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The Nature and Role of Feedback Text Comments in Online Marketplaces: Implications for Trust Building, Price Premiums, and Seller Differentiation

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For online marketplaces to succeed and prevent a market of lemons, their feedback mechanism (reputation system) must differentiate among sellers and create price premiums for trustworthy sellers as returns to their reputation. However, the literature has solely focused on numerical (positive and negative) feedback ratings, alas ignoring the role of feedback text comments. These text comments are proposed to convey useful reputation information about a seller's prior transactions that cannot be fully captured with crude numerical ratings. Building on the economics and trust literatures, this study examines the rich content of feedback text comments and their role in building a buyer's trust in a seller's benevolence and credibility. In turn, benevolence and credibility are proposed to differentiate among sellers by influencing the price premiums that a seller receives from buyers.

This paper utilizes content analysis to quantify over 10,000 publicly available feedback text comments of 420 sellers in eBay's online auction marketplace, and to match them with primary data from 420 buyers that recently transacted with these 420 sellers. These dyadic data show that evidence of extraordinary past seller behavior contained in the sellers' feedback text comments creates price premiums for reputable sellers by engendering buyer's trust in the sellers' benevolence and credibility (controlling for the impact of numerical ratings). The addition of text comments and benevolence helps explain a greater variance in price premiums ($R^2 = 50\%$) compared to the existing literature ($R^2 = 20\%$–30%). By showing the economic value of feedback text comments through trust in a seller's benevolence and credibility, this study helps explain the success of online marketplaces that primarily rely on the text comments (versus crude numerical ratings) to differentiate among sellers and prevent a market of lemon sellers. By integrating the economics and trust literatures, the paper has theoretical and practical implications for better understanding the nature and role of feedback mechanisms, trust building, price premiums, and seller differentiation in online marketplaces.

Key words: feedback; feedback mechanisms; feedback text comments; price premiums; seller differentiation; seller heterogeneity; trust; benevolence; credibility; numerical ratings; online marketplaces; auctions
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1. Introduction

The inherent temporal and physical separation between buyers and sellers in impersonal online marketplaces poses uncertainties for buyers because they mostly transact with new and unknown sellers with no brand name. To account for these uncertainties, online auction marketplaces such as eBay have instituted feedback mechanisms, which are IT systems that enable the collection and dissemination of information about past transactions of sellers (Dellarocas 2003, Resnick et al. 2000). Feedback mechanisms facilitate transactions by mitigating information asymmetry and building buyers' trust in sellers (Pavlou and Gefen 2004, 2005). Feedback mechanisms have also been shown to render price premiums for reputable sellers (Ba and Pavlou 2002). Price premiums are essential for online marketplaces: Lack of seller differentiation would force high-quality sellers to flee the

market because their reputation cannot be signaled and rewarded, thereby resulting in a market of lemon sellers (Akerlof 1970).

Whereas the success of online auction marketplaces has been largely attributed to their feedback mechanism (Dellarocas 2003), researchers and practitioners have been puzzled about the seemingly enormous success of crude numerical (positive and negative) feedback ratings to facilitate effective transactions among strangers, yet the literature has ignored the role of qualitative *feedback text comments* that accompany these numerical ratings.[1] By exclusively studying numerical ratings, the literature has attributed the value of feedback mechanisms *solely* to their numerical ratings, something reflected by the low variance explained in price premiums ($R^2 = 20\%–30\%$). We argue that feedback text comments contain fine-grained information about sellers that cannot be conveyed by crude numerical ratings. For example, there is a difference between a text comment that denotes regular delivery and a text comment that denotes a seller satisfying a buyer's extraordinary request (even if both comments would receive a positive rating). Similarly, there is a distinction between a text comment that suggests a slight product delivery delay and a text comment that denotes fraud or severe incompetence (even if both comments would simply receive a negative rating). Feedback text comments are herein proposed to offer richer evidence of a seller's past transactions *beyond* crude positive and negative ratings, and they are posited to represent the true basis of the value of feedback mechanisms. To better understand the full potential and economic value of feedback mechanisms, this study aims to quantify the nature of feedback text comments and test their role in seller differentiation by shaping trust and price premiums.

The potential role of feedback text comments has been suggested in the literature (Ba and Pavlou 2002, p. 256; Cabral and Hortaçsu 2006, p. 6). However, the difficulty in assessing the meaning of numerous text comments has precluded their scientific assessment besides small-scale attempts. For instance, Cabral and Hortaçsu (2006, pp. 6–9) subjectively assess few negative text comments in eBay's auctions to determine if a seller's second negative text comment was "nastier" than the first one. Pavlou and Gefen (2005) subjectively assess the meaning of negative text comments to identify which type of psychological contract violation buyers experienced with sellers. There is also an emerging interest in the e-commerce and trust literatures to assess the trust-building potential of text arguments. For instance, Kim and Benbasat (2003, 2005) examine how an Internet store can design its posted text to build trust. Accordingly, Lim et al. (2007) examine the trust-building role of online consumer testimonials.

Extending this trend, this study undertakes a large-scale content analysis of over 10,000 publicly available feedback text comments in eBay's marketplace to theorize and empirically assess their potential role on trust and price premiums. Specifically, we propose that feedback text comments offer evidence of a seller's extraordinary—*outstanding* or *abysmal*—credibility and benevolence in her past transactions, which helps build a buyer's trust in a seller's *credibility* and *benevolence* by mitigating adverse selection and moral hazard, respectively.

In terms of outstanding past behavior, *outstanding credibility comments* are defined as those that denote evidence of a seller excelling in fulfilling basic contractual obligations. Examples of outstanding credibility comments include exceptional product delivery, precise product representation, and close adherence to fulfillment guarantees. *Outstanding benevolence comments* are defined as those that give evidence of a seller's extraordinary goodwill behavior. Examples include showing empathy to buyer needs, going beyond the call, and not taking advantage of buyers despite having the chance to do so. It is important to distinguish between outstanding benevolence comments that provide evidence of a seller's goodwill behavior *beyond* basic transaction fulfillment, and outstanding credibility comments that give evidence of a seller *excelling* in fulfilling the transaction's basic contractual obligations.

On the other hand, in terms of abysmal past behavior, *abysmal credibility comments* are defined as those that provide extraordinary evidence of incompetence

[1] Following a completed auction transaction, the winning buyer has the opportunity to post a numerical feedback rating (positive, negative, or neutral) and an accompanying feedback text comment of up to 80 characters of text.

and unreliability. Examples include extreme delivery delays, severe shipping and fulfillment problems, and inability to complete transactions. *Abysmal benevolence comments* are defined as those that offer evidence of a seller intentionally acting opportunistically and trying to exploit buyers. Examples include product quality deception, intentional product misrepresentation, and fraud. We also need to mention the distinction between abysmal benevolence comments that provide evidence of *intentional* malicious behavior and abysmal credibility comments that denote fulfillment problems due to *unintentional* lack of ability.

Finally, feedback text comments may also be *ordinary* because they may not provide any evidence of extraordinary past seller behavior. Examples of ordinary comments are those that denote either a regularly completed transaction or a slightly problematic one that does not produce an extraordinary surprise element.

The five categories of feedback text comments are proposed to influence trust in a seller's credibility and benevolence by spawning a surprise element (positive value for outstanding text comments or negative value for abysmal comments). In turn, a buyer's trust in a seller's credibility and benevolence influences price premiums by mitigating adverse selection and moral hazard, respectively. The resulting model (Figure 1) delineates the process by which text comments shape price premiums by building a buyer's trust in a seller's credibility and benevolence.

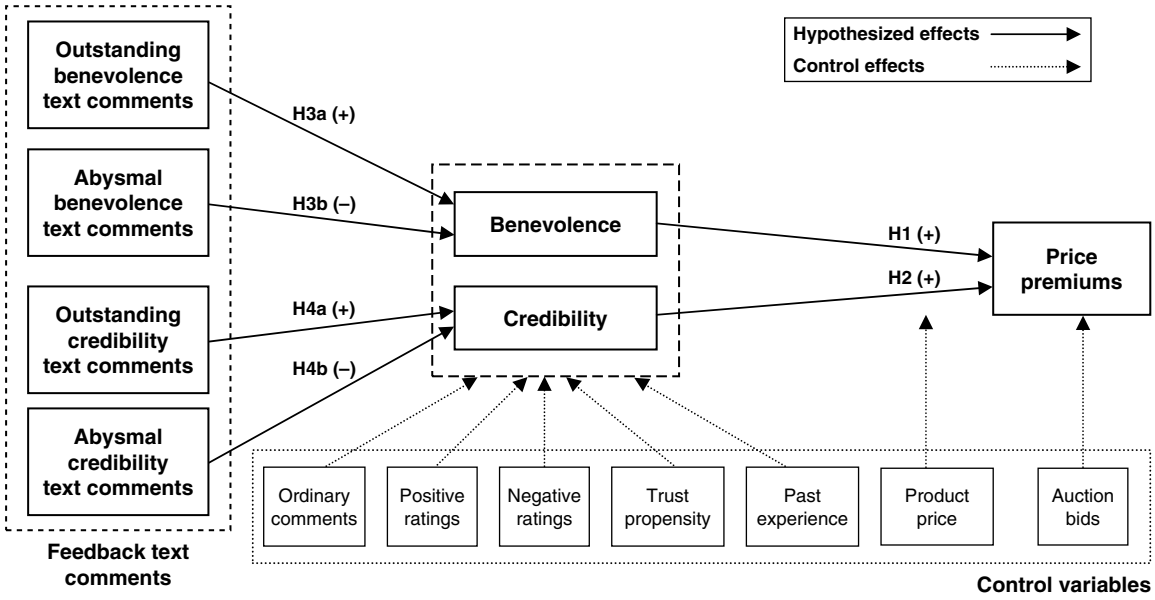
By theorizing, quantifying, and showing the trust-building potential of feedback text comments, this study suggests that the apparent success of feedback mechanisms to facilitate transactions among strangers does not mainly come from their crude numerical ratings, but rather from their rich feedback text comments. This study also shows the dual role of feedback text comments to differentiate among sellers by building two distinct types of trust (credibility and benevolence) by mitigating adverse selection and moral hazard. Finally, this study explains a large degree of the variance in price premiums, which help differentiate among sellers and prevent a market of lemons.

2. Theory Development

2.1. Trust

While trust has long been viewed as a positive element of buyer-seller transactions, the impersonal and anonymous nature of online marketplaces has further increased the importance of trust (Pavlou and Gefen 2004). Following Ba and Pavlou (2002), trust is defined as the buyer's belief that a transaction with a seller

Figure 1 The Proposed Conceptual Model and Research Hypotheses



will occur in a manner consistent with her confident expectations. While there are many ways to categorize trust dimensions (Mayer et al. 1995, McKnight et al. 2002), the well-accepted view in the literature (e.g., Ba and Pavlou 2002, Doney and Cannon 1997, Singh and Sirdeshmukh 2000) distinguishes between two dimensions of trust: (a) *benevolence* (goodwill trust), and (b) *credibility* (competence and reliability).[2]

2.1.1. Benevolence. Benevolence generally refers to a trustor's beliefs about a trustee's goodwill intentions, even given the trustee's opportunity to take advantage of the trustor. In the economics literature, benevolence assumes that the trustee would act cooperatively even if it is rational to act otherwise (Williamson 1985). In the management literature, benevolence is the belief that the trustee will do good to the trustor despite the chance to act opportunistically (Mayer et al. 1995). In marketing, benevolence is viewed as the buyer's belief that a seller will act fairly and not take advantage of buyers, even under adverse conditions (Anderson and Narus 1990). In the IS literature, benevolence refers to the trustee showing empathy toward the trustor's needs, and making proactive efforts to resolve the trustor's concerns (Bhattacherjee 2002). Integrating these literatures and applying them to online marketplaces, benevolence is defined as the buyers' belief that a seller has beneficial motives, is genuinely concerned about the buyer's interests, and will act in a goodwill manner beyond short-term profit expectations.

2.1.2. Credibility. Credibility is the buyer's belief that a seller is competent and reliable, would perform a transaction effectively, and would acknowledge guarantees and promises. Applied to online marketplaces, credibility is defined as the buyer's belief that a seller is competent and reliable and will fulfill the transaction's contractual requirements.

[2] Other views include a unitary view of trust, three dimensions (competence, honesty or integrity, and benevolence) (Bhattacherjee 2002, Mayer et al. 1995, Gefen 2002), and four dimensions (with *predictability*) (McKnight and Chervany 2002). In buyer-seller relationships, competence and reliability collapse under the notion of credibility since buyers simultaneously assess a seller's competence and reliability (e.g., Doney and Cannon 1997, Kim and Benbasat 2005). Credibility does include honesty and integrity. However, because honesty and integrity are similar to benevolence, we omit them from credibility. This is consistent with Barber (1983) and Nooteboom (1996).

2.1.3. Benevolence vs. Credibility. While credibility describes beliefs about a seller's intentions due to economic rationale (Williamson 1985), benevolence describes beliefs in a trustee's goodwill and caring intentions *beyond* basic contractual obligations (Bhattacherjee 2002). Credibility refers to trust that is based on contracts, laws, and structural assurances, while benevolence refers to trust based on goodwill intentions (Barber 1983, Yamagishi and Yamagishi 1994)—Table 1.

The literature (Ganesan 1994, Pavlou 2002) views credibility and benevolence as independent constructs, and empirically shows that they are distinct variables that usually have different relationships with other variables. Even if credibility and benevolence are theoretically and empirically distinct, the literature generally posits a positive relation between them since both constructs represent favorable expectations about a trustee's intentions, they share similar antecedents (e.g., trust propensity and past experience), and they often have similar outcomes (e.g., transactions). Since the literature does not suggest a causal link between credibility and benevolence, or that one dimension is a prerequisite of the other, we do not hypothesize any *directional* link between the two constructs.

Following Kreps and his colleagues (Kreps et al. 1982, Kreps and Wilson 1982), sellers that engage in repeated games can establish a certain reputation by truly committing to a long-term strategy. Accordingly, *Stackelberg types* are long-term players that commit to a certain dominant action (Dellarocas 2003), and they gain a reputation of being of a certain Stackelberg type.[3] Following this logic, sellers that truly commit to acting in a competent and reliable manner by fulfilling contractual requirements can gain a reputation of credibility. Accordingly, sellers that truly commit to acting in a goodwill fashion and that refrain from any opportunistic behavior can gain a reputation for benevolence. Sellers that commit to a certain long-term strategy can gain a reputation for being a certain Stackelberg type, and they can use this reputation to build a buyer's trust in their credibility or benevolence.

[3] The authors thank Reviewer 1 for suggesting the correspondence between the two trust dimensions with Stackelberg's types.

Table 1 Theoretical and Measurement Distinction Between Credibility and Benevolence

	Credibility	Benevolence
Definition	The buyer's belief that a seller is competent and reliable, and will fulfill the transaction's contractual requirements.	The buyer's belief that a seller has beneficial motives, is genuinely concerned about the buyer's interests, and will act in a goodwill manner beyond short-term profit expectations.
Sample items	1. I believe this seller will deliver to me a product that matches the posted description. 2. I believe this seller will deliver to me a product according to the posted delivery terms and conditions. 3. This seller is likely to be reliable. 4. This seller is likely to be credible.	1. This seller is likely to care for my welfare. 2. If there is a problem with my transaction, this seller will go out on a limb for me. 3. This seller is likely to make sacrifices for me if needed. 4. This seller is *unlikely* to act opportunistically, even given the chance. 5. This seller is likely to keep my best interests in mind.

The proposed distinction between benevolence and credibility is consistent with the economics literature that views distinct Stackelberg types, *benevolent* sellers who are committed to acting in a goodwill fashion, and *credible* sellers who are committed to fulfillment excellence. The two Stackelberg types are not mutually exclusive; we propose that it is possible for a seller to simultaneously pursue a benevolent and a credible strategy.

Despite the abstract existence of Stackelberg types, this study focuses on the *resulting* actual buyer's beliefs, which may not necessarily correspond to the seller's *intended* Stackelberg type. For example, sellers may be committed to either goodwill or competent behavior, but because they may do so at different degrees of effectiveness buyers are likely to have different levels of trust in their benevolence and credibility. A buyer's beliefs in the seller's benevolence and credibility are viewed as two *continuous* perceptual constructs from the buyer's standpoint, as opposed to Stackelberg types that are viewed from the seller's standpoint as intended *binary* strategies.

2.2. Price Premiums

Price premiums result from high prices that lead to above-average profits (Shapiro 1983). In online marketplaces, a price premium is defined as the monetary amount above the average price received by multiple sellers that sell a perfectly duplicate product during a finite period (Ba and Pavlou 2002). Price premiums are due to differences in *fulfillment* characteristics such as product delivery and responsiveness. In fact, the auctions literature has shown that a reputation for product fulfillment often results in price premiums. For example, Resnick et al. (2006) show that more reputable sellers get 8.1% higher prices than less reputable ones. However, rather than directly linking a reputation for superior product fulfillment to price premiums, we argue that a buyer's trust in a seller's benevolence and credibility is the *direct* predictor of price premiums, whereas evidence of transaction fulfillment (from feedback text comments and numerical ratings) is likely to have an *indirect* effect through the two trust beliefs (benevolence and credibility).

Following the information economics literature (Akerlof 1970, Jensen and Meckling 1976), buyers face two major problems when transacting with sellers. *Adverse selection* refers to the precontractual problem of assessing the seller's true competencies and the characteristics of her products, which corresponds to the notion of credibility. *Moral hazard* refers to the postcontractual problem of the seller intentionally reducing product delivery and quality, which corresponds to the notion of benevolence. By integrating the information economics with the trust literature, we argue that a buyer's trust in a seller's credibility and benevolence can influence price premiums by mitigating adverse selection and moral hazard, respectively.

2.2.1. Benevolence and Price Premiums. Trust in a seller's benevolence first acts as a signal to buyers that a seller is likely to refrain from opportunism, even if he has the chance. Buyers are thus willing to pay a premium to transact with a benevolent seller to prevent moral hazard in case the seller has the opportunity to act opportunistically. Second, a reputation for benevolence is an asset that sellers are unlikely to jeopardize to exploit a single buyer. Because benevolence provides sellers an incentive to continue their cooperative behavior and refrain from opportunism,

benevolent sellers have a stronger incentive to maintain their goodwill behavior to protect their reputations (Klein and Leffler 1981). Viewing these signals and incentives, buyers would strive to transact with benevolent sellers and are more likely to offer those sellers price premiums (higher auction bids) to prevent moral hazard. Because trust can mitigate moral hazard (Pavlou et al. 2007), buyers would demand a monetary compensation for the higher uncertainty they are exposed to when transacting with less benevolent sellers. The dynamic nature of the auction mechanism ensures that benevolent sellers are compensated with higher prices and less benevolent sellers are compensated with price discounts.

Hypothesis 1 (H1). *A seller's* benevolence *positively influences price premiums in online marketplaces*.

2.2.2. Credibility and Price Premiums. Buyers are also willing to compensate *credible* sellers with price premiums to transact with sellers who are more competent and who are more likely to fulfill transaction requirements to mitigate adverse seller selection. Ba and Pavlou (2002) show that trust in a seller's credibility results in price premiums for sellers in online marketplaces by overcoming adverse selection (also see Dellarocas 2003 for a more detailed review). We thus hypothesize:

Hypothesis 2 (H2). *Seller's* credibility *positively influences price premiums in online marketplaces*.

2.3. Feedback Mechanisms

A key element of online marketplaces is their feedback mechanism. For instance, eBay's feedback forum is a reputation system where buyers can post feedback about their past transactions with sellers (Dellarocas 2003). Whereas sellers essentially transact with a single buyer at any given time, feedback mechanisms employ the Internet's communication capabilities to create an environment where buyers learn about each seller's previous transactions through word-of-mouth (WOM) communication. WOM communication has long been regarded as the most credible, objective, and influential means for sharing information and building trust because WOM communication among impartial buyers is unlikely to be biased or profit driven (e.g., Kamins et al. 1997, Milgrom et al. 1990). Therefore, feedback mechanisms have been shown to build buyers' trust in sellers (Pavlou and Gefen 2004, 2005).

The trust literature has identified three primary trust-building means (Zucker 1986): *familiarity*, similarity, and *institutional structures*. Because familiarity and similarity are not widely present in online auction marketplaces (Pavlou and Gefen 2004), this study focuses on how the community of buyers *collectively* shares feedback about sellers' past transactions through the feedback mechanism (an institutional structure) to build trust. Indeed, the literature suggests that people tend to rely on the opinions of others to form their trust beliefs (Banerjee 1992). Following the economics literature, feedback mechanisms build trust through the logic of *signal* and *incentives*. First, by signaling their Stackelberg type by committing to a certain long-term strategy, sellers build a reputation (Fombrum and Shanley 1990). This logic is consistent with Kreps et al. (1982), who argue that a seller's past transactions *signal* buyers regarding the seller's Stackelberg type. Second, following the logic of repeated games (Klein and Leffler 1981, Wilson 1985), feedback gives sellers *incentives* to act cooperatively to avoid jeopardizing their reputation (Ba and Pavlou 2002). Feedback mechanisms act as reputation systems, informing buyers about a seller's reputation, a key antecedent of trust (Gefen et al. 2003, Pavlou 2003, Pavlou and Fygenson 2006).

The literature has described the role of feedback mechanisms in terms of crude positive and negative ratings. Buyers trust sellers with many positive ratings, which are signals of a superior reputation (Ba and Pavlou 2002). Because reputable sellers have greater incentives *not* to cheat (to protect their reputation), buyers are likely to trust reputable sellers (Melnick and Alm 2002). Livingston (2005) shows that sellers with more than 672 positive ratings earn a 10% price premium over new sellers. In contrast, a negative rating is a signal of a problematic transaction. Because the normal purpose of online auctions is to properly fulfill transactions, any deviation reduces prices (Eaton 2002, Cabral and Hortaçsu 2006). In fact, Lucking-Reiley et al. (2006) show that a 1% increase in negative ratings reduces prices by 0.11%. In sum, the literature convincingly shows that positive ratings increase price premiums, while negative ones reduce price premiums (e.g., Houser and Wooders 2006, Kalyanam and McIntyre 2001).

2.4. Feedback Text Comments and Trust Building

Feedback text comments provide fine-grained information about a seller's reputation that is likely to engender a buyer's trust in a seller's benevolence and credibility by allowing buyers to identify sellers that are committed to certain Stackelberg actions. For text comments to signal a seller's reputation, we focus on text comments that convey evidence of a seller's *extraordinary* prior transactions. This is because evidence that is likely to spawn a surprise element is most likely to cause changes in buyer's beliefs (Bikhchandandi et al. 1992), as explained below.

2.4.1. Feedback Text Comments and Benevolence. Feedback text comments provide fine-grained evidence that a seller has previously acted in an *outstanding* fashion to pursue its buyers' best interests, or acted opportunistically in an *abysmal* manner to exploit its buyers. By spawning a *surprise* element, text comments can signal a reputation of outstanding or abysmal benevolence, thus helping buyers either build or damage their trust in a seller's benevolence. Even if benevolence is in the eye of the beholder, surprising extraordinary comments are very likely to be perceived by buyers as a signal of a seller's commitment to benevolence or potential for malevolence. Accordingly, even if buyers may have a slightly different understanding of what constitutes extraordinary seller behavior, it is possible to identify a broad set of text comments that many buyers would perceive as conveying evidence of extraordinary seller behaviors:

Outstanding benevolence comments. These text comments capture a seller's extraordinary evidence of goodwill behavior. Outstanding benevolence comments include (i) a genuine interest in buyers' interests; (ii) proactively resolving customer problems, viewing problems as joint responsibilities and going beyond the call; (iii) taking initiatives for mutual benefit that exceed short-term profit expectations; and (iv) showing responsiveness and empathy to buyer concerns; and (v) and not exploiting buyers, even given the chance.

Abysmal benevolence comments. These text comments provide evidence of a seller acting opportunistically and trying to exploit buyers. Evidence of malevolent comments include (i) acting opportunistically and deliberately trying to abuse buyers; (ii) focusing on short-term profit maximization by trying to exploit buyer vulnerabilities; and (iii) engaging in intentional product misrepresentation, quality deception, selling counterfeit products, and fraud.

Outstanding and abysmal benevolence text comments are *not* equivalent to crude positive and negative ratings. While there may be a positive relationship between positive and negative ratings with outstanding and abysmal text comments, respectively, not all positive ratings will necessarily be accompanied by outstanding benevolence text comments, nor will all negative ratings necessarily be associated with abysmal benevolence comments. First, *outstanding* comments surpass positive ratings to suggest evidence of goodwill past activities beyond fulfilling basic transaction obligations. Second, *abysmal* benevolence comments exceed negative ratings to denote deliberate efforts to exploit buyers beyond unintentional mishaps. Such comments would not be classified as benevolent, but they would be *ordinary*. While outstanding or abysmal benevolence text comments are always accompanied by a positive or negative rating, respectively, positive and negative ratings would *not* be necessarily accompanied by a benevolence text comment (but they would often be accompanied by an ordinary comment).

We must also distinguish between a buyer's beliefs in a seller's benevolence from benevolence text comments. Benevolence is a belief that a seller will act in a goodwill fashion beyond short-term profit expectations. In contrast, benevolence text comments are left by other buyers to describe a seller's activities, as shown in Table 2.

We argue that buyer's trust in a seller's benevolence can be engendered from feedback text comments, especially if text comments show evidence of a seller's extraordinary (outstanding or abysmal) past behaviors. Following the logic of WOM communication (Dellarocas 2003), buyers can assess whether a seller is committed to benevolent behaviors or if they are likely to act opportunistically. Benevolent text comments signal a seller's reputation (Kreps and Wilson 1982); they are proposed to build a buyer's trust in a seller's benevolence by allowing buyers to infer that the seller is likely to act in a goodwill fashion. In contrast, evidence of prior opportunistic activities is likely to damage a seller's reputation for benevolence, and thereby reduce the buyer's trust beliefs in the seller's benevolence.

Table 2 Theoretical and Empirical Distinction Between Feedback Comments and Benevolence

	Benevolence feedback comments	Buyer's trust in a seller's benevolence
Description	Benevolence feedback comments describe a seller's prior activities, which are *outstanding* or *abysmal* (not ordinary).	The buyer's belief that a seller is genuinely interested in her interests and has beneficial motives, even in the absence of explicit guarantees that would prevent seller opportunism.
Sample items	1. Outstanding benevolence comments (see Table 4a). 2. Abysmal benevolence comments (see Table 4b). 3. Not ordinary comments (see Table 4e).	1. This seller is likely to care for my welfare. 2. If there is a problem with my transaction, this seller will go out on a limb for me. 3. This seller is likely to make sacrifices for me if needed. 4. This seller is *unlikely* to act opportunistically, even given the chance. 5. This seller is likely to keep my best interests in mind.

Hypothesis 3A (H3A). *Outstanding benevolence comments* positively *influence a buyer's belief in a seller's benevolence*.

Hypothesis 3B (H3B). *Abysmal benevolence comments* negatively *influence a buyer's belief in a seller's benevolence*.

2.4.2. Feedback Text Comments and Credibility. Feedback text comments are also proposed to convey evidence of a seller's extraordinary behavior for credibility, either for outstanding competence and reliability in fulfilling past transactions, or abysmally failing to fulfill transaction requirements due to incompetence and unreliability. A seller's outstanding and abysmal credibility text comments are distinct from both the seller's numerical ratings and from the buyer's trust in the seller's credibility.

Outstanding credibility comments. These text comments render evidence of a seller excelling in fulfilling transactions, including evidence of (i) exceptional product delivery and transaction fulfillment; (ii) precise product description; and (iii) faithful adherence to contractual requirements, service promises, and product guarantees.

Abysmal credibility comments. These text comments give extraordinary evidence of incompetence and unreliability, such as (i) extreme delays in product deliveries due to incompetence, (ii) shipping problems due to lack of reliability, (iii) contract default (reneging), and (iv) inability to complete basic transaction requirements.

We propose that trust in the seller's credibility can be engendered based on feedback text comments, particularly if the seller's comments provide evidence of extraordinary (either outstanding or abysmal) past behavior. By signaling a seller's exceptional reputation for excelling in fulfilling transactions, outstanding credibility comments are likely to engender a buyer's trust in a seller's credibility. In contrast, abysmal credibility comments surprise buyers and give them serious doubts that the seller will even fulfill their basic transaction expectations.

Hypothesis 4A (H4A). *Outstanding credibility text comments* positively *influence a buyer's belief in a seller's credibility*.

Hypothesis 4B (H4B). *Abysmal credibility text comments* negatively *influence a buyer's belief in a seller's credibility*.

2.5. Control Variables

Several effects are controlled for their potential impact on the study's dependent variables.

Ordinary comments. All comments that do not fall under the four extraordinary categories are viewed as ordinary. The impact of ordinary comments on benevolence, credibility, and price premiums is controlled for.

Numerical ratings. Numerical ratings are mostly positive or negative (neutral ratings are rare). The literature has shown the favorable role of positive ratings and the destructive role of negative ratings on trust and price premiums (e.g., Cabral and Hortaçsu 2006, Houser and Wooders 2006). This is because buyers appreciate a long history of positive transactions, but they are skeptical of sellers with negative ratings. Hence, the impact of numerical ratings (both a seller's lifetime and the 25 recent ones) on benevolence, credibility, and price premiums is controlled for.

Auction bids. The number of auction bids (number of unique buyer bids in a single auction) is expected

to raise prices given the dynamic nature of online auctions (Bajari and Hortaçsu 2003).

Product price. Ba and Pavlou (2002) showed that product price *moderates* the relationship between credibility and price premiums. This is because expensive products are associated with a greater risk because the possibility of loss is a function of the product's price. The interaction effect between product price and credibility is thus controlled for. Following the same logic, we also control for a potential *interaction effect* between benevolence and product price.

Past experience with seller. Because trust beliefs may be formed through familiarity (Gefen et al. 2003), we asked buyers whether they had transacted with the *same* seller prior to the focal transaction. Past experience with the seller is controlled for its potential impact on benevolence, credibility, and price premiums.

Past experience with marketplace. In addition to being familiar with a specific seller, we also control for the buyer's familiarity with eBay's marketplace (Pavlou and Gefen 2005) on benevolence, credibility, and price premiums.

Trust propensity. Trust is shaped by trust propensity, which has been shown to impact trust in online marketplaces (Pavlou and Gefen 2004). Hence, we control for its potential impact on both dimensions of trust.

3. Research Methodology

3.1. Study Setting

This study tests the proposed hypotheses in eBay's online auction marketplace, which is the most successful marketplace with over 90% of the online auction market share (Sinclair 2005). Following Pavlou and Gefen (2005), the study's research method integrated secondary auction data from eBay with primary data from eBay's buyers. To identify survey respondents and associate them with a specific transaction (to obtain the price premiums) with a specific seller (to obtain the seller's feedback text comments and numerical ratings), we collected data from 1,665 completed auctions for 10 distinct products (iPod, $n = 512$; movie DVD, $n = 341$; music CD, $n = 312$; Palm Pilot, $n = 138$; digital camera, $n = 110$; camcorder, $n = 92$; DVD player, $n = 84$; monitor, $n = 76$) during May of 2005.

Following Ba and Pavlou (2002), two research assistants inspected the posted descriptions of these products to ensure that they were perfect duplicates to avoid product-related variations within each product category. Auctions with products that did not satisfy these requirements or whose sellers had fewer than five transactions were ignored. For each auction, we collected data on (i) the final auction price (highest winning bid), (ii) the seller's feedback text comments and numerical ratings, (iii) the buyer's experience, and (iv) the number of auction bids.

E-mails were sent to the 1,665 buyers who won these auctions within one week from the time the auction was completed, inviting them to participate in our study. The e-mail explained the study's purpose and asked the buyers to click on a URL link that linked to the survey instrument (Appendix 1). The e-mail mentioned that the results would only be reported in aggregate to ensure the buyers' anonymity. To receive a high response rate, each e-mail was personalized by referring to the product the buyer had recently won. The respondents were also offered a report of the study's results. Following two reminders, a total of 420 responses (25% response rate) were obtained.

Nonresponse bias was assessed by verifying that the respondents' demographics were similar to those of online consumers, and by verifying that the responses of early and late respondents were not significantly different (Armstrong and Overton 1977). Early respondents were those who responded within one week. The two samples were compared based on their demographics (age, gender, annual income, education, Internet experience, and eBay experience). All t-test comparisons between the means of the early and late respondents showed no significant differences, and the demographics were similar to the demographics of online consumers (http://www.survey.net/content0r.html).

3.2. Measure Operationalization

3.2.1. Content Analysis of Feedback Text Comments. Because the study's independent variables (outstanding and abysmal benevolence and credibility comments) are embedded in each seller's qualitative text comments, their quantification was undertaken

Table 3 Buyers' Demographic Characteristics

	Age (years)	Gender	Education Income	Internet experience (years)	eBay experience (years)	(years)
Average (STD)	38.9 (17.1)	49% women	$37K (27K)	15.4 (4.2)	6.1 (1.7)	2.8 (4.5)

with *content analysis. Content analysis* is a popular technique in buyer research (e.g., Kassarjian 1977, Kolbe and Burnett 1991) by transforming the meaning of text comments into objective data using systematic procedures to ensure the objectivity, reproducibility, and reliability of the data analysis (e.g., Berelson 1952, Holsti 1969, Krippendorff 1980, Weber 1990). Feedback text comments were deemed categorical and were classified into five distinct categories:

Outstanding benevolence comments. Feedback text comments were classified as *outstanding benevolence* if they reflected a seller's goodwill intentions, such as genuine interest and responsiveness to the buyer's interests. Outstanding benevolence comments also showed evidence of proactive problem resolution, going beyond the call, and avoiding exploiting buyers' vulnerabilities. Table 4a shows a sample of actual benevolence text comments.

Abysmal benevolence comments. Feedback text comments were classified as *abysmal benevolence* if they reflected evidence of opportunistic behavior and deliberate attempts to exploit buyers, such as fraud, product quality deception, and intentional product misrepresentation. Table 4b shows a sample of such malevolent text comments.

Outstanding credibility comments. Feedback text comments were classified as *outstanding credibility* if they provided evidence of exceptional product fulfillment and excellence in adhering to transactional requirements. Table 4c shows some actual examples of outstanding credibility comments.

Abysmal credibility comments. Feedback text comments were classified as *abysmal credibility* if they showed evidence of unintentional incompetence and lack of reliability, such as extreme delays in product delivery, reneging, and inability to acknowledge contractual requirements. Table 4d presents actual examples of such text comments.

Ordinary comments. Finally, text comments that could not be classified under any of the four categories were classified as *ordinary*. Ordinary text comments could have either a positive or a negative tone, but they did not contain evidence of *outstanding* or *abysmal* benevolence or credibility. Table 4e offers examples of such comments.

Only the feedback text comments of the 420 sellers that could be matched with the buyers' survey responses were quantified with content analysis. The content analysis only examined each seller's first 25 text comments, which is the default number of comments on a single page on eBay's site. First, a pilot coding of the first 50 text comments of a random sample of 20 sellers showed that the first 25 comments roughly contained the same content as 50 comments (in terms of benevolence and credibility comments). This analysis was repeated for the first 100 comments of 10 sellers with similar findings. Moreover, ex ante personal interviews with 12 regular eBay buyers indicated that buyers rarely examine text comments

Table 4a Examples of Outstanding Benevolence Text Comments

1. Seller went above and beyond her duty to help me. She had a solution to every problem! I am indebted to her.
2. Seller went out of his way to proactively accommodate my own bidding error!
3. Seller went above and beyond what was necessary to complete this transaction despite many problems.
4. Seller went the extra distance to resolve several recurring issues with PayPal.
5. Seller was really tolerant and did not take advantage of my bidding error.

Table 4b Examples of Abysmal Benevolence Text Comments

1. Seller collects payment and does not send expensive items. Buyer beware!
2. Product's condition profoundly misrepresented; this is a copied CD, not original; beware!!!
3. Seller took advantage of a problematic camcorder to charge me for unnecessary accessories.
4. Fraud! Seller never shipped the Palm Pilot after receiving my full payment.
5. Seller overcharged me for overnight shipping ($75) because I asked for fast delivery. Shipping cost was only $18!

Table 4c Examples of Outstanding Credibility Text Comments

1. Extremely prompt seller. I was thrilled with the speed of the service I received.
2. Super-fast transaction and delivery. Excellent seller!
3. Outstanding fulfillment and customer service. My best experience on eBay.
4. One of the best sellers on eBay. Super-fast delivery and customer service.
5. Lightning-fast delivery. Got product one day after auction ended!

beyond the first Web page, while none of them ever viewed comments beyond the first two Web pages (50 total responses). Most important, a distinct survey item asked the respondents to indicate how many feedback comments they examined for the seller they purchased from: 81% viewed 25 comments (one Web page), 5% viewed 50 comments, 11% viewed more than 50 comments, and only 3% did not view any text comments. This suggests that the first 25 comments in a seller's feedback profile are likely to provide representative information about each seller, and they are also likely to be viewed and assessed by buyers. This is consistent with the literature that suggests that recent feedback is the most influential (Dellarocas 2003). Despite this sampling scheme, a total of 11,000 feedback comments were coded with content analysis.

3.2.2. Content Analysis Procedure. Following Kolbe and Burnett (1991), three coders (who were unaware of the study's purpose) underwent a training sequence. First, the coders were given many text comments classified under the proposed five categories. Second, the coders were asked to find text comments from eBay's sellers (not from the 420 sellers) that could be classified into the five categories. Third, the coders had a meeting with the authors where the spirit of the comments that should be coded along the five categories was discussed. This meeting also created a reference sheet with

Table 4d Examples of Abysmal Credibility Text Comments

1. Very displeased with such incompetence and negligence.
2. Overnight shipping took two weeks! Useless seller...
3. Product was damaged during shipping because of bad packaging. Inept seller.
4. Seller decided to default auction because she miscalculated products in hand.
5. Extreme delay in shipping; product arrived one month later...

Table 4e Examples of Ordinary Feedback Text Comments

1. Nice seller, great job, A+, great eBayer, no complaints.
2. Very friendly e-mails and communications. Smooth transaction.
3. Very good customer service. Great seller.
4. Nice product, smooth transaction, pleasure to deal with this seller all the time.
5. Slight delivery delay, but overall ok transaction.

examples of text comments. Fourth, each coder analyzed 250 randomly selected text comments for practice. Following this pretest, the coders met with the authors to discuss any coding inconsistencies. This resulted in a comprehensive reference set of text comments that the coders had available during the actual coding procedure. Finally, as part of the actual coding, each coder individually analyzed the first 25 comments for the 420 sellers, and classified these comments under the five categories. To ensure that the coders were not biased by a seller's entire set of 25 comments, all text comments were pooled and given to the three coders in random order. To prevent any ordering bias, each coder received a different randomized order. To ensure an independent coding and a credible interrater reliability score, the coders did not communicate during the actual coding procedure. Overall, each coder analyzed more than 11,000 text comments (including an additional 10% duplicate comments for calculating Holsti's 1969 intracoder reliability) during a two-week period (1,000 text comments per day).

To test the objectivity, reproducibility, and reliability of the content analysis, three reliability scores were calculated for each of the proposed five categories (Table 5). First, we used Krippendorff's (1980) alpha, which is deemed the most relevant measure of agreement among multiple coders. Second, Perrault and Leigh's (1989) reliability index was calculated, in which the authors independently evaluated a sample of the text comments and compared their results with those of the coders. Third, Holsti's (1969) intracoder reliability score was calculated, in which the coders were asked to code a random 10% sample of the comments twice (without being aware of the duplicate comments). Reliability was calculated for the 10% duplicate text comments.

As shown in Table 5, the three reliability coefficients exceeded the acceptable values for all five categories.

Table 5 Content Analysis Reliability Scores for Each of the Proposed Categories

Text comments	Krippendorff's (1980) alpha	Reliability index	Holsti's intracoder reliability
Outstanding benevolence	0.82	0.91	0.95
Abysmal benevolence	0.81	0.89	0.94
Outstanding credibility	0.80	0.86	0.90
Abysmal credibility	0.80	0.85	0.88
Ordinary comments	0.90	0.95	0.97

First, all elements in the first column exceeded Krippendorff's (1980) suggested value of 0.70, implying adequate reliability. Second, the values in the second column also exceeded Perreault and Leigh's recommendation of 0.80. Third, the scores in the third column are all above 0.90, exceeding Kassarjian's (1977) minimum values. As Kolbe and Burnett (1991, p. 248) argue, "interjudge reliability is often perceived as the standard measure of research quality. High levels of disagreement among judges suggest weaknesses in research methods, including the possibility of poor operational definitions, categories, and judge training." Because all three reliability scores well exceeded the recommended values, the coding scheme is deemed reliable and the results support the five proposed categories.

Table 6 provides evidence on the frequency of the text comments that were classified into each category. Since positive ratings are not necessarily accompanied by outstanding text comments, only 20% of the positive ratings were classified as outstanding. Of those, one-third (7.2%) was deemed outstanding benevolence, and two-thirds (12.65%) as outstanding credibility. In contrast, 97% of the negative ratings were classified as either abysmal benevolence or credibility. This is justifiable since negative ratings are rare (Resnick and Zeckhauser 2002), and eBay encourages buyers to resolve problems before posting negative feedback. Buyers thus post a negative rating to denote evidence of abysmal benevolence or credibility. Of the abysmal text comments, about one-quarter was classified as abysmal benevolence (0.34% of total), and the rest as abysmal credibility (or 1.03% of all feedback).

Benevolence and credibility text comments are *not* mutually exclusive since both the outstanding ($r = 0.34$) and the abysmal ($r = 0.42$) comments are correlated. All outstanding text comments followed a *unimodal* distribution, suggesting no distinct types of sellers with either multiple or no outstanding comments (bimodal distribution).

These statistics suggest that buyers mostly give abysmal comments to accompany their negative ratings, but only a small fraction (about 20%) of the positive ratings is associated with an outstanding text comment. Therefore, 80% of the text comments were classified as ordinary with virtually all of them (97%) having a positive connotation.

Having classified all text comments in five categories, they were linked back to each of the 420 sellers, which in turn were matched with the survey responses of the 420 buyers they recently transacted with these 420 sellers.

Numerical ratings. Positive ratings measure the number of each seller's positive (+1) ratings, while negative ratings measure each seller's negative (−1) ratings. Given the distribution of positive and negative ratings, the natural logarithm has been used to normalize their distribution (Ba and Pavlou 2002). Numerical ratings were collected for only the 420 sellers whose buyers responded to our survey, and they reflect the seller's *lifetime* feedback ratings. Also, we tested the impact of more recent (past month, past six months, and past 12 months) ratings. However, because none of these samples had a significant role when the lifetime numerical ratings were included, they were omitted. Finally, we included the 25 most-recent numerical ratings of these sellers that accompany the seller's 25 comments.

Price premium. Following Ba and Pavlou (2002), a measure of price premium for each seller was calculated by subtracting the mean price (for each product) from the final price of the product paid by the buyer,

Table 6 Descriptive Statistics of Feedback Text Comments

	Outstanding benevolence	Abysmal benevolence	Outstanding credibility	Abysmal credibility	Ordinary	Positive ratings	Negative ratings	Neutral ratings
Feedback (%)	7.25	0.34	12.65	1.03	78.73	98.55	1.42	0.03

divided by the product's mean price. The mean price was calculated for both the entire ($n = 1{,}665$) and the respondents' sample ($n = 420$). The mean prices for each product were *not* statistically different between the two samples, implying that the respondents were not biased in terms of the prices they paid. The mean of the *entire* sample was selected.

Product price. Product price was measured as each product's mean price across all auctions in our sample (iPod $144; DVDs $21; CDs $8; Palm Pilot $172; camera $211; camcorder $451; DVD player $281 monitor $371).

3.2.3. Survey Measurement Items. A survey measurement instrument was developed and distributed to the buyers who had recently purchased a product from one of the 420 sellers. Buyers were asked to rate their trust beliefs in the seller's benevolence and credibility, trust propensity, and transaction experience. All measurement items were based on existing scales (Appendix 1). The survey instrument was pilot tested for appropriateness and clarity with 12 eBay buyers. All survey items were measured on Likert-type scales anchored at (1) = strongly disagree, (4) = neutral, and (7) = strongly agree.

Benevolence. Buyer's trust in a seller's benevolence was measured using a five-item scale adapted from Gefen (2002) and Pavlou (2002). The reliability of the benevolence scale was 0.90.[4]

Credibility. Buyer's trust in the seller's credibility was measured with a four-item scale based on Ba and Pavlou (2002) and Gefen (2002). The reliability of the credibility scale was 0.93.

Trust propensity. This construct was measured based on Gefen (2000). The scale's reliability was 0.94.

Past experience with seller. A binary survey item asked buyers whether they had previously transacted with the seller they recently purchased the product from, following Pavlou and Gefen (2004). Only 7% of the buyers reported having bought from the same seller before, confirming Resnick and Zeckhauser's (2002) findings.

[4] Reliability is measured with the internal consistency coefficient of partial least squares (PLS) given by $(\sum \lambda_i)^2/[(\sum \lambda_i)^2 + \Sigma_i * \mathrm{Var}(\varepsilon_i)]$, where ε_i is the component loading to an indicator and $\mathrm{Var}(\varepsilon_i) = 1 - \lambda i^2$.

Past experience with marketplace (*past transactions*). The number of past transactions was *objectively* collected from eBay's auctions with secondary data that reported the number of each buyer's past transactions.

4. Results

Data analysis was conducted with partial least square (PLS), which is best suited for complex models by placing minimal demands on sample size and residual distributions (Chin et al. 2003). PLS was chosen to manage the study's secondary data (single-item variables that do not follow the normal distribution) and interaction effects.

4.1. Measurement Model

Table 7 reports the correlation matrix, the AVEs, and the descriptive statistics of the principal constructs. Convergent and discriminant validity is inferred when (a) the square root of each construct is larger than its correlations with other constructs (the AVE shared between the construct and its indicators is larger than the AVE shared between the construct and other items) and (b) the PLS indicators load much higher on their hypothesized construct than on other constructs (own-loadings are higher than cross-loadings). As shown in Table 7, the square roots of the AVE were all above 0.80, which is larger than all other cross-correlations, indicating that the variance explained by each construct is much larger than the measurement error variance. Confirmatory factor analysis was also conducted (Agarwal and Karahanna 2000). As shown in Appendix 2, all items load on their own constructs. These two tests validate the measurement properties of the study's principal constructs.

Common method bias was assessed with several tests (Podsakoff et al. 2003): First, it was assessed with *Harman's one-factor test*, in which a factor analysis showed that all constructs explain roughly equal variance (Appendix 2), inferring no common method bias. Second, a *partial correlation method* (Podsakoff and Organ 1986) was used, in which the highest variable from the factor analysis was entered as an additional independent variable. This variable did not create a significant change in the variance explained in the dependent variables. Finally, the study uses a combination of secondary and primary data. In sum, these tests suggest lack of common method bias.

Table 7 Correlation Matrix, AVEs, and Descriptive Statistics of Principal Constructs

	Mean (STD)	PP	BEN	CRED	O-B	A-B	O-C	A-C	ORD	(+)	(−)
Price premiums (PP)	0.0 (0.66)	**1.0**	0.51**	0.37**	0.30**	−0.28**	0.25**	−0.26**	0.18**	0.22**	−0.29**
Benevolence (BEN)	4.8 (2.3)		**0.93**	0.46**	0.52**	−0.60**	0.41**	−0.33**	0.14*	0.13*	−0.17**
Credibility (CRED)	5.2 (2.0)			**0.94**	0.24*	−0.29**	0.39**	−0.46**	0.21**	0.24**	−0.43**
Outstanding benevolence (O-B)	1.7 (1.4)				**0.94**	−0.10*	0.34**	−0.06	0.04	0.29**	−0.11*
Abysmal benevolence (A-B)	0.1 (0.3)					**0.92**	−0.08	0.42**	−0.05	−0.11*	0.53**
Outstanding credibility (O-C)	3.1 (2.0)						**0.88**	−0.16**	−0.09	0.45**	−0.16**
Abysmal credibility (A-C)	0.3 (0.5)							**0.88**	−0.06	−0.11	0.63**
Ordinary comments (ORD)	19.8 (4.1)								**0.96**	0.77**	−0.14*
Positive ratings (+)	7.2 (9.2)									**1.0**	0.25**
Negative ratings (−)	2.1 (1.1)										**1.0**

Notes. Average variance explained (AVE) values are shown in the matrix diagonal; *significant at $p < 0.05$ level; **significant at $p < 0.01$ level.

4.2. Structural Models and Hypotheses Testing

The structural model was tested with PLS. To account for heteroskedasticity and error in variance, all items were standardized. The interaction effects were computed by cross-multiplying each construct's standardized items (Chin et al. 2003). Multicollinearity among the independent variables was not a serious concern for this study since all relevant checks (e.g., eigenanalysis, tolerance values, and variance inflation factors (VIF) did not show such evidence of multicollinearity. Only significant relationships and control effects are shown in Figure 2 for clarity and ease of exposition.

As Figure 2 shows, a buyer's trust in the seller's benevolence ($b = 0.41$, $p < 0.01$) and credibility ($b = 0.30$, $p < 0.01$) have a significant impact on price premiums, controlling for the control effects of auction bids and product price ($\Delta R^2 = 0.054$ for benevolence; $\Delta R^2 = 0.048$ for credibility),[5] and the impact of numerical ratings and past experience. These findings validate H1 and H2 and confirm the economic value of benevolence and credibility. Interestingly, benevolence ($b = 0.41$) had a stronger impact on price premiums compared to credibility ($b = 0.30$), ($t = 11.3$, $p < 0.001$).[6]

In terms of a buyer's trust in the seller's benevolence, outstanding benevolence comments ($b = 0.34$, $p < 0.01$) and abysmal benevolence comments ($b = -0.41$, $p < 0.01$) are significant predictors, supporting H3A and H3B. In terms of credibility, outstanding ($b = 0.26$, $p < 0.01$) and abysmal ($b = -0.32$, $p < 0.01$) credibility text comments have a significant effect on a buyer's trust in a seller's credibility, supporting H4A and H4B. These hypotheses are supported despite the control effects of numerical ratings, past experience, trust propensity, and ordinary text comments.[7]

While positive and negative ratings have a significant impact on credibility, they do *not* influence benevolence. This can be explained by the fact that credibility may *also* be built based on a history of completed transactions, which the seller's lifetime numerical ratings convey (evidence of effectively or ineffectively completed transactions). Thus, the seller's transaction history in terms of numerical ratings does not offer evidence of a seller's benevolence.

Besides *lifetime* numerical ratings, we also assessed the role of each seller's most recent 25 numerical ratings. These 25 ratings had a negligible impact on trust,

[5] The tests for the significance of the moderated control effects followed Carte and Russell's (2003, p. 481) F-statistic:

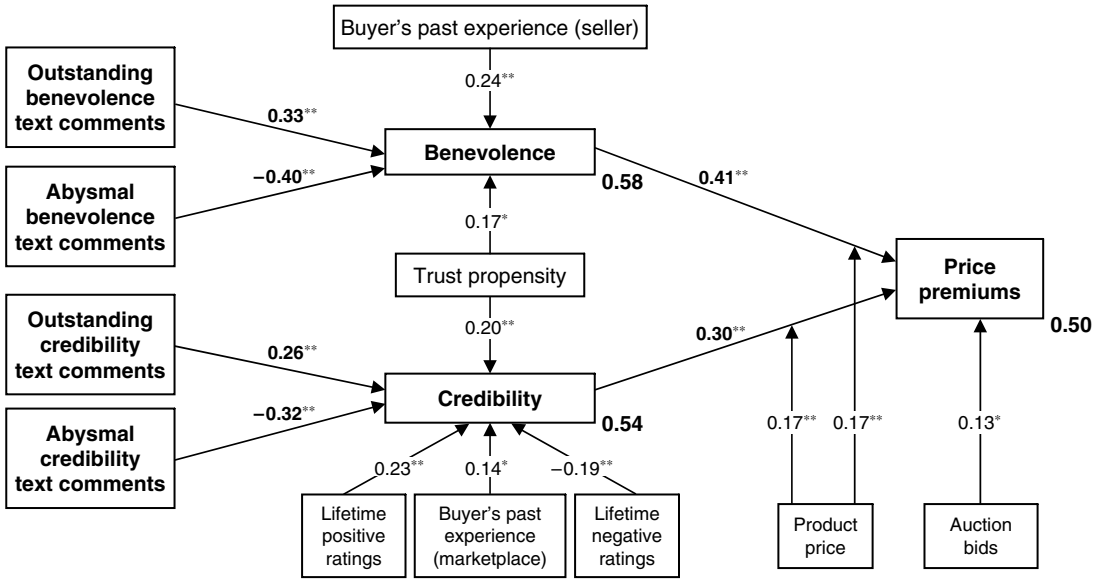
$$F(df_{\text{interaction}} - df_{\text{main}}, N - df_{\text{interaction}} - 1) = [\Delta R^2/(df_{\text{interaction}} - df_{\text{main}})]/[(1 - R^2_{\text{interaction}})/(N - df_{\text{interaction}} - 1)].$$

The F-statistic ($p < 0.05$) showed that the variance explained due to the moderated effects is significant beyond the main effects.

[6] To test the statistical difference between the two models, the PLS path coefficients were compared using Chin's (2003) equation, which is an adaptation of the traditional t-test for comparing regression coefficients between independent samples.

[7] Consistent with the study's conceptualization, the control effect of ordinary text comments was treated as a unitary variable. The analysis was replicated by distinguishing between ordinary text comments with a positive and a negative connotation. Because 97% of the ordinary text comments had a positive connotation, the ordinary text comments with a positive connotation had identical results to those of the original variable, and therefore did not have a significant control effect. Similarly, the 3% of the ordinary comments that had a negative connotation did not have a significant control effect on any dependent variable.

Figure 2 PLS Results for the Proposed Conceptual Model



Notes. Only significant relationships are shown. Variance explained shown next to each construct.
*Significant at $p < 0.05$.
**Significant at $p < 0.01$.

implying that their corresponding 25 text comments already provided all meaningful information about the seller. Extrapolating from this finding, if we were able to quantify all of a seller's *lifetime* text comments, perhaps the lifetime numerical ratings would also have a negligible effect.

4.3. A Direct Model

To overcome the subjective assessment of buyer's trust in a seller's benevolence and credibility with primary data, an alternative (direct) model was tested with only secondary data (numerical ratings and text comments) (Figure 3).

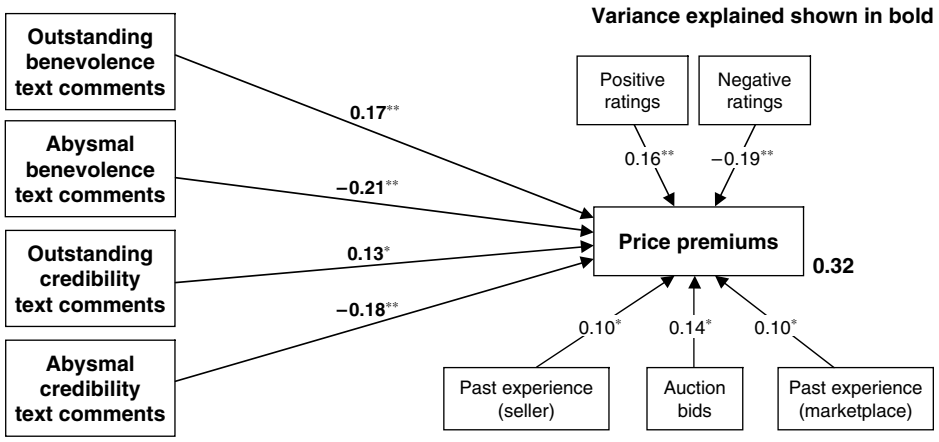
While the results confirm the significant role of feedback text comments and numerical ratings, the variance explained ($R^2 = 32\%$) is significantly lower than the full model ($R^2 = 50\%$). To test the mediating role of a buyer's trust in the seller's benevolence and credibility, we used Baron and Kenny's (1986) test for mediation (omitted for brevity). The results suggest that the impact of text comments becomes insignificant when the two trust dimensions are included in the full model, confirming the *full* mediating role of a buyer's trust in the seller's benevolence and credibility.

4.4. Nonlinear and Interaction Effects[8]

In addition to the proposed *linear* effects, we also examined potential nonlinear and interaction effects between the numerical ratings and text comments. First, since a single or a few extraordinary text comments may not have a significant impact on trust beliefs compared to a seller with multiple extraordinary text comments, we examined quadratic (X^2) effects of the feedback text comments (controlling for the existing independent effects). As shown in Table 8, all quadratic effects have a directional ($p < 0.10$), yet no statistically significant effect ($p < 0.05$). This is because there are only a few extraordinary text comments for each seller to take advantage of the cumulative effects of multiple comments. In practice, sellers rarely have many negative comments, because such sellers tend to change their identity (Friedman and Resnick 2001). Also, Cabral and Hortaçsu (2006) show that, while the impact of the first negative comment on sales is harmful, the impact of the second negative one is less influential, and the third one is insignificant, suggesting that there are diminishing returns to many abysmal text comments.

[8] We are indebted to anonymous Reviewer 2 for suggesting the possibility for nonlinear and interaction effects.

Figure 3 A Competing (Direct) Model for Predicting Price Premiums



*Significant at $p < 0.05$.
**Significant at $p < 0.01$.

Second, we examined *interaction effects* between feedback text comments and positive ratings, aiming to test whether sellers with many positive or negative ratings are less likely to be affected by extraordinary text comments. For example, experienced sellers with numerous positive ratings may not need outstanding text comments to earn their buyers' trust. Also, an abysmal comment may be too destructive for sellers with only a few positive ratings.

However, the data did not identify any significant interaction effects. The most obvious reason is that interaction effects are difficult to detect in the presence of many existing significant independent variables. Also, the fact that a seller has a long history of positive ratings only says that transactions have been ordinarily fulfilled, saying little about the seller's goodwill activities and excellence in product fulfillment. Also, Resnick et al. (2006) experimentally showed that, even for relatively new sellers, one or two abysmal feedback comments did not severely affect auction prices.

Table 8 Quadratic Effects of Extraordinary Text Comments on Trust Beliefs

Independent quadratic effect	Dependent variable	PLS path coefficient	*p*-value	Significance
(Outstanding benevolence comments)^2	Benevolence	0.11	0.078	$p < 0.10$
(Abysmal benevolence comments)^2	Benevolence	−0.09	0.083	$p < 0.10$
(Outstanding credibility comments)^2	Credibility	0.13	0.064	$p < 0.10$
(Abysmal credibility comments)^2	Credibility	−0.08	0.087	$p < 0.10$

5. Discussion

5.1. Key Findings and Contributions

This study conceptualizes, operationalizes, and validates the nature and role of feedback text comments as a means for building trust, shaping price premiums, and differentiating among sellers in online auction marketplaces. To the best of our knowledge, this is the first study to examine the nature and role of feedback text comments. The results showed that virtually all (97%) of the study's buyers reported having assessed the sellers' text comments before transacting with them. This is consistent with the literature that argues that buyers assess all available information to form their trust beliefs and transaction behavior (Pavlou et al. 2007). The study proposed five theory-driven categories of text comments that help build a buyer's trust in a seller's credibility and benevolence. Notably, feedback text comments had a greater impact on a seller's credibility and benevolence than did crude numerical ratings. This study also delineated the process by which feedback mechanisms shape price premiums through the full mediating role of trust, thereby enhancing the descriptive power of a model that links feedback with price premiums. Besides credibility (Ba and Pavlou 2002), benevolence is validated as another missing link in the process

by which feedback shapes price premiums. Interestingly, while the literature has primarily focused on credibility, this study shows that benevolence is a more influential predictor of price premiums than is credibility by contributing an extra 23% in variance explained. Otherwise, the existing variables would explain 27% of the variance in price premiums, consistent with the literature. Taken together, an integrated model with text comments and two trust dimensions helps explain a substantially higher variance in price premiums ($R^2 = 50\%$) compared to prior studies (R^2 =20%–30%).

From a methodological perspective, a key empirical contribution is the large-scale content analysis to quantify the meaning of over 10,000 text comments. The use of publicly available secondary data increases the study's realism while overcoming concerns for common method bias since the study's constructs are separately measured from three distinct sources. Having a combination of quantitative and qualitative data from various sources enhances the robustness of the study's data and renders confidence in the study's results (Mingers 2001).

5.2. Implications for Theory and Research

5.2.1. Implications for Understanding the Success of Online Marketplaces. To prevent a market of lemon sellers (Akerlof 1970), online marketplaces must differentiate among sellers and reward high-quality sellers with price premiums as returns to their superior reputation. Because feedback text comments have a greater potential than do crude numerical ratings to differentiate among sellers on the basis of building trust, they have implications for explaining the success of online marketplaces to facilitate transactions among strangers. While the value of feedback mechanisms has been largely attributed to their crude numerical ratings, this study suggests that buyers read and take into consideration feedback text comments to compensate for the inability of numerical ratings to offer detailed information about the seller's past transactions. Thus, this study helps identify the *true* reason for the success of feedback mechanisms to achieve seller differentiation in online marketplaces.

5.2.2. Implications for the Design of Feedback Mechanisms. By differentiating between credibility and benevolence, this study shows that feedback mechanisms can deal with both adverse selection (identifying credible sellers) and moral hazard (transacting with benevolent sellers). Since both credibility and benevolence are important in differentiating among sellers, this study suggests that the optimal design of feedback mechanisms must address both adverse selection and moral hazard concerns. By theorizing and empirically showing that credibility and benevolence are distinct constructs that are shaped by different antecedents, this study confirms the notion that mitigating adverse selection is distinct from addressing moral hazard (Dellarocas 2005a). The demonstration of the dual role of feedback mechanisms helps integrate the emerging literature on the optimal design of feedback mechanisms with the well-established trust-building literature.

This study shows that crude numerical ratings offer little information value when text comments are present. However, given the search costs associated with reading and assessing the meaning of text comments, buyers still rely on crude numerical ratings to form their trust beliefs and differentiate among sellers. Had it been possible to quantify and concisely summarize all text comments, perhaps crude numerical ratings would become redundant.

Despite the distinction between numerical ratings and text comments, it is important to reiterate that these two types of feedback are not mutually exclusive, but that they complement each other to offer buyers relevant information to help them differentiate among sellers. Each type has its advantages and disadvantages. While text comments are useful in offering rich information about a seller's most-recent transactions, they cannot be easily read and quantified to concisely capture *all* a seller's previous transactions. In contrast, numerical ratings can be easily read to describe the seller's entire transaction history, but they cannot offer fine-grained information about a seller. Hence, with the current design of feedback mechanisms, text comments and numerical ratings are both valuable.

5.2.3. Implications for the Trust Literature. This study contributes to the emerging literature on understanding the trust-building potential of *text* arguments. However, while this literature has primarily focused on text arguments created by commercial entities that

are intentionally generated to engender trust (e.g., Kim and Benbasat 2003, Lim et al. 2007), this study shows that trust can also be built based on text comments left by neutral parties whose goal is not necessarily to build trust.

For the trust literature, a key finding is the existence and role of benevolence in impersonal environments, which challenges the assumption that benevolence requires familiarity (Lewicki and Bunker 1995, Sitkin and Roth 1993). Even accounting for the modest impact of the buyer's trust propensity and past experience with the same seller (familiarity), a buyer's trust in a seller's benevolence is primarily built through text comments given by third parties who are unrelated to the dyadic buyer-seller relationship. By conveying rich information about a seller's past activities, text comments form and transfer a collectively held belief that helps build benevolence in impersonal environments.

While both benevolence and credibility are significant predictors of price premiums, a key finding is the stronger impact of benevolence. This finding can be explained in three ways: First, the literature suggests that benevolence is the most influential form of trust (Lewicki and Bunker 1995, Sitkin and Roth 1993). Second, commitment to goodwill behavior is more difficult to undertake than to excel in credibly fulfilling transactions, as this study attests. Hence, benevolence is more likely to differentiate among sellers, and thus have a greater impact on price premiums. Third, Dellarocas (2005b) argues that the simple fulfillment procedure in online marketplaces makes it difficult for sellers to differentiate on the basis of credibility (adverse selection). Therefore, sellers are more likely to differentiate on the basis of their benevolence by reducing moral hazard. Still, the study shows that buyers do differentiate among sellers on the basis of credibility, and stresses the importance of both dimensions of trust to differentiate among sellers.

In terms of the trust-building potenstial of feedback mechanisms, it is notable that numerical ratings have only a weak effect on credibility and an insignificant effect on benevolence. On the other hand, feedback text comments have a significant effect on both dimensions of trust. This is also because sellers have recognized the value of collecting positive ratings and avoiding negative ratings, and have established such homogenous reputations. Recognizing this seller homogeneity in terms of positive and negative ratings, buyers are less likely to focus on numerical ratings in forming their trust beliefs, and to seek seller heterogeneity in feedback text comments.

Following the economics literature, sellers can be viewed as Stackelberg types that always pursue a certain long-term strategy (Dellarocas 2003). Accordingly, benevolent sellers are committed to a goodwill strategy, and *credible* sellers pursue a strategy of fulfillment excellence. In spite of these two mutually exclusive strategies, it is possible for sellers to simultaneously have several outstanding benevolence and credibility text comments, and for buyers to simultaneously have trust in a seller's benevolence and credibility. The results show that both benevolence and credibility text comments follow a unimodal distribution, implying that sellers may have different degrees of effectiveness in executing their Stackelberg type, and buyers may not perceive seller types exactly as the sellers intended them to. These findings have implications for how buyers perceive Stackelberg types and form their trust beliefs, thereby integrating the economics with the trust literatures to understand trust building in online marketplaces.

5.3. Implications for Practice

Because numerical ratings do not convey much information beyond text comments, feedback forum designers could attempt to either codify and summarize all of the sellers' text comments, or enable buyers to report their past experiences in terms of meaningful and quantifiable categories. For example, buyers can be asked to rate their past experiences along the study's proposed categories, similar to how Yahoo! Movies (http://movies.yahoo.com) solicits movie reviews along specific dimensions. Moreover, the identified path coefficients of each category (Figures 2 and 3) can be used to weigh the impact of each category in terms of creating a meaningful summary score for each seller. The recency of the text comments can also be weighed. Having such a summary score would reduce the buyer's high search costs in terms reading multiple text comments from many potential sellers, and facilitate more transactions by allowing buyers to quickly screen out opportunistic or incompetent sellers.

Second, because text comments have an impact on prices, sellers must strive to entice outstanding text comments to build a reputation for benevolence and credibility. Also, since both dimensions of trust become more influential on price premiums for more expensive products, sellers of high-priced goods should focus on building their reputation. For example, the comments shown in Tables 4a and 4c serve as prominent examples of outstanding behavior. Sellers also should avoid receiving abysmal text comments (Tables 4b and 4d). Therefore, sellers must look beyond numerical ratings and focus on obtaining extraordinary feedback text comments.

5.4. Limitations and Suggestions for Future Research

Since seller heterogeneity is partly explained by text comments, future research in online marketplaces and feedback mechanisms could examine text comments. Some opportunities for future research include the following: First, despite the objective assessment of text comments with content analysis with high intercoder reliabilities, text comments are subject to buyers' personal assessment in terms of shaping their trust beliefs and price premiums. The coders' assessment of text comments is thus not necessarily the same as those of buyers in online marketplaces. This is why each buyer's *self-assessed* credibility and benevolence beliefs *fully* mediate the impact of text comments (Figure 2), whereas the objective analysis of text comments by independent coders has a direct effect on price premiums (Figure 3). Future research could try to quantify how extraordinary text comments spawn a surprise element in buyers, and attempt to standardize the process by which text comments can be classified into the proposed five categories. Future research could also attempt to enhance intercoder reliability and reduce coding inconsistencies across coders.

Second, even if eBay has 90% of the online auction market share, the generalizability of the study's findings must be tested in other online marketplaces. Specifically, eBay's crude numerical ratings may force buyers to resort to text comments to get richer information about sellers. While this does not negate the trust-building potential of feedback text comments, their relative impact may have been lower if a more granular means for representing numerical ratings was available, such as the ones in Yahoo! Movies. Future research could examine other types of feedback mechanisms in other online marketplaces with various variations of text comments and numerical ratings.

Third, it is clearly difficult for buyers to read and assess the meaning of many text comments for multiple sellers (compared to ratings that are concisely summarized). Even if virtually all (97%) buyers read text comments before transacting with sellers, the high search costs may impede buyers from assessing many sellers, thereby reducing the availability of sellers and the degree of competitiveness in the marketplace. Similar to our content analysis that succinctly extracted the content of text comments, future research may build an automated tool to efficiently perform content analysis of text comments to give an objective weighted summary score. Data mining techniques could help future research to efficiently extract the content of text comments (e.g., Ghose et al. 2005).

Fourth, in addition to specifying the theory-driven categories of text comments based on the notion that sellers have evidence of engaging in *extraordinary* activities, almost 80% of the text comments were classified as *ordinary*. Other factors could be hidden in these ordinary comments that could be relevant for online auction marketplaces (Ghose et al. 2006). Because 97% of the negative ratings were categorized as either abysmal benevolence or credibility, most ordinary text comments have a positive connotation. Future research could uncover other factors beyond benevolence and credibility comments that could better predict price premiums.

Fifth, for sellers, the cost of accumulating outstanding text comments has not been explicitly accounted for. There is a trade-off between gaining a price premium by being committed to goodwill or credible behavior and the cost of such behavior. There are two potential answers for sellers: either pursue a Stackelberg strategy by incurring the costs needed to fully satisfy buyers in order to enjoy future returns from a superior reputation of benevolence or credibility, or differentiate between price-sensitive buyers and those sensitive to goodwill behavior or fulfillment excellence. Future research could obtain the optimum level of long-term commitment to benevolence and credibility that maxi-

mizes price premiums, given the relative cost of each strategy.

Sixth, since posting feedback is voluntary, slightly more than half of eBay buyers leave feedback (Steiner 2003). Therefore, since *not* all seller activities are documented, text comments (similar to numerical ratings) may mostly reflect evidence from either extremely pleased or extremely disgruntled buyers. Even if this may be the case, this should not raise any concerns about a systematic bias to our results in either direction. What this study analyzes is the feedback text comments that the buyer reads, even if they only reflect a truncated sample of a seller's past transactions. Nonetheless, future research could attempt to solicit feedback from the remaining half of the buyers (those who do not regularly leave feedback) to examine potential differences.

Seventh, despite our attempts to uncover nonlinear relationships between text comments and trust beliefs (§4.4) in an exploratory fashion, only linear relationships were statistically shown, due to the small number of outstanding text comments in each category and the large number of independent effects given the sample size that made it difficult to uncover nonlinear effects. Given the directional support for some nonlinear (quadratic) effects (Table 8), future research could undertake a theory-driven examination of nonlinear effects and a confirmatory empirical analysis with a larger sample size.

Finally, the products in our sample are new technology products (electronics, music, and movies). Even if our focus is on product fulfillment differences across sellers (not product characteristics), more uncertain products (e.g., used, experience) may have rendered different results. Future research could test different types of products.

6. Conclusion

Since feedback text comments are an inseparable component of online feedback mechanisms, their analysis is a necessary complement to the emerging literature on feedback mechanisms in online auction marketplaces. Because text comments explain a larger degree of seller heterogeneity than crude numerical ratings, they represent an imperative aspect of the value of feedback mechanisms to facilitate effective online marketplaces by building buyers' trust and shaping price premiums for trustworthy sellers. The study also explains the role of feedback text comments in terms of identifying sellers who are committed to credible and benevolent strategy (Stackelberg types). In doing so, it integrates the economics and trust literatures to specify the dual role of feedback text comments in both mitigating adverse selection and moral hazard by building trust in a seller's credibility and benevolence, respectively. Finally, by quantifying text comments into meaningful categories by building on the trust literature, this study aims to provide a blueprint for analyzing the nature and role text comments in other research contexts.

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Appendix 1. Survey Measurement Items

Buyer's trust in seller's benevolence (Gefen 2002, Pavlou 2002)

1. This seller is likely to care for my welfare.
2. If there is a problem with my transaction, this seller will go out on a limb for me.
3. This seller is likely to make sacrifices for me if needed.
4. This seller is unlikely to act opportunistically, even given the chance.
5. This seller is likely to keep my best interests in mind.

Buyer's trust in seller's credibility (Ba and Pavlou 2002, Gefen 2002)

1. I believe this seller will deliver to me a product that matches the posted description.
2. I believe this seller will deliver to me a product according to the posted delivery terms and conditions.
3. This seller is likely to be honest.
4. This seller is likely to be reliable.
5. This seller is likely to be credible.

Buyer's trust propensity (Gefen et al. 2003)

1. I usually trust sellers unless they give me a reason not to trust them.
2. I generally give sellers the benefit of the doubt.
3. My typical approach is to trust sellers until they prove I should not trust them.

Buyer's past experience with seller (Pavlou and Gefen 2004)

Prior to the last transaction, did you transact with this seller in the past? (Yes/No)

Number of feedback comments examined

Prior to bidding at this seller's auction, how many feedback comments have you examined? [none; 25(1 page); 50(2 pages); more than 50]

Appendix 2. PLS Confirmatory Factor Analysis for the Study's Principal Constructs

	P-P	BEN	CRED	O-BEN	A-BEN	O-CRED	A-CRED	ORD	T-P	PE(S)	PE(M)
Price premium	**1.0**	0.41	0.35	0.31	−0.32	0.26	−0.25	0.20	0.21	0.28	0.23
Benevolence 1	0.48	**0.90**	0.44	0.51	−0.55	0.40	−0.33	0.12	0.24	0.33	0.27
Benevolence 2	0.43	**0.87**	0.42	0.51	−0.59	0.42	−0.34	0.13	0.30	0.29	0.26
Benevolence 3	0.45	**0.91**	0.47	0.48	−0.60	0.39	−0.40	0.17	0.24	0.37	0.30
Benevolence 4	0.41	**0.88**	0.41	0.53	−0.61	0.35	−0.41	0.19	0.29	0.33	0.29
Benevolence 5	0.47	**0.89**	0.44	0.46	−0.62	0.34	−0.51	0.16	0.25	0.35	0.27
Credibility 1	0.38	0.46	**0.95**	0.29	−0.30	0.44	−0.48	0.19	0.25	0.30	0.31
Credibility 2	0.34	0.43	**0.94**	0.26	−0.26	0.47	−0.50	0.23	0.20	0.32	0.35
Credibility 3	0.39	0.51	**0.92**	0.32	−0.34	0.43	−0.49	0.26	0.24	0.29	0.40
Credibility 4	0.36	0.47	**0.91**	0.28	−0.25	0.49	−0.45	0.22	0.30	0.33	0.36
Outstanding benevolence comments 1	0.29	0.49	0.39	**0.85**	−0.18	0.35	−0.04	0.25	0.10	0.09	0.09
Outstanding benevolence comments 2	0.31	0.52	0.31	**0.81**	−0.13	0.33	−0.05	0.21	0.07	0.03	0.11
Outstanding benevolence comments 3	0.37	0.50	0.36	**0.86**	−0.10	0.40	−0.06	0.23	0.08	0.06	0.08
Abysmal benevolence comments 1	0.33	−0.57	−0.44	−0.26	**0.80**	−0.09	0.45	−0.04	−0.05	0.09	−0.03
Abysmal benevolence comments 2	0.29	−0.58	−0.29	−0.30	**0.81**	−0.05	0.46	−0.05	0.08	0.00	−0.06
Abysmal benevolence comments 3	0.28	−0.53	−0.38	−0.25	**0.86**	−0.08	0.43	−0.04	0.05	−0.02	0.03
Outstanding credibility comments 1	0.28	0.43	0.32	0.44	−0.09	**0.86**	−0.20	0.05	0.04	0.04	0.06
Outstanding credibility comments 2	0.29	0.35	0.33	0.34	−0.03	**0.88**	−0.16	0.09	0.09	−0.01	0.10
Outstanding credibility comments 3	0.22	0.40	0.35	0.36	−0.07	**0.83**	−0.18	0.06	0.07	0.06	0.11
Abysmal credibility comments 1	0.26	−0.42	−0.38	−0.09	0.38	−0.21	**0.89**	−0.08	0.01	0.02	−0.01
Abysmal credibility comments 2	0.29	−0.39	−0.41	−0.15	0.45	−0.18	**0.90**	−0.07	−0.04	−0.01	−0.04
Abysmal credibility comments 3	0.23	−0.37	−0.44	−0.13	0.42	−0.19	**0.82**	−0.04	0.02	0.07	0.06
Ordinary comments 1	0.21	0.18	0.24	0.21	−0.09	0.10	−0.06	**0.95**	−0.08	0.09	0.01
Ordinary comments 2	0.15	0.13	0.27	0.25	−0.03	0.16	−0.03	**0.93**	0.04	0.04	0.04
Ordinary comments 3	0.18	0.13	0.24	0.18	−0.02	0.05	−0.08	**0.91**	0.07	0.03	0.02
Trust propensity 1	0.19	0.25	0.29	0.11	0.10	0.05	−0.06	−0.01	**0.95**	0.24	0.30
Trust propensity 2	0.18	0.30	0.33	0.10	−0.06	0.09	0.04	0.06	**0.93**	0.26	0.33
Trust Propensity 3	0.16	0.32	0.36	0.09	−0.04	0.10	−0.03	0.08	**0.91**	0.30	0.35
Past experience (seller)	0.29	0.34	0.32	0.06	0.03	0.03	−0.01	−0.07	0.25	**1.0**	0.48
Past experience (marketplace)	0.19	0.24	0.38	0.10	−0.08	0.01	0.04	0.04	0.33	0.44	**1.0**
Variance explained (83.1%)	**8.0**	**10.3**	**9.8**	**7.2**	**6.2**	**6.6**	**7.0**	**9.2**	**7.7**	**6.0**	**5.1**

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