Chapter 5

Preferences and Cognitive Processes in Interdependence Situations: A Theoretical Analysis of Cooperation

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In everyday life there are many social situations in which an action taken by one party (i.e., a person or a group) influences another's outcomes or well-being. Situations differ with respect to the amount and type of that influence. At one extreme of a continuum we may posit *dependence* situations; at the other extreme, *interdependence* situations. In dependence situations the first party influences the second, but the second does not influence the first. If social situations are analyzed on the basis of external, observable outcomes, helping behavior or charity-giving would be good examples of dependence situations. (A helper can influence a person helped, but the latter does not influence the helper's outcomes—at least not in a visible way.) In social interdependence situations all parties' actions affect their own outcomes as well as the outcomes of others. Examples of interdependence include the sharing of household chores between roommates, contributing to a collaborative research project, and conserving energy or other social resources.

The analysis of people's behavior in interdependence situations usually focuses on two basic problems: (*a*) When do people cooperate or sacrifice their own profits to benefit others; and (*b*) what rules do people apply in their decision making, and are these rules rational or irrational? In at-

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tempting to answer these questions, psychologists have relied heavily on concepts derived from the theory of decision making, especially game theory. The game theory approach assumes that individuals are rational in the sense that they try to maximize the subjective utility or value of outcomes. The most common psychological interpretation of this assumption is that every individual tries to maximize his or her own gains.

Critics have become increasingly skeptical of the value of game theory or, at least, of its psychological interpretation. People frequently do not follow game theory prescriptions about the best solutions even in the simplest situations, as in games with dominating strategies (e.g., prisoner's dilemma or some no-conflict games). Three reasons may be suggested for the failure of the game theory approach to predict behavior in interdependence situations:

First, it is an oversimplification of human motivation to assume that people maximize only their own gains in interdependence situations. There is a tendency to assume that if a game has a dominating strategy, rational behavior will consist in selecting that strategy. It is difficult to believe that people erroneously choose a solution that is worse than other available ones. However, rather than suspect people of irrationality when they select a dominated strategy, it may be worthwhile to assume that they seek out values other than to maximize their own absolute gains. This issue will be discussed in greater detail later in the chapter.

Second, departures from optimal solutions, especially in relatively complex situations, may occur because subjects apply maximization rules that have not been incorporated into decision making theory. A plausible interpretation for a large portion of choices in *n*-person games is that individuals use some very simplified ways of maximizing utility, such as assuming that their partners will choose certain strategies and then choosing the best responses to those strategies (Grzelak, Iwinski, & Radzicki, 1977). (For other discussions of this issue see de Zeeuw & Wagenaar, 1974; Grzelak, 1976, 1978; Kozielecki, 1975; Tyszka & Grzelak, 1976.)

Third, people's social knowledge and their perceptions of the actual degree of interdependence may influence their behavior. Decision theory itself has not considered how a variety of transformational processes, perceptions of partners' characteristics, perceptions of the task, etc., influence people's behavior.

In sum, people's reactions to conflict situations may be understood in terms of differences in their (*a*) structures of values, (*b*) preferred maximization rules, and (*c*) subjective interpretations of the entire decision-making situation.

Recently psychologists have been developing new and more sophisticated

approaches to interdependence. These theories are frequently based on either a reinterpretation of the utility concept (e.g., the social motivation approach) or an emphasis on the cognitive mechanisms underlying behavior in interdependence situations. We will argue that both motivational and cognitive factors are necessary to account for behavior in interdependence situations.

The following major ideas will be discussed in this chapter:

1. Human preferences (social motivation) determining the subjective value of outcomes in any given interdependence situation are fairly complex and multidimensional. The structure of preferences is related to two basic aspects of interdependence: (*a*) the distribution of outcomes among the parties involved, and (*b*) the distribution of control or power among the parties.
2. A strong relationship exists between an individual's preferences and his or her information processing.
3. Interpersonal differences in preferences and information processes produce different systems of social knowledge and different subjective interpretations of any given social situation.
4. These differences in preferences, social knowledge, and subjective interpretations account for the observed variety in people's reactions to social interdependence. These differences may also have important implications for the analysis of human rationality, of social influence, etc.

In the next section some basic beliefs underlying our approach are presented. After that, we discuss the structure of social motivation (or structure of preferences), the relationship between preferences and the perception of interdependence, and finally, the relationship between preferences and behavior.

Basic Assumptions

Although it is difficult to describe all the assumptions that underlie our approach, some general beliefs about human nature and the social world should be stated explicitly. Attempts to specify such basic beliefs seem worthwhile, particularly at a relatively early stage of theory development.

1. *For any two outcomes an individual is either indifferent (if the outcomes are not important) or prefers one over the other.*[1] An individual tries to gain

[1] The term *outcome* is used here in a very broad sense. It includes external outcomes (e.g., money, prestige, fatigue, etc.) as well as internal ones (e.g., satisfaction from complying with someone's norms, or standards).

some outcomes and to avoid others. The subjective value, or subjective utility, of any outcome for a person can be inferred from these preferences if they are sufficiently consistent.

2. *Individuals are basically rational; they tend to maximize the subjective value associated with the consequences of their actions.* Persons try to select actions that bring about the most preferred outcomes, that is, those associated with the highest subjective value.[2] We assume that "selfless" motivation does not exist and that people invariably try to maximize their own interests. People of course may differ in the way they construe their self-interest. People's actual behavior may occasionally depart from what appears to be the best way of maximizing their interests. In general, though, all behavior attempts to gain the most valuable outcomes for individuals.

3. *Individuals' attempts to maximize their interests are mediated by a subjective, cognitive interpretation of the social situation.* Individuals interpret and transform pieces of information on the basis of the unique system of meanings that they develop throughout their lives. This system includes individuals' knowledge of others, of social settings, and of social norms.

Relatively automatic and impulsive behavior is possible. However, we believe that behavior (with the exception of unconditioned responses) is or at least at some point in the past was mediated by information processing. This processing includes one's recognition of the structure of interdependence, inferences about partner's characteristics, thoughts about the best way to maximize one's interests, and so forth. This analysis implies that even in the case of seemingly impulsive and automatic behavior, an adequate explanation requires knowledge of the behavior's cognitive antecedents.

The perfect rationality of all players that is posited by game theory implies that players' rules of interest maximization depend only on the structure of interdependence. Everyday experience does not support this view. Our behavior may vary as a function of how we perceive the partner as well as of what we believe is acceptable behavior in the given situation. Thus we use different strategies for solving interdependence problems based on the structure of interdependence (as perceived by the individual) as well as on the interpretation of the partner's and the social situation's characteristics.

4. *The behavior of individuals depends on both their intellectual ability and their repertory of skills.* Given the complexity of many social situations, information processing is necessary to comprehend the situation and to

[2] We will use the broader term, *subjective value* of outcomes, rather than *subjective utility* of outcomes since the measures of preferences employed in our studies often fail to satisfy all the requirements imposed by mathematical utility theory (von Neuman & Morgenstern, 1953).

select the best action. Thus, among other factors, individuals' intellectual levels contribute to their success in maximizing goals (see Mischel, 1973).

5. *The maximization of one's interests often requires coaction with others.* Individuals frequently are not self-sufficient in satisfying their needs. Some preferred outcomes can be obtained only by the joint action of two or more parties (e.g., conceiving a child requires joint action by a male and a female). Individual differences in preferred outcomes and in resources make exchanges with others valuable as a means of obtaining desirable outcomes. For instance, a babysitter provides services that are considered valuable by parents who, in turn, provide money to the babysitter.

6. *The maximization of outcomes by one individual often affects the maximization of outcomes by others (in terms of probability and amount).* Examples include the mutual dependence of individuals on energy and other material resources.

Statements 5 and 6 indicate that social interdependence is an important and inevitable property of social life. Individuals' outcomes depend not only on their own actions but on the actions taken by other members of their group, community, or society. In some cases individuals have the same or corresponding preferences for outcomes. In other cases, individuals have different or at least not entirely corresponding preferences. When individuals disagree about their most preferred outcomes, we have a situation with high conflict of interests.

Individuals are motivated to maximize their own interests. Hence, high conflict situations may induce competitive and exploitive behaviors that could destroy existing social structures or exhaust social resources. As a result, groups impose restrictions (by means of both informal norms and legislation) on the amount of goods individuals can obtain and/or on the way these goods can be obtained. These rules serve to reduce socially undesirable outcomes like violence, aggression, and the destruction of social structures and, at the individual level, to reduce uncertainty about how much and under what conditions persons can gain what they want. Social norms about input–output distributions among members in any social structure seem to derive from a concern about conflict in situations of social interdependence.

Structure of Preferences

It is assumed that individuals seek to obtain the most valuable outcomes. However, individuals may use different criteria to evaluate the consequences

of their actions. First, the quality of preferred outcome varies among individuals (e.g., someone may prefer making money to enjoying family happiness, or vice versa). Second, people evaluate not only specific outcomes but whole actions or strategies, especially in the light of the social approval and moral value they assign to such actions. Their preferences vary according to their concern for and knowledge about what is "good" and what is "bad" to do in a particular social setting. Third, the subjective value resulting from any combination of choices in an interdependence situation depends on how these outcomes are shared between the individual and others. Fourth, preferences vary depending on whether gains are brought about by an individual's own action or by the actions of others. We will focus on the third and fourth of these criteria since they embody the most prominent features of an interdependence situation.

Outcome Preferences

We have noted that the diversity of behavior in interdependence situations is partly due to differences in individuals' preferences for outcomes. People differ in how they define their self-interest (i.e., in what they consider suitable criteria for subjective evaluations of available outcomes). People's preferences about outcome distributions for themselves and others seem to reflect individualistic tendencies (to maximize one's own gains), concern for partner's gains (to maximize or minimize the partner's gains), and concern for relative differences between one's own and the partner's outcomes (to maximize that difference). Thus, individuals' subjective value, or utility, of outcomes consists of many components. (The notion that utility is a function of more than the one variable of the individual's own gain has been developed theoretically and empirically confirmed by many researchers, including: Grzelak *et al.*, 1977; MacCrimmon & Messick, 1976; McClintock & McNeel, 1967; McClintock & Van Avermaet, Chapter 3, this volume; Messick & Thorngate, 1967; Pruitt, 1970; and Radzicki, 1976.)

Control Preferences

The idea of control as a value was inspired by a number of theories. Ultimately, it seemed justified by our inability to predict people's behavior from their outcome preferences and expectations about partners (Kranas, 1977). This failure could be explained in many ways. For one thing, outcome preferences do not provide sufficient information about an individual's interests, that is, about what he or she tries to maximize. Interdependence situations not only differ in the magnitude and distribution of outcomes as a consequence of the choices made by all the parties, they also differ

in how much and to what extent each party can control his or her own and other parties' outcomes (Kelley & Thibaut, 1978). In every interdependence situation each party has a certain level of control over its own outcomes and the other party's outcomes, as determined by the payoff structure. The amount or level of that control can be defined, as proposed by Kelley and Thibaut (1978), by the magnitude of the difference in own and others' outcomes that the party can produce by changing from one strategy to another. Control in the simplest, two-person situation can thus be described, from an individual's point of view, in terms of individuals' control of their own outcomes; partners' control of their own outcomes; individual's control of the partner's outcomes; and partner's control of the individual's outcomes.[3]

Theoretically these dimensions are independent, though in real life situations one party's high control over one domain of outcomes often implies low control by the other party over the same domain. My high control over my own outcomes frequently means that others have low control over my outcomes.

Kelley and Thibaut's (1978) theory of interdependence provides an elegant and comprehensive analysis of control. The present chapter offers a simpler analysis based on the four dimensions just listed. We postulate that it matters to people who controls what outcomes in any given situation. In other words, people care about the characteristics of any given situation in terms of each of the four dimensions. Individuals may like or dislike the opportunity to control their own outcomes (positive or negative self-control preferences), like or dislike controlling partners' outcomes (power preferences), like or dislike partners' ability to control their own outcomes (preferences for partners' self-control), and, finally, like or dislike partners' ability to affect their own outcomes (preferences for partners' power).

We further postulate that people are sensitive not only to the amount of control they and their partners have over outcomes but to relative differences in control exercised by themselves and their partners. For instance, some people may try to gain more control over their own and/or partner's outcomes than the partner has himself, whereas other people value highly equitable distributions of control above all else. Thus within each domain of outcomes (own or partner's) we can speak of the value of equity in control (or simply of "partnership").

Individuals can satisfy their preferences by moving from one situation to another, as in the following examples or, in a given situation, by choosing

[3] For the sake of simplicity we have not considered a control based on *coordination* of moves taken by the parties (i.e., *behavioral control*, in Kelley's and Thibaut's theory). We do not believe that this type of control plays a crucial role in individuals' preferences.

actions that maximize their specific needs for control. If party A has strong preferences *only* for his or her own self-control or independence, the two examples (1 and 2) presented in Table 5–1 should have about the same high positive value for A. That is, in both examples, A has the same amount of control over his own outcomes (compare the differences in outcomes associated with strategies a_1 and a_2). If party A, in addition to his preferences for self-control, also prefers to have control over his partner, then "Example 2" should be evaluated more favorably. If A prefers that all parties should be able to control themselves, then "Example 1" better satisfies his desires since it provides both parties with an equally high possibility for self-control.

An example of exercizing control within a situation is shown in Table 5–2. If A places high value on his own independence and/or control over partner's outcomes, then strategies a_1 and a_2 in the situation presented in Table 5–2 are more valuable to him than a_3 and a_4 since in switching from a_1 to a_2 or from a_2 to a_1 he produces bigger differences in partner's outcomes and at the same time partner's choices have very little influence on his own outcomes. Knowledge about A's preferences over control should make our predictions of his choices more accurate. If A's control preferences are very strong, and stronger than, say, his individualistic preferences for outcomes (to gain as much as he can), he should choose a_1 or a_2 even though a_3 and a_4 are likely to bring him higher outcomes (since b_1 is a dominating strategy for B).

It should be noted at this point that subjective value of control (unlike subjective value of outcomes) is not based on outcomes themselves but on *differences* in outcomes as produced by either own or others' choices. In the case of one's own choices (that is, control over one's own and/or partner's

Table 5.1
Two Examples of Varying Control over Outcomes

		Party B	
		b_1	b_2
Party A	a_1	10, 1	11, 10
	a_2	3, 2	1, 9

Example 1: Low interdependence; high bilateral self-control (each party controls its own outcomes and has little control over other party's outcomes).

		Party B	
		b_1	b_2
Party A	a_1	10, 10	11, 9
	a_2	3, 1,	1, 2

Example 2: High self-control and power (A controls own outcomes and B's outcomes; B's choices do not affect either party's outcomes).

Table 5.2
Exercising Control within a Situation

		B	
		b_1	b_2
A	a_1	15, 12	16, 10
	a_2	16, 23	14, 22
	a_3	20, 17	10, 13
	a_4	24, 18	11, 15

outcomes) it is not possible to determine which single action maximizes control, that is, either self-control or control over other. We can only compare any two strategies. In our example, when A changes choices from a_1 to a_2 in Table 5–2 he or she can exercise more control over partner than by choosing between a_3 and a_4 or even between a_1 and a_2. Thus our predictions, if based only on A's preferences over his or her own control, are limited to a set of strategies rather than to a single strategy. In the case of A's preferences over partner's control, we can speak of the degree to which any *single* strategy by A maximizes B's control interests. For instance, strategy a_3 maximizes B's possibility to control his own outcomes ($17 - 13 = 4$), strategy a_4 maximizes B's possibility to control A's outcomes, and strategy a_1 minimizes B's possibility to control A's outcomes.

Of the types of control discussed so far, the need to control one's own outcomes has the longest theoretical tradition, beginning with Adler (1929). White (1959) provides a major statement of the motivational aspects of self-control in his concept of effectance motivation. De Charms' (1968) theory of personal causation states that behaviors stemming from own choices are more valuable and more strongly motivated than those stemming from external pressures. Brehm's (1966) theory of reactance seems to be based on the assumption that individuals need to control their own outcomes. Theory and research on privacy (see Derlega & Chaikin, 1977) can be interpreted in terms of an individual's desire to maintain control over the interpersonal flow of information, and findings about human territorial behavior and crowding (e.g., Altman, 1975) can be interpreted in terms of control over the physical and social environment.

Control over others' outcomes as a value seems to underlie research on the Machiavellian personality (Christie & Geis, 1970). If we possess control over other people, we obviously force them (by the use of threats, promises, rewards, and/or punishments) to act in a way that suits our interests.

The notion of control seems to function in psychology at *two* levels of

generality. At a general level, control means the fundamental ability of individuals to satisfy their needs effectively. This meaning is probably most closely related to that proposed by White (1959), and we can quite safely assume that all people want to control themselves and the environment in this sense (except perhaps in cases of severe mental pathology). However, general control may be gained and maintained through such means as asserting one's own needs and wishes, submitting one's fate to another person (a spouse or a boss), or gaining power over other people. In these cases the meaning of control refers to more specific ways of attaining individual goals. People may handle control in a general sense quite effectively even if they are and want to be very dependent on others (as is often the case in neurotic patients). Similarly, all the other specific preferences for control discussed above may be viewed as derivatives of a general need for control.

Thus, the general idea of control as a value has a long tradition in psychology. However, most theories have focused either on the general concept or on one specific type of control (i.e., control over one's own outcomes), assuming that the proposed motivation exists in most people. We postulate that the need for control is multidimensional and that there are individual differences in patterns of people's values concerning control. These differences in preferences about control will affect people's behavior in various social situations. For instance, people with high preferences for self-control will tend to resist attempts by others to influence their attitudes or behavior. The reactance phenomenon (Brehm, 1972) may be limited to those people who have high preferences for control over own outcomes and should not be observed in people for whom self-control does not seem to be valuable. The effectiveness of directive or nondirective psychotherapy may also depend on patient's control preferences.

Measurement of Preferences

MEASURES OF OUTCOME PREFERENCES

In our studies, individuals' outcome preferences have been measured with two similar methods. The first method is based on a type of conjoint measurement developed by Radzicki (1976). The technique is based on a set of "offers," each of which contains two payoffs: one payoff for the subject and the other for the anonymous partner. A complete set of offers may include the various possible combinations of five levels of payoffs (e.g., \$1, \$2, \$3, \$4, \$5) for a subject and and his or her partner. Subjects are asked to rank the offers in terms of their preference, from the most to the least attractive. Subjects are told that their rank order will determine their

own as well as their partner's payoffs but that in another (albeit nonexistent) group the partners' rank orders will determine payoffs.[4]

The best approximation of each subject's utility as a function of his or her own payoffs (x) and the partner's payoffs (y) is calculated from the subject's payoff ranking. Sometimes polynomials of the second degree are used. But we find that the simplest but quite satisfactory piecewise linear class of functions can be used,[5] that is,

$$u(xy) = ax + by + c(x-y).$$

The first term in this equation can be interpreted as the utility of one's own gains, the second term as the utility of the partner's gains, and the third as the utility of the absolute difference between one's own and the partner's outcomes.[6] The best fitting function of this type, that is, parameters a, b, and c, would be calculated for each subject to match her or his rank order. (The criterion of best fit is based on either the least square method or the correlation between the subject's ranking and the rank of values derived from the utility function.) The results can be interpreted in psychological terms that are similar to a proposal by McClintock (1977). That is, purely "individualistic" persons are those whose best fitting functions show b and c parameters as close to 0. "Altruistic" persons are those with $b > 0$ and $b > a$. Persons with $c < 0$ and $c > a$ and $c > b$ are basically concerned with equity.

A second method was used to measure outcome preferences in our most recent research (we will refer to this research as the "Warsaw study").[7] This technique also relies on rank ordering a set of offers, but a different method is used to reveal the main criterion for a person's ranking. The criteria are identified by correlation coefficients between a subject's rank order and "ideal" one-dimension patterns of preferences. The formal analysis (Wieczorkowska, 1979) showed that any consistent preferential order can be described by a three dimensional space with the diemnsions being individualism, altruism, and equity (see Table 5–3).

[4] The payoffs to subjects are real, not imaginary.

[5] The piece-linear function usually fits 80–90% of the subjects' rank orders. The polynomials of the second degree give, of course, good approximation in all cases of consistent rank orders; however, psychological interpretation of the terms is less straightforward than in the case of the simpler function.

[6] For detailed discussion of the procedure and the theoretical basis of the technique, see J. Radzicki (1976), and Grzelak (1977).

[7] The Warsaw study (which is not yet published) consists of six experiments conducted in one large project. Outcome and control preferences were measured in all 656 subjects, and the experiments differed in respect to type of dependent variables. The study was designed and conducted in collaboration with the author's M.A. students and with the assistance of Z. Czwartosz and G. Wieczorkowska.

Table 5.3
Outcome Preferences

	Pattern					
	Individualistic		Altruistic		Equity	
Rank	Me	Partner	Me	Partner	Me	Partner
1	40	40	40	40	40	40
2	40	30	30	40	30	30
3	40	20	20	40	20	20
4	40	10	10	40	10	10
5	30	40	40	30	40	30
6	30	30	30	30	30	40
⋮	⋮	⋮	⋮	⋮	⋮	⋮
16	10	10	10	10	10	40

The three formally independent dimensions have proven to be empirically independent too. The highest correlation coefficient between any two of the criteria in the Warsaw study was .16.

MEASURES OF CONTROL PREFERENCES

A technique employed in our recent studies reconciles theoretical requirements (described in section on "System of Preferences: Some General Comments") and the need for a technique that is easy to use and easily understood by subjects. The method is similar to that used in measuring outcome preferences. Subjects believe that, in dyads, they will perform 100 short tasks and that they will be paired randomly with an anonymous partner of the same age and social status. Both members of the pair have to solve *all* 100 tasks to receive a monetary reward. The magnitude of the reward depends on the level of the dyad's performance and is to be divided equally (so that each member will get the same share). Although both members have to solve 100 tasks, the dyad's level of performance is to be evaluated on the basis of a selection of tasks from the subject's set of tasks and another from the partner's set. The subjects are asked to evaluate the attractiveness of different ratios of such selections, for example, 20% of subject's tasks vis-à-vis 80% of partner's tasks. All possible combinations (summing to 100% or less) of subject's and partner's percentages make up a set of 15 offers, each describing what proportion (or percent) of subject's and partner's tasks will account for the final dyad performance. Subjects are informed that in cases where two percentages do not sum to 100 (e.g., 35% subject's tasks and 20% partner's tasks) the answers to the remaining portion of the tasks (45%) will be decided randomly (based on a random

drawing from the pool of correct and incorrect answers). The evaluation of the attractiveness of the offers is based on subjects' rank ordering of all the offers from most to least desirable. The subjects believe that they will not be able to identify their partners. Subjects' preferences are identified by the similarity (correlation coefficient) of their rank orders to the selected one-dimensional "ideal" patterns of preferences (see Table 5–4).

Thus each subject's structure of control preferences is described by four correlation coefficients that reflect how the subject values self-control, partner's self-control, fate control, and equity of control (or partnership). The final analysis in our study revealed that these dimensions were relatively independent. The highest correlation coefficient between any two control preference dimensions in the Warsaw study was .39; others were all below .24. Very low correlations were also found between all possible dimensions of control and outcome preferences (coefficients were below .18), showing that the two components of preference structure are independent.

System of Preferences: Some General Comments

RELATIONSHIP BETWEEN THE TWO SYSTEMS OF PREFERENCES

So far we have discussed the two systems of preferences separately. In presenting our empirical findings, we will limit ourselves to the simple effects of one or the other dimension of preference. It is important to note,

Table 5.4
Patterns of Preferences for Control

	Pattern							
	Self-control		Partner's control		Fate control		Partnership	
Rank	My tasks	Partner's Tasks	My tasks	Partner's tasks	My tasks	Partner's tasks	My tasks	Partner's tasks
1	80	20	20	80	20	20	50	50
2	65	35	35	65	35	20	65	35
3	65	20	20	65	20	35	35	65
4	50	50	50	50	35	35	50	35
5	50	35	35	50	50	20	35	50
6	50	20	20	50	20	50	⋮	⋮
⋮	⋮	⋮	⋮	⋮	⋮	⋮	80	20
15	20	20	20	20	20	80	20	80

Note: Numbers show the percentage of subject's and his or her partner's tasks that account for dyad's performance.

however, that an individual's preferences should be described in terms of both components of preferences and their relative strength.

Interesting theoretical hypotheses about differences in behavior and cognitive processes can be related to specific configurations of control and outcome preferences. For instance, we can expect the behavior of "altruistic" individuals to be different, depending on their control values. Individuals with high respect for others' self-control should be sensitive and responsive to others' needs (respecting others' right to define what is good for them), whereas "altruistic" individuals with high need for power should be more aggressive in enforcing whatever they consider to be good for others. For instance, overprotective parents may attempt to control a child's outcomes, disregarding his or her own needs. We may also expect competitive persons who respect others' need for self-control to solve interpersonal conflicts in a more peaceful way (obeying socially acceptable rules, which usually affirm equal control rights for both parties) than competitive and power-oriented individuals.

The Warsaw study showed that a substantial number of people can be found at the extremes of any preference dimension (indicated by a correlation coefficient between ideal preference order and a given point on the dimension of .40 or more). For instance, we found over 20% of subjects selecting even improbable preferences, such as preferences for not having control over own outcomes. We also found that for many subjects outcome preferences were stronger than central preferences and that for other people the opposite was true. Thus it seems realistic to analyze preferences in terms of various configurations of their dimensions and strength.

THEORETICAL AND METHODOLOGICAL STATUS OF PREFERENCES

We do not consider preferences to be stable, traitlike characteristics of personality. They vary from situation to situation depending on partner's characteristics, group norms, etc. It was found in the Warsaw study that preferences revealed by subjects are strongly influenced by their images of their partners. Outcome and control preferences were measured twice by the methods described above. In the first session the subject's partner was described only as a fellow student. In the second session (a week later) the subject's partner was specifically described by his position on each of several continua such as prestige; wealth; ability (higher or lower than that possessed by the subject) to solve intellectual tasks; and possession of skills similar to those required by the experimental tasks. A number of significant differences in preferences were observed in intrapersonal comparisons (changes from the first to the second session) as well as in intergroup comparisons (across different partners' characteristics in the second session).

Outcome and control preferences were most affected by the wealth of the partner, the partner's prestige, and information about level of subjects' abilities as compared to their partners' abilities.

The results demonstrate the interactional nature of preferences. The lack of stability across various kinds of situations does not imply that the preferences are not consistent at all (Endler & Magnusson, 1976; Magnusson & Endler, 1977). What is stable and characteristic for a person is his or her individual pattern of preference variability across situations. For instance, if person A displays less competitiveness when facing a more prestigious partner than when facing a partner of similar status, this difference should occur systematically whenever person A is exposed to partners of various levels of social prestige. Thus, a person's preferences will be defined by both preference (or, rather, preference configuration) factors and situational factors. Knowledge about both kinds of factors is still limited, and further research should assess what factors account for most of the variance in people's preferences. Like other variables, preferences in any given situation or across situations should be characterized by a probability distribution over different preference values or at least by a range within which individuals' preferences vary. Any single measurement may lead, for a number of reasons, to a preference assessment that is far from the best representation of the individual's actual preferences.

It is highly desirable (but it will be extremely difficult) to develop new methods of measurement that would permit us to collect a large sample of any single individual's preferences in various situations. This project would probably require the use of repeated measures, which are inconvenient and time-consuming for a researcher as well as for his or her subjects. The absence of such methods, together with financial restraints, explains why we use relatively simple techniques in our present research. The use of an anonymous, "average" partner in measuring preferences is based on the assumption that preferences revealed by subjects in such a setting represent an "average" of subjects' preferences across at least different situations. This technique, however, is not appropriate if we assume the probabilistic and interactional nature of preferences.

Preferences, Cognitive Processes, and Behavior

Preferences and Information Processing

INFORMATION SEEKING

Any effective, deliberate course of action requires knowledge about both outcomes and the means to achieve them. Not every bit of knowledge we

possess has an immediate, instrumental value. However, it seems reasonable to assume that individuals search primarily for information that will be useful in obtaining desirable outcomes. Thus information seeking is selective in nature: An individual searches for information that is consistent and instrumental to his or her structure of preferences. A general hypothesis is that in interdependence situations, people with highly individualistic outcome preferences and/or with high self-control preferences will show lower interest in others and their outcomes than people with any other type of preference. An individualistic person should be interested in a partner's outcomes only to the degree to which that knowledge is necessary for maximization of the person's own gains. For example, once the person discovers that one of his or her strategies is dominating, the person does not need more information about the interdependence structure, especially information related to a partner. On the other hand, someone who is either competitive, altruistic, or equity oriented needs to know at least what a partner's outcomes are in order to maximize, respectively, his or her own gains, losses, or equity. Sometimes information may be needed about the subjective value of outcomes for partners. For example, an equitable solution for a person may be any equal distribution of external outcomes or a solution that creates the same level of satisfaction for the person and the partner. In the latter case the person would want information about the external outcome distribution and about the other person's preferences. In either case we expect stronger interest in the partner's outcomes and in the partner himself or herself. Similarly, someone motivated to respect partner's self-control, to control other's outcomes, or to have control equal to a partner, has to collect more extensive information about the interdependence structure in order to fulfill his or her own needs.

These predictions have been partially verified in two of our studies (Grzelak, 1978; Warsaw study). In both studies subjects were placed in a two-person, non-zero-sum, gamelike situation that was not well defined. They were told only that they could earn some money and that how much they earned depended on both what strategy (*X* or *O*) they chose themselves and what strategy their partners chose. The experimenters provided no information either about the specific outcomes for possible combinations of choices or about the partners' identity except that they were high school students. Before making their own choice, subjects could ask any question and as many questions as they wanted in order to understand the situation. The numbers and types of questions asked made up the dependent variable. The independent variables were outcome preferences in the first study (Grzelak, 1980) and both types of preferences in the Warsaw study.

A summary of the main findings is presented in Table 5–5. The first

Table 5.5
Preferences and Information Seeking

Type of preferences	Type of information searched for	Level of exploratory activity
Individualistic: *high* versus low	Strategic: High interest in own outcomes[a,b] Low interest in partner's outcomes[b] Nonstrategic: High interest in partner's personality and background[b]	High[a,b]
Altruistic or *aggressive* versus neutral	Strategic: High interest in partner's outcomes[a,b] Nonstrategic: High interest in partner's personal characteristics[a,b]	—
Equity versus Inequity	Strategic: High interest in own and partner's outcomes[a,b] Nonstrategic: Low interest in partner himself[b]	High[a,b]
Own control: *high* versus low	Strategic: Low interest in partner's strategic position[b]	—
Partner's control: *high* versus low	Strategic: Low interest in own and partner's outcomes[b] Nonstrategic: Low interest in partner's characteristics not related to the situation[b]	Low[b]
Fate control: *high* versus low	Strategic: Low interest in partner's outcomes, relations among outcomes and partner's strategic position[b]	—
Partnership: *high* versus low	Strategic: High interest in relationship between own and partner's outcomes, and in partner's strategic position[b]	—

[a] Results from Grzelak (1980).
[b] Results from Warsaw study.
[c] This is the only case in which one of the two extremes is compared with the middle of the continuum.

column in Table 5–5 identifies dimensions for which dichotomous comparisons were made. The second column specifies the type of question that was asked more or less frequently by subjects located at one end of the continuum (indicated by italicized terms in the first column) versus subjects who were at the other end. The questions are grouped into two broad categories: strategic and nonstrategic. The strategic questions are those related to the payoff-matrix (that is, they seek to define the decision problem); and all other questions are nonstrategic, having to do mainly with partner's characteristics and the rules of the game. Significant differences were found on every preference dimension, confirming the relationship between preferences and the selective nature of information seeking. However, the direction of the specific differences was not quite what we predicted. For instance, although the individualistically oriented subjects as compared with nonindividualistic subjects asked more questions about their own and fewer about the partner's strategic position, unexpectedly, they asked more questions about the partner himself or herself. Also, contrary to predictions, high preferences for partner's control resulted in low interest in both the strategic properties of the situation and in the partner himself. Subjects with a tendency to either maximize or minimize partner's gains showed, as expected, strong interest in partner's as well as in their own outcomes. The equity-oriented subjects showed strong interest in the strategic aspects of the situation and little interest in their partner's situation. This may reflect a general tendency for equity oriented persons to be concerned with external outcomes rather than in their subjective value to both parties. Strong interest in strategic properties of the situation, including partner's position, was also shown by subjects with high preferences for equal control distribution (a partnership orientation). Some of the preferential dimensions also were correlated with level of exploratory activity as measured by total number of questions asked. Subjects with individualistic, equity, and low partner's control preferences asked more questions than subjects located on, respectively, the other ends of these continua.

The results, though not definitive, suggest that a strong linkage exists between preferential factors and informational inputs. The elements used by individuals to construct their view of a situation vary on the basis of their outcome and control preferences. In other words, individuals are sensitive to different aspects of the external world based on their preferences. A further question for research is: Once received, do the pieces of information remain unchanged in a person's memory storage or are they transformed after memory processing so that they depart from the original ones? The studies described next provide some preliminary answers to this question.

MEMORY TRANSFORMATION

In two experiments (Grzelak, 1978; Warsaw study) a PDG payoff matrix was presented to subjects. The properties of the game were explained in detail during a 7–10-min period of instruction. Next the experimenter hid the matrix and asked subjects to fill out a short questionnaire, to divert their attention from the game. Then subjects were asked to recall all the payoffs that had been seen before. Number and type of errors in recalling the payoff matrix were the dependent variables.

One major effect of preferences for equity was found in the Grzelak (1978) study. Subjects with high equity preferences recalled payoffs so that differences between their own and partner's outcomes were smaller than in the original matrix. Inaccuracy in recalling payoffs was in many cases large enough to change completely the strategic quality of the game. Subjects with high preferences as compared with those with low preferences for equity showed a strong tendency to equalize payoffs (especially payoffs that were originally most different).

A simple explanation of this "equalizing effect" assumes that high equity preferences reveal subjects' motivation to gain and maintain equity with respect to outcome distribution. Perception of inequitable outcomes could then produce negative emotional tension. This tension could be reduced by finding and justifying inequity, by attempting to restore equity or, as in our experiment, by transforming, in memory, the original perception of inequity (i.e., denying its existence).

A number of significant effects appeared in the Warsaw study among the measured outcome and control preferences. However, some results were unexpected and difficult to interpret. For instance, the "equalizing effect" for equity oriented subjects observed in the first study was found for one pair of outcomes: that associated with subject's competitive and partner's cooperative strategy. The same equity subjects, however, tended to increase differences between outcomes that were originally similar (for mutual competition or cooperation). Thus the defensive equalization of outcomes postulated after the first study is not the only response of equity oriented people, and there are probably other factors that influence types of memory transformations.

Some transformations were either consistent with preferences or at least easy to understand:

Subjects with individualistic, as compared with nonindividualistic, orientation did not change outcomes substantially in either direction. However, subjects tended to recall the payoff matrix such that partner's control over their outcomes appeared to be stronger (i.e., larger changes were produced by partner's choices) than in the original matrix. Does threat that results

from partner's control provide a good justification for making a defensive choice that also suits the subject's individual interest?

Altruists increased partners' outcomes associated with their own cooperative strategy, whereas equity oriented people tended to increase both own and partners' outcomes in the same case.

Subjects with high preferences for self-control recalled payoffs that gave them higher control over own outcomes than the original matrix did. They also recalled that the partner had higher control over his or her own outcomes. Their recollections of their own payoffs was at the same time more accurate than recollections of subjects with low preferences for self-control.

Subjects with preferences for partner's control increased partner's payoffs, and subjects with preferences for partnership increased differences between own and partner's outcomes, to the partner's advantage.

SUBJECTIVE REPRESENTATION OF THE INTERDEPENDENCE SITUATION

Preferences affect the type of information that an individual searches for and, probably, the way information is transformed in memory. Individuals may see the same situation differently based on how they process information. Kelley and Thibaut (1978) present a similar idea in their analysis of interdependence. They postulated that any interdependence situation (as represented by a given matrix) is transformed through various mental operations into an effective matrix to which we finally respond. Abric (1976; see also Chapter 4, this volume) expresses a similar view.

Not only are there interpersonal differences in subjective representations, but one's system of preferences accounts for these differences to a great extent. If preferences affect information seeking and memory processing, people with different preference patterns should also build up different systems of general beliefs about others (implicit personality theories) and the social world (implicit theories of the social world). We have some evidence from the Warsaw study to support this hypothesis dealing with one type of beliefs about others, that is, expectations about others' preferences over outcome and control distributions.

Preferences and Expectations about Others

According to game theory, players' knowledge about interdependence is limited to their information about the game matrix. Thus, the player's anticipation of his or her partner's future move is based only on what can be inferred from the game matrix to be a rational choice for the partner. The game situation is also termed decision making under uncertainty because of this assumption.

This situation seems to contradict our everyday experiences with social interdependence, in which we try to anticipate our partner's moves based on our social stereotypes and/or the information that we already possess about the person with whom we are dealing. At the present time, we do not have a clear picture of the relationship between a player's decisions and his or her expectations about a partner's behavior. Kelley and Stahelski (1970), on the basis of their research, hypothesized that expectations about others depend on motivational factors. Cooperatively as compared with competitively inclined people tend to perceive the social world as more differentiated. A cooperatively oriented individual expects others to be cooperative as well as competitive, whereas a competitive person perceives others to be like himself (that is, competitive too). Codol (1975) questioned this relationship by asserting that the dominant tendency in anticipating others' behavior is to expect other people to behave "as I do" ("but a little worse than me"). Tyszka and Grzelak (1976) observed the same tendency in some game situations, and in other situations they reported slightly higher differentiation of expectations about partner's moves in cooperative than in competitive players.

In an experiment conducted as part of the Warsaw study, subjects played five two-person games differing in strength of conflict and in type and amount of control (from high subject's to high partner's control over outcomes). The subjects were asked about their expectations concerning people's, as well as their actual anonymous partner's, preferences or intentions before all the games and then in each game separately. In questions about people in general, subjects were asked to put down the percentages of people they believed made up different categories of outcome preferences (competitive, individualistic, equity-oriented, cooperative, and altruistic) and control preferences (preferring each party's independent control; own control over all outcomes, or own power; partner's control over all outcomes, or partner's power; and "reverse" control, in which each party controls the other party's outcomes). We tested for differences in expectations for every preference dimension. No systematic differences in expectations were found across game situations. In most cases the comparisons between subjects' expectations about others in five games revealed differences in the same direction although only some of them reached a conventional level of statistical significance. Taking into account only those differences that were significant in at least two game situations, the results can be summarized as follows:

1. Subjects with individualistic preferences expected others not to value partner's power.
2. Equity-oriented subjects perceived others more often as being equity oriented and less often as power oriented.

3. Subjects with high preferences for own control perceived others less often as competitive, altruistic, and preferring partner's control, and more often as cooperative.
4. Subjects who respected partner's control expected others less often to be altruistic.
5. Subjects who minimized fate control expected others less often to be competitive and altruistic. They also expected others to value power and/or the independence (self-control) of each party.
6. Subjects with a partnership orientation perceived others as being competitive more often, and as individualistic and preferring partner's control less often.

The results did not consistently support the hypotheses about expectations of others discussed earlier. We observed a tendency in subjects to perceive others as similar to themselves only in cases of preferences for equity and, to some extent, for own control. The results did not support Kelley and Stahelski's hypothesis either. However, the number of significant results obtained in the present study and their consistency across various interdependence situations indicates that a strong relationship exists between preferences and expectations about other people's motivation.

Preferences and Level of Performance

People's actual behavior in a given social situation depends on what they want to gain (i.e., their preferences) and their subjective representation of the situation. An important aspect of the subjective representation is recognition about how well the situation enables one to satisfy preferences, that is, about the outcome and control structure of the situation. Thus the type, intensity, and quality of responses performed by people should depend on both the structure of their preferences and the perceived interdependence structure. We have already shown that there is a relationship between preferences and perception. A separate part of the Warsaw study was designed to test this relationship as well as behavior in different interdependence situations.

Subjects thought that they were paired with an anonymous partner with whom they were supposed to perform a number of simple calculations in 12 3-minute periods. They were told that the amount of money that each dyad would earn for the task depended on the number of correct calculations completed by the dyad. There were nine 3 × 3 experimental conditions varying in the amount of control the subject had over the dyad's performance and in the subject's share in the dyad's earnings. The "control" conditions differed in terms of the number of subject's work-periods the subject believed were used to calculate the dyad's performance: 4 in low control, 6

in equal control, and 8 in high control condition. The remaining work-periods used were supposedly the partner's. In the three pay conditions, the subject earned 35%, 50% or 65% of the dyad payoff. The number of calculations in all 12 periods (level of performance) and number of errors (quality of performance) were the dependent variables.

The type of interdependence itself did not produce any differences in subjects' performance. All the significant differences were associated either with the type of subjects' preferences or with the interaction between preferences and situation. Subjects with low preferences for equity, fate-control, and partnership, and high preferences for own control had a higher overall level of performance than subjects representing the other sides of these dimensions. However, high level of preferences for partnership and a non-fate-control orientation were associated with a low level of quality in performance (high number of errors).

The major results were that performance and its quality depend on both the nature of the interdependence and specific outcome and control preferences. Table 5–6 shows what types of preferences are associated with level and quality of performance in each interdependence situation. The observed differential effects of type of preferences and type of interdependence may have important implications. For instance, the validity of Adams' (1965) theory of equity may be limited in interdependence situations to people with high preferences for equity and possibly partnership. Adams assumed that people are motivated to gain and maintain equity. Our results show that there were interpersonal differences in level of motivation for equity that are large enough to produce considerable differences in behavior. Besides the theoretical value of the results, they may also have important practical implications (e.g., in industry) if confirmed in further research.

Summary and Concluding Remarks

This chapter's theoretical approach incorporated both motivational and cognitive components to study interdependence. For many years a psychological interpretation of game theory heavily influenced our investigation of interdependence. We learned from a number of experiments about the importance of the external outcome structure and of the strategic features of interdependence. However, we also learned that these strategic aspects of the situation (if interpreted on the basis of a simple one-dimension concept of utility) accounted for only part of the variance in people's choice behavior. In an attempt to construct more powerful theories, psychologists focused their attention either on developing more complex theories of utility of outcomes (values that people tend to maximize) or on cognitive processes

Table 5.6
Preferences, Interdependence and Level of Performance

"Control" conditions	Payoff conditions: Low			Equal			High			Overall		
		P	*Q*		*P*	*Q*		*P*	*Q*		*P*	*Q*
	Eq:	low	—	Par:	low	—				Eq:	low	—
Low				Nf:	high	—				Nf:	high	—
		P	*Q*		*P*	*Q*		*P*	*Q*		*P*	*Q*
	P_{con}:	—	low	Ind:	high	—	Alt:	high	—	Ind:	high	—
				O_{con}:	high	low				Alt:	—	low
Equal				Nf:	high	low				Eq:	low	—
										O_{con}:	high	low
										Nf:	high	low
										Par:	low	—
		P	*Q*		*P*	*Q*		*P*	*Q*		*P*	*Q*
High				P_{con}:	—	high				Alt:	—	high
		P	*Q*		*P*	*Q*		*P*	*Q*		*P*	*Q*
	Eq:	low	—	O_{con}:	high	—	Ind:	high	—	Eq:	low	—
	O_{con}:	high	—	P_{con}:	—	high	Nf	—	low	O_{con}:	high	low
Overall	P_{con}:	low	—	Nf:	high	low				Nf:	high	low
				Par:	low	—				Par:	low	—

P = level of performance
Q = quality of performance
Ind = high individualistic preferences
Alt = altruistic preferences
Eq = equity preferences

O_{con} = own control preferences
P_{con} = partner's control preferences
Nf = nonfate control preferences
Par = partnership preferences

underlying decision making under interdependence. McClintock and Van Avermaet's chapter in this book (Chapter 3) represents the first approach; Abric's chapter (Chapter 4) represents the second approach. In agreement with both approaches, we assume that there is a continuous interplay between people's values and their cognitive processes.

Three theoretical ideas advanced in this chapter should be reemphasized:

First, the various components of an interdependence structure influence the subjective value of the consequences of actions taken by individuals. The most important features of the interdependence structure are defined by the outcome and control distributions that exist among the involved parties. People have preferences over both who can gain (and how much can be gained) in any given situation and who can determine the actual outcomes (and to what degree). Thus a theory of social values should incorporate people's preferences over control.

Second, any deliberate behavior in interdependence situations is mediated by people's knowledge or interpretation of the situation. This knowledge is based on information that the individual collects in a given situation, inferences he or she makes from this information, and information that the individual already possesses about the social world.

Third, there is a strong linkage between people's preferences and information seeking, subjective representations of the situation, and general beliefs about others and the social world.

In general, the empirical results presented in this chapter strongly support these theoretical ideas. We found that interpersonal differences in preferences for both outcome and control distribution produce differences in individuals' cognitive functioning and behavior. The present results do not always create a clear and consistent picture of the relationships among the specific preferences, cognitive processes, implicit social knowledge, and behavior. However, they show that these variables are strongly interrelated. The nature of these interrelationships must be investigated in future research.

We have demonstrated the various effects of differences in preferences. In most cases the findings did not permit straightforward causal interpretations. We have emphasized the preferential aspects of choice behavior under interdependence. However, the chapter does not provide any answer to the basic question about what comes first: preferences or cognitive processes (cf. Zajonc, 1980). As a matter of fact we believe that at the general level of analysis presented in this chapter, the relationship between preferences and cognitive processes is not one-directional. We have shown that people's information seeking greatly depends on the system of preferences they already possess. On the other hand, the individual's environment may influence the development of his or her view of the social world so as either

to strengthen or call into question (and possibly modify) the individual's value system.

Findings reported in the chapter were mainly limited to simple cognitive and behavioral correlates of single preference dimensions. They did not show the interactions among preference dimensions in their full complexity. However, it seems that progress in exploring interdependence will require clarification of basic concepts and improvement in our measurement techniques. More precise definitions of preferential space and methods to measure a variety of possible configurations of preferences are needed. Eventually, we should be able to define individual's preferences by their location in a multidimensional space of preferences.

The findings showing that people's behavior correlates with the subjective representation of social interdependence and subjective evaluation of outcomes may substantially change the way we try to answer questions about people's rationality and cooperation. In order to evaluate people's rationality we have to know not only what are the subjective values of outcomes but also how they perceive these outcomes and what they expect from their partners. The assumptions made in game theory that partners are alike and perfectly rational are incorrect. We have shown that decision makers may have different views of partners, depending on their preferences. If so, what seems irrational to an external observer may in fact be rational if we relate the individual's behavior to what he or she knows about the situation. In addition, an individual's subjective representation and preferences may change over time within the same interaction as new information about the partner or structure of the situation becomes available. Thus, if we relate rationality to the logical analysis of subjective reasons for behavior rather than to external standards of rationality (e.g., as proposed by normative theories of decision making) we have to investigate carefully people's preferences, their subjective representations, and their dynamics.

The same issue may be raised about cooperation. It may, for example, happen that we interpret someone's behavior as being competitive even though he or she is cooperative, at least in terms of conscious intentions. This person might simply misperceive the structure of interdependence and hurt others when in fact he or she wants to help. Is he then a cooperative or an aggressive person? The answer always depends on our theoretical perspective. The person is aggressive in terms of what he or she really did to other people. The person is cooperative if we think only in terms of his subjective representation and intentions. He may be either cooperative or aggressive in terms of his structure of preferences measured independently from the analyzed situation.

In this chapter we discussed preferences and some aspects of cognitive processes underlying behavior in interdependence situations. It should be

mentioned that our approach can also be extended to the analysis of other types of behavior, including helping behavior. As we pointed out in the first chapter of this book, differences between cooperation and helping behavior are not substantial in most cases. Helping behavior is also influenced by one's system of preferences and the subjective representation of the other person as well as by the entire social situation. However, a detailed discussion of the issue lies beyond the scope of this chapter.

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