DO TEXTUAL COMMENTS AND EXISTING ORDERS AFFECT CONSUMER PARTICIPATION IN ONLINE GROUP-BUYING?

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Abstract. In group-buying auctions on the Internet, the number of existing orders and feedback to bidding consumers are information sources for evaluating the bidding risk they face and the trust they have for the mechanism. Feedback is often presented as ratings and textual comments. We evaluate comments and existing orders as drivers of how consumers’ perceived risk and trust change. Our experimental results indicate that comments affect these two things, but the number of existing orders only impacts perceived trust. In addition, a consumer’s intention to join a group-buying auction is impacted by both the perceived risk and trust. We develop additional results that refine our understanding of the value of comments and why they cannot be replaced by ratings.

Keywords: E-commerce, group-buying auctions, feedback systems, mechanism design, reputation, risk, trust.

1. INTRODUCTION

In e-commerce, dynamic pricing mechanisms have been developed so buyers and sellers can interactively negotiate product prices. This mechanism has been shown to outperform posted-price selling under some circumstances. Group-buying auctions on the Internet were introduced in the mid-1990s, as a market mechanism that collects consumers’ orders to obtain volume discounts. This enables retailers to minimize customer acquisition costs and to offload excess inventories. This business model for Internet-based selling has been fraught with problems. Mobshop, Mercata and LetsBuyIt were all unsuccessful, though they were heavily funded. Surprisingly though, new group-buying businesses are trying to make a comeback recently. For instance, Don’tCrack.com (www.dontcrack.com), CleanMPG.com (www.cleanmpg.com) and Ecomoder.com (eco-moder.com) have included group-buying in their business models. GroupBuyCenter.com (www.group-buycenter.com) even has adopted group-buying as its core business model. In addition, sites such as eSwarm.com (www.eswarm.com) and GroupBuyDiscounts.com (www.groupbuydiscounts.com) have announced they will focus on group-buying soon.

In Taiwan, group-buying has become an interesting model for online transactions in recent years. For example, PTT is the hottest group-buying auction platform in Taiwan. It had 450-plus group-buying recruiting posts in operation every day during March 2008, for example. DinBenDon! (dmbendon.net) and iHergo (www.ihergo.com) are B2C group-buying marketplaces too. There are also B2C group-buying businesses, such as TWDECO.com (www.twdeco.com.tw) and YLlib.com (www.ylib.com), which have included auctions in their business models. The potential of group-buying auctions in Taiwan can be found in the following real-world stories.

- In the first month in March 2007, iHergo was visited by 20,000 people and had 2,000 people register as members. By the end of its fifth week, four hundred transactions had been made [9].

- A bakery shop in eastern Taiwan sold 3,000-4,000 slices of Tiramisu every day. It had only been able to sell 100 a day prior to using a group-buying auction. Currently, 60% of its sales still come from group-buying auctions [1].

- In May 2008, the average number of users exceeded 150,000 DinBenDon!, where consumers can buy “lunch boxes” as a group. There are now more than 2,300 participating providers [8].

From the above phenomena, we can see the potential of group-buying auction in the future even if it had not been successful in the past. Although group-buying can offer benefits for buyers and sellers, there are risks too. Consumers face price uncertainty because the final price depends on the number of participants, and this is unknown until the last moment. Group-buying may fail due to insufficient orders, so there are both time and psychological risks present. In addition, there must be an initiator for each group-buying auction. The initiator can be a seller, a consumer, or a third party. The initiator must negotiate with retailers, recruit members, collecting money, arrange for shipping, and distribute goods. Consumer-initiators must obtain trust.

E-commerce creates risk due to incomplete or incorrect information, information asymmetries, and uncertainty about the identity of the transacting parties or product quality. In such settings, high trust is needed to reduce the perceived risk [3, 6]. Information-seeking is a strategy that consumers can adopt to increase their trust and lower their risk [6]. Word-of-mouth and reputation also can increase trust [7]. There are two formats for online feedback systems, ratings and comments. Ratings give a quantitative reading on word-of-mouth, and textual comments enable users to describe their evaluations in words. Seller ratings often influence the
price of their products [20]. There is evidence that positive comments increase the seller’s pricing power [13].

Comments may provide detailed and valuable information which cannot be found from ratings. For example, when a consumer finds a negative score for a targeted seller, he might want to understand how it is resulted. Did the seller do something wrong? Or was the score inappropriate? From comments, a consumer can learn about how much trust to place in the opinion and its initiator. This may help consumers to make decisions about participating in group-buying auctions.

The number of existing orders is another factor related to trust and risk in group-buying. First, it suggests the risks that consumers face in terms of the final price, and the chance of a successful purchase. The more people who join group-buying, the lower the final price will be. This may induce more people to join. On the other hand, with fewer existing orders, the higher the likelihood of insufficient orders materializing so the auction will reach an attractive closing price. Second, existing orders also may load on trust in the group-buying initiator. So the number of orders may provide information on how much consumers trust the initiator and believe that the group-buying auction will succeed.

Kauffman and Wang [19] provide evidence of a positive participation externality effect in Internet-based group-buying auctions. As the group size increases, potential buyers will be more willing to join. Network externalities also have been identified as a factor that increases consumer demand in general. So small buying groups will find it to be more difficult to attract consumers because price risk, time to obtain the product, the possibility that the auction will not close.

Compared with other kinds of online transactions, group-buying has considerably more complexity in terms of risk and trust issues. In addition to the trust issue in regular transactions, consumers have to face various uncertainties, including final price, ending time, and the success and failure of the group-buying auction. Comments generally are known to be a valuable mechanism in e-auctions [13], but their effects are unclear when the initiator plays a key role in group-buying auction. Also the number of existing orders is a good indicator of risk of group-buying auction and trust in the initiator. We will investigate these issues, and consumer intentions to participate in a group-buying auction. Next, §2 discusses related research and develops hypotheses in §3. §4 describes research design and §5 reports analysis results. §6 concludes.

2. THEORY

We next discuss group-buying auction mechanisms on the Internet, perceived risk in transaction-making, online feedback mechanisms, and consumer trust.

2.1. The Online Group-Buying Mechanism

An online group-buying auction is an Internet-based exchange mechanism that allows consumers to take advantage of volume discounts by shopping together. It provides benefits for both sides in transaction-making. For consumers, aggregated demand provides bargaining power to negotiate with sellers for volume discounts. For sellers, the large volume lowers transaction costs by limiting negotiation.

Tsvetovat et al. [27] indicated two kinds of protocols in group-buying auctions. Under a post-negotiation protocol, negotiating with suppliers is done after forming a coalition. Under a pre-negotiation protocol, a coalition is formed after negotiating with suppliers is done before forming a coalition. In both, an initiator to form the coalition is necessary. Bidders not only face the trust in the initiator but also the risk that price will not fall far enough, and so they not be able to obtain the product in a reasonable amount of time or at all, at a price they are willing to pay. Lacking trust, bidders may not join the coalition.

Kauffman and Wang [19] observed consumer behavior in online group-buying, which implies the existence of the risks they perceive. They noticed a price drop when the number of orders is approaching the next discount level. The number of new orders increases more quickly then. They also saw interesting dynamics at the end of the auction cycle. More orders were placed as the group-buying transaction at that time. They also posited the presence of a participation externality. Consumers expressed more interest to participate in a group-buying as more orders arrive.

2.2. Online Feedback Mechanisms

Word-of-mouth is a consumer communication channel that plays an essential role in their behavior and purchasing decisions [16]. Through IT, the Internet provides consumers with platforms to exchange experience, opinions, and knowledge. This is electronic word-of-mouth [12]. Online reputation systems bidirectional communications as a basis for large-scale word-of-mouth networks [7]. This approach has been widely implemented and is used for trust building in e-marketplaces. Such mechanisms provide ratings and comments about the behaviors of all parties to a transaction. eBay and Yahoo have adopted it for online auction users to evaluate the risk of transactions.

There are two kinds of word-of-mouth. Positive feedback comes when a consumer is satisfied with a transaction. Negative feedback is a way that a consumer can complain if things do not work out so well. Some of the effects of online feedback have been studied. Lee et al. [20] found that with higher negative feedback scores, sellers in eBay had to lower the prices
of used computer monitors and printers. Sellers with more negative reputations often are forced to reduce prices too. Melnik and Aim [22] reported that positive feedback supports price, while negative feedback undermines them. Good reputations on eBay are known to mean that eBay buyers will trust sellers more [3]. Consumers, thus, exhibit higher willingness to pay. They did not find evidence that negative feedback had no effect. Ghose et al. [13] and Archak et al. [2] also showed the importance of feedback. They collected field data from Amazon.com, and indicated that positive opinions give sellers pricing power. Positive reviews increase their sales too. The research points out the value of textual comments: comments revealed more information to consumers, who valued them over ratings scores.

Consumers have to accept higher risks online than in traditional face-to-face transactions. They have concerns about trading partner identity and product quality. So a feedback mechanism provides valuable information to control their transaction risk. Positive reputations for sellers may indicate a lower while negative feedback may be a warning. So online feedback mechanisms help to prevent opportunistic behavior.

2.3. Perceived Risk in Transaction-Making

Risk involves uncertainty in transaction-making. Perceived risk indicates a consumer’s perception of risk he deliberates making a transaction decision [6]. Before purchasing, a consumer possesses buying goals. He cannot ascertain if he will achieve his buying goals, and hence the sense of risk. Financial risk is a common element of risk [6]. Consumers may also perceive the risk of losing time and be frustrated with their inability to consummate a transaction [6].

Another consideration is hazard risk. It relates to whether a product will endanger consumer health or safety [24]. Other dimensions include social risk and product performance risk [23]. So perceived risk is multi-dimensional.

In addition to the general risk encountered in online shopping, dynamic pricing increases the risk in group-buying. There are uncertainties in the final price, product delivery, and auction success. Such uncertainties result in financial, time and psychological risks.

2.4. Trust

According to the Oxford English Dictionary, trust is a belief that someone or something is good, sincere, or honest, and will not try to harm or trick you. It reflects positive outcomes that one can receive based on interacting with another party in an exchange relationship characterized by uncertainty [4]. In a social relationship, trust is desirable. When uncertainty and information asymmetries exist in a transaction, trust is more than desirable, it is essential.

Though the Internet offers a convenient channel for transactions, the nature of e-commerce makes it hard for consumers to identify transaction partners. So trust becomes a critical factor. Familiarity, calculativeness, and values are three critical source of trust [5, 28]. Familiarity grows from repeated interactions. Calculativeness is a subjective calculation about the costs and benefits of cheating. Finally, value comes from institutional structures that increase consumer confidence and willingness to transact.

Three characteristics of trust appear often in the literature [21]. They are ability, benevolence, and integrity. In a group-buying auction, ability means that the auction’s initiator has the required competencies, such as negotiation with suppliers and recruiting participants. Benevolence points to the problem that arises if the auction initiator is not viewed as doing her best on behalf of other group-buying auction participants. Integrity on the part of the initiator describes whether she is viewed as adhering to principles or rules that make sense to consumers. Since the initiator plays the key role in group-buying, trust is the sine qua non for consumers who wish to participate.

3. MODEL AND HYPOTHESES

Our purpose is to explore the effects of textual comments as online feedback in group-buying auctions. We investigate this and existing orders’ impacts on consumer perceptions of risk and willingness to participate and trust in the auction initiator.

There is a positive participation externality effect that indicates the larger the existing number of orders is, the more new orders will arrive [19]. If the existing orders are many, it will create momentum to reach the final discounted price, which results in higher chances of success for the group auction to successfully finish. The cycle-ending effect, which indicates that there will be more orders as the group-buying auction comes closer to the end, may be a by-product of the greater perceived likelihood that the group-buying auction’s final price will be attractive. From these two effects, it seems that less uncertainty in a group-buying auction is associated with lower perceived risks by potential and actual participants.

Seeking information before purchasing is a means to avoid undesirable risk [6]. No research on information-seeking behavior in group-buying auctions has been conducted to date. Other researchers have reported that online word-of-mouth helps to prevent opportunistic behavior [3]. Comments are a viable source of alternative information for consumers to gauge risk. Compared with negative comments, positive comments
will make consumers perceive less risk. No research on
this topic has been done in the group-buying auction
context.

Regarding negative feedback, previous researchers
have shown inconsistent results for rating scores [7].
Negative feedback may have no effects, it may lead to
price reductions, or it may lead to a lower probability
of completing a sale. Ratings only show the number of
negative feedback comments without the details on
their contents. Comments give additional helpful de-
tails. Negative comments suggest the presence of risk,
and more negative words should lead to perceptions of
higher risk levels. Along these lines, a major negative
comment from an evaluator should lead a consumer to
perceive a higher level of risk than a minor negative
comment would suggest. What will happen when a
consumer sees a major negative comment vs. some mi-
nor negative comments? A few minor negative com-
ments may indicate a riskier situation. Thus, we will
compare the perceived risks between positive and nega-
tive comments, and also investigate the effect of the
negativity level and number of negative comments on
perceived risk with:

- **Hypothesis 1a (Negative Effect on Perceived Risk of Positive Comments):** Positive comments have a
  negative effect on consumers’ perceived risk.

- **Hypothesis 1b (Positive Effects of Negative Comments on Perceived Risk):** Negative comments have a
  positive effect on consumers’ perceived risk.

- **Hypothesis 1c (Major Negative Comment Effect on Perceived Risk):** Consumers perceive different
  risks between one major negative comment and sev-
  eral minor negative comments.

Trust in counterparties in Internet-based exchange
is a critical factor in consumer behavior. We also know
that trust and reputation are highly related [14], and
that a seller’s reputation matters. A better reputation
makes buyers trust sellers more so they are willing to
pay a higher price. In addition, data from Amazon.com
showed that positive opinions enhance seller pricing
power [2]. And they also suggest that with a good
reputation comes higher cheating costs, since there is
value to be lost.

Tsvetovat et al. [27] indicated that trust in the ini-
tiator is a necessity for consumers to make decisions
about participating in a group-buying auction. Positive
comments suggest that consumers are satisfied in the
initiator’s performance; negative comments mean the
opposite. So, compared with negative comments, con-
sumers will have more trust in the auction initiator
when there are positive comments. Further, the extent
of negative comments may also lead to mistrust in the
initiator. Minor negative comments may give consum-
ers the idea that they should be believed, so this may
diminish their trust. Major negative comments may
only be believed if they are consistently stated by expe-
rienced buyers. The countervailing effects suggest that
a number of different hypotheses may be true. So we
propose several hypotheses about the effect of com-
ments on consumers’ perceived trust, as follows:

- **Hypothesis 2a (Positive Comments Effects on Initiative Trust):** Positive comments have a positive ef-
  fect on a consumer’s perceived trust in a group-
  buying auction initiator.

- **Hypothesis 2b (Negative Comments Effects on Initiative Trust):** Negative comments have a negative
  effect on consumers’ perceived trust in a group-
  buying auction initiator.

- **Hypothesis 2c (Major and Minor Negative Comments Effects on Initiator Trust):** Consumers per-
  ceive different levels of trust in a group-buying
  auction initiator in the presence of a single major
  negative comment vs. a few minor negative com-
  ments.

The positive participation externality effect in
group-buying auctions that we discussed earlier indi-
cates that the more existing order there are, the more
new orders will arrive. The number of existing orders
represents the number of consumers who trust the ini-
tiator of the auction. This has a beneficial effect on the
consumer’s perceived risk of the auction mechanism.
So more people may participate. This is a bandwagon
effect. This leads us to state the following hypotheses:

- **Hypothesis 3 (Existing Orders Effect on Perceived Risk):** Existing orders in a group-buying
  auction negatively influence consumers’ perceived
  risk.

- **Hypothesis 4 (Existing Orders Effect on Perceived Trust in Initiator):** Existing orders in a
  group-buying auction positively influence consumer
  trust in the initiator.

According to prospect theory, when facing uncer-
tainty, people tend to be risk-averse [18]. They will
choose less risky alternatives. This implies that con-
sumers may not participate in a market when it evi-
dences some risks in transaction-making. The results
of Gefen [10] agree with this: perceived risk negatively
affects consumer intentions to trade online. As a result,
we assert:

- **Hypothesis 5 (Perceived Risk Effects on Group-
  Buying Participation):** Consumers’ perceived risk
  negatively affects their intention to participate in a
  group-buying auction.

Jarvenpaa et al. [17] remind us that if consumers do
not have a positive attitude toward transaction-making,
they will not have an intention to trade. When trading in an environment full of uncertainty like online group-buying, trust will affect consumer attitudes. Trust represents a belief that the consumer will not be harmed, and that the initiator of the auction will act fairly and honestly. It provides a basis for the development of confidence in the mechanism. We assert:

**Hypothesis 6 (Consumer Trust Effects on Group-Buying Participation): Consumer trust in the initiator positively affects the person’s willingness to participate in a group-buying auction.**

Our research model is shown in Figure 1.

**Fig. 1. Research Model**

4. METHODS

We next discuss our research design and questionnaire development.

4.1. Research Design

We conducted an experiment in which subjects were asked to buy an e-pet, called a Negogo iDog, an imitation of Sega’s iDog, for their best friend’s birthday. See Figure 2.

**Fig. 2. The Auction Item: A Sega iDog Imitation**

Note: For additional information, see [the-gadgeteer.com/review/sega_toys_idog_mini](http://the-gadgeteer.com/review/sega_toys_idog_mini).

The experimental process is shown in Figure 3. The manipulation of price curve was based on a survey of market prices. The list price of an iDog in the market when we conducted this experiment was NT$1,800. After surveying the market, we found that the lowest price was NT$1,400. Based on this information, we designed a price curve including shipping fee that was realistic. See Table 1.

**Table 1. Manipulation of the Price Curve**

<table>
<thead>
<tr>
<th># Buyers</th>
<th>Price in NT$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-5</td>
<td>1,700</td>
</tr>
<tr>
<td>6-10</td>
<td>1,600</td>
</tr>
<tr>
<td>11-15</td>
<td>1,510</td>
</tr>
<tr>
<td>15-20</td>
<td>1,430</td>
</tr>
<tr>
<td>&gt; 21</td>
<td>1,360</td>
</tr>
</tbody>
</table>

We used a 3 x 2 factorial design. Our manipulation of the number of existing orders is shown in Table 2. We told subjects that a group-buying auction needed to recruit 30 participants for success.

**Table 2. Manipulation of Existing Orders**

<table>
<thead>
<tr>
<th># Existing Orders</th>
<th># Buyers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>1-5</td>
</tr>
<tr>
<td>High</td>
<td>11-15</td>
</tr>
</tbody>
</table>

Regarding the manipulation of textual comments, we collected comments about the iDog from other e-market environments to learn about the textual comments of consumers in the real world. We collected 22 positive and 14 negative comments from actual e-
forums. After modifying these comments to adapt them for the experimental scenario, 15 positive and 10 negative comments were chosen for a pretest with 22 subjects. In the pretest, subjects were asked to determine the positive or negative degree of each comment. 1 indicated ‘highly positive,’ a 5 was for ‘neutral,’ and a 9 was for ‘highly negative.’ t-tests were used to check the polarity of every comment with 5 as the threshold. Values greater than 5 suggested negative comments, while those smaller than 5 were positive ones. Furthermore, we coded negative comment as major or minor relative to the average score of each negative comment. Recognizing that most consumers would not read too many comments, we ended up using ten positive comments, one major negative comment and three minor negative comments. Our experimental control group was shown ten positive comments. The other two groups were shown one additional major negative comment, and additional three minor negative comments. Our experimental control group was shown ten positive comments. The other two groups were shown one additional major negative comment, and additional three minor negative comments, respectively, in additional to the ten positive comments. Table 3 summarizes our manipulation.

Table 3. Manipulation of Textual Comments

<table>
<thead>
<tr>
<th>Textual Comments</th>
<th># Positive Comments</th>
<th># Negative Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td># Minor</td>
<td># Major</td>
</tr>
<tr>
<td>All positive comments</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Positive plus a few minor negative</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Positive plus a single major negative</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

We recruited subjects from the online group-buying forums of famous bulletin board systems in Taiwan during a ten-day period. We randomly assigned subjects to different groups. There were 1,048 valid responses, with 66.9% of them students. Subject numbers are shown in Table 4.

Table 4. Research Design

<table>
<thead>
<tr>
<th>Number of Subjects</th>
<th>Existing Orders</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>All positive</td>
<td>166</td>
</tr>
<tr>
<td>Positive plus a few minor negative</td>
<td>178</td>
</tr>
<tr>
<td>Positive plus a single major negative</td>
<td>173</td>
</tr>
<tr>
<td>Total</td>
<td>517</td>
</tr>
</tbody>
</table>

4.2. Questionnaire Design

There are several parts in the questionnaire. It includes: demographic data on the subjects; cognitive measures on perceived risk and trust, and intention to join; and a request for subjects to explain the reasons for the decisions that they made during the experiment.

All items in the cognition measurement portion of the questionnaire were specified on a 7-point Likert scale. 7 was ‘strongly agree’, 4 was ‘neutral’ and 1 was ‘strongly disagree’. We use responses about the subjects’ perceived risk to understand their perceptions about overall risk. The items that we used were adapted from Stone and Gronhaug [26] and Gefen [10]. Perceived trust in the group-buying initiator measures the subjects trust in the initiator. In contrast, questionnaire items about perceived trust in the initiator were adapted from Gefen et al. [11] and Ba and Pavlou [3]. We used the subjects’ anticipated intentions to investigate their willingness to join and bid for the sale item. Our questionnaire was revised based on Gupta et al. [15] and Spears and Singh [25].

5. ANALYSIS

We next discuss the effects of comments and existing orders. We now discuss the effects of comments and existing order in group-buying, and consumer intentions to participate.

**Effects of textual comments and existing orders.** We sought to understand two things. One is the effect of textual comments and the number of existing orders on consumers’ perceived risk of joining the group-buying auction. The other is the perceived trust to the initiator. To do this, we ran a multivariate analysis of variance test (MANOVA). Table 6 shows the related homoscedasticity test. The results match MANOVA’s assumption of homoscedasticity. It also indicated that textual comments and the number of existing orders have significant main effects on perceived risk and trust. Following the MANOVA test, we also conducted an analysis of variance test (ANOVA) to examine the effect of textual comments and existing orders separately. The MANOVA and ANOVA test results are summarized in Table 7.

### Table 5. Reliability of Constructs

<table>
<thead>
<tr>
<th>Constructs (# items)</th>
<th>Cronbach’s α</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived risk (2)</td>
<td>0.729</td>
</tr>
<tr>
<td>Perceived trust (4)</td>
<td>0.866</td>
</tr>
<tr>
<td>Intention to Join (4)</td>
<td>0.938</td>
</tr>
</tbody>
</table>

5.2. Hypothesis Test Results

We now discuss the effects of comments and existing order in group-buying, and consumer intentions to participate.
The results show that the textual comments have a significant effect on both consumers’ perceived risk and trust, but existing orders only significantly influence consumers’ perceived trust in the initiator, not the perceived risk. So our results do not support the Exist-{
}ing Orders Effect on Perceived Risk Hypothesis (H3).

Further, to examine the direction of the effect of two independent variables, we compared the means of the dependent variables between groups. The means of perceived risk and trust relative to textual comments are shown in Table 8.

Table 9 presents post hoc mean difference test results on the effect of textual comments on perceived risk and trust. The test shows that consumers perceived the highest trust in the initiator and the lowest risk for participating in the group-buying auction when the comments were all positive. Though this may not come as a surprise, the perceived risk from all positive comments is only significantly less than if there are a few additional minor negative comments. In other words, an additional single major negative comment did not bring significantly higher risk perception.

- **Table 6. Homoscedasticity Tests**

- **Table 7. Analysis of Variance Tests**

- **Table 8. Perceived Risk / Trust: Textual Comments**

- **Table 9. Post hoc Mean Differences Test of Effects of Textual Comments on Perceived Risk and Trust**

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- **Table 6. Homoscedasticity Tests**
  - **Multivariate Test**
    - Box’s M: 20.01, F: 1.33, df 1: 15, df 2: 5,894,438.4, Signif.: 0.18
  - **Univariate Test**
    - Perceived risk: F: 1.14, df 1: 5, df 2: 1,042, Signif.: 0.34
    - Perceived trust: F: 1.31, df 1: 5, df 2: 1,042, Signif.: 0.26

- **Table 7. Analysis of Variance Tests**
  - **Multivariate Test (MANOVA)**
    - Independent variable: Wilk’s Λ: 0.99, F: 2.51, Signif.: 0.04
    - Source: Textual comments
    - Wilk’s Λ: 0.99, F: 4.14, Signif.: 0.02
      - **Univariate Test (ANOVA)**
        - Dependent variable: Perceived risk
          - Source: Textual comments
          - F: 5.25, Signif.: 0.07
            - F: 5.42, Signif.: 0.03
          - Source: Existing orders
          - F: 4.64, Signif.: 0.08
            - F: 4.51, Signif.: 0.05
  - **Source:** Existing orders
  - Perceived risk: F: 0.31, Signif.: 0.57
  - Perceived trust: F: 6.64, Signif.: 0.00

- **Table 8. Perceived Risk / Trust: Textual Comments**
  - **Dependent Variable:** Perceived Risk
    - Groups (i)
      - All positive comments: Mean: 4.27, Std. Dev.: 0.957
      - Positive plus a few minor negative: Mean: 4.43, Std. Dev.: 1.025
      - Positive plus one major negative: Mean: 4.31, Std. Dev.: 0.973
  - **Dependent Variable:** Trust in Auction Initiator
    - Groups (i)
      - All positive comments: Mean: 4.67, Std. Dev.: 0.870
      - Positive plus a few minor negative: Mean: 4.51, Std. Dev.: 0.956
      - Positive plus one major negative: Mean: 4.64, Std. Dev.: 0.860

- **Table 9. Post hoc Mean Differences Test of Effects of Textual Comments on Perceived Risk and Trust**
  - **Dependent variable: Perceived Risk**
    - Groups (i)
      - All positive comments: Mean Difference (i-j): -0.17, Std. Dev.: 0.075, Signif.: 0.08
      - Positive plus a few minor negative: Mean Difference (i-j): -0.05, Std. Dev.: 0.075, Signif.: 0.83
      - Positive plus a single major negative: All positive: Mean Difference (i-j): 0.12, Std. Dev.: 0.074, Signif.: 0.26
      - Positive plus a few minor negative: Mean Difference (i-j): -0.12, Std. Dev.: 0.074, Signif.: 0.26
  - **Dependent variable: Perceived Trust**
    - Groups (i)
      - All positive: Mean Difference (i-j): 0.17, Std. Dev.: 0.068, Signif.: 0.05
      - Positive plus a few minor negative: Mean Difference (i-j): 0.03, Std. Dev.: 0.068, Signif.: 0.89
      - Positive plus a single major negative: All positive: Mean Difference (i-j): -0.13, Std. Dev.: 0.067, Signif.: 0.14
      - Positive plus a few minor negative: Mean Difference (i-j): 0.13, Std. Dev.: 0.067, Signif.: 0.14

Notes: * p<0.1, ** p<0.05, *** p<0.01; Scheffe test for comparisons.

We obtained a similar result for the perceived trust to the initiator. However, Table 8 shows that additional negative comments increase risk and reduce trust. Hence, we find that H1a, H1b, H2a, and H2b are supported. However, we did not find a significant difference between the impact of an additional single major and a few additional minor negative comments on perceived risk and trust. Thus, our H1c and H2c do not seem to be supported. Regarding the effect of existing orders, since the MANOVA test in Table 7 only shows a significant ef-
fect for perceived trust, we implemented an ANOVA test was to examine the direction of the differences in perceived trust. See Tables 10 and 11. The results show that the larger number of existing orders led to higher perceived trust in the initiator, supporting H4.

### Table 10. Group Means for Perceived Trust

<table>
<thead>
<tr>
<th>Groups</th>
<th>Mean</th>
<th>Std. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>4.52</td>
<td>0.923</td>
</tr>
<tr>
<td>High</td>
<td>4.68</td>
<td>0.869</td>
</tr>
</tbody>
</table>

### Table 11. ANOVA for Effect of Existing Orders

<table>
<thead>
<tr>
<th>Dependent Variable: Perceived Trust</th>
<th>Sum of Squares</th>
<th>d.f.</th>
<th>Mean square</th>
<th>F</th>
<th>Signif.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between group</td>
<td>6.78</td>
<td>1</td>
<td>6.767</td>
<td>8.43</td>
<td>0.00***</td>
</tr>
<tr>
<td>Within group</td>
<td>839.38</td>
<td>1,046</td>
<td>0.802</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>846.15</td>
<td>1,047</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

**Intention to Participate.** We conducted a multiple regression analysis to test whether consumers’ perceived risk of participating in a group-buying auction and their perceived trust in the initiator affect their intention to participate. Table 12 indicates that both perceived risk and trust significantly influence consumers’ intentions. It also reveals that the effect of perceived risk is negative, while the effect of trust is positive. This provides support for both H5 and H6.

### Table 12. Regression: Intention to Join, and Perceived Risk and Trust

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>β</th>
<th>Signif.</th>
<th>Collinearity Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>β</td>
<td>Signif.</td>
<td>Tolerance</td>
</tr>
<tr>
<td>Perceived Risk</td>
<td>-0.15</td>
<td>0.00***</td>
<td>0.95</td>
</tr>
<tr>
<td>Perceived Trust</td>
<td>0.48</td>
<td>0.00***</td>
<td>0.95</td>
</tr>
</tbody>
</table>

Note: Dependent var. is Intention to Participate. $F = 206.68$ ($p=0.00$). $R^2=0.28$, adj. $R^2=0.28$. *$p<0.1$, **$p<0.05$, ***$p<0.01$.

### 5.3. Discussion

Overall, the results confirm most but not all of our hypotheses. First, positive textual comments diminish consumers’ perceived risk, but have a positive effect on perceived trust. Negative comments, by the same token, increase perceived risk, but diminish perceived trust. For both perceived risk and trust, there is no difference between the effect of an additional single major negative comment and a few additional minor negative comments. Second, existing orders only have significant effects on perceived trust, but not on perceived risk. With more existing orders, the higher consumers’ perceived trust will be. Third, the perceived risk of participating in a group-buying auction and the perceived trust in the auction initiator will impact consumer intentions to participate. Perceived risk has a negative impact while perceived trust has a positive impact.

Positive comments, based on our results, seem to strengthen consumer confidence and convince them that a group-buying auction is a safe environment in which to make a purchase. In contrast, negative comments signal threats. Our results suggest that group-buying auction initiators need to build and maintain good reputations. From Ba and Pavlou [3] we know that if buyers are unable to identify their transaction partners, they feel some risk. So with initiators of group-buying auctions, a key role they will play is to convince consumers to join. Positive comments lead to higher perceived trust and lower perceived risk. Also an additional major negative comment, in our results, seems to have neither increased the perceived risk nor decreased the perceived trust. But interestingly, just a few additional minor negative comments increased perceived risk and decrease perceived trust. In contrast, we found that there was no significant difference between an additional single major negative comment and a few additional minor negative comments.

Although a major negative comment is generally worse than a minor negative comment, an additional single major negative comment, given that all the others are positive, is regarded as an exception. So not much weight is place on it. One of our experimental subjects told us that “only one negative comment will suspicious and may not be trustworthy.” However, a few additional minor negative comments may get more attention from consumers than an additional single major negative comment. Consumers, we believe, consider both the content and amount of comments. We conclude that textual comments are not perfect substitutes for rating scores in group-buying auctions.

Our results indicate the manner in which the number of existing orders impact perceived trust. They seem to have less of an effect on perceived risk. This suggests that the hypothesized positive participation externality effect in group-buying is more like a bandwagon effect. In other words, as the number of participants increases, consumers become more comfortable to join. Others’ commitments increase consumer trust.

There are limitations in this research. First, the data were collected in an experiment, not a field study. Though it imitated a real marketplace, there still is the issue of external validity. Second, we also do not know the extent to which the product we used in our experiment influences its generalizability. In addition, the experimental nature of this study itself changes the characteristics of the respondents, who may not per-
fectly represent real world consumer.

6. CONCLUSION

Trust and risk are continuing to concern consumers in online shopping. Compared with posted-prices, online group-buying creates more uncertainty from dynamic pricing, which brings risks. The role of the initiator in group-buying also brings issues of risk and trust. Although the initiator is often a seller or a third party, it is quite often that a consumer initiates the group-buying auction. Trust in the initiator is a concern that influences consumer participation. Textual feedback and the number of exiting orders give consumers information to evaluate how they can trust the initiator and the degree of risk they face. As we noted, we chose to study comments, since they give more information than ratings and there were researches on the impact of ratings.

This research offers insight into how textual comments and the number of existing orders impact consumer perceptions of risk in joining a group-buying auction. They also influence a consumer’s and trust in the auction initiator. Textual comments also impact consumer perception of risk, while the number of existing orders only impact perceived trust. As we expected, textual comments positively impact perceived trust, but negatively impact perceived risk – and so too for existing orders. With more existing orders, consumers have more trust. With all positive comments though, an additional major negative comment has little or no effect on perceived trust. Yet a few additional minor negative comments increase perceived risk and decrease perceived trust. From our results, ratings seem like they are imperfect substitutes for ratings though.

7. ACKNOWLEDGMENTS

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8. REFERENCES

[21] Mayer, R. C., Davis, J. H., and Schoorman, F.D. An In-
Appendix 1. Purchase Strategy for a 128MB Negogo iDog in a Group-Buying Auction on the Internet

Note: This screenshot of the group-buying experimental test bed includes the original list price of the Negogo iDog at NT$1,800. It also shows the complete group-buying price curve for 1 to 5 orders at NT$1,700 for each item all the way down to 21 or more orders at NT$1,360 for each item. Item prices are inclusive of shipping fees, and the auction was open between April 30 and May 9, about ten days. The lower-middle buttons permit the consumer to: participate in the group-buying auction immediately and make a bid (購買); think some more about participating (再考慮看看); and, to decline to participate (放棄購買). The opportunity for a consumer to decline to participate in an auction is an important feature of this experimental test bed that makes it more like the real world. Source: Electronic Commerce and Negotiation Support Systems Group, National Sun Yat-Sen University, Kaohsiung, Taiwan, 2008.