

## Lecture Notes in Economics and Mathematical Systems

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## 213

## Aspiration Levels in Bargaining and Economic Decision Making

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EXPECTATIONS, ATTRIBUTIONS, AND BEHAVIOR IN BARGAINING WITH  
LIKED AND DISLIKED PARTNERS

by

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Each of the 128 subjects plays the Harsanyi-Selten bargaining game with incomplete information 8 times, allegedly each time with a randomly selected partner. Actually, in 4 games the partner is simulated by a computer program. Combined with an experimental variation of liking (liking - disliking), costs (low, mixed, high), and dependency, i.e. the possibility of awarding a bonus to the partner at the end of the game (dependent - not dependent) the experiment follows a 2 x 2 x 3 x 2 repeated measures design.

It is predicted that: (1) the probability of deadlock is the same for liking and disliking dyads, (2) in the case of agreement the game reaches its goal faster with a liked partner than with a disliked one, (3) in the case of conflict, the game ends earlier with a disliked partner than with a liked one, (4) the responsibility for deadlock is attributed more to the partner than to oneself, (5) the credit for agreement is attributed more to oneself than to the partner.

Since the emotional responses to the partner's behavior are measured several times during the bargaining process, the bargaining outcome can be explained in terms of emotional responses to confirmed or disconfirmed expectations.

When people enter a bargaining situation, they usually have developed some more or less stable emotional relations of liking or disliking between each other, and they expect that the social interaction with the bargaining partners will not be terminated with the bargaining process. Therefore their bargaining behavior will take into account its probable effect on their future social relations. A suboptimal outcome of the bargaining may be accepted in order to secure positive and possibly rewarding relations for the future. This belongs to the instrumental strategy a person applies in order to achieve his/her short term and long term goals.

Another primary motivation may be to behave in a way which is consistent with the concept of the ideal self. Thus a person may be cooperative even if exploiting the other person would have no negative external effects. Following one's personal (private) norm of equity or equality, in spite of the temptation of maximizing individual gain, is an example of a behavior which we may call conscientious as opposed to instrumental.

A third kind of behavior which may lead to suboptimal bargaining can be called expressive or impulsive. A person may be so resentful toward his bargaining partner, that he/she thwarts his/her own goals

by expressing anger or declining mutually useful cooperation.

The aim of the present experiment is to explore some aspects of such different impacts of social emotions on bargaining processes and outcomes.

In a previous experiment (BRANDSTÄTTER & HOGGATT, 1982), the following hypotheses were tested:

- (1) Liking promotes agreement in a bargaining situation (main effect of liking), more so (a) if the stake is rather low (interaction between liking and cost; a variation of costs determined the maximal possible gain), (b) if the opponents are dependent on each other beyond the bargaining situation (interaction between liking and future dependence)
- (2) Tough bargaining of a liked opponent is excused by attributing the toughness to his/her difficult pay-off situation.

There was no main effect of liking but a tendency towards an interaction between liking and cost, and no interaction between liking and future dependence. The attribution hypothesis was not confirmed either. However, there was an unpredicted interactive influence of liking and cost on the number of stages; i.e. the number of exchanges of demands before agreement or deadlock was reached. If agreement was reached in a dyad in which at least one person had high costs (mixed or high cost dyad), it often happened at an earlier stage in the liking condition than in the disliking condition. If in a mixed or high cost dyad the game ended in deadlock, it occurred at a later stage in the liking than in the disliking conditions.

As a post hoc explanation of those results, the authors assumed that, at the beginning, liking partners are ready to yield to their partner's demands, and expect that their partners will also act cooperatively, thus promoting an early agreement in many cases. However, if the expectations are not met at the early stages of the game, the willingness to compromise decreases as a consequence of disappointment and anger, thus often leading to a deadlock at a later stage.

If both players had low costs, agreement was always reached, but it took more time and more exchanges of offers between liking partners, than between disliking partners. It was thought that in this situation, liking partners especially, enjoyed the interaction and therefore were not in a hurry to come to an end.

The sample size (32 subjects, each playing four bargaining games with another person, and four with a computer program) was too small for safeguarding against the risk of accepting the null hypothesis when it was wrong. So it would be premature to discard all the hypotheses of

the former experiment just because the results were statistically not significant. On the other hand, the unexpected interactive influence of liking and cost on the duration of the game (i.e. number of bargaining stages) needs some further evidence and a closer scrutiny to render the interpretation less speculative. The experiment to be reported here replicates the previous study with a much greater number of subjects from a different population, and with some additional dependent variables, measures of expectations and attributions.

There are only a few experiments focussing on the impact of partner similarity or partner liking on the bargaining process and outcome, if we consider only those studies that imply bargaining in the narrow sense, i.e. exchanging demands and making concessions in order to reach agreement (MORGAN & SAWYER, 1967; BENTON, 1971; DRUCKMAN & BONOMA, 1976). Most of the other studies on mixed motive interaction that refer to liking as an independent variable use the PD-game or related games, and are therefore not immediately relevant in this context.

MORGAN and SAWYER (1967) stressed the point that communicating the expectations as to the equality or equitability of the solution, induces friends rather than non-friends, to meet the other's expectations more closely.

BENTON (1971) found that liking for the partner (liking not manipulated but sociometrically assessed) had a remarkable influence on the style of bargaining communication with female dyads only; female subjects emitted a greater number of positive emotional responses if they liked each other. Such a difference could not be observed in male dyads.

In the experiment of DRUCKMAN & BONOMA (1976), the subjects (boys from a junior high school) negotiated with a simulated partner via written messages mediated by the experimenter. Attraction was manipulated by informing the subjects about their alleged similarity with their partner. Comparing the initial and final attraction rating, they found a decrease in attractiveness for similar dyads, and a slight increase for dissimilar ones. Similarity turned out to be a hindrance to reaching an agreement. This was explained by disappointed expectation of the similar players.

Whereas in the forementioned experiments the subjects were informed on the other's pay-off situation, in our experiment the subjects are not. Nevertheless, they tend to guess it in order to explain and to predict the partner's behavior. If we know those subjective explanations (attributions), we are better able to understand the subject's behavior and the process of interaction.

The rather complex experimental design, which will be described in detail later, allows for four independent variables, (a) partner realization (computer program - real partner), (b) liking (liking - disliking), (c) cost (low,low; low,high; high,low; high,high), (d) dependence beyond the bargaining situation (dependent - not dependent).

We state the following predictions, which are based on the general idea of a subject's expectations according to his/her initial social emotional relations with the partner, and of the emotional and behavioral consequences of confirmed, or disconfirmed expectations. No hypotheses will be stated as to the effects of dependence beyond the game, which is given by the subject's possibility of awarding a bonus to the partner at the experimenter's expense. It would be equally plausible to predict an attenuation of the liking x cost effects as well an accentuation of those effects. The first prediction could be based on the assumption that the knowledge of the future mutual dependence would prevent a subject from expressing anger or behaving uncooperatively in the case of disappointed expectations. The second kind of prediction would be suggested by the idea that the expectancy of future dependence would render the liking relation more salient.

1. The probability of arriving at an agreement is the same for liking and disliking dyads.

Although it may be assumed that in the beginning stages of their interaction, liking dyads are ready to cooperate and to avoid pressure tactics in order to integrate both partially opposing interests in a mutually satisfying agreement, in later stages, such willingness to cooperate decreases, if the partner does not meet the expectation of mutual cooperation.

2. If games end in agreement, it will be reached by liking dyads with mixed or high costs at an earlier stage than by disliking dyads with mixed or high costs. The opposite will be true for dyads with low costs.

This hypothesis is based on the assumption that, early in the bargaining process, liking dyads make cooperative moves. If the other reciprocates, because of his/her advantageous payoff situation, agreement may be reached soon. Disliking partners are less compromising from the beginning. However, should they arrive at an agreement, they tend to need a greater number of steps in order to get there. Dyads in the more comfortable low cost condition generally have no difficulties in meeting the mutual expectations in making concessions and in avoiding

deadlocks. It may be assumed that liking dyads are able to enjoy the interaction, and are thus not in a hurry to end it by quick concessions.

3. If games end in a deadlock, this occurs to liking dyads with mixed or high costs at a later stage than to disliking dyads with mixed or high costs.

In stating this hypothesis (which is theoretically closely related to the second hypothesis), we assume that, in difficult payoff situations, liking dyads become increasingly tough bargainers if their expectations have not been met during the early stages of the bargaining process thus enhancing the risk of deadlock. Disliking partners do not need to cope with disconfirmed expectations; on the contrary, if they have avoided early deadlock and if their partner is less competitive than expected, they may actually be appreciative during the later stages of the game. Dyads in the low cost condition are not expected to end in deadlock; therefore no hypothesis is needed.

4. The responsibility for a failure (deadlock) will predominantly be attributed to the partner's behavior, more so if the partner was liked at the beginning than if he was disliked.

Generally, people tend to blame their partner rather than themselves or the situation for a negative outcome of a social interaction (SNYDER, STEPHAN & ROSENFELD, 1976). Intuition as well as experimental results (e.g. WOLOSIN, SHERMAN & TILL, 1973; REGAN, STRAUSS & FAZIO, 1974) support the assumption that success (failure) of a liked person is more often attributed internally (externally) than success (failure) of a disliked person. If we nevertheless predict a predominantly internal attribution of a breakdown in bargaining for the liking condition, this makes sense only if we assume that toughness of a liked partner entails disillusionment, attrition of the liking relation, and anger.

5. The credits for success (agreement) will mainly be attributed to the self

This hypothesis is complementary to hypotheses 4, and is based on the same principle of "self serving biases" (MILLER & ROSS, 1975).

## METHOD

### Subjects

The subjects were 70 male and 58 female students from the University of Linz and from a local high school, between the age of 17 and 26. They were randomly grouped into 16 mixed sex groups of 8 persons (For comments on randomization refer to Table 1).

### The bargaining game

We used the bargaining game with incomplete information, designed by HARSANYI and SELTEN (1972). The two players have to divide 20 money units between themselves if they reach an agreement.

The S only knows his own cost, which he is told at the beginning of the game, (high cost = 9 money units, low costs = 0 money units) and he also knows that the other's cost is with a probability of  $p = .50$  either low or high. Independently of one another, both players decide on a demand at each stage. As soon as both bargainers have made their demands, they are reported to the players simultaneously. Each player guesses the cost of the other, and goes on to the next stage.

Agreement is reached if the sum of both demands is at the most 20 money units. In this case, S receives his last demand minus his cost. The amount by which the sum of demands falls short of 20 is split evenly.

Deadlock occurs at any stage for which neither player has made a concession, i.e. both demands remain at the levels set in the previous stage. In the case of deadlock both players have a net payoff of zero. The original design of the game was modified in order to be able to test our hypothesis about liking and dependency.

### Variation of liking

When the eight participants arrived at the laboratory, they were seated around a table and asked to introduce themselves to the others by talking a little about their work and leisure activities. Each S could be identified by a letter printed on a card and put before him on the table. Based on the first impression or prior acquaintance, each S marked on a scale ranging from 0 (very close) to 9 (very remote), with an indifference point between 4 and 5, how close he felt to each of the other participants. At the beginning of each game, S was informed of whether he and his partner in the game liked each other or did not like each other, in order to learn "how liking based on first impression is affected by further interaction in a bargaining situation".

### Dependency

The participants of half of the groups were informed that, at the end of each game, they could award a bonus payment of 0, 2 or 4 money units (1 money unit = two Austrian shillings) to the other player if they wished to but without being charged for the bonus. They were told that they would find out about the received bonus only after all the games were completed.

### Person and robot games

Based on the data of a previous experiment (HOGGATT et al., 1978), the laboratory computer was programmed to simulate a person's bargaining behavior. For more information on that programme see HOGGATT et al. 1978. The subjects were unaware that they were occasionally playing with a robot. Each subject played 8 games, with the games numbered 1,4,5 and 8 being played with the robot. Only the games played with people were analyzed for this report.

### Continuous ratings

At the beginning of each game, data concerning the outcome of each individual game was collected. The maximum and minimum results expected had to be rated on a point scale. After every second phase of the game, all subjects had to rate the liking that they experienced for their partner at that particular moment, and his costs. In addition to this, the players had the opportunity to exchange "remarks" at each stage of the game. Each remark was equivalent to a specific point on a 10-point friendliness scale (e.g. 1 = "it is fun to be your partner", 5 = "we will see what happens next", 10 = "you are a greedy and selfish person"). These remarks appeared on both screens immediately after being typed in. The computer was programmed to emit rather friendly comments in the liking condition, and rather unfriendly ones in the disliking condition, in both situations dependent on the subjects last yield.

### List of the scale

- 1 it is fun to be your partner
- 2 I appreciate your cooperativeness
- 3 You are a person one can get along with
- 4 You seem to behave rationally
- 5 We will see what happens next
- 6 You press hard for your position
- 7 I am irritated by your stubborn behavior

- 8 You do not care at all about fair play
- 9 You are a greedy and selfish person

After the third game, all subjects had to complete a questionnaire about self-evaluation (PERRY, G. quoted in KIRCHLER & BRANDSTÄTTER, 1982) and about the type of attributional tendencies (FLEISCHMANN, 1982).

### Final ratings

At the end of each of the 8 games, the subjects rated their satisfaction with their bargaining outcome on an 8-point rating scale, ranging from very satisfactory to very unsatisfactory, without a neutral point. The attributions related to own behavior, partner behavior, own cost, partner's cost, other causes, and were rated on 6-point scales.

### The incomplete block design

An incomplete block design with repeated measures was chosen in order to balance for the effects of major importance (table 1). The design was the same for low dependence (no bonus could be awarded at the end of the game) and high dependence (bonus could be awarded).

Table 1: Experimental design

	Time order of games							
	1	2	3	4	5	6	7	8
1	AR <u>99</u>	AE oo	AF <u>o9</u>	AR 9o	AR o9	AF <u>9o</u>	AE 99	AR <u>oo</u>
2	BR <u>oo</u>	BF 99	BE <u>o9</u>	BR o9	BR 9o	BE <u>9o</u>	BF oo	BR <u>99</u>
3	CR 9o	CG <u>o9</u>	CH oo	CR <u>99</u>	CR <u>oo</u>	CH 99	CH <u>9o</u>	CR o9
4	DR o9	DH <u>o9</u>	DG 99	DR <u>oo</u>	DR <u>99</u>	DG oo	DH <u>9o</u>	DR 9o
5	ER <u>99</u>	EA oo	EB <u>9o</u>	ER o9	ER 9o	EB <u>o9</u>	EA 99	ER <u>oo</u>
6	FR <u>oo</u>	FB 99	FA <u>9o</u>	FR 9o	FR o9	FA <u>o9</u>	FB oo	FR <u>99</u>
7	GR 9o	GC <u>9o</u>	GD 99	GR <u>oo</u>	GR <u>99</u>	GD oo	GC <u>o9</u>	GR o9
8	HR o9	HD <u>9o</u>	HC oo	HR <u>99</u>	HR oo	HC 99	HD <u>o9</u>	HR 9o

Note. By mistake of the computer program, the randomization in the allocation of subjects was not perfect. In particular, the interaction of cost and liking conditions was partially confounded with effects of the time order of the 16 experimental sessions. Therefore, the data have been corrected for time order effects of experimental sessions.

Note. Person players A to H; R = Robot. Cost states of the dyad: oo, o9, 9o, 99. Liking underlined, otherwise disliking. This design was applied to 16 groups (8 persons each), half of them with liking pattern reversed. The person games (columns 2,3,6,7) in line 1 to 4 are identical to those in line 5 to 7.

RESULTS

The data analysis is restricted to those games that are played with another person. Since 64 dyads played 4 such games each, we have a total number of 256 games.

Liking and probability of agreement

The probability of agreement is not dependent on liking. 74 % reach agreement in the liking condition, 67 % in the disliking condition. With  $n_1 = n_2 = 128$ , such a difference is not significant.

Hypothesis 1 is therefore confirmed.

Table 2: Frequencies of games ending in deadlock (D) or Agreement (A)

Cost condition	Low		Mixed		High	
	D	A	D	A	D	A
<b>Bonus</b>						
Liking	2	14	7	25	8	8
Disliking	2	14	9	23	12	4
<b>No Bonus</b>						
Liking	3	13	8	24	5	11
Disliking	3	13	9	23	7	9

Liking influences time of agreement and of deadlock

Table 3 points out that disliking dyads in the low cost condition reach conflict later and agreement earlier than liking dyads. The opposite is true for dyads in the mixed cost condition. So far hypothesis 2 and hypothesis 3 have been confirmed. But high cost dyads behave contrary to the prediction. They go with the low cost dyads and not with the mixed cost dyads.

Table 3: Number of bargaining stages before deadlock or agreement is reached

Cost		Deadlock		Agreement	
		Disliking	Liking	Disliking	Liking
Low	$\bar{x}$	9.39	6.49	7.73	8.12
(LL)	n	(5)	(4)	(27)	(28)
Mixed	$\bar{x}$	7.32	7.49	8.66	8.04
(LH,HL)	n	(18)	(15)	(46)	(49)
High	$\bar{x}$	7.79	6.57	9.18	9.35
(HH)	n	(19)	(14)	(13)	(18)

Note.  $F(1, 239) = 3.11$ ;  $p = .08$  for interaction Subject's Cost x Partner's Cost x Liking x Outcome. The first and last demand of the previous game have been taken into account for covariate control in an attempt to partial out carry-over effects from preceding games. The cost conditions LH and HL have been combined for this table.

In Fig. 1 low cost and high cost dyads are combined (equal cost dyads) and compared with mixed cost dyads. There is a tendency for a significant interaction (Cost x Liking x Outcome) with  $F(1, 239) = 3.29$  and  $p = .07$ .

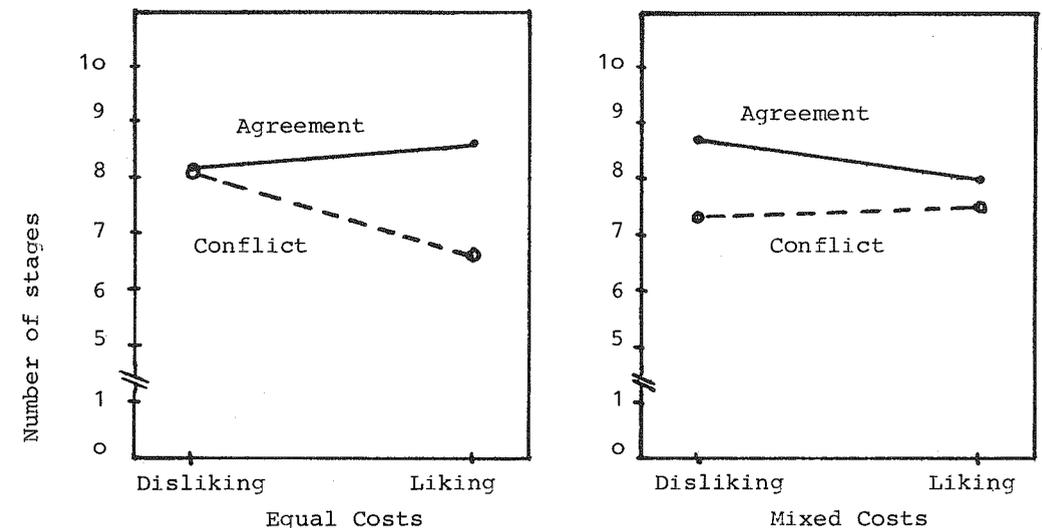


Figure 1: Number of stages, needed for agreement and deadlock depending on liking in equal cost and mixed cost dyads.

Causal attributions of failure (deadlock) and success (agreement)

Immediately after ending a bargaining game, the subjects indicated their causal attributions of outcome on a six-point scale. For testing the hypotheses 4 and 5, we draw on the different score "attribution to partners minus attribution to self". Table 4 displays the results. The higher the score, the more prevailing the attribution towards the partner's behavior.

Table 4: Causal attributions of bargaining outcome. Difference scores "responsibility of partner minus responsibility of subject"

	Deadlock		Agreement	
	A.M.	n	A.M.	n
Liking	1.48	66	-.35	190
Disliking	1.32	84	-.33	172

Hypotheses 4 and 5 are confirmed in so far as partner attribution prevails over self attribution in the case of deadlock but not in the case of agreement ( $F(1,478) = 92,57$ ;  $p = .000$ ); however, since there is no interaction between liking and outcome, the second part of hypotheses 4 is disconfirmed.

Final ratings of social-emotional distance and final guesses of partner's costs

A subject who is confronted with a liked but unexpectedly tough bargaining partner has at least two options in restoring cognitive consistency (a) to increase the social emotional distance, (b) to assume that the partner has high costs.

There is a tendency towards an interaction between liking and partner's cost in the final rating of social-emotional distance ( $F(1,326) = 3.42$ ;  $p = .065$ ) as Table 5 shows. In the liking condition,

the high cost partner who generally concedes less is significantly less liked than the low cost partner.

Table 5: Final rating of social-emotional distance depending on liking and partner's cost

Partner's Cost	Disliking		Liking	
	$\bar{x}$	n	$\bar{x}$	n
High	3.62	(84)	3.33	(87)
Low	3.74	(86)	2.74	(79)

Note. The scale of social emotional distance extends from 0 = very close to 9 = very remote. Only games that take at least seven stages have been considered here.

The differences in final guesses of partner's costs are not significant (cf. Table 6).

Table 6: Final guesses of partner's cost depending on liking and partner's cost.

Partner's Cost	Disliking		Liking	
	$\bar{x}$	n	$\bar{x}$	n
High	3.21	(84)	3.54	(87)
Low	3.17	(86)	3.11	(79)

Liking and friendliness in the course of bargaining

All the preceding hypotheses rest more or less on the assumption that initial liking goes along with readiness to cooperate and with high expectations concerning the partner's cooperation. Disconfirmed expectations should lead to attrition of liking and as a consequence to more unfriendly remarks. This deterioration of social integration is supposed to increase the risk of deadlocks. We have to compare the changes of liking ratings and friendliness in games that end in deadlock with those that reach agreement in order to verify these assumptions.

Figure 2 presents the sequence of liking ratings and of message friendliness for those games that extend over at least seven stages (exchanges of offers).

Unfriendliness of remarks.  
Social distance ratings, resp.

Unfriendliness of remarks.  
Social distance ratings, resp.

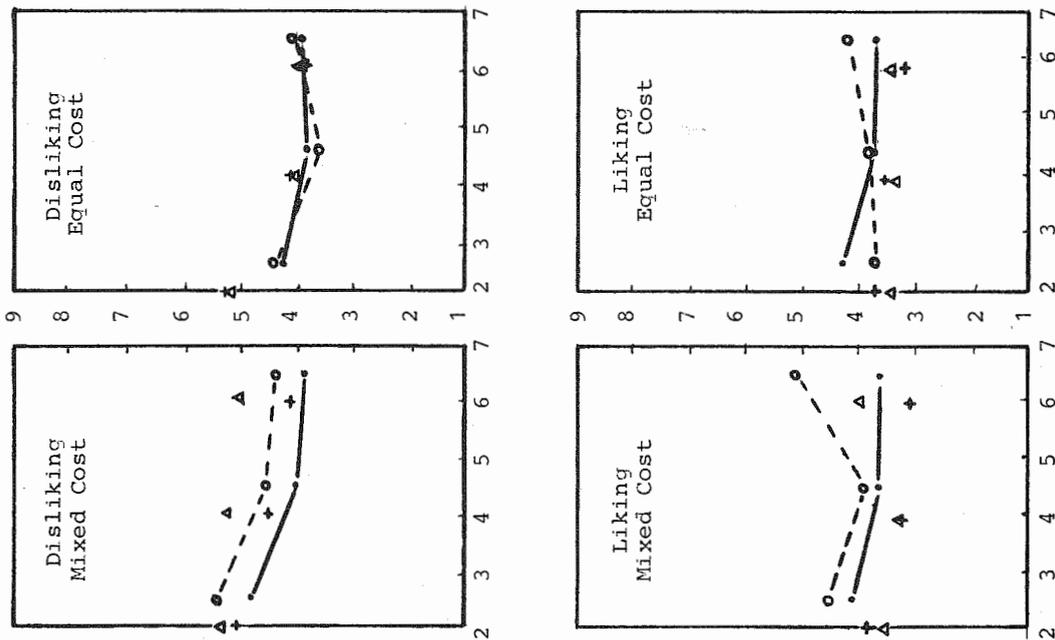


Figure 2: Unfriendliness of remarks (● Agreement, ○ Deadlock), and ratings of social distance (⊕ Agreement, △ Deadlock)

We see that in the mixed cost liking condition, deadlock is preceded by an increase of social emotional distance and of unfriendliness of remarks.

Probabilities of reciprocating a partner's concession

Given a certain probability of making a concession, the dyad will run a lower risk of deadlock if the bargaining partners manage to coordinate their concessions. It would be both a fair and an efficient way of coordinating concessions if person A makes a concession at one stage, and person B reciprocates that concession at the next stage. In the equal cost condition, this kind of reciprocating happens more often with liked partners, whereas in the mixed cost condition, reciprocating occurs more often with disliked partners (cf. Table 7).

Table 7: Subject's concessions following a partner's concession

Subject's concession	Equal Cost		Mixed Cost	
	Disliking	Liking	Disliking	Liking
Yes	177	237	250	173
No	49	40	45	50

Note.  $\chi^2 = 8.90, p < .05$

## DISCUSSION

On the whole, we were able to show that the social emotional relations in a bargaining situation with incomplete information change in a predictable way depending on the payoff situation. The main line of argumentation was that liking/disliking fosters specific expectations concerning the partner's cooperative/competitive behavior. Confronted with unexpected behavior, the subject experiences disappointment/relief which in turn affect instrumental, and impulsive behavior. The latter is tempered by rational strategies if the stakes are high.

There are some results contradicting our hypotheses, and which call for further differentiation of concepts and theoretical statements.

More specifically, we have to deal with the unexpected discrepancy between mixed cost and high cost dyads that reach agreement. In the study of BRANDSTÄTTER & HOGGATT (1982) no more than two high cost games ended in agreement. Therefore, it is only in this study that a separate analysis of this category is possible.

Considering all the evidence for the process of change in liking, friendliness, satisfaction, and attribution specific to the different experimental conditions, this evidence could be reported here only in part, we can draw the following conclusion: It is only the low cost player in the mixed cost liking condition whose expectations for his partner's cooperation are often disconfirmed: Having low cost, he is in a position to make concessions, but at the same time, he also expects that his liked partner will reciprocate his concessions, assuming that the other is in a similar cost condition. Contrary to the subject's expectation, quite often the partner takes a hard position because of his high costs, thus provoking disappointment, attrition of liking and increased risk of deadlock at later stages of the bargaining process. This problem does not occur if both players have high costs. In such a situation, mutual expectations and behavior are better balanced. In the mixed cost condition, disliking partners seem to have less difficulties in coordinating their concessions than liking partners (cf. Table 7).

Whether the bargaining partners were dependent on each other or not beyond the bargaining situation did not make a significant difference in the influence of liking on the bargaining process and outcome. However, there is some indication that expectation of future dependence which is given in the bonus condition, makes the social emotional relation more salient, and therefore accentuates differences of bargaining behavior related to differences in liking. A closer look at the data and more sophisticated statistical methods should lead to a better

understanding of some other results of the complex experiment which can not be discussed here.

A next step could be to test our hypotheses with a task that is less unidimensional and that allows for a more complex integrative bargaining (CARNEVALE et al., 1981) confronting the subjects with a whole package of options. We may expect that different emotional relations will then have a rather strong effect on whether the bargaining partners are able to integrate the different goals and perspectives in a mutually satisfying solution, or whether they choose pressure tactics and competitive strategies with an increased risk of deadlocks.

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#### INFORMATION-PROCESSING IN BARGAINING: REACTIONS TO AN OPPONENT'S SHIFT IN CONCESSION STRATEGY

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**Abstract:** Reactions to an opponent's change in bargaining strategy were assessed at three levels of analysis: Subject's concessions, facial expressions, and neurophysiological processes. Each of these reactions is part of the monitoring function in negotiation. That function is described in terms of information-processing cycles involving expectations, evaluations, and adjustments. Playing repeated games against a computer, subjects monitored the computer's concessions as a trend. Appropriate adjustments were made late in the session, indicating that considerable experience was needed for learning. However, facial expressions and neurophysiological responses indicated earlier responsiveness: Changes in certain expressions (head angle, brow to nose, length of mouth) and in the EEG record (amplitude of the P300 wave-form) occurred in response to early computer concession shifts. Implications for information processing in bargaining are discussed in terms of an extended bargaining process. Different forms of responsiveness to an opponent's moves occur at different junctions in the session.

This experiment is a continuation of our work on information processing in negotiation. One model in particular was found to reflect well the dynamic of negotiation. According to that model, negotiators monitor the other's concessions as a trend. A negotiator's responses are mediated by expectations and aspirations which are adjusted through the course of the conference. Information processing can be represented by a sequence of steps involving the formation of, evaluation of, and adjustment of expectations or aspirations based on a comparison of, "Where is he at now?", and "Where am I at now?" (Druckman, 1978). An attempt is made to probe these processes by developing indicators of the steps as these unfold in the course of bargaining.

Indicators of information processing are developed at three levels of analysis: Concessions, micro-facial expressions, and neurophysiological processes. These behaviors may be hypothesized as being functionally equivalent indicators of processing activities. Reacting to an opponent's moves, a bargainer's adjustments (concession rate

\* The authors' contributions were equal. Karis and Donchin supervised the data collection, analyses of the EEG record, and the photographic procedures. Karis and Druckman developed the concession-making learning index, and Druckman designed the coding system for facial expressions. Thanks go to Frank Stech for his suggestions of coding procedures for facial expressions. The research was supported by the Defense Advanced Research Projects Agency. Such support does not imply that the study reflects the view of the Department of Defense.