

# Effect of Bargaining in Electronic Commerce

*Ting-Peng Liang and Her-Sen Doong*

**ABSTRACT:** Internet business has grown at an unprecedented rate in the past several years. Recent research has found that the functions provided by a store have a significant impact on customer purchase decisions. Price bargaining is a common practice in traditional businesses, and this study investigates its effect in electronic commerce, focusing on three different bargaining strategies. An intelligent agent that allows customers to bargain for a better price was implemented and integrated into experimental stores. The results show that consumers prefer shopping at bargaining stores even when there is no financial gain. Different bargaining strategies and customer personalities may also affect the outcome and customer satisfaction.

**KEY WORDS AND PHRASES:** Electronic commerce, intelligent agents, price bargaining.

The revolution of the computer network and the World Wide Web (WWW) has changed traditional commercial activities, such as shopping, brokerage, negotiating, and retailing. Customers can purchase a large selection of product items from an ever-increasing number of Internet stores. In the coming new age, a significant portion of business operations will be shifted to cyberspace through globally connected networks. Forrester Research estimates that by the year 2003, consumers will spend \$108 billion to buy goods on-line, while businesses will spend \$1.3 trillion. The availability of Web technology will induce the economy to become Internet-based because of the greater efficiency this will achieve.

In traditional markets, suppliers sell merchandise to a wide variety of customers by maintaining a considerable degree of flexibility in pricing. Negotiations on price and other terms are common. That is, even when there are stated list prices and discount structures, the actual price paid by a customer may depend upon the result of a negotiation. In fact, price bargaining benefits both sellers and buyers because it often leads to the exchange of information on market price distribution and product specifications. Such bargaining gives the seller an opportunity to interact with its customers and to increase the probability of clinching a deal. The buyer benefits by obtaining more information about products and may acquire a more suitable product at a lower price. Arndt observed that a growing number of markets are coming under negotiated exchange, in which price and other terms are set via the bargaining behavior [1]. Thus, there is no doubt that bargaining plays an important role in consumer purchasing decisions and commercial transactions.

The past decade witnessed an increased interest in the utilization of information technologies to facilitate negotiations. Many researchers have built negotiation support systems to facilitate the bargaining process between corporations. Agents that facilitate negotiation in electronic commerce have

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also been proposed [34, 47]. However, not many empirical findings have been reported.

Given the importance of bargaining in consumer decisions, the purpose of this study is to investigate the effect of bargaining in electronic commerce. An intelligent agent armed with three different strategies for price bargaining was developed. An experiment was conducted to test the effect of different bargaining strategies and purchasing contingencies. The results contribute to a better understanding of bargaining mechanisms that can be incorporated into electronic commerce.

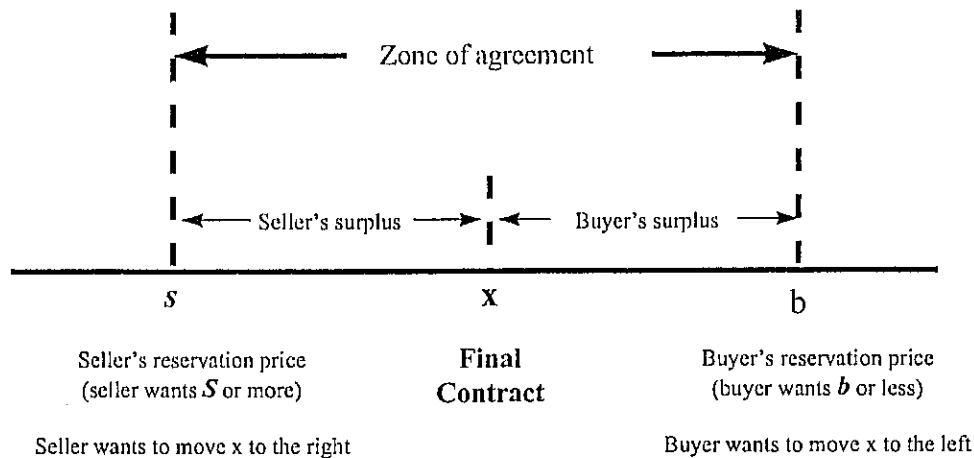
## Research Background

Bargaining, or negotiation that is generally used interchangeably, is the interaction that occurs when two or more persons attempt to agree on a mutually acceptable outcome in a situation where their orders of preference for possible outcomes are negatively correlated [21]. Bargaining is appropriate if a zone of agreement exists [41]. The concept of a zone of agreement is illustrated in Figure 1. Suppose that two bargainers are negotiating on a price, and each has established its own threshold value. The seller sets a reservation price,  $s$ , as the minimum it will accept. For any final contract value,  $x$ , the seller receives a surplus if  $x > s$ . Obviously, the seller desires the maximum surplus. Likewise, the buyer has a reservation price,  $b$ , which is the maximum it will settle for. For any  $x < b$ , the buyer receives a benefit. If the seller's reservation price is less than the buyer's, then the zone of agreement is the interval from  $s$  to  $b$ , and bargaining will determine the price of the final deal.

Bargaining can be viewed as a search behavior, and the two parties involved in bargaining as negotiators jointly searching in a multidimensional space to find an agreed point [37]. For price bargaining, the negotiators might consider cost dimensions and price dimensions in their search for a mutually agreed final price in the zone of agreement. Therefore, consumers must decide whether to buy an item at the list price or to make an additional effort to buy it at a lower price (e.g., by bargaining with sellers or searching in the market). Stigler argued that a perfectly rational consumer should continue to bargain or search until the expected gain from another bargain or search is less than the cost of continued bargain or search [53]. For consumers, the goal is to maximize the surplus by balancing the amount of money saved from bargaining with sellers and the cost of bargaining. That is, from the economic perspective, the cost versus the savings is the only consideration, and saving money is the only motivation for bargaining.

However, recent research indicates that consumer decisions may not always be rational [28, 29, 46, 50, 51, 52, 56, 57, 58]. For instance, Kahneman and Tversky proposed the prospect theory and showed that bargain hunting (price search) might be motivated by factors other than the absolute amount of money [54, 55]. In addition, a series of studies by Darke and Freedman also demonstrated that shoppers gained satisfaction from bargain hunting even when the amount saved was insignificant or did not benefit them directly [14].

Another issue is bargaining strategies. In order to have a good chance of



**Figure 1. The Zone of Agreement**

achieving the negotiator's objectives, the bargainers can develop tactics and strategies to be used as a bargaining plan. A bargaining tactic is defined as a position or maneuver to be taken at a specific point in the bargaining process [22]. A bargaining strategy consists of bargaining tactics to be used throughout the bargaining process and implies a commitment to an overall approach to be taken with the bargaining opponent. Previous research has identified several strategies, such as the tough strategy [49], the intermediate strategy [3], the soft strategy [38], and the fair strategy [48]. These differ from one another in many dimensions (e.g., hard or soft initial offer, many versus few concessions, large or small concessions, etc.). For example, Fouraker and Siegel defined a tough bargainer as one who makes a high opening offer followed by infrequent and small concessions [19].

For bargain hunting, the transaction theory suggests that a large percentage of discount can cause the search to end by raising consumer satisfaction over a critical threshold. Thaler argued that a high percentage of discount adds to the perceived value of the offer because it indicates that the price is a real bargain [54, 55]. Darke et al. adopted the heuristic-systematic model of social judgment [8, 9, 10] to explain bargain-hunting behavior [15]. The heuristic-systematic model distinguishes between systematic and heuristic processing of information and suggests that people should attempt to find a balance between concerns about the validity of a judgment and the preference for minimizing processing effort [8, 43]. They found that a participant would stop searching when it got a large discount and the initial base price of the item was low. Although there is some evidence, previous research on the effect of different strategies is inconclusive.

## Research Framework and Hypotheses

Bargaining behavior and outcomes are determined by the bargaining structure, the individuals involved, and the bargaining strategies [23]. Structural influences are the characteristics of the bargaining situation (e.g., the number of

participants, the form of the negotiations). Individual differences are the characteristics of the individuals participating in the negotiations (e.g., personality, gender, education, culture). Strategic differences include differences in opening bids, frequency and degree of concessions, and the number and frequency of offers.

This study focuses on the situation in which two parties bargain on product prices over the Internet. One party is the shopper, and the other is the intelligent computer agent. The following three issues are discussed:

1. Whether the bargaining agent can attract customers to an electronic store.
2. Which bargaining strategy would have the best effect.
3. How individual differences may affect the outcome of electronic bargaining.

### **Effect of Bargaining**

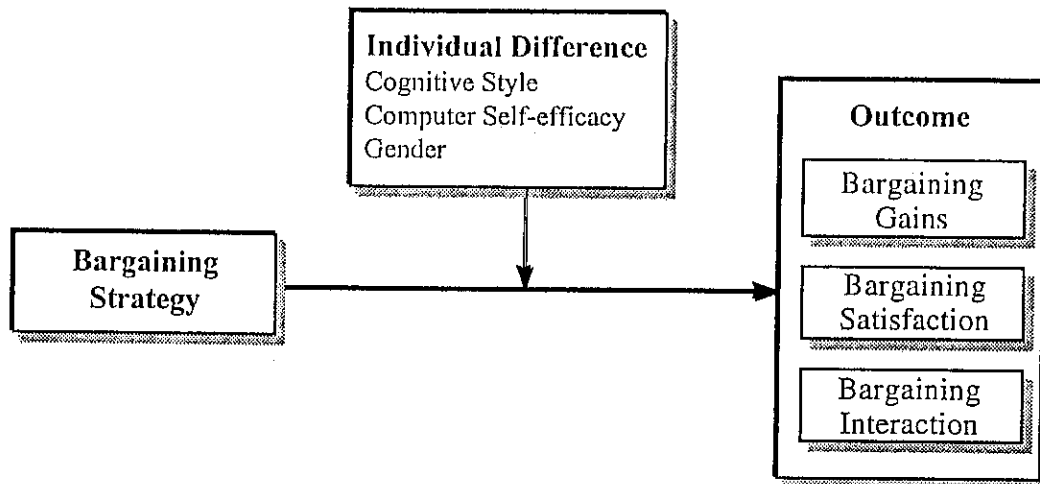
As discussed above, consumer decisions are not always completely rational, and bargaining is not a purely economic decision that balances bargaining cost and financial savings. Research findings indicate that shoppers may enjoy bargaining regardless of the financial gain. Moreover, bargaining with a computer agent on the Internet might be like a simulation game for a shopper that makes it possible to perform actions occurring in the real world. Therefore, in comparison to other electronic stores, those with a bargaining mechanism may increase microcomputer playfulness. Since higher microcomputer playfulness can lead to immediate subjective experiences, such as involvement, satisfaction, and positive mood [60], Internet shoppers can be expected to prefer shopping at electronic stores that have a bargaining agent.

*H1: Consumers are more likely to shop at bargaining stores on the Internet even when there is no financial gain.*

### **Effect of Bargaining Strategies**

Bargaining strategies may also affect consumer decisions. A bargaining strategy comprises the tactics for an initial offer, degree and frequency of concessions, and number and frequency of subsequent offers. Barry and Oliver studied affective processes in a two-party negotiation and proposed that the initial offer, tactics, concessions, and opponent behavior would affect economic outcomes [37]. The economic outcome, in turn, would affect perceptual outcomes, such as satisfaction and desire for future interaction. Based on the theory, the bargaining strategy can affect the bargaining gain (an economic outcome), satisfaction, and bargaining interaction (perceptual outcomes), as shown in Figure 2.

The framework shows that the independent variable of the research is the bargaining strategy, and the dependent variables are the bargaining gain, customer satisfaction, and bargaining interaction. Individual difference is included



**Figure 2. Research Framework**

as a moderating variable. That is, its existence may change the effect of the various bargaining strategies.

For simplicity, three different kinds of bargaining strategies are adopted for the bargaining agent: utility increasing, utility decreasing, and utility-neutral strategies.

1. Utility-decreasing strategy (UDC strategy): The agent makes a higher discount on the initial offer, followed by smaller and smaller concessions. Individuals facing this strategy may perceive the bargaining as utility decreasing.
2. Utility-increasing strategy (UIC strategy): The agent makes a lower discount on the initial offer, followed by larger and larger concessions. Individuals facing this strategy perceive the bargaining as utility increasing.
3. Utility-neutral strategy (UNC strategy): The agent makes an intermediate discount on the initial offer, followed by concessions of fixed size.

As was mentioned earlier, a high-percentage discount often causes shoppers to stop searching because it gives them a perception that they have gotten a real bargain and lets them be satisfied with the price. Moreover, the smaller and smaller concessions may lead customers to believe that the discount is close to the seller's reservation price and thus that further bargaining would not be cost-effective. It is supposed to be more effective in attracting customers.

The UIC strategy, on the other hand, makes a low discount on the initial offer and then gradually increases the concession. This is likely to motivate customers who are not satisfied with the initial offer to pursue the increasing concession by continuing to bargain. Therefore, it tends to generate more bargaining runs. The following hypothesis resulted from the preceding discussion:

*H2: Different bargaining strategies will result in differences in bargaining gain, customer satisfaction, and bargaining interaction.*

The hypothesis can be deconstructed into:

*H2a: Bargaining gain will be arrayed as UIC strategy > UNC strategy > UDC strategy.*

*H2b: Customer satisfaction will be arrayed as UDC strategy > UNC strategy > UIC strategy.*

*H2c: Bargaining interaction will be arrayed as UIC strategy > UNC strategy > UDC strategy.*

### **Effect of Individual Difference**

The bargainer's personal characteristics are important considerations [23]. This study considers cognitive style, computer self-efficacy, and gender as moderating variables.

#### *Cognitive Styles*

Cognitive styles are the characteristic and self-consistent modes of functioning that individuals show in their perceptual and intellectual activities [62]. One way to measure cognitive styles is to form a continuum with intuitive decision-makers at one extreme and analytical decision-makers at the other. Intuitive decision-makers tend to look for workable solutions to the total problem situation. They search for analogies with familiar problems [26]. Analytical decision-makers tend to reduce problem complexities and discover the causal relationship between variables.

Since decisions are a function of decision-makers' cognitive makeup [24], much discussion has been devoted to the role of cognitive style in decision-making. For example, Benbasat and Dexter [4], Cole and Gaeth [11], and Lusk and Kersnick [33] have shown that cognitive styles have an important impact on performance. As is well known, bargaining is a dynamic process of searching for the most favorable price. Differences in cognitive styles may affect the consumer's bargaining behavior. Since the analytical decision-maker prefers dealing with numbers [59] and is more willing to make extra efforts to reach the optimal result [6], it is reasonable to assume that an analytical person is more likely to go for bargaining.

*H3: The effect of bargaining strategies on bargaining gain, consumer satisfaction, and bargaining interaction is moderated by the cognitive style. Analytical decision-makers will have the higher bargaining gain, consumer satisfaction, and bargaining interactions.*

#### *Computer Self-Efficacy*

The consumer's ability and intention to use computers and the Internet, the essential elements of electronic shopping, may affect the relationship between bargaining strategies and outcomes. One way to measure this ability is com-

puter self-efficacy [36]. Compeau and Higgins found that computer self-efficacy (CSE) significantly influenced an individual's emotional reactions to computers and actual computer use [12]. They discovered a positive relationship between CSE and the use of computers and a negative relationship between CSE and computer anxiety. Shoppers bargaining with an intelligent agent need experience in computer operations, network usage, and related skills. Individuals with higher computer self-efficacy can be assumed to have a greater interest in bargaining.

*H4: The effect of bargaining strategies on bargaining gain, consumer satisfaction, and bargaining interaction is moderated by the customer's CSE.*

### *Gender*

Gender difference is another characteristic that may moderate the effect of bargaining strategies. Galbraith and Stephenson found that gender difference affected decision-making behaviors [20]. Powell and Ansic indicated that males and females adopted different strategies in financial decision environments [39]. Qualls stated that gender differences affected purchase decisions [40]. Rubin and Brown observed different sexual roles in negotiations [45]. The hypothesis is, therefore, formulated as follows:

*H5: The effect of bargaining strategies on bargaining gain, consumer satisfaction, and bargaining interaction is moderated by the customer's gender.*

## **Research Design**

An experiment was conducted to test the hypotheses. Volunteers were recruited and asked to purchase certain items from an experimental shopping mall on the Internet, in which some stores had bargaining agents, and others did not. The primary control variable was the bargaining strategy.

### **Subjects**

A total of 105 subjects (72 men and 33 women) taking extended education courses at the undergraduate level (most of them have full-time jobs) participated in the experiment. The average age was 30. Every participant received a nominal stipend of \$4 for participating, and the top 50 performers, as measured by their bargaining gains, received an additional \$4. Performance-based rewards were provided to encourage serious decision-making. The subjects were randomly assigned to one of three treatments (UIC, UDC, or UNC). Each group had 35 members.

### **Tasks**

Subjects were asked to purchase four items (CD-ROM, monitor, printer, and scanner) from an experimental Internet shopping mall of 20 stores (see Figure 3



**Figure 3. Sample Screen of the Bargaining Store in the Experimental Mall**

- <sup>a</sup> List price
- <sup>b</sup> Subjects enter their offers here
- <sup>c</sup> Asking price of the bargaining agent
- <sup>d</sup> The message box of the bargaining agent

for a sample screen). Each item had a particular brand and model, and their price structures were carefully designed. The stores were similar functionally except for the existence and behavior of the bargaining agent. Subjects could stroll freely in the mall via hyperlinks to buy the items. No time constraint was imposed.

The price structures of the items are shown in Table 1. Buyers who were completely rational would (1) go to the bargaining stores to buy the CD-ROM and scanner (they could get lower prices after proper bargaining), (2) go to the regular store to buy the monitor (they could not get prices better than the lowest list price it offered), and (3) go to either store to buy the printer (the reservation price equaled the lowest list price at the regular store). During the experiment, the subjects were not told which store had bargaining agents or the reservation price of the bargaining stores. The bargaining stores looked similar to the regular stores at the beginning, but the bargaining agent showed up when the subjects wanted to bargain. The reservation price of the bargaining store was the best price they could get, the actual price depended upon the negotiation between agent and subject. The computer recorded the whole bargaining process.

### Treatments

Subjects were assigned randomly to deal with agents that had three different bargaining strategies. The computer agent decided the new asking price based



Item	CD-ROM	Monitor	Printer	Scanner
Lowest list price in Liang mall	15,000	12,000	12,000	12,000
List price in bargaining store	15,000	15,000	15,000	15,000
Reservation price of bargaining store	12,000	12,100	12,000	10,000

**Table 1. Price Structure of Items** (in NT\$).

on its strategic pricing model. The UDC strategy made a high opening percentage discount (6.7 percent), followed by smaller and smaller percentage discounts in its concessions (e.g., 4.3 percent, 3.0 percent, 2.3 percent, 1.6 percent, 1.6 percent, 0.8 percent, 0.8 percent). The UIC strategy made a low initial percentage discount (0.67 percent), followed by larger and larger discounts (e.g., 1.34 percent, 2.04 percent, 2.78 percent, 3.57 percent, 3.70 percent, 3.85 percent, 4.0 percent). The UNC strategy made an intermediate opening percentage discount (2 percent), followed by a fixed percent discount in its concessions (e.g., 2 percent ~ 2.5 percent).

### **Measurement of Variables**

Five variables must be measured in the experiment: bargaining gain, customer satisfaction, bargaining interaction, cognitive style, and computer self-efficacy.

#### *Bargaining Gain*

Behavioral price theories suggest that individuals often use reference prices as standards for comparison to help them evaluate price offers in purchase decisions [61]. In this experiment, it can reasonably be assumed that the lowest list price available in the experimental mall would become the subject's reservation price. That is, the subjects used the lowest list price in the mall as the reference price to bargain with the computer agent. Therefore, subjects had bargaining gains only when the deal price was lower than their reservation price. In the experiment, only the CD-ROM and scanner could allow them to have bargaining gains. The equation is set as follows:

$$\text{Bargaining gain} = (15,000 - \text{deal price of CD-ROM}) + (12,000 - \text{deal price of scanner})$$

#### *Customer Satisfaction*

An instrument adapted from existing tools for measuring user satisfaction of computer-based information systems was developed to measure customer satisfaction with bargaining. The instrument includes eight items for measuring perceived usefulness, five items for decision-making satisfaction, and one item for the overall satisfaction (see Table 2). For each item, a five-point Likert scale was used (1 = strongly disagree; 2 = disagree; 3 = uncertain, 4 = agree; 5 = strongly agree).

**Perceived usefulness**

1.	I enjoy bargaining in electronic stores.	PU1
2.	I think electronic stores with the bargaining function are more similar to traditional stores.	PU2
3.	I like shopping from electronic stores with the bargaining function.	PU3
4.	The bargaining function is very important for electronic stores.	PU4
5.	The bargaining function is extremely useful.	PU5
6.	The bargaining function makes me enjoy shopping.	PU6
7.	As a result of the bargaining function, I can buy the product at a more acceptable price.	PU7
8.	I benefited from the existence of the bargaining function in electronic stores.	PU8

**Decision-making satisfaction**

9.	Utilization of the bargaining function has enabled me to make better shopping decisions.	DS1
10.	As a result of the bargaining function, I am able to consider more factors in shopping.	DS2
11.	As a result of the bargaining function, I am able to present my arguments about price more convincingly.	DS3
12.	As a result of the bargaining function, I am able to analyze product prices faster.	DS4
13.	As a result of the bargaining function, more relevant information for the shopping decision has been available to me.	DS5

**Overall satisfaction**

14.	Overall, I am satisfied with the bargaining function.	OT1
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**Table 2. Questionnaire Items for Measuring Customer Satisfaction.***Bargaining Interaction*

The subject interacts with the computer agent by making price offers. Therefore, bargaining interaction is defined as the total number of offers made by the subject in four purchasing sessions.

*Cognitive Styles*

The subject's cognitive style was assessed by the Rational-Experiential Inventory [18]. The instrument is a self-report measure based on cognitive-experiential self-theory to classify individual differences in intuitive-experiential and analytical-rational thinking. For the experiment, it was translated into Chinese and modified to reflect Chinese usage. The modified tool was validated on a group of subjects who did not participate in the experiment.

*Computer Self-Efficacy*

The instrument developed by Compeau and Higgins was used to measure computer self-efficacy. The questionnaire was translated into Chinese and was also validated with a group of subjects who did not participate in the later stages of the experiment.

## **Experimental Procedures**

The whole process was divided into three stages: practice, experiment, and data collection. The practice session allowed the subject to play with the experimental environment. Subjects were asked to link to a practice Web site and enter a certain date. If the date was correct, they were linked to the mall and started the experiment. Otherwise, the subject would be reviewed for his or her ability to perform in the experiment. In this study, all subjects passed the practice session successfully.

Once they entered the experimental session, subjects used a Web browser to purchase the assigned items. To avoid biases that might be induced by network traffic jams, subjects were actually dealing with a personal Web server installed on their workstation. All subject activities, such as travel paths and price offers, were recorded.

After finishing their purchases, the subjects were asked to fill out four questionnaires. The first obtained their demographic data. The second assessed consumer satisfaction. The third assessed cognitive styles. The fourth assessed computer self-efficacy.

## **Experimental Results**

### **Data Validation**

The collected data have to be evaluated for reliability and validity. Reliability is the stability of the instrument over various conditions and has traditionally been assessed by the Cronbach alpha coefficient, which measures the internal consistency of the collected data. Table 3 shows the number of items, their means, standard deviations, and Cronbach alpha values. Since all Cronbach alpha values are higher than 0.75, a level generally considered satisfactory for multi-item scales, the data reliability is acceptable.

Three different kinds of validity were measured: criterion related, convergent, and discriminant validity. Criterion-related validity (as defined in [31]) shows how closely the items included in the instrument are related to the construct of bargaining satisfaction. The item measuring overall satisfaction, that is "Overall, I am satisfied with bargaining mechanism," is assumed to be a valid measure and used as a criterion scale if all other items in the instrument are correlated with this criterion scale. Although the cutoffs are somewhat arbitrary, previous research suggests that items should be eliminated if their correlation with the criterion scale is below 0.4 [16, 27]. Table 4 shows the correlation between criterion scale (OT1) and measurement items (PU1 ~ DS5). All correlation coefficients are positive and significant at the 0.001 level. Thus, the criterion-related validity is acceptable.

Convergent validity is achieved if the items that measure the same factor correlate highly with one another. Discriminant validity holds if items are correlated more highly with the factor they intend to measure than with the other factors. Factor analysis is a popular approach for assessing the convergent and discriminant validity of constructs [5]. The results of the factor analysis using principal components extraction with varimax rotation on the items of the per-

	Factor	Number of items	Mean	Standard deviation	Cronbach alpha
Bargaining satisfaction	Perceived usefulness	8	31.2286	6.6046	0.94
	Decision-making satisfaction	5	19.1810	4.3452	0.93
Computer self-efficacy		10	6.7276	2.1440	0.95
Cognitive style	NFC	5	0.1943	0.9770	0.79
	FI	5	0.2762	0.8659	0.80

**Table 3. Reliability of Factors.**

Items	Criterion scale													
	PU1	PU2	PU3	PU4	PU5	PU6	PU7	PU8	DS1	DS2	DS3	DS4	DS5	
OT1	0.64	0.61	0.71	0.70	0.74	0.64	0.76	0.66	0.69	0.65	0.70	0.59	0.74	

**Table 4. Correlation Between Criterion Scale and Items.**

ceived usefulness and decision-making satisfaction are shown in Table 5. Overall satisfaction is not included in the analysis because it is a criterion scale. The results show that the Eigen values of both factors are greater than 1, which collectively explained 75 percent of the variance. All items have higher loads on their associated factors, which fulfills the requirement of the convergent validity. For discriminant validity, each item must load higher on its associated factor than on any other construct. The condition is also satisfactory. Therefore, both convergent and discriminant validities hold.

## Findings

### (1) Effect of Bargaining Agents

The log file shows that all the subjects tried to bargain with the computer agent. Table 6 summarizes the number of subjects who purchased items from the bargaining stores. As expected, the majority of the subjects went to the bargaining stores to purchase scanners or CD-ROMs.

The interesting part is the situation where subjects bought monitors and printers. Economically, there was no reason for them to purchase from the bargaining store because the reservation price of the bargaining agent was higher than the list price of the nonbargaining store. However, 38 of the 105 subjects purchased from the bargaining store at higher prices.

For printers, the reservation prices were the same for both kinds of stores. Theoretically, there should be a roughly equal number of subjects shopping at each store if they are equally attractive (i.e., assuming the bargaining agent has only economic effects). The result again is that subjects who purchased from the bargaining store significantly outnumbered those who purchased from nonbargaining stores (63 versus 42,  $p = 0.002$ ). Thus, hypothesis H1 is supported. That is, even if there is no financial gain, consumers may still prefer shopping from electronic stores that give them the opportunity to bargain.

Factor item	Perceived usefulness	Decision-making satisfaction
PU1	0.65674	0.40735
PU2	0.74949	0.35801
PU3	0.90671	0.22669
PU4	0.81661	0.34152
PU5	0.67675	0.58600
PU6	0.77470	0.29905
PU7	0.66328	0.54270
PU8	0.58770	0.53486
DS1	0.47544	0.73929
DS2	0.38921	0.82291
DS3	0.43447	0.75910
DS4	0.16181	0.85513
DS5	0.42742	0.80165
Eigen value	8.68	1.06
Percent of variance	66.8	8.2

**Table 5. Result of Factor Analysis.**

Item strategy	CD-ROM	Monitor	Printer	Scanner	Total
UNC (N = 35)	29	13	16	31	89
UIC (N = 35)	28	10	18	29	85
UDC (N = 35)	27	15	29	31	102
Total	84	38	63	91	276

**Table 6. Number of Subjects Who Purchased from Bargaining Stores.**

### (2) Effect of Different Bargaining Strategies

A further examination of the data in Table 6 indicates that the subjects' decisions were affected by the bargaining strategy adopted by the computer agent. For instance, the number of subjects who purchased printers from the bargaining stores differed significantly when different bargaining strategies were encountered (chi-square = 11.67,  $p = 0.003$ ). This is consistent with the prediction that the UDC strategy would be the most effective for luring consumers.

The results of the correlation analysis show that the bargaining gain and bargaining round are positively correlated. (See Table 7.) This means that the more you bargain with the computer agent, the more economic benefit you may gain. Besides, cognitive styles are negatively correlated with customer satisfaction and bargaining round. That is, intuitive shoppers were less satisfied with the bargaining function and spent less time interacting with the computer agent. This supports hypothesis H3. Computer self-efficacy is positively related to bargaining gain, bargaining satisfaction, and bargaining round, but the relationships are not statistically significant. Hence, CSE is not an independent variable that affects the outcome.

Table 8 shows the results of different bargaining strategies. Tables 9 and 10 summarize the MANOVA result, which means that (1) the effect of the bargaining strategy is statistically significant ( $p = 0.00$ ) and (2) different strategies did

Variables	CS	CSE	BG	BS
Cognitive style (CS)	1			
Computer self-efficacy (CSE)	-0.128	1		
Bargaining gain (BG)	-0.160	0.063	1	
Customer satisfaction (BS)	-0.303 <sup>b</sup>	0.075	-0.070	1
Bargaining round (BR)	-0.215 <sup>a</sup>	0.155	0.417 <sup>b</sup>	0.075

<sup>a</sup>Significant at the 0.05 level.

<sup>b</sup>Significant at the 0.01 level.

**Table 7. Correlation Among Variables.**

generate different bargaining gains, consumer satisfaction, and bargaining interactions. These findings support hypothesis H2. A further analysis using the Turkey method to compare the means in Table 8 shows the following:

1. The bargaining gain is ranked as UIC > UNC ( $p = 0.006$ ) > UDC ( $p = 0.004$ ).
2. The customer satisfaction is ranked as UDC > UNC ( $p = 0.014$ ) and UIC ( $p = 0.008$ ).
3. The bargaining interaction is ranked as UIC > UNC ( $p = 0.042$ ) and UDC ( $p = 0.004$ ).

Therefore, hypotheses H2a, H2b, and H2c are partially supported. The differences in customer satisfaction and bargaining interaction between UNC and UDC are insignificant statistically.

### *(3) Moderating Effect of Individual Differences*

The moderating effects of cognitive styles, CSE, and gender can be analyzed by testing their interaction with the dependent variables. That is, it is necessary to examine whether any change in the base relationship is significant under different values of the moderating variable.

#### *Cognitive Styles*

The observations were grouped by the cognitive style of the subjects. Table 11 shows the ANOVA result, which indicates that the interaction effect was very significant ( $p = 0.003$ ). Hypothesis H3 is supported. Analytical persons tend to have higher bargaining gain and satisfaction when bargaining against UIC and UNC agents, but the effect is insignificant (or even reversed) when they deal with UDC agents. The bargaining interaction is particularly heavy for the combination of analytical consumers and UIC agents.

#### *Computer Self-Efficacy*

In order to observe the moderating effect of CSE, the data were divided into high-CSE and low-CSE groups, using the global mean (6.72) as the splitting

Variables strategy	Bargaining gain	Customer satisfaction	Bargaining round
UNC	1681.14 (205.95)	48.31 (10.48)	57.31 (39.15)
UIC	2168.29 (316.62)	47.80 (12.58)	80.74 (45.74)
UDC	1120.00 (160.70)	55.11 (5.43)	49.71 (34.24)

Note: Standard deviations are in parentheses.

**Table 8. Mean and Standard Deviation of Dependent Variables.**

Effect	Value*	F-value	Hypoth. DF	Error DF	P-value	Power <sup>b</sup>
Bargaining strategy	0.76428	4.79	6.00	200	0.00	0.99

\* Wilks' Lambda value.

<sup>b</sup> alpha = 0.05.

**Table 9. Multivariate Test of Significance.**

Variable	Hypoth. MS	Error MS	F-value	P-value	Power <sup>a</sup>
Bargaining gain	583.35	99.2420	5.88	0.004	0.87
Customer satisfaction	9631372.28	1965676.97	4.90	0.009	0.79
Bargaining round	9155.01	1599.40	5.72	0.004	0.86

<sup>a</sup> alpha = 0.05.

**Table 10. Result of MANOVA.**

point. The ANOVA results shown in Table 12 indicate that the moderating effects were significant on all three variables. Therefore, hypothesis H4 is supported. The low-CSE group tends to have high bargaining gains, low satisfaction and interaction when dealing with UIC agents. The high-CSE group has higher bargaining gains at few bargaining rounds when it bargains against UDC agents.

### Gender

The effect of gender is shown in Table 13, in which the moderating effects are significant on all three variables. Therefore, hypothesis H5 is supported. As can be seen, the bargaining gain is particularly high for female subjects dealing with UIC agents, the satisfaction is high for males dealing with UIC agents, and the bargaining interaction is high for females dealing with UIC agents.

### Conclusion

This study investigated the effect of bargaining agents in electronic stores. Several interesting findings are worthy of discussion. First, financial gains may not be the only reason for electronic bargaining. A significant portion of the

Dependent variable	Bargaining gain			Customer satisfaction			Bargaining round		
	UNC	UIC	UDC	UNC	UIC	UDC	UNC	UIC	UDC
<b>Cognitive style</b>									
Intuitive	1407	1732	1205	46.26	45.45	55.35	41.15	76.50	46.18
Analytical	2009	2750	1038	50.75	50.93	54.89	76.60	86.40	53.06
Statistics <sup>a</sup>	$F = 6.819^b$ $P\text{-value} = 0.003$			$F = 4.52^a$ $P\text{-value} = 0.013$			$F = 8.176^b$ $P\text{-value} = 0.001$		

<sup>a</sup>Significant at the 0.05 level.

<sup>b</sup>Significant at the 0.01 level.

**Table 11. Moderating Analysis: Cognitive Style.**

Dependent variable	Bargaining gain			Customer satisfaction			Bargaining round		
	UNC	UIC	UDC	UNC	UIC	UDC	UNC	UIC	UDC
<b>CSE</b>									
High	1953	1910	1175	49.15	50.10	55.60	51.08	87.80	55.10
Low	1520	2512	1046	47.82	44.73	54.47	61.00	71.33	42.53
Statistics <sup>a</sup>	$F = 4.36^a$ $P\text{-value} = 0.018$			$F = 4.024^a$ $P\text{-value} = 0.024$			$F = 4.528^a$ $P\text{-value} = 0.011$		

<sup>a</sup>Only significant statistics are presented.

**Table 12. Moderating Analysis: Computer Self-Efficacy.**

Dependent variable	Bargaining gain			Customer satisfaction			Bargaining round		
	UNC	UIC	UDC	UNC	UIC	UDC	UNC	UIC	UDC
<b>Sex</b>									
Male	1701	1835	1125	48.08	49.64	55.04	59.26	75.00	48.92
Female	1641	3000	1109	48.75	43.2	55.27	53.58	95.10	51.45
Statistics <sup>a</sup>	$F = 5.073^a$ $P\text{-value} = 0.013$			$F = 5.319^a$ $P\text{-value} = 0.011$			$F = 5.739^a$ $P\text{-value} = 0.008$		

<sup>a</sup>Significant at the 0.05 level.

**Table 13. Moderating Analysis: Gender Difference.**

subjects purchased from the bargaining stores by paying higher prices. This is interesting because the switching cost from one store to another is virtually zero in electronic shopping. Therefore, the higher switching cost that prevents consumers from comparing the prices available in different stores and then going for the cheapest one does not exist. Theoretically, all consumers will go for the best available price if the other conditions are the same. Obviously, either the subjects were irrational or the bargaining agent offered something more than bargaining for prices. Moreover, the bargaining gain and satisfaction are not positively correlated. This supports the argument that bargaining may be motivated by nonfinancial reasons, such as fun, achievement, and computer playfulness.

The second finding is that different bargaining strategies often result in different bargaining gains, satisfaction, and interactions. Among the three strategies tested in the experiment, the utility-increasing strategy, which makes a low initial discount and then increases the concession level during the bargaining



process, allows the customer to gain the highest economic benefits, the most bargaining rounds, but the lowest customer satisfaction. The utility-decreasing strategy, which makes a high initial discount and then decreases the concession level, generates the lowest consumer gains and bargaining rounds, but the highest customer satisfaction. These phenomena may be explained by the heuristic-systematic model, according to which subjects try to find a balance between concerns about the validity of a judgment and the preference for minimizing processing effort. The possibility of missing a better price seems low, and continuing bargaining requires more effort in the utility-decreasing game. Therefore, subjects often chose to stop further bargaining after obtaining a significant discount.

The impact of the bargaining strategy is mediated by individual differences. The study described above examined three characteristics of individuals: cognitive style, computer self-efficacy, and gender. All of these are statistically significant. Generally speaking, analytical consumers who like numbers and systematic thinking can take most advantage from the utility-increasing strategy to reach the highest bargaining gain. They also have higher satisfaction and interactions than intuitive consumers.

Computer self-efficacy also affects the result of the bargaining strategy. For example, the high-CSE group has more bargaining rounds when it deals with the utility-increasing and -decreasing strategies, but has less bargaining rounds when it deals with the utility-neutral strategy. Further studies may be necessary to explore the underlying reasons.

The effect of gender is significant when female subjects work with an agent using the utility-increasing strategy. They were able to secure the highest bargaining gain after the highest number of bargaining rounds, although their satisfaction was much lower.

These findings have practical implications. First, incorporating bargaining agents into an electronic store is likely to create competitive advantages. More consumers may be attracted by the agent's existence even though they may not be able to gain financial benefits. Second, the most appropriate generic bargaining strategy for electronic stores seems to be the utility-decreasing strategy, since it allows the lowest consumer gains and the highest consumer satisfaction. Finally, in order to maximize the bargaining effect, different strategies must be adopted for different kinds of consumers. The system needs to take the consumer's gender, cognitive style, and CSE of the consumer into consideration.

Although every effort was made to conduct the foregoing experiment in a near-real environment, limitations do exist because the subjects knew that this was an experiment. Therefore, reasonable effort must be made to generalize the findings to the real-world case. As Dorris has pointed out, a real test of a strategy's effectiveness must be conducted in the real world [17]. It may also be interesting to add more factors to see their effect on electronic commerce. For instance, time pressure may be added into the experiment to see how consumers would react when the time for bargaining is restricted.

Overall, the research discussed in this article explores several dimensions of consumer bargaining behavior in electronic commerce. Some of the findings can be applied directly to improve the practice of electronic commerce, while others may stimulate thought on directions for future research.

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For biographical information on Ting-Peng Liang, see the Guest Editor's Introduction.

HER-SEN DOONG (hsdoong@mail.im.tku.edu.tw) is a doctoral candidate and instructor in information management at National Sun Yat-sen University in Taiwan. His research interests include electronic commerce and Internet communications. His papers have been published in several conference proceedings.