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Content Analysis as a Predictive Methodology: Online Video Game Auctions on eBay

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**Abstract**

Using quantitative content analysis as a predictive methodology, a pilot study of 100 eBay auctions for one particular video game (*Call of Duty: Modern Warfare 2*) established a significant prediction of auction success (as measured via bidding volume) using multiple regression to test a persuasive communication model of credibility and attraction. After controlling for time left in the auction, a block containing features intended to attract buyer attention was highly significant, including such form variables as title capitalization, description font size, use of subtitles, and use of special symbols, and the substance variables of starting bid price and current bid. Contrary to expectations, a block containing features intended to communicate seller credibility (e.g., seller feedback ratings, return guarantee, pictures of the product) was non-significant. The development of this model using content analysis both raises theoretic issues and provides practical guidelines for success in the use of online auctions such as eBay.

## **Introduction**

As one of the earliest functions of the World Wide Web, electronic commerce (e-commerce) is no longer a new concept to many of the world's peoples (Blake et al., 2007; [www.internetworldstats.com](http://www.internetworldstats.com)). Corresponding to the rapid growth of the Internet, many online auction and shopping websites have emerged and come into human daily life. Among them, eBay, started in 1995, has now become one of the most dominant auction websites. By 2008, the number of eBay's employees had exceeded 15,000, and revenue of the company had reached almost \$7.7 billion ([www.wikipedia.com](http://www.wikipedia.com)). Despite criticisms of its operating procedures, including accusations of fraud and legal challenges to its requirement for sellers to use PayPal, eBay remains a viable forum for the exchange of goods via online connectivity.

Another interactive technology, that of video games, has become a pervasive mode of entertainment for people. According to the Entertainment Software Association (ESA) ([www.theesa.com](http://www.theesa.com)), 298.2 million video game units were sold in the United States in 2008, which translates to nine computer or video games sold on average every second of 2008. Such great sales volume resulted in \$11.7 billion in software revenue. Such a dramatically expanding industry also exerts a strong impact on economic development. A study conducted by ESA in 2008 reported that the entertainment software industry's annual growth rate exceeded 17% from 2003 to 2006, which added \$3.8 billion to the U.S. Gross Domestic Product (GDP) (ESA, 2008).

The fact that both phenomena—e-commerce and video gaming—are extensions of newer interactive technologies is for the most part incidental. However, when considering that online activities are particularly observable behaviors, and their measures are relatively easily collectible, archivable, and retrievable (Skalski, Neuendorf, & Cajigas, 2011), the study of e-commerce provides an unprecedented venue for the unobtrusive measurement of human

exchange processes via the method of content analysis. The application of e-commerce to the realm of video games is a fortuitous and rich intersection of two of the most rapidly adopted innovations in recent history (cf. Rogers, 2003).

What are important factors that may influence bidders' decisions to participate in a game auction on eBay? From a persuasive communication perspective, the current study will try to provide more knowledge about the question through content analyzing eBay game auction listings and shed light on the online auction. It is hoped that content analysis will serve as a viable methodology for the prediction of eBay success markers; the current study provides a pilot test of such a model for prediction.

### **Literature Review**

Numerous studies have examined factors that may affect consumers' online shopping decisions and behaviors. Knowledge gained from persuasive communication studies are also helpful in understanding mechanism behind the consumers' tendencies in online shopping. In this section, previous studies related to the present topic will be discussed to provide the study with theoretical and empirical foundations.

### **Empirical Research on E-commerce Websites**

Various factors have been found to have an impact on attracting e-consumers. Srinivasan, Anderson, and Donnavolu (2002) divided factors that may influence customers' loyalty to online shopping websites into eight categories: 1) Customization, which refers to the websites' ability to tailor products and service to individual customers; 2) contact interactivity means availability and effectiveness of customer support of a website; 3) cultivation refers to the extent that a website provides its customers with relevant information and incentives (e.g., Amazon may recommend other racing video games to you after you bought a copy of *Need for Speed 12* from

the website); 4) care refers the ability of a website to provide customers with information and service to facilitate customers' experience and relationship with the website (e.g., providing tracking information to customers after they buy products, or return service); 5) community represents the platform built by a website for its customers to share their opinions and communicate with each other (e.g., a customer can review service quality, or specific products on a retail website); 6) choice, which refers to the range and variety of products; 7) convenience means the usability and simplicity of a website; and 8) character refers to personality and creativity of a website (e.g., colors, logos, and style of a website). Srinivasan et al. found that among these eight factors, all except convenience had an impact on customer's loyalty to a retail website.

Torkzadeh and Dhillon (2002) studied factors that influence the success of Internet commerce. They developed two instruments, with a total of nine factors to measure means objective (forms of a website that help its customers achieve their objectives or purchases) and fundamental objective (substantive features that may influence customers' decisions and behaviors, such as product value and price), which are two sets of variables that may influence success of retail websites, earlier proposed by Keeney (1999). Specifically, five factors are used to measure means objective: Internet product choice, online payment, Internet vendor trust, shopping travel, and Internet shipping errors; the other four factor are used to measure fundamental objective: Internet shopping convenience, Internet ecology, Internet customer relation, and Internet product value. Blake, Neuendorf, & Valdiserri (2005) assessed 20 form and substantive website features (such as price incentives, easy returns, credit card safety, and product information) based on nine consumer value dimensions impacting online shopping sites proposed by Torkzadeh and Dhillon (2002), and Rogers' diffusion of innovations theory (2003)

as applied to consumers' Internet experience and innovativeness. They found a positive relationship between consumers' Internet experience and preference for substantive features; furthermore, consumers who are more innovative are more likely to manifest stronger preference for form features.

Many studies have also examined other factors that may influence retail websites' success. Shim, Eastlick, Lotz, and Warrington (2001) suggested that approval by referent others, such as families and friends, will influence attraction to a website. Yoo and Donthu (2001) indicated that consumers evaluate a website from four different dimensions; specifically, these four dimensions are ease of use, security, speed, and design. Chen and Wells (1999) suggested three dimensions that may be used by consumers to evaluate websites, which are: entertainment, information, and organization of a website.

These groundbreaking investigations on electronic commerce websites are informative and standard-setting; other recent studies that focus on more specific factors or new theoretical models, employing various methods, have also emerged and contribute to the literature. Cyr, Hassanein, Head, and Ivanov (2007), based on the technology acceptance model (TAM) (Davis, 1989), proposed a process model suggesting that the perceived usefulness, trust, enjoyment and perceived social presence of an e-commerce website will elevate consumers' loyalty to the website. Among their findings, the established positive relationship between the perceived social presence and consumers' loyalty is noteworthy, which implies some form or content features that make a retailing website sensitive and personal to customers, such as human or human-like contact, with the potential to build a long-term relationship with its customers (Cyr, Hassanein, Head, & Ivanov, 2007). Another study conducted by Chang and Chen (2009) also found that the form features of a retailing website, specifically customer interface quality (e.g., convenience,

interactivity, customization, and character), are positively associated with perceived security as well as customers' satisfaction, which will finally enhance customers' loyalty to the retailer. Furthermore, some recent studies focus on even more specific features of e-commerce websites. Schmutz, Roth, Seckler, and Opwis (2010) employed both self-report as well as eye-tracking technology to examine the effects of different presentation types (i.e., matrix vs. list) on consumers' shopping decisions and cognitive workload. Interestingly, their study found that the cognitive load of consumers who were exposed to a list presentation is significantly lower than consumers who were shopping through a matrix presentation, which indicates that a list presentation, compared with a matrix presentation, will facilitate consumers' ability to compare and select commodities more effectively.

Based on this discussion, it is quite clear that various methods have been employed to study the effects of different form and content features of e-commerce websites; however, a more direct and generalizable way of examining mediated messages, content analysis (Neuendorf, 2002; Riffe, Lacy, & Fico, 2005), is still underused. Furthermore, the previous discussed literatures were focussed on regular B2C (business to consumer) retailing websites. However, unlike Amazon and other retail websites, eBay, pursues a multi-faceted electronic commerce strategy, including B2B (business to business), B2C (business to consumer), and C2C (consumer to consumer) transactions, which stimulated it to become one of the largest electronic business organization on the Internet (Tan & Halavais, 2005).

At the same time, eBay does provides users with some similar services to "regular" e-commerce sites, such as recommendations based on past buying activity, a transaction tracking service, changeable interface, and customer support; however, in terms of specific operations, they are different from the regular retail website. For example, the overall template and look of



eBay auctions are actually are still similar even after editing; for customer support, buyers need to contact different persons based on different issues (e.g., contacting a specific seller for information about specific items, and contacting eBay's customer service for more general issues like fraud); on eBay, sellers compete with each other within the same website, but for regular retail websites, the competition happens between websites; and ultimately, eBay is more like a flea market, where various sellers sell their goods, and the perceived risk might be higher as a result. The unique properties of eBay make it a special case of e-commerce. Thus, in addition to the research on e-commerce reviewed above, a number of studies will be examined that have focused on the specific case of Internet auctions and eBay.

### **eBay and Related Research**

eBay provides people and business organizations with a powerful platform for trading goods and services. As the world's largest online auction site, the member size and trade volume of eBay have exceeded Amazon.com and Yahoo Auctions. By using a feedback rating system, eBay builds a credible market for strangers to trade in a virtual context. In this system, an individual's or organization's credibility will be evaluated by others after completing the transaction with the seller, and such evaluation will be cumulatively displayed on the seller's page as the feedback score. A higher positive score rated by more people indicates a higher trustworthiness of the seller; in contrast, a seller with a negative score may be prohibited from participating in auctions. According to Tan and Halavais (2005), the cumulative feedback score effectively indicates a seller's online reputation in electronic commerce. They also found empirical support for the fact that the feedback score has an influence on consumers' preference for purchasing. eBay also provides other ways to protect sellers and buyers, like PayPal (a third party payment system (although owned by eBay) that purportedly reduces the risks of the

transaction), although the enforced use of PayPal has come under criticism in recent years (en.wikipedia.org).

Since eBay's establishment in 1995, it has evolved into a competitive auction market. According to Laffont (1997), auctions are treated as incomplete information games. Hence, to maximize the bid price of an item, a seller has to try to minimize bidders' uncertainty about the item through indirectly providing information about the item to buyers, such as using pictures and verbal descriptions. In a study by Li, Srinivasan, and Sun (2009), the researchers categorized Internet auction features that may impact buyers' uncertainty into three categories: 1) possible direct quality indicators, which include picture postings, money-back guarantee, certification of product, and product description; 2) possible indirect quality indicators including minimum bid, hidden reserve price, and a Buy-It-Now option; and 3) possible seller credibility indicators such as seller's rating, third-party payment, certification of seller (i.e., certification provided by an independent third party with certain costs for the seller to support/guarantee the seller's credibility), credit card payment, and escrow service. Among those features, the authors found that the possible direct quality indicators and possible seller credibility indicators were positively related to the bidders' decision making and bidding amount. In another study, Cheema (2008) found that the notice of a surcharge has an impact on buyers' decision when the buyers are trading with a low reputation seller; however, such impact of a surcharge was found to be attenuated on consumers with low need for cognition. The researcher also suggested that consumers need a longer time to decide to buy from a low reputation seller. Further, White, Clapper, Noel, Fortier, and Grabolosa (2007) suggested that the product listings, such as title and descriptions, may influence buyers' decision.

While research on eBay has been popular in the business and IT fields, with several hundred articles produced since 1998, the literature that takes a communication perspective is much slimmer. Through the use of various methods such as experiments and mathematical models, the studies discussed above indeed contributed to our knowledge about online auctions. However, among all these studies, only two of them have used an actual systematic examination of auction listings via content analysis of eBay as a part of their methodology (Bandyopadhyay & Bandyopadhyay, 2009; Pavlou & Dimoka, 2006). In an effort to aid small-business owners using eBay, Bandyopadhyay and Bandyopadhyay developed a prediction of time required to reach a targeted bid level, the criterion typically used by B2C eBay sellers. By collecting bidding activity over time (every five minutes), the researchers produced a model based on the ebbs and flows of bidding traffic. Although their model predicted the optimal time to close an eBay auction, they noted that they did not take into consideration “many of the variables that affect the final bid level of online auctions, such as seller reputation” (p. 294).

Pavlou and Dimoka (2006) focused specifically on a typical online marker of seller reputation, feedback comments. Their content analysis of over 10,000 eBay text comments of 420 eBay sellers was collated with online survey data from a matched sample of 420 buyers who recently transacted with these sellers for an electronics product (of 10 distinct types, e.g., iPod, digital camera, DVD player). They found positive relationships among sellers’ positive feedback text comments, buyers’ trust in the sellers’ benevolence and credibility, and willingness by buyers to pay price premiums for auctioned products. Thus, the role of seller credibility in the online auction process has been established for a limited arena.

Thus, no content analytic studies have been conducted that reveal possible effects of certain form and content features of an auction on the results of a final transaction. Therefore,

using content analysis might be able to offer us a different method to examine online auction outcomes.

### **A Communication Foundation**

Examining Internet auctions from a communication research perspective, it is rational to consider the interaction between sellers and buyers as a process of communication. A seller communicates information about the product and self through a webpage to potential buyers. Through processing the information, buyers make decisions whether to participate in the trade. Hence, to compose an effective message about the product and self (i.e., features that are used to attract customers, describe products and convey seller reputation) is very important for a successful trade. Previous persuasive communication studies have suggested that credible and attractive sources are more effective in persuading people to behave in a desired direction (Perloff, 2007). Specifically, credibility can be defined as the attitude toward a source of communication held at a given time by a receiver (McCroskey, 1997). According to Perloff, three components of credibility of a communication source are expertise, trustworthiness, and goodwill. A source can have all three components in some situations; on the other hand, only possessing one or two of them is also effective in enhancing the source's credibility.

Social attractiveness is another important factor in persuasion. The term refers to a communicator's characteristics such as likability, similarity with message recipients, or physical attractiveness, which can effectively induce attitude change on message receivers.

Both credibility and social attractiveness are communicators' characteristics that may positively influence the effect of persuasion. In the Internet commerce context, the knowledge from persuasive research is inspiring and applicable.

### **Content Analysis as a Predictive Methodology**

In recent decades, scholars have begun to recognize the potential of quantitative content analysis for the prediction of message outcomes, as shown in examples that include news media content as predictive of public opinion on a wide variety of topics (e.g., Hertog & Fan, 1995; Zullo, 1991), news coverage of political races as an influence on voter behavior (Druckman & Parkin, 2005), and even the type of humor aimed at Republicans on *The Daily Show* as predictive of audience attitudes toward President Bush and Vice-President Cheney (Morris, 2009). The systematic, empirical study of diverse message characteristics, both manifest and latent, can provide a firm base for the subsequent analysis of the impact or performance of those messages in a wide variety of contexts. For example, Pardun, L'Engle, and Brown (2005) linked consumption of sexual content in six different media (as measured via content analysis) to subsequent sexual behaviors and behavioral intentions by adolescents. Important to our understanding of how a content analysis of e-commerce features might relate to outcomes, some studies of advertising have used content analysis to establish features of ad layout and copy as predictive of advertising readership (e.g., McQuarrie & Phillips, 2008).

eBay, as one of the most frequently used online auction websites, draws hundreds of millions of users to buy or sell all kinds of items every day. At the same time, as video games becoming more and more popular, the characteristics of this kind of commodity, such as relatively low price, easy shipping, and transferability (i.e., people might be likely to sell a video game after they finish it), make video games a good fit for online transactions; in fact, one can easily find a large number of auctions of video games on eBay at any time. Therefore, games might provide a good starting point for the application of content analysis as a method for predicting auction outcomes.

For the current study, it is hoped that content analytic variables will predict eBay “success”—i.e., auction bidding activity—with a robustness that provides a model for future unobtrusive predictive models of online behaviors. Thus, the application of this predictive methodological system to video game auctions should be viewed as a type of case examination or pilot study.

### **Research Question and Hypotheses**

According to the discussion above, sellers in an auction have to try to provide buyers with as much information as possible to reduce buyers’ uncertainty so that the trade can succeed. However, the context of Internet auctions is very different than the context of real world auctions or commerce in general. First of all, eBay sellers and buyers usually are total strangers---buyers have no information about the person with whom they may do business; secondly, buyers have not directly seen or touched the item that they may bid for--all the information about the item is provided by the seller, a total stranger; thirdly, sellers usually do not have a brick and mortar store—outside of email and the seller’s personal webpage, buyers cannot contact or locate the seller in person in the real world; lastly, after completing the transaction, the buyer usually cannot get the item immediately, rather they have to get the item through shipping. All four of these factors are likely to increase the uncertainty of buyers, which will have a suppressing impact on an auction. Hence, those sellers who can minimize the impact of these negative factors are more competitive in achieving successful transactions. In regard to the uncertainty brought by these negative factors, they are generated primarily because of a lack of credibility. Specifically, sellers are complete strangers to buyers, and buyers also know little about the items for which they are about to bid; the limited understanding between the buyers and sellers and

items induce the buyers' uncertainty about the quality of the sellers and items (i.e., their credibility) and produce hesitation in participating in the trade.

The literature suggests various website features that may attract consumers to shop. Some of these features can be considered as enhancing the credibility of the websites (e.g., customer care, community of a website, interactivity, easy return, and credit card safety), and others can be considered as enhancing attractiveness of the websites (e.g., website design, color, convenience, and downloading speed). Since communicators who possess the characteristics of credibility and attractiveness are more effective in persuading other people (Perloff, 2007), it is logical that those features that can improve credibility and attractiveness (i.e., features attracting buyer attention) of a seller and game auction listing will also positively influence the bidding results of the auction; consequently, two hypotheses are proposed:

H1: The higher the perceived credibility of an online auction listing and its seller, the more the bidders will favorably evaluate the auction listing, and participate in the auction.

H2: The higher the attractiveness of an online auction listing, the more the bidder will favorably evaluate the auction listing, and participate in the auction.

The present study also proposes a research question, which is:

RQ: What are important factors that may influence bidders' decisions to participate in a game auction on eBay?

## **Methods**

Incorporating previous marketing research and persuasion studies, the current study expands the definitions of source credibility and social attractiveness into new aspects. In online auctions, credibility is not only a source characteristic, but also can be expressed by the auction messages and images. Hence, the credibility can be defined as message features or characteristics

that are used by buyers to evaluate the qualities of a seller, auction listing, and auction item.

Since in Internet auctions, buyers usually do not have much specific information about the sellers and items, attractiveness, in this study, is defined more intuitively. Attractiveness refers to an auction listing's features or characteristics that can attract buyers' attention to the auction item. Based on the definitions of the constructs of credibility and attraction, some features examined in previous research fit these definitions accurately. Collecting from previous studies, credibility can be measured by sellers' feedback ratings, pictures of auction items (number and type of pictures of an item), specification of a return guarantee, and payment options; attraction is related to form features such as font choices, style of titles, and use of symbols, and substantive features such as descriptions of the item's condition, delivery and shipping specifics, and item pricing. The dependent variable, bidding activity, is viewed as the ultimate measure of online auction success.

The full content analysis codebook may be found in Appendix A.

## **Sampling**

The ultimate population for the current research is all video games auctions on eBay (except for "eBay Stores", and all the "buy it now" items). However, for this specific pilot exemplification, the population is all video game auctions on eBay for the video game, *Call of Duty: Modern Warfare 2*. According to GameSpot.com, *Call of Duty: Modern Warfare 2* ranked in the top 10 most popular video games among recently released video games on the website; moreover, there is also a large volume of units of the game available on eBay for auction, therefore, using this specific game in the study should be able to provide the analysis with good variance. The unit of sampling and data collection were the individual auction listing. The study



used a systematic random sampling method. A total of 100 auction listings were selected from all auctions of *Call of Duty: Modern Warfare 2* (XBOX 360 system).

### **Coding and Inter-coder Reliability**

Content analysis coding was conducted by two coders without knowledge of the study purpose. A subsample of 30 units was first coded by both coders for the purpose of testing inter-coder reliability. Since all the variables are measured at the ratio level or can be assumed (via dummy coding) to be ratio, four statistics (percent agreement, Cohen's kappa, Pearson correlation, and Lin's concordance coefficient) that are primarily used to test inter-coder reliability were applied by using the computer application PRAM (<http://www.geocities.com/skymegsoftware/pram.html>). Among 30 variables, 27 of them achieved good reliability; specifically, all 27 variables obtained a percent agreement above 90%, a Cohen's kappa at or above .776, a value of Pearson correlation above .85, and a Lin's concordance at or above .839. Among the other three variables, description font size had a relatively low percent agreement<sup>i</sup> (63%); after controlling for chance, Cohen's kappa for this variable was .568, in the acceptable range according to Banerjee et al. (1999; see also Neuendorf, 2009). However, both Pearson correlation and Lin's concordance for this variable were found to be highly acceptable, at or above .924. Two variables, payment options and deleting important information on title, obtained perfect percent agreement values (i.e., 100%); the other three statistics were incalculable due to lack of variance in the reliability subsample.

## **Results**

### **Sample Description**

Of the 100 eBay auction listings, the majority (84%) reported a seller's positive feedback percentage of 100%. The feedback scores ranged from -1 to 49383 (i.e., a positive score refers

to the total number of positive evaluations received by a seller; in contrast, a negative score means numbers of negative evaluation received), with 89% of them below 1000. Only 7% of the sellers showed certification; 38% provided a return guarantee. All auctions included at least one image, but 83% of them did not picture the exact item being auctioned but rather used a default product picture provided by eBay. The majority (58%) indicated the item condition to be brand new, with another 32% indicating “like new.” About half (49%) of the listings used as their title the game’s name exactly as indicated on the product; 26% added capitalization to the title, 24% added symbols (e.g., @, #, etc.) to the title, 40% added information (e.g., “fast shipping” or “original factory seal”) to the title beyond the game’s name, and 3% deleted important information (e.g., not using the official game title, but rather an acronym) from the title. About 40% of the auctions included a subtitle, with 46% of the subtitles using capitalization, and 61% of them adding symbols. Just over 90% of the listings included a seller-provided description of the auction item (Note: eBay allows sellers to do more editing on product descriptions, in terms of form features such as font color and size, than is allowed for titles). For the description, the most popular font size was 12 point, with 43% of listings; others ranged from 10 point to 36 point. Most sellers (76%) used only black font in the item description, with 12% using three or more font colors. Thirty percent used bold font, 11% used italics, 9% used underscoring, and 48% used capitalization in the item description. Shipping cost and speed were not specified in 15% of cases; when specified, the shipping cost was almost always (98%) \$4.00 or less. However, 41% of the listings indicated a delivery time of six days or greater.

The starting price for the game ranged from \$0.01 to \$55.99, with a mean of \$20.62. The current bid on the game ranged from \$0.99 to \$55.99, with a mean of \$35.51. Time left in the

auction ranged from 11 minutes to 9,840 minutes (nearly seven days), with a mean of 3402 minutes (56.7 hours). The number of bids ranged from 0 to 19, with a mean of 4.4.

The content analysis item measuring what payment options the seller provides was a constant—due to eBay’s current policies, all U.S. listings offer only PayPal. Thus, this feature was not available as a predictor in the regression analysis.

### **Hypothesis Testing/Addressing the Research Question**

Using hierarchical linear multiple regression, the current study attempts to test the hypotheses and answer the research question. Since most auctions included in the sample were not finished at the time of coding, in the regression, the first block was time left on the auction, to control time’s effect on the dependent variable of bidding activity. Credibility features were included as block 2, and attraction features as block 3.

#### **Positive Relationship between Credibility Features and Bidding Numbers.**

According to the results (see Table 1), the  $R^2$  Change for block 2, credibility, is .023,  $F_{(6, 92)} = .411$ ,  $p = .870$ , indicating that the credibility of a seller and his/her auction message do not have a significant contribution in predicting bidding behavior (after controlling for time left in the auction). In other words, when a bidder considers whether he/she should participate in a game auction on eBay, the game seller and auction message’s credibility related factors (e.g., seller’s feedback ratings, seller’s certification, return guarantee and auctioning pictures) do not significantly influence the bidder’s decision. The hypothesis that the higher the perceived credibility of an auction listing and its seller, the more the bidders will favorably evaluate the auction listing and participate in the auction is not supported by the results.

-----Table 1 about here-----

#### **Positive Relationship between Attraction Features and Bidding Numbers**

For the second hypothesis that predicts a positive relationship between the attractiveness of an auction message and bidding behaviors, the results support the predicted relationship. According to the results (see Table 1), the  $R^2$  Change of the third block, attraction features, is .548,  $F_{(21, 71)} = 6.029$ ,  $p < .001$ , which indicates that 54.8% of the variance of bidding behaviors on game auction listings can be explained by the attraction features of the game auction listing (e.g., title characteristics, item description font aspects, shipping details, and initial bid price).

### **Specific Influential Factors**

The study's research question asked what were the important factors that may influence bidders' decisions to participate in a game auction on eBay. Time left in the auction was included as the sole control variable in the first block of the regression. As seen in Table 1, the first block is significant in predicting bidding behavior ( $R^2$  Change = .121,  $F_{(1, 98)} = 15.536$ ,  $p < .001$ ). The variable of time left is negatively related with the dependent variable ( $r = -.348$ ,  $p < .001$ ), and has a significant unique contribution (final beta =  $-.225$ ,  $p < .05$ ) in predicting bidding numbers; in other words, the more time left to the end of the auction, the less the bidder will participate in the auction, and the lower the bidding numbers. This is to be expected, and verifies the value of including time left as an initial control variable.

As noted, the second block, that comprised of credibility indicators, does not contribute significantly to the prediction. Nor do any of the six specific credibility features show any one-on-one, bivariate correlations with bidding behaviors. The third block, a large set of attraction features of various types, is significant in total and includes several significant and near-significant unique contributors to bidding volume. The major unique contributors are starting price (final beta =  $-.797$ ,  $p < .001$ ) and current bid price (final beta =  $.406$ ,  $p < .001$ ). Taken

together, these coefficients indicate that a large differential in the posted price—i.e., from a low starting price to a high current price—is related to greater bidding volume. Two additional variables have unique contributions of note: Font size (final beta = .179,  $p < .10$ ) and capitalization of the title (final beta = .274,  $p < .05$ ). Taken together, these relationships show that capitalizing the posting's title and using a larger font size will be predictive of greater bidding volume.

Several other relationships are noteworthy. Final beta coefficients indicate unique contributions, after all other predictor variables are taken into account (i.e., controlled for); the zero-order correlation coefficients also tell a story of important relationships between independent and dependent variables. Independent variables that have significant correlations with the dependent measure may not have significant beta weights, due to intercorrelations among the predictors; however, this does not mean that these independent variables are unimportant to an understanding of the dependent variable, in this case, the dynamics of bidding behavior. Thus, it is interesting to note that greater bidding volume is related to, in zero-order relationships: Capitalization of the title ( $r = .156, p < .10$ ), adding symbols to the title ( $r = .155, p < .10$ ), not deleting important information from the title ( $r = -.162, p < .10$ ), having a subtitle ( $r = .178, p < .05$ ), indicating a lower shipping cost ( $r = -.170, p < .05$ ), and listing a lower starting price ( $r = -.617, p < .001$ ).

In sum, 69% of the variance in bidding volume (57% adjusted  $R^2$ ) can be explained by the three blocks together. Consumers' bidding decisions can be predicted by the time left to the end of an auction and by attraction features of the auction. Specifically, time left is negatively related to the bidding numbers, and attractiveness of an auction listing is positively related with the bidding numbers.

### **Discussion**

In a pilot investigation of the viability of content analysis as a predictive methodology for online behaviors, the current study examined the factors that can influence bidding numbers of an online game auction on eBay. Factors such as starting price, current bid price, key features of the title of an auction listing, and the time left to the end of the auction were found to be significantly influential via this new effort in electronic commerce research.

Furthermore, the study also found that credibility factors are not significant in influencing bidders' bidding behaviors. Incorporating this result with the "constant" of payment options, it may become more understandable. The study confirmed that all the auction listings indicated that PayPal must be used; PayPal is intended to protect buyers from fraud. Even if a buyer encounters fraud, he/she still can get their money back from PayPal; hence, in such a safe context, seller and message credibility may not be an essential factor in influencing bidders' decisions.

The study found attraction features to be quite important, although not all features performed as expected. A predictive methodology implies a practical outcome—i.e., on the basis of content analysis, being able to create messages that will have specific, successful outcomes. What predictors and correlates of successful bidder activity are controllable by the video game eBay seller? In this case, only select attraction features proved to be important. The following summarizes the practical advice that might be given to an eBay seller on the basis of this study:

1. The title: Use capitalization, add eye-catching symbols, and make sure not to delete important information from the title (e.g., use the full name of the product)
2. Include a subtitle.
3. Use a large font for the product description.

4. Indicate as low a shipping cost as possible.
5. Begin with a low starting price for the product.

It is equally informative to examine what auction listing features were *not* found to be related to bidding volume. The following summarizes what factors did not make a difference with regard to buyer activity:

1. Seller credibility characteristics—feedback score, feedback percentage, and seller certification, a return guarantee, and pictures of the product—number and content
2. Information on the item's condition
3. Title features—adherence to the default title, adding information to the title
4. Subtitle features—capitalization, adding symbols to the subtitle
5. A seller-added description
6. Description font (other than size)—colors, bolding, italicization, underscoring, general capitalization
7. Shipping—estimated days for delivery, range of shipping

It is important to remember that while this pilot investigation demonstrated the efficacy of using content analysis to predict eBay activity, the study has necessarily focused on just one very specific product: The video game *Call of Duty: Modern Warfare 2*. Factors that draw bidders to auctions for this action-packed game may not be the same as those that will attract bidders to auctions for jewelry, classic movies, or sporting goods. Certainly, each product type may tend to have a particular bidder profile, and therefore a unique predictive equation for its bidding success. The method demonstrated here ought to be applied to auctions of a variety of product types to test for robustness and to document differences in the model across types.

In terms of theoretical implications, the current study also provides partially support to the previous literatures on persuasion. Although the results surprisingly fail to support credibility as one significant predictor of bidding behaviors, attractiveness does play an important role in bidding transactions, which theoretically confirms the positive effects of attractiveness on enhancing people's evaluation on sellers and websites. Moreover, as has been discussed above, the possible role played by PayPal in eBay transactions might also be considered as a form of credibility guarantee, which is also consistent with previous persuasive theories; however, further studies on the effects of PayPal still needed to confirm such assumption and extend our knowledge.

In future studies, combining content analysis with other research methods could provide more details about the dynamics of online bidding behavior. For example, through merging the content analysis of auction listings with surveys of consumers' responses to those auction listings' features, additional information about the persuasion mechanisms at play may be attained, which will be very useful in guiding online auction design. Additionally, future studies could use a longitudinal rather than cross-sectional design, in order to track the over-time dynamics of the online auction environment.



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Table 1. Results of Hierarchical Linear Multiple Regression Predicting Bidding Volume

Block	Independent Variable	<i>r</i>	Final Beta	R <sup>2</sup> change
Block 1: Time left				.121***
	V30 time left in auction	-.348***	-.225*	
Block 2: Credibility Features				.023
	V2 feedback score	.026	-.004	
	V3 feedback percentage	-.059	-.095	
	V4 seller certification	.063	-.100	
	V5 number of pics	.020	-.056	
	V6 pics showing exact product	.012	.067	
	V7 return guarantee	.081	.039	
Block 3: Attraction Features				.548***
	V9 item condition	.036	.058	
	V10 use of default title	.063	.156	
	V11 title capitalization	.156 <sup>a</sup>	.274*	
	V12 title added symbols	.155 <sup>a</sup>	-.068	
	V13 title added information	.003	-.032	
	V14 title deleted information	-.162 <sup>a</sup>	.027	
	V15 subtitle	.178*	.073	
	V16 subtitle capitalization	.088	.062	
	V17 subtitle added symbols	-.021	-.002	
	V18 seller added description	.021	-.006	
	V19 description font size	.105	.179 <sup>a</sup>	
	V20 description font colors	.020	-.111	
	V21 description bold	.116	.000	
	V22 description italic	.050	.097	
	V23 description underscore	.026	.058	
	V24 description capitalization	.009	-.142	
	V25 shipping cost	-.170*	-.072	
	V26 speed of delivery	.130	.101	
	V27 range of shipping	-.011	.022	
	V28 starting price	-.617***	-.797***	
	V29 current bid price	.038	.406***	

Total Model

R<sup>2</sup> = .693Adjusted R<sup>2</sup> = .571F<sub>(28,71)</sub> = 5.712\*\*\*NOTE: <sup>a</sup> -  $p < .10$ ; \* -  $p < .05$ ; \*\* -  $p < .01$ ; \*\*\* -  $p < .001$ 

NOTE: An examination of tolerances and condition indexes revealed no multicollinearity concerns.

## Appendix A

### Online Game Auction Study Content Analysis Codebook

#### I. Sampling Strategy

1. Go to [www.ebay.com](http://www.ebay.com)
2. Input “Call of Duty: Modern Warfare 2 XBOX 360” into search box, and select Category as “Video Games”, then search.
3. In results page, select “Call of Duty: Modern Warfare 2 (Xbox 360, 2009)” in “Popular Products” menu.
4. In “preference” menu, check “Auction”
5. Sort the results according to “Best match”
6. Based on the formula:

$$\frac{\text{Results number}}{30} = \text{Skip Interval (X)}$$

obtain the skip interval. Start with a random number auction listing between 1 and X generated by <http://www.random.org/integers/>, and select every Xth unit as sample.

#### II. Screening the results

Use the following criteria to determine whether the auction listing will be included in the sample:

1. Whether the auction listing is selling the video game?
  - A. Yes, it is selling the video game *Call of Duty: Modern Warfare 2*.
  - B. Yes, but the game being sold is not *Call of Duty: Modern Warfare 2*.
  - C. No, it is selling accessories of the game *Call of Duty: Modern Warfare 2*.

Only if the answer to 1. is A, include the listing in the sample.

#5 and #6 Picture(s)

#4 Seller's  
certification#15- 17  
Subtitle#9 Item  
condition

**NEW Call of Duty: Modern Warfare 2 (Xbox 360, 2009)**

**\*\*NEW FACTORY SEALED\*FREE FAST SHIPPING\*IN STOCK NOW\*\***

Item condition: **Brand New**

Time left: 7h 48m 39s (Dec 07, 2009 06:21:58 PST)

Bid history: 8 bids

Current bid: **US \$56.00**

Your max bid: **US \$**  **Place bid**

(Enter US \$57.00 or more)

**Watch this item**

Shipping: **FREE shipping** US Postal Service First Class Mail | [See all details](#)  
Estimated delivery within 5-8 business days

Returns: **No Returns Accepted**

Coverage: Pay with **PayPal** and your full purchase price is covered | [See terms](#)

**Top-rated seller**

**cheaven078** (209 ★)

100% Positive feedback

- Consistently receives highest buyers' ratings
- Ships items quickly
- Has earned a track record of excellent service

[Ask a question](#)

[Save this seller](#)

[See other items](#)

**Other item info**

Item number: 220522547267

Item location: Kansas, United States

Ships to: United States

Payments: PayPal [See details](#)

[Share](#) [Print](#) [Report item](#)

Stock photo

General product  
information  
provided by eBay

## Description Shipping and payments

## Item specifics - Video Games

Platform: Microsoft Xbox 360

Rating: M - Mature

Condition: Brand New

UPC: 047875837492

Publisher: Activision Inc.

Genre: Shooter

Sub-Genre: --

Format: NTSC (N. America)

Release Date: Nov 10, 2009

[See reviews](#)

## Detailed item info

## Description

Return to today's war front with the second chapter in the Modern Warfare series. Modern Warfare 2 continues the gripping and heart-racing action as players face off against a new threat dedicated to bringing the world to the brink of collapse. Playing as Sgt. Gary "Roach" Sanderson, your international squad of elite soldiers battle through harrowing combat scenarios that range from snowy mountaintops in Siberia to the crowded streets of Rio de Janeiro, Brazil and beyond, facing a terrorist force hellbent on redefining the boundary lines of today's modern warfare. Players can face the threat alone or with other players in cooperative SpecOps mode. For even more intense combat, take up arms against online foes in enhanced deathmatch warfare on a host of Modern Warfare 2 maps.

## Special Features

- Epic single-player campaign picks up immediately following the thrilling events from Call of Duty 4: Modern Warfare.
- The definitive multiplayer experience returns, with a host of new perks and enhancements.
- New cooperative SpecOps mode, the perfect combination of Modern Warfare's single-player intensity and the addictive replayability of its multiplayer.

## Details

Memory Card: No(0)

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#8 Payment options

#25 Shipping cost

#26 Delivery time

#27 Shipping range

#18- 24 Description  
provided by the

**YOU ARE BIDDING ON A BRAND NEW, FACTORY SEALED JUST RELEASED 11-10-2009 GAME, CALL OF DUTY: MODERN WARFARE 2 FOR THE XBOX 360!!**

**HOTTEST GAME AROUND!!**

**NO ONE IS BETTER AT DELIVERING JAW-DROPPING ACTION MOMENTS THAN INFINITY WARD!!**



#10 - 14 Title of auction listing

#30 Time left

#28 Starting price, click here.

#31 Current bid number.

#29 Current bid

#2 Seller's feedback rating

#3 Feedback percentage

The screenshot shows an eBay auction for a brand new, factory-sealed Xbox 360 game, Call of Duty: Modern Warfare 2. The seller is 'cheaven18', a top-rated seller with 100% positive feedback. The current bid is \$56.00, and there are 8 bids. The time left is 7h 48m 39s. The listing includes a stock photo of the game box, a 'FREE shipping' badge, and a 'Top-rated seller' badge. The shipping details show 'FREE shipping US Postal Service First Class Mail' with an estimated delivery within 5-8 business days. The return policy is 'No Returns Accepted'. The listing also shows other item information, including the item number 220522547267, item location in Kansas, United States, and shipping to the United States. The payment method is PayPal.

#7 Return Guarantees

**Description**   **Shipping and payments**

**Item specifics - Video Games**

Platform:	Microsoft Xbox 360	Genre:	Shooter
Rating:	M - Mature	Sub-Genre:	--
Condition:	Brand New	Format:	NTSC (N. America)
UPC:	047875837492	Release Date:	Nov 10, 2009
Publisher:	Activision Inc.		

[See reviews](#)

**Detailed item info**

**Description**

Return to today's war front with the second chapter in the Modern Warfare series. Modern Warfare 2 continues the gripping and heart-racing action as players face off against a new threat dedicated to bringing the world to the brink of collapse. Playing as Sgt. Gary "Roach" Sanderson, your international squad of elite soldiers battle through harrowing combat scenarios that range from snowy mountaintops in Siberia to the crowded streets of Rio de Janeiro, Brazil and beyond, facing a terrorist force hellbent on redefining the boundary lines of today's modern warfare. Players can face the threat alone or with other players in cooperative SpecOps mode. For even more intense combat, take up arms against online foes in enhanced deathmatch warfare on a host of Modern Warfare 2 maps.

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**Details**

Memory Card: No(0)

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**YOU ARE BIDDING ON A BRAND NEW, FACTORY SEALED JUST RELEASED 11-10-2009 GAME, CALL OF DUTY: MODERN WARFARE 2 FOR THE XBOX 360!!**

**HOTTEST GAME AROUND!!**

**NO ONE IS BETTER AT DELIVERING JAW-DROPPING ACTION MOMENTS THAN INFINITY WARD!!**



**III. Coding Scheme**

1. Coder ID. \_\_\_\_\_

**A. Credibility**

2. What is current seller's feedback rating score? (Open ended question) \_\_\_\_\_
3. What is current seller's feedback percentage? (Open ended question. Just record the numerator, for example: -94% is recorded as -94, 85% is recorded as 85) \_\_\_\_\_
4. Does the current seller have any seller certification? (For example: Top-rated seller certification, or Power seller)
  0. No
  1. Yes
5. Including the title picture, how many pictures of the auctioning item does the seller provide? (Open ended question) \_\_\_\_\_
6. Among these provided pictures, how many of them are the representation of the exact auctioning item.
  0. None of them.
  1. Just 1 picture
  2. 2 pictures
  3. 3 pictures
  4. More than 3 pictures
7. Does the seller provide return guarantee for the current auctioning item?
  0. No
  1. Yes
  9. Not specified
8. What payment options does the seller provide? (For this question, "other payment options" is defined as all the payment options except PayPal, such as check, money order, and credit/debit card)
  1. Only PayPal
  2. PayPal and other payment options
  3. Only other payment options
9. What is the item condition indicated by the seller?
  1. Brand new
  2. Like new
  3. Very good
  4. Acceptable
  5. Not specified

**B. Attractiveness**

Questions 10 – 14, Comparing with the default title of auction listing of the item, the current title is:

(The Default Title: The default title of the game on eBay auction list is:

"Call of Duty: Modern Warfare 2 (Xbox 360, 2009)")

10. Exactly same with the default title
  0. No
  1. Yes
11. Differently capitalizing letters than the default title  
 (Examples: "CALL OF DUTY: MODERN WARFARE 2 (XBOX 360, 2009)", or "SEALED Call of Duty: Modern Warfare 2")
  0. No

1. Yes
  12. Adding new symbols (Do not code symbols that are using grammatically):  
(Examples: “\*\*New Call of Duty: Modern Warfare 2 (Xbox 360, 2009)\*\*”, or “\$\$\$Call of Duty: Modern Warfare 2!!”)  
    0. No
    1. Yes
  13. Adding information that are influential in selling the item  
(Examples: “MINT Call of Duty: Modern Warfare 2”, or “Call of Duty: Modern Warfare 2! FREE SHIPPING!!”)  
    0. No
    1. Yes
  14. Deleting information that is influential in selling the item?  
(Example: “Call of Duty FREE SHIPPING”)  
    0. No
    1. Yes
- Questions 15- 17, does the current auction listing:
15. Have a subtitle?  
    0. No
    1. Yes
  16. Capitalize all or partial letters of the subtitle with an intention of emphasizing certain information  
(Examples: “BRAND NEW AND FAST SHIPPING”, or “Brand new and FAST SHIPPING”)  
    0. No
    1. Yes
    9. Not applicable
  17. Adding symbols (Do not code symbols that are using grammatically)  
(Examples: @, #, \$, %, ^, \*, and etc.)  
    0. No
    1. Yes
    9. Not applicable
- Questions 18- 24 are all about the description provided by the seller:
18. Besides the general product information provided by eBay, did the seller write specific description about the item being auctioned.  
    0. No
    1. Yes
  19. Which one is the most like the biggest font size of the description added by the seller  
    1. FONT size (8 pt.)
    2. FONT size (10 pt.)
    3. FONT size (12 pt.)
    4. FONT size (14 pt.)
    5. FONT size (18 pt.)
    6. **FONT size** (24 pt.)

## 7. FONT size (36 pt.)

9. Not applicable
20. How many font colors did the seller use in the seller added description of the item?
  1. Only Black
  2. Only one non-black color
  3. 2 font colors
  4. 3 font colors
  5. More than 3 font colors
  9. Not applicable
21. Does the seller use **Bold** font in the description of the item?
  0. No
  1. Yes
  9. Not applicable
22. Does the seller use *Italic* font in the description of the item?
  0. No
  1. Yes
  9. Not applicable
23. Does the seller underline certain text in the description of the item?
  0. No
  1. Yes
  9. Not applicable
24. Does the seller use CAPITALIZATION in the description of the item? (Do Not record normal capitalization)
  0. No
  1. Yes
  9. Not applicable
25. What is the amount of shipping cost?
  1. Free shipping
  2. Equal or less than \$4.00
  3. More than \$4.00
  9. Not specified
26. How many days are needed for delivery? (Record based on maximum estimated days)
  1.  $\geq 6$  days
  2. 4 to 5 days
  3. 2 to 3 days
  4. 1 day
  9. Not specified
27. What is the range of shipping?
  1. U.S only
  2. U.S and Canada
  3. Worldwide
  9. Not specified
28. What was the starting price of the item? Click the number of bids beside the “Bid history” for the starting price. (Open ended question) \_\_\_\_\_

29. What is the current bid of the item? (Open ended question) \_\_\_\_\_
30. How much time left to the end of the current auction? Please convert to unit of minute  
(Open ended question) \_\_\_\_\_
31. How many bids have been placed on the current auction? (Open ended question)  
\_\_\_\_\_

## Notes

---

<sup>1</sup> Although a manifest variable, font size is not easily measured in a reliable fashion due to variations in screen settings across computers. An alternative coding method might be to use the copy and paste function to copy words on a webpage to Word software. Thus, coders would get more accurate font size values, which should result in greater agreement/covariation between coders. However, such a method may not be applicable to some websites with specific encoding and settings; furthermore, such a tedious operation is not very efficient when coding a large number of units.