

行政院國家科學委員會專題研究計畫 期中進度報告

子計畫五：消費者的網路資訊搜尋、處理與使用行為(1/3)

計畫類別：整合型計畫

計畫編號：NSC93-2416-H-004-025-

執行期間：93年08月01日至94年07月31日

執行單位：國立政治大學企業管理學系

計畫主持人：別蓮蒂

共同主持人：樓永堅，張愛華

計畫參與人員：黃增隆、夏康寧、林育則

報告類型：精簡報告

報告附件：出席國際會議研究心得報告及發表論文

處理方式：本計畫可公開查詢

中 華 民 國 94 年 5 月 30 日

行政院國家科學委員會補助專題研究計畫期中進度報告

消費者的網路資訊搜尋、處理與使用行為

計畫類別：整合型計畫

計畫編號：NSC93-2416-H-004-025

執行期間：93年8月1日至96年7月31日

計畫主持人：別蓮蒂

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計畫參與人員：

成果報告類型(依經費核定清單規定繳交)：完整報告

本成果報告包括以下應繳交之附件：

出席國際學術會議心得報告及發表之論文各一份(附件二)

處理方式：除產學合作研究計畫、提升產業技術及人才培育研究計畫、

列管計畫及下列情形者外，得立即公開查詢

涉及專利或其他智慧財產權，一年 二年後可公開查詢

執行單位：國立政治大學企業管理學系

中華民國 94 年 5 月 30 日

行政院國家科學委員會專題研究計畫期中報告
消費者的網路資訊搜尋、處理與使用行為

Consumers' Information Searching, Processing, and Usage Behavior on the
Internet

計畫編號：NSC93-2416-H-004-025

執行期間：2004年8月1日至2007年7月31日

主持人：別蓮蒂教授 國立政治大學企業管理學系

說明：本研究案已完成第一部分「消費者網路拍賣的『贏家詛咒』心態」研究，已投稿國外期刊送審中，請參附件一。現正進行消費者的網路資訊搜集行為研究，並將在今年下半年再進行一個消費者網路拍賣的實驗法研究。

附件一

Abstract

The existence of winner's curse and loser's curse for the irrational bidders was denoted in previous study, but the psychological perspective of the curses, that is the regret feeling, was not directly discussed or measured. Also, the phenomena of the winner's and loser's curses were not clearly evaluated in an online auction where most of the participants are non-professional bidders. The purposes of this study are then to measure and identify the determinants of the online winner's and loser's curses. Based on Prospect Theory, this study proposes that the regret level of the bidders is non-linearly related to the overpaid or underbid price compared with a reference point of the estimated reasonable price.

A web-based survey is designed to investigate the bidders of Yahoo! Taiwan auctions site. As expected, it is found that the winner's regret level increase as the difference between the end price and the estimated reasonable price increases. In addition, the marginal value of winner's curse increases as the magnitude of the price difference increases. However, the losers' regret level is only strongly tied with the degree of the uncertainty about the chance of winning the bid. The number of bidders is not related to either the winner's or the loser's curse, which is different from previous findings in brick-and-mortar auctions. Finally, due to the endowment effect, the loser's regrets are stronger than the winner's.

Key words: winner's curse, loser's curse, auction, Prospect Theory, endowment effect

INTRODUCTION

Online auction has become a popular World Wide Web application in many countries. For example, there are now over 1600 Internet auction sites worldwide (Lucking-Reiley, 2000). Besides, the growing speed of the online auction market is surprising. In 2000, \$5 billion worth of goods were sold on eBay. In Taiwan, the turnover of online auction on Yahoo! in 2003 was already in nine hundred million of NTD and at the same time the turnover of online auction on all sites has achieved over tens of billions of NTD (Lin, 2003). In 2004, Yahoo! Taiwan reports that it brought in NTD 15 billion revenue from its online auction business which accounted for more than 90% of its total e-commerce transactions (IDIC, 2005). On the other hand, the amount of online auction visitors increases from 910,600 in 2001 to 1,280,100 in 2002.

Unlike traditional physical auction, the participants of online auction are mostly non-professionals. Therefore, the online bidding behavior may not all base on rational calculation. The participants are very likely to experience regret or disappointment after the auction events. This phenomenon is termed as the ‘winner’s curse’ or ‘loser’s curse’ in economic literatures on auction (e.g., Capen, Clapp, & Campbell, 1971; Milgrom, 1989; Holt & Sherman, 1994). However, the economic perspective of bidding behavior has mostly to do with commodity or items whose monetary values are unambiguous—which is not often true in consumers-operating auctions (Ariely & Simonson, 2003). Besides, the extant literature has not in-depth investigated on the psychological state of these “curses” and adequate measures for the curses are yet existent. Typically, the curses are measured in monetary amounts which are the differences between the final bidding price and the winning bidding price (or seller’s reserve price). Yet, due to the nature of bounded rationality of consumers and the items of auction may not all have unambiguous values to different auction participants, it is susceptible that the “curse” can be properly measured by monetary terms. In other words, can the subjective sense of regret be adequately represented by objective monetary amount? Also, there is an implicit assumption that curse is linearly correlated with the amount of price difference. From the perspective of Prospect Theory (Kahneman & Tversky, 1984), it is likely that the degree of regret (or disutility) may not be linearly related to the amount of monetary loss.

To sum up, we would address the following questions: how should we measure curses of winners and losers? What are the relationships between degree of regret and the price differences? What factors are more influential on the level of curses? In the following sections, we will first review the literature related to our research questions and derive our research hypotheses. Then, the research methodology is described, which is followed with discussions, conclusions and research implication.

LITERATURE REVIEW AND HYPOTHESES

Winner’s Curse and Loser’s Curse

The “winner’s curse” is a concept that was first mentioned by Capen, Clapp, and Campbell (1971) while discussing bidding for oil leases. They made the assumption that the oil-drilling right was worth the same amount to all the bidders (common value), and each bidder had an independent estimate of the value of the right. They further assumed that the estimates were unbiased, so that the mean of estimates was the true value of the right. However, since it was difficult to estimate the value of the right, their estimates varied

substantially. Even if the bidders usually bid less than their estimates (for the sake of gaining profit), some bids might still be higher than the true lease value. Since the bids usually were correlated with the estimates, the winners were very likely to have the highest estimates. These winners were likely to overestimate the value, and failed to correct their biases, thus raised large losses. In this situation, the winner of the auction was just like a loser and “winner’s curse” phenomenon occurred (Capen, et al., 1971). Specifically, the winner may feel cursed in one of two situations: 1) the winning bid exceeds the true value of the auctioned object, so the winner loses money; or 2) the true value of the item is less than the winner’s estimation, so the winner is disappointed. Therefore, even if the winning bidder made a profit in the situation one, the winner may still be unhappy about the result as long as the profit is less than expected (Thaler, 1992).

The winner’s curse cannot occur if all the bidders are rational (Cox & Isaac, 1984). Thaler (1992) further indicated that rational bidding required to distinguish between the expected value of the item conditioned only on the prior information available and that in turn conditioned on winning the auction. They suggested that the winner should adjust their valuation of the item to compensate for the presence of other bidders. That is, when the number of bidders increases, the winners are likely to think it is necessary to bid more aggressively to win the bid, and are likely to overestimate the value of the item. At this time, the winners should be aware of the situation, make the adjustment for the valuation of auction item downward, and bid less aggressively (Capen et al., 1971). However, it is difficult to do so, and may still result in the winner’s curse.

Some evidences from previous experimental and field studies also demonstrated that the winner’s curse might be a common phenomenon. Bazerman and Samuelson (1983) conducted the first experiment to reveal the winner’s curse phenomenon. Their auctioned objects were jars of coins or other objects, such as paper clips valued at four cents each. Unknown to those MBA student subjects, each jar had a value of \$8. No feedback was provided until the entire experiment was completed. The students were also asked to estimate the value of each jar, and a \$2 prize was offered for the best guess in each class. The students’ mean estimate of the value of the jars was \$5.13, lower than the true value of \$8. Nevertheless, the mean winning bid was \$10.01, producing an average loss of \$2.01 to the winning bidder. Samuelson and Bazerman (1985) have run another series of experiments about the winner’s curse in a different context and again obtained an extreme form of the winner’s curse.

A common criticism toward the experimental economics, especially to those experimental results, disagreeing with economic theory, was that the participants were college students working on toy problems. It was assumed that experts wouldn’t make these silly mistakes in the real world. Yet, two pieces of previous research proved that experts are not immune from winner’s curse. Weiner, Bazerman, and Carroll (1987) gave 69 MBA students a buy-a-firm problem via a microcomputer. All the students repeated the trials 20 times and received the feedback after each trial, including the true value of the company, whether their bid was accepted, and how much money they made or lost. Among the 69 students, only five of them learned to bid appropriately by the end of the experiment. Other students showed no learning effect, and the average bid even drifted up over the last few trials. Dyer, Kagel, and Levin (1987) conducted an experiment with a group of managers of construction firms and found out that managers also fell into the winner’s curse. Based on these two studies, it is concluded that no matter experts or novices, people can hardly avoid the winner’s curse (Thaler, 1992).

The winner’s curse was not only found in laboratorial studies, bidders in the real world

make the same mistakes. Numerous field studies found evidence of the winner's curse in market contexts. In the field of book publishing, for example, Dessauer (1981) indicated that most auctioned books fail to earn profits. Cassing and Douglas (1980) looked at the market for free agents in baseball and concluded that free agents were overpaid. Kagel and Levin (1986) also denoted that losses due to overbidding were common in auctions with larger numbers of bidders, and losses were not eliminated with experienced participants in such auctions. Since the winner's curse is so common, the key ingredient of the winner's curse may be a cognitive illusion causing a substantial majority of bidders to make a systematic error. The systematic bias arises because bidders fail to recognize that winning an auction is an informative event, and a bid can be accepted only if the seller's value for the item is less than the bid (Thaler, 1992). The bidders exclude the relevant information from their decision processes which contributes to this bias phenomenon (Bazerman & Samuelson, 1983). Bazerman and Samuelson argued that if the bidder assumed he or she would win the auction, this piece of data should indicate that the bidder had probably overestimated the value of the item in comparison to other competitors. If the bidder correctly made the inference, he/she should revise his or her valuation. Not taking this inference into account, the winning bidder risked paying too much for the "prize".

The evidence and the measurement of winner's curse are usually gauged with the difference between the individual's bid and objective value (though unknown) of the item of auction (Bazerman & Samuelson, 1983; Bajari & Hortacsu, 2003). However, it is important to recognize that an individual may have a purely subjective value for the item of auction. Therefore, it is possible for the individual to overbid the commodity, be aware of the overbid for the commodity, and yet experience no regret. Conversely, a winning bidder may pay less than the value of the commodity yet experiences a subjective winner's curse (Bazerman & Samuelson, 1983). These cases can be explained with the cognitive consistence theory (Aronson, 1968; Festinger, 1957). The overpaid bidder is likely to exaggerate the value of the commodity in order to rationalize his or her bid. This attempt occurs more often when the value of the acquired does not have a clearly specified value. Johns and Zaichkowsky (2003) conducted a survey right after the auctions were over and found that none of overpaid winners (exceeds their price limits for the item) experienced a sense of regret. Their findings pointed out that several reasons contributing no winner's curse when overbidding: 1) the bidders had set prior evaluations, 2) had experience with the auction, 3) the competition of bidding was moderately strong, 4) the items were unique and 5) no similar items to compare the price, and the price over-limit was within the threshold of perceived difference (Johns & Zaichkowsky, 2003). To sum up, the objective monetary amounts of price differences may not be the proper representation of the subjective sense of curse.

Holt and Sherman (1994) claimed that the same information processing bias could also produce underbidding. For example, failure to adjust for the fact that a bid increase picks up the sale of relatively valuable units may cause a naïve bidder to bid too low. This unexpected failure on closing a bid is called the loser's curse (Holt & Sherman, 1994). Since the loser's curse is due to underbidding, its effect is the opposite of that arising from the winner's curse (Holt & Sherman, 1994).

The phenomena of the winner's and loser's curse were thoroughly revealed in previous research, but few studies explained the reasons with related theorems. Most of the studies discussed this issue with econometric models (Thiel, 1988; Holt & Sherman, 1994). In this study, the extents of the winner's and loser's curse are measured and compared from a perceptual viewpoint, and the determinants of the curses are identified. In the following pages, the "endowment effect" and "Prospect Theory" are introduced to explain the phenomena of winner's and loser's curse, and then propose related hypotheses.

Winner's Curse, Loser's Curse, and Reference Point

Kahneman and Tversky (1979) developed Prospect Theory to describe individual choice under uncertainty. In the Prospect Theory, the utility function is replaced with the value function. The essential feature of the theory is that the carriers of value are changes in wealth or welfare, rather than final states. In other words, our perceptual apparatus is attuned to the evaluation of changes or difference rather than to the evaluation of absolute magnitudes. Moreover, this feature reflects the fact that people appear to respond more to perceived changes than to absolute levels. Simply state, it is easier to discriminate a change from \$5 to \$10 than a change from \$955 to \$960. Therefore, when discussing the effect of a price on purchase decision, the concept of a reference price is introduced into the value function.

In an online auction, the bidder's pleasure and discouragement result primarily from the comparison between their final price and the end price or the reserve price which is the minimum price for the seller to sell the auction item. When the seller did not set the reserve price, the bidder may compare the final submitted price with the price he/she estimated to be reasonable. Therefore, if the winner pays more than the reserve price or the reasonable price in order to win the bid, the winner is likely to feel regret which is a curse of winning. Conversely, the loser, whose final price is less than the end price, may also feel regrets if the end price is less than the price he/she considered reasonable. The loser might estimate the item more valuable than his/her final offerer. In order to get a better deal, the bidder didn't offer a higher price and then lost. In this case, since the loser would rather offer more in exchange for the wanted item, the loser's curse occurred. Especially for the second highest bidder, the perceived regret is bigger than other losers if the second highest offer is very close to the end price. Thus, the differences of the final prices submitted by the bidders and the estimated reasonable prices can impact the perceived regrets, for both winners and losers. The above discussions lead to the following hypotheses.

H1a: The winner's regret level (i.e., winner's curse) increases as the difference between the end price and the estimated reasonable price increases.

H1b: The loser's regret level (i.e., loser's curse) increases as the difference between the second high price and the estimated reasonable price decreases.

According to Prospect Theory, the value function is a concave line for gains and a convex line for losses (Kahneman & Tversky, 1979). We also proposed that both the winner's and loser's curses should also follow the convex losing line. Regardless of the winner's curse or the loser's curse, the difference between a loss of \$10 and a loss of \$20 appears greater than the difference between a loss of \$110 and a loss of \$120. The winner experiences great regret when the end price is much higher than the estimated value of the product. The feeling of loss increases convexly with the extra cost of the item. To the loser, the regret is strong when the offered price is so close to the end price and still less than the perceived value of the product, and decreases convexly with the gap between the offered price and the estimated value of the item. Figure 1 and 2 exhibit our proposed shapes of the winner's and loser's regret, respectively.

H2a: The marginal value of winner's curse increases as the magnitude of the price difference increases.

H2b: The marginal value of loser's curse increases as the magnitude of the price difference decreases.

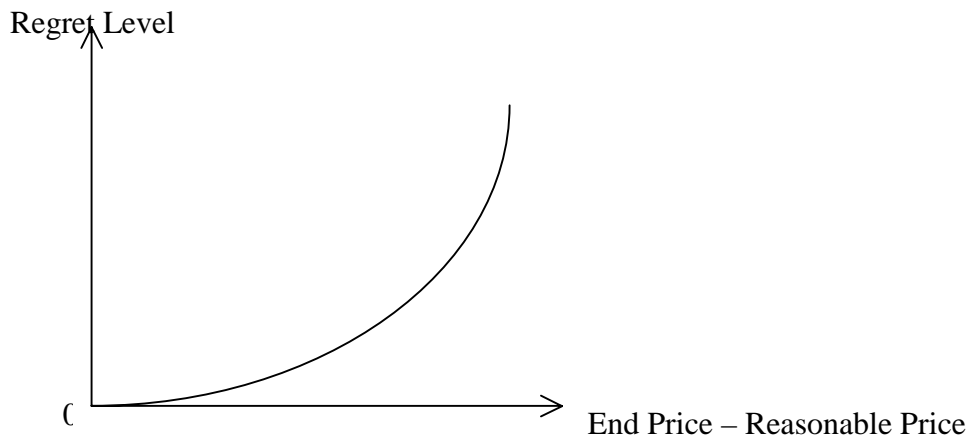


Figure 1. The Proposed Winner's Curse with the Price Difference



Figure 2. The Proposed Loser's Curse with the Price Difference

Number of Bidders

Thaler (1992) contended that, to avoid the winner's curse, the bidder should take into consideration the presence of other bidders and the information revealed from their bidding. However, it is difficult to keep rational. As the number of bidders increases, ideally there is more information available to each bidder (Wilcox, 2000); however, the number of the bidders also leads to the perception that the competition is getting intense and sends out the signal that the item is desirable. Then the end bid is likely raised. The standard auction theory posits that a higher number of bidders increase the closing price, which also increases the probability of success of transaction (Hansen, 1985; Vincent, 1995).

In an online auction, more bidders also imply the auction object to be of high value. This is especially true when the item of auction does not have an unambiguous value. Besides, in an intense competition of bidding, the participants become more involved (Ariely & Simonson, 2003). With the emotional attachment getting strong in an auction, the bidders are prone to exhibit escalation of commitment. The winner is thus likely to overbid and regrets after the closure of the bid. Similarly, when there are many bidders, the losers also feel the item better and regret not to have bidden a higher price.

The above discussion leads to the following hypotheses.

H3a: The winner's regret level increases as the number of bidders increases.

H3b: The loser's regret level increases as the number of bidders increases.

Uncertainty

Wang and Zender (1998) show that risk-averse investors shade their bids more when there is greater uncertainty, even in the absence of private information. As a result, the expected selling price is inversely related to uncertainty. In other words, when the uncertainty is higher, bidders should bid more cautiously, thus lowering expected revenue to the seller. In particular, if bidders rationally adjust for the winner's curse, it is expected that greater uncertainty leads to more bid shading and less quantity demanded (Nyborg, Rydqvist, & Sundaresan, 2002).

The auction theory predicts that the optimal bid is responsive to the type of uncertainty. Under the so-called common values (CV) model, bidders face some common source of uncertainty regarding the cost, and the winner is prone to underestimate the "true" cost. Rational bidders avoid this "winner's curse" by adding a surcharge to their estimated cost (Cihan Bilginsoy, 1999).

However, bidders who desire the auction item are hardly rational. It is also true in an online auction. Due to the uncertainty and unsatisfied desire, it is hard for the bidder to rationally evaluate the true value of the product. When the bidders want to win the product badly and are uncertain about the result, they may overestimate the price to be on the safe side. It results in an overbidding and winner's curse. On the other hand, when the bidder is not sure about the true value of the product but shades the bid and loses, the loser may also suffer from a greater regret. The following hypotheses are proposed:

H4a: The winner's regret level increases as the level of uncertainty increases.

H4b: The loser's regret level increases as the level of uncertainty increases.

Endowment effect

The endowment effect, indicating that an individual's preference can be changed because of the possession, holds a different statement from the traditional assumption in economics that preferences should be the same (Boven, Loewenstein, & Dunning, 2003). The endowment effect was demonstrated as a robust phenomenon in numerous laboratory and field studies with diverse methodologies (Johnson et al., 1992; Kahneman et al., 1990, 1991; Knetch & Simon, 1984).

The original theoretical foundation of the endowment effect is Prospect Theory, showing that individual's responses toward losses and gains are asymmetric (Kahneman & Tversky, 1979). The slope of the value function for losses is steeper than that for gains. Therefore, it is expected that people may become attached to what they own and be reluctant to lose them. The "psychological endowment" may also occur on the online auction (Strahilevitz & Loewenstein, 2001). The winner can own the product and value it higher, but the loser has nothing after the auction. It is then proposed that in general, the winner's regret is less than the loser's regret due to the endowment effect.

H5: The winner's regret level is lower than the loser's regret level.

METHOD

The real bidders on the Yahoo! Auction were the sampling frame of this study. Data were collected from two resources: one was directly collecting bidders' regret levels and attitudes through a survey; the other was the record of corresponding bids.

Questionnaire Design

An electronic questionnaire was designed to collect bidders' attitudes toward the bid right after the auction was closed. The first section of the questionnaire is about the general attitudes toward the bid, including satisfaction, desire of the goods, and worry about the possibility of failure. The second part is the measurement of regrets. The third section asks respondents to estimate the reasonable price and memorize how many sincere bidders were there during the auction. The last section is about the respondent's background information, including demographic profiles and experience with the Internet and e-auction.

Record of Bid

Other than the survey, the history and other related information of each bid was also recorded during the bid and after the bid was closed. The recorded information includes the item for bid, new or used, with or without photo, seller's id, seller's positive and negative rating, buyers' ids, total participants, total bids, starting price, and ending price.

Because the purpose of this study is mainly about the auction price and the regret, the item on bid is not the focal consideration. Therefore, almost all the items were acceptable in this study. The criteria of an eligible auction were that 1) the closing time was between 10:00 a.m. on February 25 and 1:00 a.m. on March 1, 2005, 2) the item was not tagged with a "Buy Now" price, 3) real estates, automobiles, motorcycles, and items related to stars or models were not included due to the possible bias from the extremely high price of the previous three categories and strong involvement with the last category, 4) one auction with more than one same item was excluded since it could be sold by a professional seller, and 5) a valid record must have more than one buyer.

Process of Data Collection

All the eligible auctions were identified and recorded before the set closing time. Starting from 10:00 a.m. on February 25, an invitation letter of an Internet survey was e-mailed to the buyers, including the winners and the losers with the second highest price, right after each auction ended. The purpose of the survey was briefed and a website linkage was indicated in the letter. All the valid respondents could receive a coupon with a face value of NT\$200 as the reward. The survey closed at 5:00 p.m. on March 1.

During this time period, 1089 auctions were recorded and 2066 invitation emails were sent out. After cross checking the respondents' ids with auction participants' ids and deleting incomplete response, 336 samples out of the 455 respondents were valid.

Definition of Variables

The dependent variables of this study are the winner's curse and the loser's curse. These two variables are directly measured as the regret levels of the winner or loser. The rationale of measuring the regret level is that the winner should be satisfied and happy about the bidding result if the winner acts rationally during the bidding process. The winner should not feel regrets toward the bid since a rational winner already wins the bid with a

reasonable price offered by himself or herself. It is likewise for the loser. The rational loser has offered the maximum price to reflect the perceived value of the product. Then, the loser should not feel regrets about his or her bidding price since the end price is higher than the estimated reasonable price of the product. Therefore, this study measures the regret level to represent the winner's and loser's curse.

The measurement of regrets was adapted from two previous scales for the regret of purchase experience (Creyer & Ross, 1999; Inman & Zeelenberg, 2002). These two scales were developed to measure the feeling of regrets after a purchase. They were combined and revised to fit the bidding decisions. After deleting repeating items in these two scales, 10 items remained in the questionnaire as a set to measure respondents' regrets toward their bidding price and bidding decision. The final scale included the regret toward the bid price, the action, and the decision in the auction in a 7-point Likert-type scale. The Cronbach's alpha for the reliability of this scale was 0.81.

The major independent variables are the price difference, number of bidders, and the perceived uncertainty. For the winner, the price difference is defined as the difference between the end price of a bid and the estimated reasonable price by the winner. For the loser, the price difference is the gap between the second highest price and the estimated reasonable price by the loser. Since the price difference was hypothesized to have cumulative effects on both curses, the square of the price difference is added into the model. The information of the end price, the second highest price, and the number of bidders were captured from the auction record on Yahoo! The estimated reasonable price was collected through the survey.

The perceived uncertainty about an auction is the bidder's attitude of how unsure is the bid and the desire of winning the auction before the bid was closed. It was measured in two 5-point Likert-type scales from 1 as total certain/not very desire to 5 as strongly uncertain/very desire. The desire level was treated as the weight of the uncertainty based on the rational in the hypothesis. These two measures were also collected through the survey. The controlled variable in the model was the rating of the seller, which was suspected to relate with the bidder's regret level; however, it is an exogenous variable in our model.

RESULTS

Demographic Profiles of the Respondents and the Eligible Auctions

Within the 336 valid respondents, 195 winners and 141 losers completed the survey. Females are slightly more than males (52% female winners and 54% female losers). The respondents tend to be young with higher educational levels that 78% are in age 20 to 39 and 75% have at least college education. The average time that the respondents spend on Yahoo auction is 2.7 hours per day.

The most popular auction items were 3C products, female clothing, and female accessories. More than half (55%) of the auction items are used. The price range of these items is wide, considering that automobiles were excluded. The price of the most expensive item is NT \$27,489 during this time period and the cheapest one costs only \$11 (NT \$31 = US \$1). The average number of bidders for each auction is 6.15 (SD=3.86).

Bidders' Attitudes toward the Auction

The average regret level for the winner is 3.33 (SD=0.86) and for the loser is 3.53

(SD=0.95). In general, the losers experience slightly more regret feelings than the winners. The t value for the comparison is 2.01, significant at the $\alpha=0.05$ level. H5, the endowment effect, is supported. However, since the neutral level is 4, both winners and losers do not feel too sorry about the auction.

The winner's average uncertainty and desire level about winning the bit before the auction ended is 3.04 (SD=1.08), and the loser's uncertainty level is 3.29 (SD=1.01). In average, the winners estimate 5.30 (SD=6.74) major competitors during the auction, and the losers guess there were 5.31 (SD=9.13) bidders.

The Winner's Curse

A general linear model is applied to examine the determinants of the winner's curse. To illustrate the nonlinear relationship between the regret level and the price difference of the end price and the reasonable price, a square term of the price difference is also added in the model. The dependent variable is the winner's regret level, and the independent variables are price difference, the square of price difference, the degree of uncertainty, and the number of bidders. The model is significant at the $\alpha=0.01$ level with $F=5.58$.

Hypothesis 1a states that the winner's regret level increases as the difference between the end price and the estimated reasonable price increases. As show in Table 1, when the end price is higher than the estimated reasonable price, the winner is more likely to feel regretful ($\beta=0.41$, $t=7.71$, $p<0.01$). In addition, hypothesis 2a indicates that the marginal value of winner's curse increases as the difference between the end price and the estimated reasonable price increases. The result shows that when the square of the price difference increases, the regret level also increases ($\beta=0.41$, $t=3.78$, $p<0.01$). Therefore, the more the price gap is, the greater the regrets is perceived and the regrets accumulate acceleratively.

Hypothesis 3a asserts that the winner's regret level increases as the number of bidders increases, which is not significant ($t=-0.41$, $p>0.05$). Hypothesis 3a is not supported. Hypothesis 4a, whether the winner's regret is positively related to the level of uncertainty, is supported ($\beta=0.20$, $t=2.86$, $p<0.01$). The perceived uncertainty and desirability appears to influence the level of the winner's curse. When the uncertainty is higher, the winner is more regretful.

The Loser's Curse

The analysis model for the loser's curse is similar to the winner's curse. The only difference is the definition of the price difference. For the loser's curse, the price difference is the second highest price, which is offered by the loser, minus the estimated reasonable price by the loser. The model is significant at the $\alpha=0.01$ level with $F=4.27$ (shown in Table 2).

The relationship between the price difference and the regret level is not observable. Both Hypothesis 1b ($t=0.12$, $p=0.91$) and 2b ($t=-1.73$, $p=0.09$) are not significant. The number of bidders is also not related to the loser's curse either ($t=1.55$, $p=0.12$). The only significant variable is the perceived uncertainty level. As proposed in Hypothesis 4b, the loser's regret level increases as the level of uncertainty increases ($t=3.59$, $p=0.00$). When the perceived uncertainty and the desire of the product are high, the loser tends to feel more regretful.

Table 1. The Factors of the Winner's Curse (N=195)

Source	<u>B</u>	<u>SE B</u>	β	t Value
Intercept	3.04	0.42	0.00	7.17 **
Price difference	0.00	0.00	0.41	3.78 **
Price difference ²	0.00	0.00	0.41	3.75 **
Number of bidders	0.01	0.01	0.08	-0.41
Uncertainty	0.03	0.01	0.20	2.86 **
Rating of seller	-0.17	0.41	-0.03	0.04
Model	Adj R ² = 0.11			F = 5.58**

Note 1. The price difference for the winner's curse is the end price of a bid minus the winner's estimated reasonable price.

Note 2. ** denotes the $\alpha=0.01$ significant level and * denotes the $\alpha=0.05$ significant level.

Table 2. The Factors of the Loser's Curse (N=141)

Source	<u>B</u>	<u>SE B</u>	β	t Value
Intercept	2.46	0.86	0.00 **	2.87 **
Price difference	0.00	0.00	0.01	0.12
Price difference ²	-0.00	0.00	-0.15	-1.73
Number of bidders	0.01	0.01	0.13	1.55
Uncertainty	0.05	0.01	0.30 **	3.59 **
Rating of seller	0.42	0.88	0.04	0.48
Model	Adj R ² = 0.11			F = 4.27**

Note 1. The price difference for the loser's curse is the second high price of a bid minus the loser's estimated reasonable price.

Note 2. ** denotes the $\alpha=0.01$ significant level; * denotes the $\alpha=0.05$ significant level.

DISCUSSIONS AND IMPLICATIONS

This study distributes an email survey to the bidders after a real online auction is closed. The survey targets are the winners and the losers with the second highest bid. Both winners and losers are expected to experience regrets more or less. The focal point of this study is using the perceived regret level directly measure the psychological perceptive of the winner's

curse and the loser's curse, instead of using the monetary loss as a proxy of the curse in previous studies. The argument is that the curse in term of the monetary loss is not always perceived if 1) the item on an auction is not re-sold for making profits, 2) the monetary value of the item on an auction is difficult to decide, and/or 3) the endowment effect makes the winner insensitive about the monetary loss. Therefore, direct measures of the psychological feeling of the winner's curse and the loser's curse are considered in this study.

Conclusions and Discussions

The results show that the level of regrets corresponding to the price gaps exhibits a convex shape as what we infer from the Prospect Theory. The level of regrets is not linearly related to the price difference, which has not been dealt in economic theory on auction. It is found that the level of regrets increases acceleratively as the difference between the end price and the estimated reasonable price increases. It is consistent with the Prospect Theory which posits that consumers respond more to perceived changes than to absolute levels. In this study, the reasonable price is a reference point and its difference from the end price is the perceived changes. In fact, we regressed the regret level on the end price, but the relationship was not statistically significant. The marginal value of the winner's curse increases as the magnitude of the difference between the end price and the estimated reasonable price increases.

Another insightful meaning behind our findings of the winner's curse is that, the price gap or monetary loss was defined as a proxy of the winner's curse in previous auction studies based on the economic viewpoint. According to the findings of this study, only considering the price gap or monetary loss is not good enough to be the proxy for the regret feeling due to the accelerative effect.

However, the relationship between the price gap and the loser's curse are not as our expectancy. One of the possible reasons is that the losers are more rational than the winners. Because they evaluate the price carefully, they bid lower prices and do not win the bid. In this situation, even though they still feel upset about the result, yet their regrets are not related to the price. In other words, if the loser bids rationally, no regrets occur even the offered price is still lower than the estimated value by the winner. Maybe the feeling of "losing of something longing for" is the true reason for regrets, which is somehow supported by the only significant contributor-uncertainty and desirability on the loser's regret. Actually, the results also show that the average regret level of losers is higher than that of the winners. This can be explained by the endowment theory. According to endowment theory, individual's preference toward an object could be increased if one has the feeling of the possession (Boven, Loewenstein, & Dunning, 2003). For the bidder at an on-line auction, although they do not really possess the product before the close of bid, they have participated the bidding and traced the product they want for a while. That participation may generate some plausible possession no matter for both winners and losers. After the close of the bidding, the winners gain the product and the realization of the possession help to dilute the regret feeling. However, for the losers, since they have not gained any product, they actually would feel as if the product has been taken away from them after the bidding. Therefore, the losers feel more regrets than the winners do. It also contributes another explanation that the uncertainty and desirability of the loser is the major reason of strong regret feeling.

While comparing the factors of the winner's curse and the loser's curse, it is possible that the natures and contents of these two courses are basically different. The loser's curse may come from the regrets of not obtaining the item, and winner's curse is due to the price overpaid. In the past research on the bidder's curse, the focus is often on the monetary loss

without discussing psychological state. This study provides another view to examine the curses and wishes that both economics and psychology perspectives of the curses can be fully investigated in the future.

The degree of uncertainty is found to influence the winner's regret level. This is consistent with previous research (e.g., Bazerman & Samuelson, 1983; Nyborg, Rydqvist, & Sundaresan, 2002). However, different from previous research aiming at the uncertainty about the value of the item, our research addresses a broader scope of uncertainty, i.e. the degree of uncertainty about the product and about winning the product. The relationship between the uncertainty and the regret level of losers is also observed, which has not been examined before. When the bidders wanted the product badly and worried about unable to win the product, their losses significantly strike them more, i.e., they regret more.

In this study, the number of people bidding on line is not related to the winner's curse or loser's curse. It is not consistent with the suggestion of past research, but not surprising. The online environment differs from the brick-and-mortar auction. First, the online bidders do not see other participants. The influences of other bidders' expressions and attitudes do not exist. The online environment is then hardly heated up. Also, bidders perceive 5 involved participants in average in this study, which is rather a small number compared with the number of traditional auction participants. Therefore, bidders in an online auction may not feel tension building up from increasing only few participants. The direct comparison between online and brick-and-mortar auctions would be another interesting topic.

Implications

Since when the bidders are less regretful, they are more likely to participate in the future bidding (Ariely & Simonson, 2003), reducing the bidders' regrets becomes an issue for online auction operators. More price information for items with some degrees of standard, such as used cars, new or used computers, should be provided. For instance, the information and evaluation of used cars is easily accessible via the Internet in the United States, which does not discourage consumers from online bidding, instead, they are more dare to bid online. More product information can also reduce the uncertainty of the product quality. When the product quality is more certain, the bidders can estimate the value and reasonable price more easily.

Limitations and Suggestions to Further Research

The feeling of the curse or say, regret, is not expected to hold too long. Based on the Balance Theory, bidders have to reduce their post-auction dissonance to reach a new balance status. This adjustment starts right after the auction closed for both winners and losers. The research process of the study was design to distribute the invitation email to the bidder right after the bid was closed and the bidder should be still online. However, the bidders may not respond immediately. If true bidders can be recruited into an experimental lab and ask them to report their feeling during and right after the auction, more prompt reactions can be observed. Of course an experimental design might provide an unreal environment for the participants which lose the external validity.

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