interested in studying group cooperation. In today's study, you will belong to a task group. In that group, you will be randomly assigned to the role of decider (manager) or contributor (programmer)

Let's assume the following situation: There are freelance computer programmers who are now working alone. A computer program company finds out that there are demands for a bunch of new computer programs in the market and the programmers are able to develop the programs. The company suggest that the programmers develop the new programs together. It will guarantee better profits to the programmers than if developed and sell the program by themselves, because the company will advertise and ensure mass distribution. Thus, the programmers decide to work together in the company.

To develop the programs, the programmers will decide how much time and skill they will invest in the project. This amount will be represented by *"resource unit (RU)"* in this experiment. After they develop each program, the company sells it on the market on behalf of the programmers. Then the manager of the company will distributed the revenues on the programmers.

In this study, one group is composed of 4 participants who are randomly assigned to two different roles: a manger and a programmer. Only one participants will be assigned to the manager's role. If you assigned to be a manager, you will not be involved in developing computer programs. But after each program is developed through the programmers' investments, the manager will divided the revenue among the programmers according to

the amount of work they invested in the program. As a manager, you will be informed of all programmers' investments levels in the task. Thus, you can use this information in deciding reward allocations.

The rest of the participants will be assigned to a programmer's role. If you are assigned to be a programmer, you are supposed to develop a new program in each session with your RUs(resource units) which represents your time and skills that are ready to invest. You will start every session with some initial RUs. After investment, you will get paid from the participant who is assigned to the manager's role. You are only able to know about your own investment and reward information. The other programmer's level of investments a rewards will be unknown.

Now, let's begin with the study with assigning your role. Please wait while the experimenter is randomly assigning the roles of each participants…. You are assigned to a programmer's role. You are programmer 2 (P2).

Let's talk more about the programmer's role. Each programmer has 500RUs in each session that can be invested to develop a new program. The products developed by you and other programmers will be sold in market by the manager's effort, and will bring 1.5(150%) times higher revenue to the company. The participant who is assigned to be a manager is supposed to decide your payment. The company's payment guideline recommends that the invested group RUs from the programmers will be multiplied by 1.3(130%) and returned back to the programmers. However, it is the manager who finally decides programmers' payments, and your payment can vary according to the manager's decision. The rest of the profit: *total revenue – programmers' payment*, will be the payment for the manager.

While the manager has final say over payment amounts from investment, programmers can decide how much to invest from their RUs. You can keep the RUs not invested in the group task. The programmers will develop several different programs and will be asked to decide their investment in each time.

Importantly, your total RUs will be converted in to real money with at the end of the experiment and paid to you. That is, you will paid for the RUs that you do not invest and for your payments from investments throughout the experiment. The RUs you earn from this experiments will be rounded up to the nearest thousandth and converted to $1 per 1000 RUs. For example, if you earn 6200RUs, you will get $7.

Quizzes (Bolds are the right answers)

How many people are in your group?

1 person 3 people **4 people** 5 people

How many programmers are in your group?

1 programmer 3 programmers
4 programmers 5 programmers

You are assigned to be _____.

A manager **A programmer**
An experimenter Neither of them

According to the company's guidelines, each programmer's invested RUs will be multiplied by about _____ times and returned to the programmer.

1.0 times **1.3 times**
1.5 times 2.0 times

If you invest in 400RUs to develop the program, how much RUs would you expect to earn from the company?

360 RUs 400 RUs
520 RUs 600 RUs

Questionnaire (Each set of questionnaire was administered after each trial)

My Payment form the company were

Very Unjust 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 Very Just

How angry do you feel about your returns on investments?

Not angry at all 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 Very angry

How satisfied do you feel about your returns on investments?

Not satisfied at all 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 Very satisfied

How resentful do you feel about your returns on investments?

Not resentful at all 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 Very resentful

How disappointed do you feel about your returns on investments?

Not disappointed at all 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 Very disappointed

If another company were to offer you another position, which is expected to pay a little more, would you want to switch jobs?

No 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 Yes

APPENDIX D – MULTI-LEVEL MODEL SELECTION

This appendix presents a series of model specifications which are used for analyses in chapter 5. The preferred model in each specification is highlighted in gray.

Table D.1 Summary of Multi-level Models predicting Justice Evaluations

Justice Evaluations	-2LL	# of Parameter	Chi^2	d.f.	*p*-value
Null Model	6367.4	1			
Manipulation	5888.7	2	478.7	1	< .001
Condition	6342.7	4			
$M^1 + C^2$	5851.5	5	491.2	1	< .001
M + C + M×C	5762.6	8	88.9	3	< .001
Full Model	5769.0	14			

[1] Manipulation of Rewards
[2] Condition

Table D.2 Summary of Multi-level Models predicting Anger

Anger	-2LL	# of Parameter	Chi^2	d.f.	*p*-value
Null Model	6334.7	1			
Manipulation	5751.3	2	583.4	1	< .001
Condition	6299.2	4			
$M^1 + C^2$	5693.1	5	606.1	1	< .001
M + C + M×C	5581.8	8	111.3	3	< .001
Full Model	5581.9	14			

[1] Manipulation of Rewards
[2] Condition

Table D.3 Summary of Multi-level Models predicting Disappointment

Disappointment	-2LL	# of Parameter	Chi^2	d.f.	*p*-value
Null Model	6459.5	1			
Manipulation	5803.8	2	655.7	1	< .001
Condition	6429.5	4			
$M^1 + C^2$	5751.6	5	677.9	1	< .001
M + C + M×C	5564.9	8	186.7	3	< .001
Full Model	5558.1	14	6.8	9	.658

[1] Manipulation of Rewards
[2] Condition

Table D.4 Summary of Multi-level Models predicting Resentment

Resentment	-2LL	# of Parameter	Chi^2	d.f.	*p*-value
Null Model	6267.6	1			
Manipulation	5802.5	2	465.1	1	< .001
Condition	6250.6	4			
$M^1 + C^2$	5777.0	5	473.6	1	< .001
M + C + M×C	5696.4	8	80.6	3	< .001
Full Model	5690.8	14	5.6	9	.779

[1] Manipulation of Rewards
[2] Condition

Table D.5 Summary of Multi-level Models predicting Satisfaction

Satisfaction	-2LL	# of Parameter	Chi^2	d.f.	*p*-value
Null Model	6476.5	1			
Manipulation	5749.8	2	726.7	1	< .001
Condition	6449.5	4			
$M^1 + C^2$	5699.9	5	749.6	1	< .001
M + C + M×C	5499.8	8	200.1	3	< .001
Full Model	5493.5	14	6.3	9	.710

[1] Manipulation of Rewards
[2] Condition

Table D.6 Summary of Multi-level Models predicting Investment (with the trial)

Invest	-2LL	# of Parameter	Chi^2	d.f.	*p*-value
Null Model	15660.8	1			
Condition	15579.3	4	81.5	3	< .001
Trial	15513.5	15	63.8	11	< .001
$T^1 + C^2$	15429.6	18	85.9	3	< .001
T + C + T×C	15173.4	60	256.2	42	< .001
Full Model	15103.2	66	70.2	6	< .001

[1] Trial
[2] Condition

Table D.7 Summary of Multi-level Models predicting Staying Behavior

Staying	-2LL	# of Parameter	Chi^2	d.f.	*p*-value
Null Model	6507.9	1			
Manipulation	6360.2	2	147.7	1	< .001
Condition	6473.6	4			
$M^1 + C^2$	6321.1	5	152.5	1	< .001
M + C + M×C	6280.5	8	40.6	3	< .001
Full Model	6236.7	14	43.8	9	< .001

[1] Manipulation of Rewards
[2] Condition

Table D.8 Specifying Covariance Structure of the Model predicting Justice Evaluations

Justice Evaluations	-2LL	# of parameters	Chi^2	d.f.	*p*-value
UN	4823.0	105			
Ante(1)	5471.7	27	648.7	78	< .001
AR(1)	5706.0	2	883.0	103	< .001
ARH(1)	5655.4	15	832.4	90	< .001
ARMA(1,1)	5587.0	3	764.0	102	< .001
CS	5587.1	2	764.1	103	< .001
CSH	5533.4	15	710.4	90	< .001
TOEP	5176.4	14	353.4	91	< .001
TOEPH	5371.1	27	548.1	78	< .001
VC	5762.6	1	939.6	104	< .001

Table D.9 Specifying Covariance Structure of the Model predicting Anger

Anger	-2LL	# of parameters	Chi^2	d.f.	*p*-value
UN	4583.8	105			
Ante(1)	5173.3	27	589.5	78	< .001
AR(1)	5484.2	2	900.4	103	< .001
ARH(1)	5287.6	15	703.8	90	< .001
ARMA(1,1)	5330.7	3	746.9	102	< .001
CS	5330.9	2	747.1	103	< .001
CSH	5146.6	15	562.8	90	< .001
TOEP	5164.4	14	580.6	91	< .001
TOEPH	5004.2	27	420.4	78	< .001
VC	5581.8	1	998.0	104	< .001

Table D.6 Specifying Covariance Structure of the Model predicting Disappointment

Disappointment	-2LL	# of parameters	Chi^2	d.f.	*p*-value
UN	4677.0	105			
Ante(1)	5154.7	27	477.7	78	< .001
AR(1)	5458.0	2	781.0	103	< .001
ARH(1)	5291.7	15	614.7	90	< .001
ARMA(1,1)	5330.3	3	653.3	102	< .001
CS	5337.1	2	660.1	103	< .001
CSH	5188.9	15	511.9	90	< .001
TOEP	5199.3	14	522.3	91	< .001
TOEPH	5062.7	27	385.7	78	< .001
VC	5564.9	1	887.9	104	< .001

Table D.7 Specifying Covariance Structure of the Model predicting Resentment

Resentment	-2LL	# of parameters	Chi^2	d.f.	*p*-value
UN	4728.5	105			
Ante(1)	5270.2	27	541.7	78	< .001
AR(1)	5567.4	2	838.9	103	< .001
ARH(1)	5389.2	15	660.7	90	< .001
ARMA(1,1)	5388.9	3	660.4	102	< .001
CS	5389.0	2	660.5	103	< .001
CSH	5217.3	15	488.8	90	< .001
TOEP	5248.7	14	520.2	91	< .001
TOEPH	5092.0	27	363.5	78	< .001
VC	5696.4	1	967.9	104	< .001

Table D.8 Specifying Covariance Structure of the Model predicting Satisfaction

Satisfaction	-2LL	# of parameters	Chi^2	d.f.	*p*-value
UN	4745.7	105			
Ante(1)	5197.6	27	451.9	78	< .001
AR(1)	5412.4	2	666.7	103	< .001
ARH(1)	5211.5	15	465.8	90	< .001
ARMA(1,1)	5285.7	3	540.0	102	< .001
CS	5286.8	2	541.1	103	< .001
CSH	5211.5	15	465.8	90	< .001
TOEP	5004.0	14	258.3	91	< .001
TOEPH	5138.9	27	393.2	78	< .001
VC	5499.8	1	754.1	104	< .001

Table D.9 Specifying Covariance Structure of the Model predicting Investment

Investment	-2LL	# of parameters	Chi^2	d.f.	*p*-value
UN	14481.7	105			
Ante(1)	14739.3	27	257.6	78	< .001
AR(1)	14820.2	2	338.5	103	< .001
ARH(1)	14773.4	15	291.7	90	< .001
ARMA(1,1)	14688.7	3	207.0	102	< .001
CS	14724.9	2	243.2	103	< .001
CSH	14686.4	15	204.7	90	< .001
TOEP	14666.2	14	184.5	91	< .001
TOEPH	14624.9	27	143.2	78	< .001
VC	15103.2	1	621.5	104	< .001

Table D.10 Specifying Covariance Structure of the Model predicting Staying

Staying	-2LL	# of parameters	Chi^2	d.f.	*p*-value
UN	4912.2	105			
Ante(1)	5505.4	27	593.2	78	< .001
AR(1)	5703.9	2	791.7	103	< .001
ARH(1)	5634.9	15	722.7	90	< .001
ARMA(1,1)	5426.7	3	514.5	102	< .001
CS	5461.9	2	549.7	103	< .001
CSH	5423.8	15	511.6	90	< .001
TOEP	5353.1	14	440.9	91	< .001
TOEPH	5307.0	27	394.8	78	< .001
VC	6236.7	1	1324.5	104	< .001

These present a series of model specifications which are used for analyses in chapter 6. The preferred model in each specification is highlighted in gray.

Table D.11 Summary of Multi-level Models predicting Justice Evaluations

Justice Evaluations	-2LL	# of Parameter	Chi^2	d.f.	*p*-value
Null Model	10910.8	1			
P + R + P×R	10889.4	9	21.4	8	.006
Full	10897.9	15	12.9	14	.534

Table D.12 Specifying Covariance Structure of the Model predicting Justice Evaluations

Justice Evaluations	-2LL	# of parameters	Chi^2	d.f.	*p*-value
UN	8391.0	171			
Ante(1)	8969.0	35	578.0	78	< .001
AR(1)	9461.6	2	1070.6	103	< .001
ARH(1)	9303.2	19	912.2	90	< .001
ARMA(1,1)	9453.7	3	1062.7	102	< .001
CS	10794.4	2	2403.4	103	< .001
CSH	10183.8	19	1792.8	90	< .001
TOEP	9300.1	18	909.1	91	< .001
TOEPH	9165.9	35	774.9	78	< .001
VC	10889.4	1	2498.4	104	< .001