An Exploratory Look at Early Online Auction Decisions: Extending Signal Theory

John R. Drake[1], Dianne J. Hall[2], Casey Cegielski[3], and Terry Anthony Byrd[4]

[1] East Carolina University, Department of Management Information Systems, Greenville, NC, USA,
drakejo@ecu.edu
Auburn University, Department of Information Systems and Supply Chain Management, Auburn, AL, USA,
[2]halldia@auburn.edu, [3]cegieca@auburn.edu, [4]byrdter@auburn.edu

Abstract

Extant literature in decision theory suggests that online auction buyers depend on signals for mitigating uncertainty that influence bidder behavior at multiple points. However, the depth and breadth of the use of signals has only been partially explored. Using data from 242 online auction users, we show that eight emergent factors influence decisions of auction selection and initial bid in different ways. We further find that two ethical perspectives impact the evaluation of seller uncertainty in unique ways, although neither perspective predominates within our sample. These results enable sellers and online auction marketplaces to better design and implement auction systems that provide signals that buyers most desire.

Keywords: Online auctions, Signal theory, Ethics, Uncertainty, Decision theory, Contractarianism, Objectivism

1   Introduction

Auctions have experienced tremendous commercial success online. Consumers and merchants alike appreciate the ease of participating from their home or office. Despite the increased interest in and success of online auctions, researchers understand little about how buyer uncertainty impacts their behavior in early online auction decisions. These early decisions constitute explicit and implicit judgments made when first interacting with a particular auction, both in selecting a particular auction and in choosing an initial bid. While it is known that uncertainty in a seller can be mitigated by trust, website informativeness, product diagnosticity, and social presence [41], when does this mitigation take place and with what auction characteristics? Evidence exists that differentiation between product uncertainty and seller uncertainty is manifested by buyers [21], but the mechanisms for how this differentiation takes place are not fully understood. Often multiple sellers are auctioning similar products and the buyer must choose between these sellers and products using a variety of bidding strategies [9].

Online auction literature suggests three broad categories of signals that impact a buyer's decision to enter an auction – the product's signals, the seller's signals, and the auction environment's signals [24], [31]. Researchers have explored such auction characteristics as feedback scores [5], [11], escrow services [30], starting prices [4], reserve prices [62], psychological contract violations [40], fixed prices [27], shipping costs [55], and certifications [13]. Although less prevalent, some research has explored what auction characteristics affect the selection of a particular auction over alternatives. Auction characteristics such as current bid amount have been shown to influence entry into the auction for a particular product [3]. While a large number of researchers have addressed signals, most have focused on the impact on price premiums. Furthermore, in the majority of cases, the signals were selected prior to data collection. If signals are being used to mitigate uncertainty in the auction, they would likely have the biggest impact early in the auction selection process. Understanding how those signals impact early auction decisions can help auction marketplaces and sellers better address buyer perceptions and needs. This research project was designed to answer the following questions: What signals are important in two early online auction decisions? How do those signals impact the various decisions to mitigate uncertainty? Do these findings support existing theory?

To address these questions, our research takes an exploratory look at auction characteristics that impact two early buyer decisions in the auction environment. We employ and expand on signal theory to justify the research design. This study contributes to literature in several ways: First, it extends signal theory in both breadth and depth. It extends the breadth by examining not only how signals are used for sellers and products [31], but also for the auction's competitive environments.   It extends the depth by probing ethical foundations for interpreting signals about sellers. Second, it develops formative factors based on the importance of auction characteristics to the bidder's decision-making process, which, to best of our knowledge, has not been accomplished before. These factors provide a basis for conceptualizing the types of signals most often employed by buyers when entering auctions. We also focus on intentional, conscious decisions, as opposed to fast, subconscious decisions made in the spur of the moment (i.e. the impulse buy). While both thinking systems are often employed in every decision and both use signals, retrospective surveys perform better at capturing conscious beliefs, behaviors, and perspectives.

2   Literature Review

Purchasing items in an auction, like many transactions [6], requires a series of choices and actions that depend on reasoned reactions to internal and external stimuli. However, in online auctions, there is a vast absence of information necessary to make informed decisions. These information asymmetries [2] create difficulties in accurately assessing the value of a product, the competence and character of a seller, and the dynamics of the auction environment. At some point in the decision process, these asymmetries must be mitigated so that a reasonable value assessment can be determined. It is our contention that the uncertainty mitigation primarily occurs at one of two different decisions at auction entry. We make this contention because entry into an auction establishes a commitment to purchase the product if the bidder wins. The commitment might be lower in auctions than in fixed price purchases because there can only be one winner among many bidders [4]. Yet, even with lower commitment levels, the bidder may in part mitigate uncertainty with a lower bid, thereby limiting the risk. Even if the decision dynamics change near the end of an auction, the value assessment and uncertainty mitigation are likely to have already occurred [4].

2.1   Two Decisions for Auction Entry

The two decisions made at auction entry happen nearly concurrent, but represent two very different processes. The first decision of interest is to select a specific product auction. We call this decision *auction selection*. Buyers follow this process whether planning to bid in only one product auction or cross-bid across several [3]; the buyer must pick those auctions in which they wish to cross-bid. Once the search and appraisal is complete, the goal to enter a specific auction has been reached. It is important to note that this decision may include a series of sub-decisions, however, for the purposes of this research we focus on the outcome of auction selection.

John R. Drake
Dianne J. Hall
Casey Cegielski
Terry Anthony Byrd

An Exploratory Look at Early Online Auction Decisions: Extending Signal Theory

The next decision is how to bid on the product in the selected product auction. Bidding strategies can change throughout an auction, so we focus on a buyer's *initial bid* decision. This value represents the first bid a buyer places in an auction, regardless of changes in bid amounts later in the auction or of the bids placed by others. The initial bid may include factors that are not product related, but is representative of the value range that the bidder assigns to the product, at least tentatively [10].

Product value is a complex idea. Individuals may value an item more or less than market value depending on many economic and psychological factors. For instance, a bidder may see an item of interest and bid low in hopes of winning the bid without much cash outlay. In this instance, the value of the product is low to the individual who would enjoy the product if won but has no specific needs or goals to attain it. On the other hand, an individual may bid well beyond market price for an item with sentimental value (e.g., a teapot just like Grandma had).

2.2 Signaling Theory

When information asymmetries exist, signaling theory suggests that the interacting parties send signals to one another in order to adjust their purchasing behaviors accordingly [56]. These signals counteract the downward spiral that information asymmetries can facilitate leading to a market of lemons [2]. Signals are particularly important in online auctions where information uncertainty exists in the product being sold, in the seller, and in the other bidders. In order to mitigate that uncertainty, buyers look for dominant signals that suggest that this auction is worth the invested time and energy to participate. In Table 1, a sampling of research highlights the common signals observed.

Table 1: Sampling of research and signals identified

	Environment		Seller		Product	
	Price	Competition	Trust	Service	Picture	Description
Kaufmann & Wood [31]	x	x			x	
Standifird, et. al. [57]	x					
Zhang & Li [66]	x			x		
Resnick & Zeckhauser [50]			x			
Pinker, et. al. [45]	x	x				
Pavlou & Dimoka [38]			x			
Gregg & Walczak [24]	x		x	x		x
Gregg & Walczak [23]	x		x	x		
Dholakia & Soltysinski [14]		x				
Dewally & Ederington [13]			x	x	x	
Bapna, et. al. [10]	x	x	x			
Fuchs, et. al. [19]	x	x	x		x	x

Signals about the product can be used to alleviate the risks inherit in online purchases. Without directly seeing and touching a product, the quality of the product remains unknown. The uncertainty about a product has a positive impact on the perceived cost of selecting a product online [34]. To determine if the product for sale is viable, signals about the product justify entering into the auction. Common signals include a photo and a detailed description of the product [24], [31].

Similarly, uncertainty about other bidders competing in the same auction induces buyers to look for signals that might indicate snipping [7] or opportunists [9] that could thwart their efforts. Buyers want to know if the effort of selecting and bidding in an auction is worth the trouble. These buyers look for signals that their effort has a reasonable chance for success, given the current competition in the auction and the value they place upon the product for sale. Signals might be formed from the rate of bidding, the current bid price, and the time left in the auction.

2.3 Seller Signals

Seller uncertainty is a widely researched phenomenon that impacts online auction behavior and deserves special attention. One signal for mitigating seller uncertainty, the feedback score, is believed to effectively establish a reputation [12], and hence the trustworthiness of a seller. However the findings of feedback scores on the final bid price have been mixed. In guitar auctions, feedback was largely insignificant in determining final sale price [16]. For Rose Bowl game tickets, the seller's reputation was insignificant in influencing the final bid price [4]. Ba and Pavlou found that negative feedback scores significantly affected the price premium of various products when interacting with price [5]. However, the number of negative feedbacks was insignificant in coin auctions, even though the overall reputation was significant. When product information, timing of bid, number of bidders, and other characteristics were taken into account, seller reputation became insignificant in affecting the final bid price of coin auctions [31]. These conflicting results that feedback scores have on the final bid price leads us to believe that there is more complexity going on here than current theory takes into account. Indeed, some research has shown that eBay Powerseller status provides a more powerful signal of reputation than feedback scores in the Austrian marketplace

John R. Drake
Dianne J. Hall
Casey Cegielski
Terry Anthony Byrd

[19]. The inconsistencies with feedback scores may stem as much from the multiple ways buyers use it to voice their approval or disapproval for the seller, the product, and even the auction platform.

Other signals describing the seller or controlled by the seller help buyers build a trustworthiness perception about the seller. The signals a seller portrays has a strong impact on the willingness to select an auction [23]. Seller location, a characteristic describing the seller, may affect this perception, if, for instance, the seller lives in a nation without a legal system that protects a buyer. A seller located far from the buyer may also lack the capability of providing the service a buyer desires. Signals controlled by the seller, such as payment options accepted [66], return policy [63], shipping insurance, shipping costs, and shipping options, may also affect how trustworthy a seller is perceived. If a seller only accepts payment options that leave a buyer vulnerable, a seller may be viewed as lacking in trustworthiness and reject the auction out of hand. Alternatively, the payment options, if they include an option for credit card, may induce the buyer to bid higher than they would otherwise due to the known anti-fraud measures built into those purchases. Buyers may also view high shipping costs as a secondary way to increase profits, thereby decreasing a buyer's trust in the seller. Alternatively, a buyer may ignore the trust implications of shipping cost and merely include the shipping costs in the calculation of how much they are willing to bid. Does trust have a greater impact on the attraction of bidders or on the amount bid in an auction?

To resolve this, we note that trust is in part an expectation of moral behavior [29]. In online transactions, trust is an expectation of post-contractual moral hazard or the lack thereof [22], [41]. The relationship between trust and ethics takes particular approach in online auctions because buyers can generally be assumed to be acting in a self-interested manner, a common assumption in consumer behavior. While individuals may not explicitly adopt this self-interested ethical approach in every context, compartmentalization of moral behavior across decision domains is common [25]. By limiting a search to ethical theories defending self-interested action, moral theory suggests a limited number of approaches to mitigating seller uncertainty. While other ethical perspectives may be legitimately considered, we found two perspectives compelling for understanding online auction buyer decision strategies for several reasons. First, both focus on self-interested pursuit of values. Second, the two perspectives take strong yet opposite views on the fundamental nature of humans. Each perspective sees human nature as primarily good or evil. By taking such a strong stance, both perspectives imply a method for judging people and establishing trust. Third, the two perspectives acknowledge seller uncertainty must be overcome through preliminary ethical evaluations of the other party prior to completing the transaction. Each perspective sketches a method for ethical evaluations to avoid these moral hazards. Fourth, the two perspectives suggest buyer decision strategies use signals that are identifiable and measurable. Yet, the signals in these two theories impact the decision at two different points in the decision making process based on their method of ethical evaluations. Finally, both perspectives leave open the opportunity for technology to mitigate that uncertainty. In the first ethical theory - Contractarianism - ethical judgment is grounded in a perceived contract between individuals to adhere to a moral authority. In the second theory - Objectivism - ethical judgment is grounded in the life of an individual as an objective standard.

It is important to note that online auction buyers may not explicitly agree with either classification. The ethical theories serve as a foundation for understanding a possible motivation behind the method, whether implicitly or explicitly adopted, for judging sellers and mitigating seller uncertainty.

2.3.1 Ethical Foundations

The first perspective, Contractarianism, follows from the accumulated tradition of Hobbes, Rousseau, Rawls, Kant, and Locke and their collective writings on man's relationship to political authority through a social contract. Contemporary philosopher David Gauthier extended the Contractarian approach to moral judgment by asserting that moral authority is established through a social contract to be moral [20]. These voluntary contracts between individuals establish what is of value and to whom. With this social view of values, individuals act morally because of the possible consequences of being caught if they do not do so. The basic assumption is that without adequate counter-measures, the natural condition of individuals is to act opportunistically [28]. In commerce, participants seek justice to avoid undo costs without corresponding benefits and to receive benefits from costs that have already taken place [20].

The second perspective, Objectivism, is defined by the writings of Ayn Rand [47], [48]. Rand asserts that morals are grounded in individual life and our nature as human beings. Life, according to Rand, is the standard by which to measure values, either good or bad. If an individual wants to advance his or her own life, he or she must pursue values and abide by an objective moral code. The value of an object is measured in terms of how well it promotes the long-term survival of that individual [54]. Moral judgments of individuals are likewise measured by the extent that those individuals promote the long-term survival of one's self. In commerce, participants seek justice to reward the creation of values and to punish the destruction of values.

It should be noted that both Contractarians and Objectivists claim rational self-interest as a basis for their value systems. However, they define rational self-interest differently. To a Contractarian, rational self-interest applies to the avoidance of negatives - as moral constraints against a particular behavior. Self-interest, according to a Contractarian, is not interest *in the self*, but interests *of the self*. Interests do not refer to oneself as the object, but rather interests refer to those held by oneself as the subject [20]. Because of this subjective view, all interests are considered acceptable except those with moral constraints. As long as the interests one holds do not negatively affect others, the interests are morally acceptable. The Objectivist view of self-interest states that interest *in the self*

John R. Drake
Dianne J. Hall
Casey Cegielski
Terry Anthony Byrd

should define interests *of the self*. These two conceptions are *necessarily* tied together. According to Objectivism, life is the standard and the objective of values [43]. It treats values as objective, not subjective, based on the nature of man and his requirements for survival. Accordingly, some values are essential for successful living, while others, such as one's career choice, as optional. Rational self-interest provides positive direction for what individuals should do, not just the avoidance of negatives.

2.3.2 Ethics and Decision Theory

Contractarianism views the natural state of humans as opportunistic through force and fraud [28]. In commerce, this means that individuals will naturally try to take advantage of the other party in a transaction. Because opportunistic behavior is considered intrinsic, Contractarians believe that it is impossible to predict when it will or will not occur with certainty. At best, a Contractarian calculates the probability that the seller will or will not act opportunistically. Gauthier argues that this ethical perspective is best explained by Bayesian decision theory when examining individual behavior [20]. He contends that a subjective probability distribution characterizes an individual's beliefs about all unknown factors. This is applied to a utility function that provides a quantitative valuation of the individual's outcome preferences [37]. In auction terms, the possibility of opportunistic behavior increases the potential cost of a transaction. Opportunistic behavior in online auctions can be mitigated by identifying those sellers who are acting opportunistically. Reputation in Bayesian decision theory works as a heuristic, effectively labeling a seller with a risk level based on feedback for past performance. Buyers from this perspective use that risk level during bidding, assessing how much to bid based in part on a seller's reputation.

In Bayesian decision theory, the selection of an auction is trivial as it assumes a defined decision-making context. It does not matter in which auction among alternative auctions a buyer selects to bid, as long as every important characteristic of the auction and seller are taken into effect when deciding how much to bid. A Contractarian might argue that the selection of an auction requires a further utility function, comparing and contrasting potential auctions on time and effort utility-maximizing expectations. Individuals using this perspective would want to expend the least amount of time to attain utility-maximization. Because signals about the seller are considered in the initial bid decision, there is no motivation to also include them in the auction selection phase. This would lead to signals about the seller being ignored during the auction selection decision, but included when deciding how much to bid. A buyer employing the Contractarian approach to judging the morality of sellers evaluates seller characteristics in initial bidding, but not in auction selection.

Objectivism, on the other hand, argues that justice requires the moral evaluation of the seller before a buyer even considers bidding on an auction with that seller. In the Objectivist perspective, if one chooses to live and to be objective, every decision implies a process of evaluation [42]. This evaluation must be based on the observed facts, which in turn determine how one ought to act. Certain actions will be considered moral and acceptable, while others will be considered immoral and unacceptable. Only from the list of acceptable actions does an individual finally conduct a *cost/benefit* analysis of each action before deciding which action to pursue. In the realm of people (such as in commerce), a moral judgment must precede any decision about with whom to associate [52]. The same process applies where observed facts about an individual - his/her actions, statements, or convictions - determine how one should judge that individual. People are not judged immoral unless evidence proves that they are immoral [43]; however, only those individuals who are judged to be moral are considered acceptable for association. It is only at this point that a *cost/benefit* analysis is considered, comparing the acceptable associations. In commerce, an objective comparison of sellers would require, in part, a moral judgment about that the seller's *goodness*. Without firsthand knowledge about the seller, an objective buyer must consider the signals about and controlled by the seller to determine if the seller is *good* and worthy of a transaction. For example, a seller with a low reputation score may be ignored by potential buyers. A buyer employing an Objectivist approach to judging the morality of sellers evaluates seller characteristics during the auction selection decision, but not during the initial bid decision. Figure 1 summarizes how the various signals are used in the two decision points.
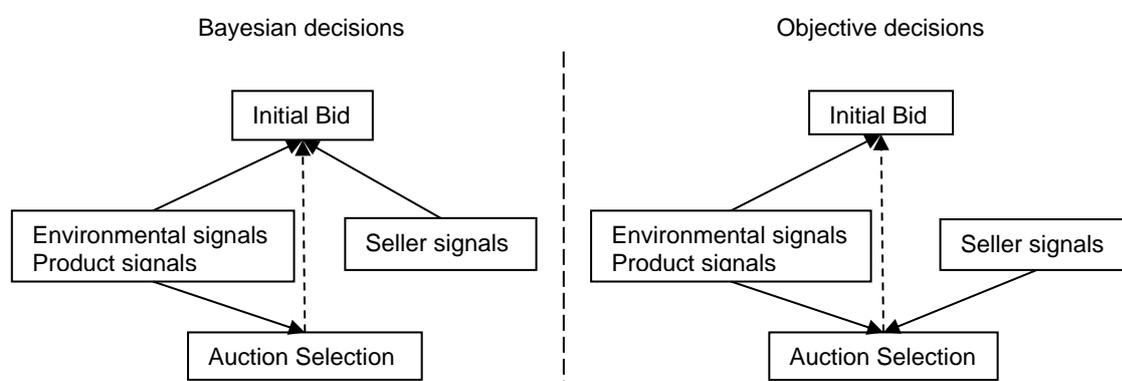

Figure 1: Possible signals' impact in online auctions

An Exploratory Look at Early Online Auction Decisions: Extending Signal Theory

John R. Drake
Dianne J. Hall
Casey Cegielski
Terry Anthony Byrd

3   Method

There are two phases to our data collection. The first involved a short survey to determine which auction characteristics are considered important by online auction users. The second phase surveyed a larger population with a composite list of auction characteristics.

3.1   Instrument Development

To determine the auction characteristics relevant for study, 18 experienced online auction participants (who have purchased five or more products in an online auction) responded to a short survey, adapted from Ajzen [1], about their experiences in online auctions. This survey asked the respondents what characteristics they consider when a) selecting a product auction among alternatives and b) picking an initial price to bid on that product. We compiled the results of these characteristics by combining the two lists, omitting duplicates, and rewording characteristics to be internal and externally consistent. The respondents identified 29 unique characteristics that affect either product auction selection, initial bid, or both. Of these 29 characteristics, 19 were specific to the auction itself (see Table 2). The remaining 10 required obtaining knowledge outside of the auction website, which is beyond the scope of our study.

After the 19 characteristics were identified, a second survey was created. For each of the characteristics, questions were developed to determine how important each characteristic was in determining the selection of a product auction and how important it was in determining the amount of the initial bid. Each of these responses were measured on a 5-point Likert scale. In addition, information regarding the average final bid of the auctions in which a respondent participated, all categories in which the respondent has placed a bid, perception of online auction experience, and demographic data.

The instrument was pre-tested with four online auction users to verify clarity, followed by a pilot test with 21 online auction users. A few minor wording changes to improve readability were made to the instrument prior to administering it to the sample.

Table 2: Important auction characteristics

Auction characteristics		
Current bid	Seller location	Buy now option
End time/time remaining	Return policy	Item quality
Rate of bidding	Payment methods accepted	Product description
Number of bidders	Proxy bidding	Photo of product
Shipping costs	Reserve price	Security
Shipping options	Minimum bid	Seller feedback
Shipping insurance		

3.2   Sample

Participants came from two groups, undergraduate students in an MIS class at a large southeastern university and a sample of attendees outside a large university sporting event. Of the 300 students contacted and offered extra credit, 195 participated (65% response); 138 had experience with online auctions. To obtain respondents from the second group, the researchers surveyed 104 sporting event attendees that appeared older than 25 and had bought something on an online auction. No incentives were offered. The over age 25 heuristic helped to avoid much of the undergraduate population already measured in the first sample. Typical demographics of sports fans are around 40 years of age and have some college experience [64]. These demographics are consistent with online auction participants [40].

Because the primary item of interest in this study was differences between reported importance of the characteristics for the auction selection and initial bid decisions, the differences between these means were computed and analyzed between groups. Our results from discriminant analysis suggested that the two samples could not be distinguished from each other (Wilk's Lambda = .919, p = .645). Similarities between student and general populations for online purchases in previous research provide additional support for combining these two data sets [39]. Because of this, the rest of our analysis is based on our combined sample. The respondent profiles, summarized in Table 3, showed a wide variance in the general population consistent with other online auction research samples [40]. Over half the participants have used online auctions for at least 3 years. On average, the participants bid at least once every 6 months. The participants also spent around one hour of time on the auction site and generally bid on items that cost $100 or less on average.

An Exploratory Look at Early Online Auction Decisions: Extending Signal Theory

John R. Drake
Dianne J. Hall
Casey Cegielski
Terry Anthony Byrd

Table 3: Respondent profiles

	Student	**General population**	**Combined**
Age	21 (1)	32 (12)	27 (10)
Gender	55% (male)	57% (male)	56% (male)
Household Income	$45,000 (42,000)	$69,000 (38,000)	$56,000 (42,000)
Duration on online auctions	2.2 (0.8)	2.6 (0.9)	2.4 (0.9)
Frequency on online auctions	3.5 (1.0)	2.7 (1.0)	3.1 (1.1)
Intensity on online auctions	1.8 (1.0)	2.1 (1.0)	2.0 (1.1)
Average product value	2.5 (1.1)	3.1 (1.1)	2.8 (1.1)
N	138	104	242

* standard deviation in parentheses

4   Results and Analysis

The mean importance of the characteristics ranged from 4.5 (photo of product) to 2.7 (seller location) for auction selection. For initial bids, the characteristic mean importance ranged from 4.4 (photo of product) to 2.8 (seller location). The mean results of each characteristic are summarized in Table 4.

Table 4: Descriptive statistics

Auction Characteristic	**AS[a] Mean**	**IB[b] Mean**	**Mean Diff.**	**Std. Dev.**	**t-score**
Current Bid	3.913	4.095	-0.182	.92	-3.074*
End time/ time remaining	4.091	4.046	0.054	.85	.988
Rate of bidding	3.038	3.204	-0.181	1.06	-2.635*
Number of bidders	3.138	3.228	-0.105	1.09	-1.485
Shipping costs	3.893	3.740	0.153	.93	2.564*
Shipping options	3.307	3.249	0.050	1.02	.761
Shipping insurance	2.921	3.025	-0.109	.96	-1.753
Seller location	2.726	2.768	-0.033	1.06	-.488
Return policy	3.610	3.462	0.155	.93	2.577*
Payment options accepted	3.992	3.806	0.187	.77	3.761*
Proxy bidding	2.776	2.854	-0.064	.92	-1.058
Reserve price	3.439	3.454	-0.008	.99	-.132
Minimum bid	3.328	3.536	-0.210	.98	-3.294*
Buy now option	3.508	3.606	-0.096	1.00	-1.485
Item quality	4.469	4.339	0.122	.77	2.450*
Product description	4.364	4.258	0.104	.76	2.106*
Photo of product	4.517	4.359	0.169	.73	3.567*
Security	4.204	3.959	0.238	.84	4.396*
Seller feedback	4.066	4.017	0.050	.81	.954

a) AS = Auction Selection b) IB = Initial Bid
* significant at p=.05 level

4.1   Exploratory Factor Analysis

In order to formulate appropriate signals from the characteristics, we performed principle component analysis on auction selection and product valuation combined to assess how the characteristics fell out naturally. Varimax rotation was applied to provide the simplest and most interpretable factors, and to allow the greatest percent of variance explained by a set of factors [33]. The number of factors was estimated with the eigenvalue greater than one rule, suggesting that eight latent factors may be appropriate. Factors items were interpreted using a cut-off of .45 or above for item loading items for construct development [32]. The security and proxy bidding items did not load on any factors above .45 level and were omitted from our final analysis (table 5). The Kaiser-Meyer-Olkin measure of sampling adequacy was .823, suggesting that the partial correlations are small and that the factors account for a substantial amount of variance. Bartlett's test for sphericity was significant at the $p>.001$ level, suggesting that the correlations in the data are appropriate for factor analysis. A total of 65% of variance was explained by these 8 factors (table 6). While this amount variance is not high, it is acceptable as a means of achieving a parsimonious factor solution and consistent with other published factor analyses [26].

An Exploratory Look at Early Online Auction Decisions: Extending Signal Theory

John R. Drake
Dianne J. Hall
Casey Cegielski
Terry Anthony Byrd

This paper is available online at
www.jtaer.com
DOI: 10.4067/S0718-18762015000100004

Table 5: Principle component analysis: Characteristics of the auction selection decision and initial bid decision

Characteristic	Factors							
	1	2	3	4	5	6	7	8
AS1						.770		
IB 1						.640		
AS2						.474		
IB 2			.457					
AS3			.544					
IB 3			.738					
AS4			.658					
IB 4			.753					
AS5		.670						
IB 5		.776						
AS6		.710						
IB 6		.824						
AS7		.585						
IB 7		.681						
AS8					.536			
IB 8					.471			
AS9					.779			
IB 9					.709			
AS10		.496						
IB 10		.496						
AS12				.727				
IB 12				.732				
AS13				.733				
IB 13				.647				
AS14								.782
IB 14								.776
AS15	.746							
IB 15	.811							
AS16	.750							
IB 16	.728							
AS17	.634							
IB 17	.618							
AS19							.770	
IB 19							.801	
Eigenvalue	8.65	4.17	2.65	1.79	1.53	1.44	1.14	1.07
% variance explained	25%	12%	8%	5%	4%	4%	3%	3%
Reliability	.875	.878	.763	.793	.776	.694	.800	.738

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
Rotation converged in 9 iterations.

Factor 1 accounted for 25% of the variance in the sample. The three items included in this factor are item quality, product description, and photo of product, signaling the product quality. Factor 2 accounted for 12% of the variance. The four items comprising that factor are shipping costs, shipping options, shipping insurance, and payment methods accepted. While the first three characteristics were all shipping related, the fourth suggested that the buyers were assessing logistical signals. Factor 3 accounted for 8% of the variance. The three items in this factor are end time/time remaining (for initial bid), rate of bidding, and number of bidders, signaling the competitive environment. Factor 4 accounted for 5% of the variance. The two items in this factor are reserve price and minimum bid, signaling minimal price information. Factor 5 accounted for 4% of the variance. The two items in this factor are return policy

John R. Drake
Dianne J. Hall
Casey Cegielski
Terry Anthony Byrd

An Exploratory Look at Early Online Auction Decisions: Extending Signal Theory

and seller location, signaling a level of service expected. This might be particularly relevant to female shoppers [61].
Factor 6 accounted for another 4% of the variance.

Table 6: Factors from exploratory item loadings

	Signal	**Auction characteristic**
1	*Product quality*	Item quality Product description Photo of product
2	*Logistics*	Shipping costs Shipping options Shipping insurance Payment options accepted
3	*Competition*	End time/ time remaining Rate of bidding Number of bidders
4	*Minimum price*	Reserve price Minimum bid
5	*Service expectations*	Return policy Seller location
6	*Expected winning bid*	Current bid End time/ time remaining
7	*Reputation*	Feedback scores
8	*Default purchase*	Buy Now Option

The two items in this factor are current bid and end time/time remaining (for auction selection only), most likely
signaling the winning bid expectation. Factor 7 accounted for 3% of the variance. The one characteristic in this
factor is seller feedback, signaling the seller's reputation. Factor 8 also accounted for 3% of the variance. The one
characteristic in this factor is buy now option, signaling a default price point.

Table 7: Auction factor differences between the auction selection decision and initial bid decision

Factor	df	AS[a] Mean	IB[b] Mean	Diff	Std. Dev.	t-value
Product quality	231	4.44	4.32	0.13	.59	3.249***
Logistics	235	3.52	3.45	0.07	.61	1.632
Competition	234	3.09	3.49	-0.41	.82	-7.684***
Minimum price	234	3.38	3.50	-0.11	.78	-2.250**
Service expectations	236	3.18	3.11	.07	.75	1.435
Expected final price	240	4.00	4.10	-.10	.88	-1.686*
Reputation	239	4.06	4.01	.05	.81	.954
Default purchase	238	3.51	3.60	-.10	1.00	-1.485

[a] AS = Auction selection decision
[b] IB = Initial bid decision
***p<.01, ** p<.05, * p<.10

4.2   Factor Differences

In order to compare the dynamics between the auction selection and initial bid decisions, the characteristics from
each factor were split between the two decisions (table 7). For instance, the items in factor 1 for auction selection
were averaged to form a single value, while the items in factor 1 for initial bid were averaged to form a second value.
We conducted t-tests between these averaged values to determine if the differences between auction selection and
initial bid decision characteristics were significant. Comparison of the factors at each decision revealed that product
quality signal was more important in auction selection, whereas the competition, minimal price and expected winning
bid signals were more important in the initial bid.

It is evident that buyers on average consider the importance of auction signals differently between auction selection
and initial bid. The one product signal - product quality – rated higher in the auction selection. Three of the four
auction environment signals – competition, minimum price, and expected final price – rated high in the initial bid.
The fourth auction environment signal – default purchase – was not significantly different between auction selection
and initial bid. We found three factors that reflect signals of a seller's propensity to behave morally and which may
help with this analysis. The feedback score provided a reputation heuristic describing a seller based on buyers' past

John R. Drake
Dianne J. Hall
Casey Cegielski
Terry Anthony Byrd

experiences. Logistic evaluation consisted of characteristics controlled by the seller. Service expected consisted of characteristics controlled by the seller, even if seller location is only partially controlled. One of our main contentions is that the importance of characteristics describing the seller (e.g., buyer feedback) and the important of characteristics controlled by the seller (e.g., shipping insurance) serve as mitigators of seller uncertainty. Surprisingly, none of these three resulted in a difference in importance significantly different from zero (figure 2). One or more reasons may have caused this: first, when calculating the mean, individuals rating seller characteristics higher in auction selection may have balanced with individuals rating seller characteristics higher in initial bid. Alternatively, anchoring bias may have damped the actual difference employed in practice. Lastly, buyers may not have utilized either decision-making perspective, which invalidates the theory.
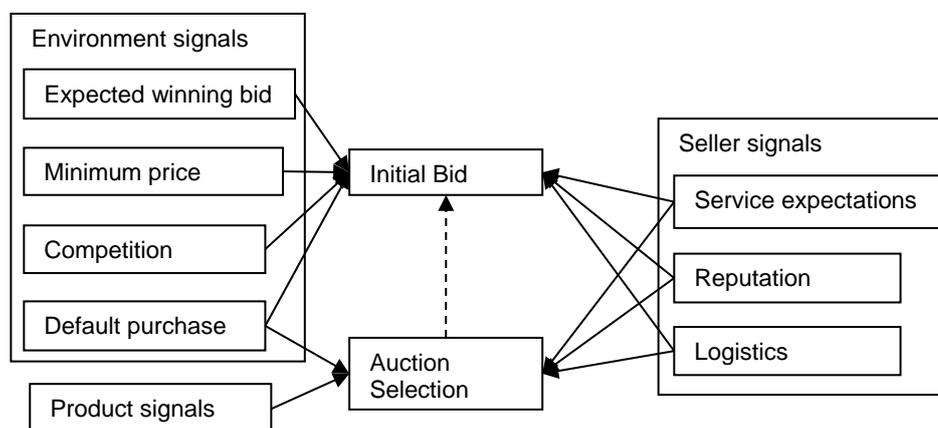

Figure 2: Modified signal model

4.3   Post Hoc Analysis

To test for these possibilities, a post hoc cluster analysis was performed on the differences between auction selection and initial bid for shipping costs, shipping options, shipping insurance, seller location, return policy, payment options accepted, and seller reputation. These seven auction characteristics comprise the three signals acting as mitigators of seller uncertainty. The agglomerative cluster analysis employed Ward's method on the squared Euclidean distance between points. The results showed two very distinct clusters; one with 158 cases of mostly negative differences. The negative differences meant that initial bid was on average ranked more important than auction selection, consistent with Contractarian approach. The second cluster had 71 cases of all significant positive differences, consistent with the Objectivist approach (see table 8). While there is likely additional complexity in the decision process not identified by these two clusters, the results indicate buyers' raking are consistent with the two Contractarian and Objectivist approaches to seller uncertainty mitigation.

Table 8: Cluster analysis of mean differences between auction selection and initial bid

	Cluster 1 (Contractarian)	Cluster 2 (Objectivism)
Shipping costs	-.1013	.7324*
Shipping options	-.3038*	.8169*
Shipping insurance	-.3481*	.4225*
Seller location	-.2658*	.5352*
Return policy	.0316	.4789*
Payment options accepted	.0253	.5352*
Seller feedback	-.0190	.2254*

* Significant at p=.05 level

5   Discussion

From a sample of 242 participants, we observed 8 emergent factors in online auction environments used as signals for enhancing decisions for both auction selection and initial bid. Product quality, logistic evaluation, competition, minimum price, service expectations, expected winning bid, reputation, and default price points influence auction selection and initial bid in different ways. Below, we discuss implications for theory, implications for practice, limitations, and future research.

John R. Drake
Dianne J. Hall
Casey Cegielski
Terry Anthony Byrd

An Exploratory Look at Early Online Auction Decisions: Extending Signal Theory

5.1 Implications for Theory

By viewing online auction entry from two decisions, this study identifies a set of factors that impact decisions to enter an auction. Consistent with marketing theory, this study confirms significant differences in the importance of various signals during the buyers' auction selection and their initial bid. By introducing this difference into online auction research, this study suggests that researchers interested in auction entry should carefully craft their research design around one or both of these decisions.

This study confirms the role of signaling in online environments [24], [41]. We build on that tradition by identifying signals from formative factors of auction characteristics. By performing a factor analysis, we suggest that signals are more than just a list of characteristics, but are composite thoughts derived from multiple facts. Signals have identities that fit within three general categories of uncertainty – seller, product, and auction environment. When taking into consideration the two different ethical decision-making strategies, the signals impacted the two decision points in different ways, further highlighting the usefulness of these factors.

Furthermore, we build on the principle agent role of signaling by highlighting how moral hazard is avoided when evaluating seller signals. Trustworthiness is, at least in part, a moral evaluation. By exploring how moral perspectives might be used when evaluating online transactions, we discover a mechanism by which trust is evaluated to mitigate moral hazards. Two moral perspectives, framed from opposite world views of mankind, suggest two different approaches for mitigating seller uncertainty. By framing buyer behavior in terms of two decision making perspectives for mitigating seller uncertainty, we discovered that one approach or the other does not predominate among auction buyers. By realizing that a participant's ethical perspective frames his or her approach to decision-making, researchers can formulate strategies to capture those differences and mitigate confounding influences on results, including the differences noted above on feedback scores. Our findings suggest that such a division of perspectives is feasible and warranted.

Although our results did not specify an economic level of analysis, certain extrapolations from individual preferences can be ascertained that can help answer how different economic markets theory impact electronic marketplaces [58]. Game theory, using Bayesian decision theory, has gained traction in online auction research because of the emergence of reputation in models of informational asymmetries and repeated actions with the possibility of observing past behavior [12], [36]. However, game theory economic models are relevant for only certain types of behavior that exhibit utility maximization. There are three types of behavior that violate expected-utility maximization of game theory; when the utility functions are inapplicable, when the subjective probability distribution is inapplicable, and when the economic model is inapplicable [37]. If a buyer makes decisions using an Objectivist method of seller uncertainty mitigation, then both the first and second criteria are violated. The utility function is violated because participants consider seller characteristics as a qualitative heuristic for judging a seller in auction selection, rather than as a quantitative heuristic. There is no comparison between sellers, but a blanket preferred or not preferred evaluation. The subjective probability distributions are violated because, as the name suggests, the decision is not subjective but objectively based on the facts about the seller. As the results suggests, a significant number of online auction buyers may utilize the Objectivist perspective creating these violations. This problem echoes Herbert Simon's issue with the concept of utility maximization used in neoclassical economics, game theory being a subset of neoclassical theory [53]. In his argument, Simon points out that utility maximization is often violated in real world empirical observations.

5.2 Implications for Practice

There are several practical implications from these results. First, the encapsulation of auction characteristics into formative factors helps sellers address marketing strategies at an abstract level rather than deal with concrete characteristics that may change from one auction marketplace to another or change over time. Knowing that certain auction signals under the seller's control (e.g., logistics) are of importance to buyers, sellers can visualize a package of characteristics that project a strong positive signal in an effort to increase bidding price and activity. For example, realizing that shipping costs is interrelated with shipping insurance, a seller could highlight key strengths, such as shipping insurance, to overcome weaknesses, such as high shipping costs, in their description. Understanding how various signals are created and utilized by buyers allows sellers to focus investment efforts to facilitate appropriate signaling.

Second, auction marketplaces need to consider the dynamics various signals introduce in both auction selection and initial bid. Focusing on only one or the other may thwart revenue generation by creating a less than ideal auction environment. For example, eBay currently does not list the seller feedback score in its search results. Interested buyers must click on the auction description page to find that information. Yet for a buyer with an objectivist perspective, adding the seller feedback information on the search results page would save them time in judging sellers. eBay does contain a *Top-rated seller* icon which partially solves this issue. In developing a search listing for online auctions, product signals, seller signals, and auction environment signals should all be included. Of these signals, the product quality, reputation, and expected price/value signals rated as the most important, forming the most likely candidates for inclusion in a search listing.

John R. Drake
Dianne J. Hall
Casey Cegielski
Terry Anthony Byrd

5.3   Limitations

While the price [5] and category [35] of the product has been shown to affect the importance of reputation, we did not limit our survey to consumers of particular products. Products of higher average price often prompt buyers to become more involved in the shopping process [44] thereby affecting how consumers evaluate product promotions, including products in online auctions. However, price and product differentiation is premature until a general understanding of auction entry is obtained.

The method of asking for the importance of auction characteristics at two decision points assumes that participants will select different sets of auction characteristics. There is some danger in this assumption, because the question itself may induce participants to identify differences when they do not do so in practice, or alternatively, to anchor their responses based on their previous response. The latter issue is more common in psychological research because respondents often strive for consistency among the questions they answer [46]. However, we were able to distinguish unique differences between some of the items from one decision to another. If anything, overcoming anchoring bias may make the differences more prominent, leading to further findings.

5.4   Future Research

Our study makes some important contributions to decision-making in online auctions marketplace literature. To the best of our knowledge, this is the first exploratory examination through primary data of buyer preferences in online auctions entry and bidding. Through this study, we extended decision-making research in the online auction realm by considering ethical perspectives that influence auction selections and initial bids. Future research should extend the relationship between ethical perspectives and decision-making. While an ideal ethical perspective is important for information systems researchers to understand, it is equally important to understand how individuals utilizing a particular ethical perspective behave. Various instruments exist for measuring ethical perspectives [15], [18], [49], [59] which should be verified and used to better understand consumer decision behavior. More so, researchers could determine if there is an ethical perspective in online auctions that results in the greatest long-term value for both buyers and sellers.

However, that is not guaranteed, as research has shown individuals will rationalize their fast subconscious decisions, sometimes attributing deliberate thinking to intuitive decisions [17]. There is also evidence that moral decisions tap into the fast, intuitive thinking process [65].

Identifying decision-making profiles will enable predictive relationships between the type of buyer and results obtained. Different buyer profiles have been identified in online auctions based on an individuals' number of bids, time of first bid, and time of last bid [8], [9]. While these profiles identify bidding strategies, they do not capture auction entry criteria. Further research should explore buyer profiles in decision-making and relate those results to different ethical and personality traits, as well as bidding strategies, products desired, and final prices. Researchers could also compare online auction decision-making strategies versus general consumer strategies, such as the strategic choice model [60].

This study also suggests that auction characteristics can be successfully categorized into valid factors. With more rigorous instrument development techniques [33], the factors identified in this research can be verified and used in predicting buyer behavior.   Although the factor item loadings were very similar between auction selection and initial bid, further research should verify if indeed they are the same or qualitatively different.

Past research has shown that different types of products induce different behaviors in buyers [4]. Other research has shown that buyers may use different levels of focus in making buying decisions, some depending on deliberate, conscious judgment of signals, while others utilizing emotional, subconscious judgment of signals [51]. With the factors discovered in this research, future researchers could test to see how product categories, method of judgment, and consumer buying behaviors vary and attract different behaviors in buyers utilizing different signals.

6   Conclusion

When buyers first view an auction, they look for signals to make two decisions. Those two decisions are whether or not to enter an auction and if so, how much to bid. In this research, we discover the signals predominately used at each decision by 242 online auction buyers. Using exploratory factor analysis, eight factors are discovered that group auction characteristics into common signals used for mitigating uncertainty in sellers, products, and the auction's competitive environment. Furthermore, we discovered that signals for mitigating seller uncertainty may be based on two ethical perspectives for judging the probability of moral hazards. These two perspectives and corresponding decision patterns suggest that seller signals may impact the auction selection and initial bid in different ways. The results expand on signal theory in both breadth and depth.

John R. Drake
Dianne J. Hall
Casey Cegielski
Terry Anthony Byrd

References

[1] I. Ajzen, Constructing a TpB Questionnaire: Conceptual and Methodological Considerations, ed: University of Massachusetts, Amherst, 2002.

[2] G. A. Akerlof, The market for lemons: Quality uncertainty and the market mechanism, The Quarterly Journal of Economics, vol. 84, no. 3, pp. 488-500, 1970.

[3] S. Anwar, R. McMillan and M. Zheng, Bidding behavior in competing auctions: Evidence from eBay, European Economic Review, vol. 50, no. 2, pp. p. 307 - 322, 2006.

[4] D. Ariely and I. Simonson, Buying, bidding, playing, or competing? Value assessment and decision dynamics in online auctions, Journal of Consumer Psychology, vol. 13, no. 1-2, pp. 113 - 123, 2003.

[5] S. Ba and P. A. Pavlou, Evidence of the effect of trust building technology in electronic markets: Price premiums and buyer behavior, MIS Quarterly, vol. 26, no. 3, pp. 243 - 268, 2002.

[6] R. P. Bagozzi and U. Dholakia, Goal setting and goal striving in consumer behavior, Journal of Marketing, vol. 63, pp. 19-32, 1999.

[7] R. Bapna, When snipers become predators: Can mechanism design save online auctions?, Communications of the ACM, vol. 46, no. 12, pp. 152-158, 2003.

[8] R. Bapna, P. Goes and A. Gupta, Insights and analysis of online auctions, Communications of the ACM, vol. 44, no. 11 , pp. 42-50, 2001.

[9] R. Bapna, P. Goes, A. Gupta, and Y. Jin, User heterogeneity and its impact on electronic auction market design: An empirical exploration, MIS Quarterly, vol. 28, no. 1, pp. 21-43, 2004.

[10] R. Bapna, W. Jank and G. Shmueli, Price formation and its dynamics in online auctions, Decision Support Systems, vol. 44, no. 3, pp. 641-656, 2008.

[11] G. E. Bolton, E. Katok and A. Ockenfels, How effective are electronic reputation mechanisms? An experimental investigation, Management Science, vol. 50, no. 11, pp. 1587-1602, 2004.

[12] C. Dellarocas, The digitization of word of mouth: Promise and challenges of online feedback mechanisms, Management Science, vol. 49, no. 10, pp. 1407-1424, 2003.

[13] M. Dewally and L. Ederington, Reputation, certification, warranties, and information as remedies for seller-buyer information asymmetries: Lessons from the online comic book market, The Journal of Business, vol. 79, no. 2, pp. 693-726, 2006.

[14] U. Dholakia and K. Soltysinski, Coveted or overlooked? The psychology of bidding for comparable listings in digital auctions, Marketing Letters, vol. 12, no. 3, pp. 225 - 237, 2001.

[15] J. R. Drake, D. J. Hall and T. Lang, Ethical perspectives of business students: Development of a new instrument, in Proceedings Decision Sciences Institute Annual Meeting, New Orleans, LA, 2009, pp. 1496-1501.

[16] D. H. Eaton, Valuing information: Evidence from guitar auctions on eBay, Journal of Applied Economics & Policy, vol. 24, no. 1, pp. 1 - 19, 2005.

[17] J. B. T. Evans, Dual-processing accounts of reasoning, Judgment, and Social Cognition, Annual Review of Psychology, vol. 59, no. 1, pp. 255-278, 2008.

[18] D. Forysth, A taxonomy of ethical ideologies, Journal of Personality and Social Psychology, vol. 39, no. 1, pp. 175-184, 1980.

[19] M. Fuchs, A. Eybl and W. Hopken, Successfully selling accommodation packages at online auctions - The case of eBay Austria, Tourism Management, vol. 32, no. 5, pp. 1166-1175, 2011.

[20] D. Gauthier, Morals by agreement. New York, NY: Oxford University Press, 1986.

[21] A. Ghose, Internet exchanges for used goods: An empirical analysis of trade patterns and adverse selection, MIS Quarterly, vol. 33, no. 2, pp. 263-291, 2009.

[22] S. Glover and I. Benbasat, A comprehensive model of perceived risk of e-commerce transactions, International Journal of Electronic Commerce, vol. 15, no. 2, pp. 47-78, 2010-11.

[23] D. G. Gregg and S. Walczak, Dressing your online auction business for success: An experiment comparing two eBay businesses, MIS Quarterly, vol. 32, no. e, pp. 653-670, 2008.

[24] D. G. Gregg and S. Walczak, The relationship between website quality, trust and price premiums at online auctions, Electronic Commerce Research, vol. 10, no. 1, pp. 1-25, 2010.

[25] S. Grover and C. Hui, The influence of the role conflict and self-interest on lying in organizations, Journal of Business Ethics, vol. 13, no. 4, pp. 295-303, 1994.

[26] R. K. Henson and J. K. Roberts, Use of exploratory factor analysis in published research, Educational and Pyschological Measurements, vol. 66, no. 3, pp. 393-416, 2006.

[27] J. K. Ho, Inter-brand comparison of online auction markets, Electronic Commerce Research, vol. 8, no. 1-2, pp. 103-114, 2008.

[28] T. Hobbes, Leviathan. New York, NY: Penguin, 1968.

[29] L. T. Hosmer, Trust: The connecting link between organizational theory and philosophic ethics, Academy of Management Review, vol. 20, vol. 2, pp. 379-403, 1995.

[30] X. Hu, Z. Lin, A. B. Whinston, and H. Zhang, Hope or hype: On the viability of escrow services as trusted third parties in online auction environments, Information Systems Research, vol. 15, no. 3, pp. 236 - 249, 2004.

[31] R. J. Kauffman and C. A. Wood, Doing their bidding: An empirical examination of factors that affect a buyer's utility in internet auctions, Information Technology and Management, vol. 7, no. 3, pp. 171-190, Sept 2006.

[32] B. R. Lewis, C. A. Snyder and R. K. Rainer, Jr., An empirical assessment of the information resource management construct, Journal of Management Information Systems, vol. 12, no. 1, pp. 199-223, 1995.

An Exploratory Look at Early Online Auction Decisions: Extending Signal Theory

John R. Drake
Dianne J. Hall
Casey Cegielski
Terry Anthony Byrd

[33] B. R. Lewis, G. F. Templeton and T. A. Byrd, A methodology for construct development in MIS research, European Journal of Information Systems, vol. 14, no. 4, pp. 388-400, 2005.

[34] T.-P. Liang and J.-S. Huang, An empirical study on consumer acceptance of products in electronic markets: A transaction cost model, Decision Support Systems, vol. 24, no. 1, pp. 29-43, 1998.

[35] J. A. Livingston, Functional forms in studies of reputation in online auctions, Electronic Commerce Research, vol. 10, no. 2, pp. 167-190, 2010.

[36] P. Milgrom and J. Roberts, Predation, reputation, and entry deterrence, Journal of Economic Theory, vol. 27, no. 2, pp. 280-312, 1982.

[37] R. B. Myerson, Game Theory: Analysis of Conflict. Cambridge, MA: Harvard University Press, 1991.

[38] P. A. Pavlou and A. Dimoka, The nature and role of feedback text comments in online marketplaces: implications for trust building, price premiums, and seller differentiation, Information Systems Research, vol. 17, no. 4, pp. 392-414, 2006.

[39] P. A. Pavlou and M. Fygenson, Understanding and predicting electronic commerce adoption: An extension of the theory of planned behavior, MIS Quarterly, vol. 30, no. 1, pp. 115-143, 2006.

[40] P. A. Pavlou and D. Gefen, Psychological contract violation in online marketplaces: Antecedents, consequences, and moderating role, Information Systems Research, vol. 16, no. 4, pp. 372-399, 2005.

[41] P. A. Pavlou, H. Liang and Y. Xue, Understanding and mitigating uncertainty in online exchange relationships: A principle - agent perspective, MIS Quarterly, vol. 31, no. 1, pp. 105-136, 2007.

[42] L. Peikoff, Fact and value, The Intellectual Activist, vol. 5, no. 1, pp. 5-6, 1989.

[43] L. Peikoff, Objectivism: the Philosophy of Ayn Rand. New York, NY: Penguin Books, 1991.

[44] R. E. Petty, J. T. Cacioppo and D. Schumann, Central and peripheral routes to advertising effectiveness: The moderating role of involvement, Journal of Consumer Research, vol. 10, no. 2, pp. 135-146, 1983.

[45] E. J. Pinker, A. Seidmann and Y. Vakrat, Managing online auctions: Current business and research issues, Management Science, vol. 49, no. 11, pp. 1457-1484, 2003.

[46] P. M. Podsakoff, S. B. MacKenzie, J.-Y. Lee, and N. P. Podsakoff, Common method biases in behavior research: A critical review of the literature and recommended remedies, Journal of Applied Psychology, vol. 88, no. 5, pp. 879-903, 2003.

[47] A. Rand, Atlas Shrugged. New York, NY: Random House, 1957.

[48] A. Rand, The Virtue of Selfishness: A New Concept of Egoism. New York, NY: Signet, 1964.

[49] R. Reidenbach and D. Robin, Toward the development of a multidimensional scale for improving evaluations of business ethics, Journal of Business Ethics, vol. 9, no. 8, pp. 639-653, 1990.

[50] P. Resnick and R. Zeckhauser, Trust among strangers in internet transactions: Empirical analysis of eBay's reputation system, in The Economics of the Internet and E-commerce vol 11. (M. R. Baye, Ed.). Greenwich, CT: JAI Press, 2002, pp. 127.158.

[51] A. Samson and B. G. Voyer, Two minds, three ways: Dual system and dual process models in consumer psychology, Academy of Marketing Science Review, vol. 2, no. 2-4, pp. 48-71, 2012.

[52] P. Schwartz, On moral sanctions, The Intellectual Activist, vol. 5, no. 1, pp. 7-8, 1989.

[53] H. A. Simon, Rational decision making in business organizations, American Economic Review, vol. 69, no. 4, pp. 493-513, 1979.

[54] T. Smith, Viable Values: A Study of Life as the Root and Reward of Morality. Lanham, MD: Rowman & Littlefield Publishers, Inc., 2000.

[55] J. Song and J. Baker, An integrated model exploring sellers' strategies in eBay auctions, Electronic Commerce Research, vol. 7, pp. 165-187, 2007.

[56] M. Spence, Signaling in retrospect and the informational structure of markets, The American Economic Review, vol. 92, no. 3, pp. 434-459, 2002.

[57] S. S. Standifird, M. R. Roelofs and Y. Durham, the impact of eBay's buy-it-now function on bidder behavior, International Journal of Electronic Commerce, vol. 9, no. 2, pp. 167-176, 2004.

[58] S. Standing, C. Standing and P. E. Love, A review of research on e-marketplaces 1997-2008, Decision Support Systems, vol. 49, no. 1, pp. 41-51, 2010.

[59] E. Stevens, Business Ethics. New York City, NY: Paulist Press, 1979.

[60] G. J. Tellis and G. G. Gaeth, Best-value, price-seeking and price aversion: The impact of information and learning on consumer choices, Journal of Marketing, vol. 54, no. 2, pp. 34 - 45, 1990.

[61] F. Ulbrich, T. Christensen and L. Stankus, Gender-specific on-line shopping preferences, Electronic Commerce Research, vol. 11, no. 2, pp. 181-199, 2011.

[62] M. J. C. Walley and D. R. Fortin, Behavioral outcomes from online auctions: reserve price, reserve disclosure, and initial bidding influences in the decision process, Journal of Business Research, vol. 58, no. 10, p.p. 1409-1418, 2005.

[63] S. Wang, S. E. Beatty and W. Foxx, Signaling the trustworthiness of small online retailers, Journal of Interactive Marketing, vol. 18, no. 1, pp. 53-69, 2004.

[64] D. L. Wann, M. P. Schrader, and A. M. Wilson, Sport fan motivation: Questionnaire validation, comparison by sport, and relationship to athletic achievement, Journal of Sport Behavior, vol. 22, no. 1, pp. 114-139, 1999.

[65] J. Woiceshyn, A model for ethical decision making in business: Reasoning, intuition, and rational moral principles, Journal of Business Ethics, vol. 104, no. 3, pp. 311-323, 2011.

[66] H. Zhang and H. Li, Factors affecting payment choices in online auctions: A study of eBay traders, Decision Support Systems, vol. 42, no. 2, pp. 1076-1088, 2006.

An Exploratory Look at Early Online Auction Decisions: Extending Signal Theory

John R. Drake
Dianne J. Hall
Casey Cegielski
Terry Anthony Byrd