

# Descriptive Asymmetries In Evaluative vs Non-Evaluative Framing of The Dollar Auction Implications for Theories of Escalation of Commitment

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## 1.) Introduction

The dollar auction, first described by Shubik<sup>1</sup>, is a classic example of an escalation of commitment or entrapment scenario described by von Neuman<sup>2</sup> and Campbell<sup>3</sup>. Specifically, the dollar auction is a logical game played with multiple players. The game leader auctions a dollar, and the two or more players bid on it. The winner pays their bet and gets the dollar; the second highest bidder pays their bet and gets nothing. In practice, once people begin bidding, they will escalate their commitment (increase their bids). Often, the bids build up long past the point when either player could gain anything from winning. The game model is similar to the War of Attrition game and the All-pay Auction.

In escalation of commitment scenarios, decision makers initially commit resources—money, time, reputation, etc.—in order to achieve some goal or goals. After the initial resource commitment, decision makers must repeatedly choose whether to allocate further resources under uncertainty and after receiving negative feedback about prior resource allocations. Escalation of commitment eludes explanation by traditional economics since traditional microeconomics supposes that decision makers maximize expected utility, i.e., microeconomics predicts that rational decision makers will choose the option with the highest utility, where utility equals the probability of an expected outcome multiplied by the value assigned to the outcome by the decision maker. According to accounting and economics texts normative criteria for investments dictate that one should invest resources only when marginal (future) benefits exceed marginal costs. Judged by the economic norms, subjects in the dollar auction make a series of increasingly irrational decisions (irrational in terms of maximizing utility).

Empirical research shows the ubiquity of escalation of commitment phenomena in human decision making. For example, why do companies offer free trials and/or introductory rates for products and services? In many cases, the companies hope that people will make an initial commitment to products and services. After the initial commitment the shopper becomes more likely to escalate commitment and pay higher rates. Thus, the companies hope to exploit escalation of commitment to make sales with shoppers who would not, and did not, commit to the new terms based on the value initially assigned to the product or service.

Researchers study escalation of commitment in single individual judgments,<sup>4-37</sup> serial individual judgments,<sup>37-43</sup> single group judgments,<sup>35,44-50</sup> serial group judgments.<sup>51-55</sup> Likewise, researchers study escalation in financial decisions,<sup>12,44,54,56,57</sup> performance evaluations,<sup>43,49,58,59</sup> product development,<sup>55,60,61</sup> public policy decisions,<sup>62,63</sup> gambling,<sup>38,52,64</sup> across-cultures,<sup>14,65,66</sup> in lower animals,<sup>67</sup> etc.. Despite the ubiquity of escalation of commitment, research also indicates that decision makers exhibit notoriously

large variability in escalation across a wide range of escalation scenarios.

Thus, researchers pursue three investigative goals regarding escalation of commitment. First, researchers try to understand the mechanisms behind escalation of commitment. Second, they seek to understand how these mechanisms shape an agent's reaction to individual cases so as to yield variation in the tendency to escalate their commitments. Following Staw & Ross<sup>10</sup> most researchers explain escalation of commitment by appealing to four classes of escalators; project determinants, sociological determinants, organizational determinants, and psychological determinants. A person's perception of the objective aspects of a situation as well as its outcomes and their utility fall under the category of project determinants. Project determinants include the such features as projected future expenditures, expected payoffs, track-record of successes and failures, and closeness to completion. Sociological determinants include the agent's perception of the their connection to the situation in the eyes of others, their relative status, the group dynamics, etc.. When commitment decisions involve organizations such as a corporation or government agency, the properties of the organization itself can lead to escalation. For instance, many large companies are slow to recognize and evaluate changes in a situation, communication and logistic difficulties hamper action, and changes may face political resistance. These features collectively create an organizational inertia, which can foster and sustain escalations of commitment.

The two major psychological theories purporting to explain escalation of commitment are the self-justification theory<sup>6-10,33,37,45,61,62</sup> and prospect theory,<sup>4,29,36,68</sup> though several researchers also investigate the role of various emotions.<sup>15,18,23,24,27</sup> Researchers advocating self-justification theory hypothesize that agents escalate commitment because they do not wish to admit errors in judgment. Researchers like Whyte seek to understand escalation of commitment using prospect theory. Daniel Kahneman and Amos Tversky introduce prospect theory in their 1979 paper, "Prospect Theory: An Analysis of Decision under Risk."<sup>69,70</sup> Prospect theory asserts that people exhibit higher risk aversion when choosing between greater or lesser gains and lower risk aversion when choosing between greater or lesser losses. As a result prospect theory accurately predicts that people tend to choose options portrayed as gains over options portrayed as losses, even when the expected utility for the choices is the same. For instance, people tend to favor bets described as having a 1/10 chance of winning a dollar over bets described as having a 9/10 chance of losing a dollar. Whyte describes his hypothesis as follows:<sup>4</sup>

A decision made pursuant to positive feedback will be construed as a choice between gains, whereas a decision made pursuant to negative feedback will be construed as a choice between losses. In the former situation, behavior which is risk averse will be observed.<sup>4</sup> (p.312)

In other words, prospect theory predicts that people who perceive an escalation as a choice between potential gains, where the escalation involves increased risk for additional gains, will tend to exhibit risk aversion resulting in diminished tendency to escalate. In contrast people who perceive an escalation as a choice between potential losses, where the escalation involves increased risk for lower losses, will tend to exhibit less risk aversion resulting in increased tendency to escalate.

## Methods

Most research into self-justification uses the degree of responsibility paradigm in which researchers

dissociate responsibility from commitment by presenting subjects with two scenarios. In one scenario, the lower the responsibility scenario, subjects choose whether to escalate commitment to a course of action originated by another individual. In the second, high responsibility scenario, the subject chooses whether to escalate commitment to a course of action that they originate. The underlying logic of the degree of responsibility paradigm is that that lower senses of responsibility for a commitment should cause a proportionally lower need for self-justification. However, we agree with Schulz-Hardt *et al*<sup>31</sup> that the degree of responsibility paradigm conflates preference and responsibility. High responsibility subjects, those who initially choose a course of action, also prefer that course of action over alternatives, making them more likely to escalate their commitment. On the other hand, many lower responsibility subjects, those who do not make the initial choice, but instead choose whether to escalate another's commitment, may not prefer the choice, making them less likely to escalate. Thus, we choose to measure escalation of commitment without varying degree of responsibility. In our experiment all of the subjects choose to bid in the auction. As a result, comparisons within and between groups occurs at the same degree of responsibility and with the same preferences.

Similarly, most experiments measure escalation of commitment as either new investment or as the amount of new investment for a single judgment. In single judgment experiments subjects read a vignette then make a single judgment regarding reinvestment. In some experiments subjects merely answer yes or no, while in others subjects decide upon an amount to invest. We suspect that the latter experimental design conflates variation in subject valuations of the investment amount, while the former offers no real measure of degree of escalation. Thus, we choose to measure escalation of commitment by the number of standardized incremental bids.

This experiment directed 23 people to a webpage containing the Dollar Auction Java program. The program randomly assigns subjects to one of four scenarios. The program describes the auction and prompts subjects to choose whether or not to bid on the auction. After an interval of random length the program tells subjects they have been outbid, describes the next bid according to the experimental group to which it assigns that subject, and asks subjects to choose to bid again (escalate) or stop bidding (accept sunk costs). The auction continues until subjects chose to stop bidding or run out of money. Escalation is measured by the number of escalating bids. The program records results in coded form for collection.

The experimental groups fall into two broad classes. The neutral control class presents bids in a non-evaluative context lacking both quantitative and qualitative evaluative information (such as bid amounts or descriptions having positive/negative valence). Specifically, the program tells subjects, "You've been outbid. You still have money left, you can bid again or quit."

The evaluative experimental groups test the two leading theories of escalation by providing the theory-specific evaluative information. The winning and losing scenarios test the predictions of prospect theory, i.e., people tend to show greater risk aversion when evaluating choices about gains than when evaluating choices about losses. The losing scenario describes bids as a choice between losses. It says, "Unless you bid now, you will lose X money and be left with X money." The winning scenario portrays bidding as a chance to possibly win money, or at least save it, and also provides evaluative information. It tells players, "If you bid now, you have a chance to win X money."

Finally, the program tests the predictions of self-justification theory, which states that people escalate because they do not want to admit error in having made a decision. In the mistake scenario the program portrays bidding as an error in judgment saying, “You are outbid. Either you can bid again or you can admit your error in bidding and stop.”

## Results

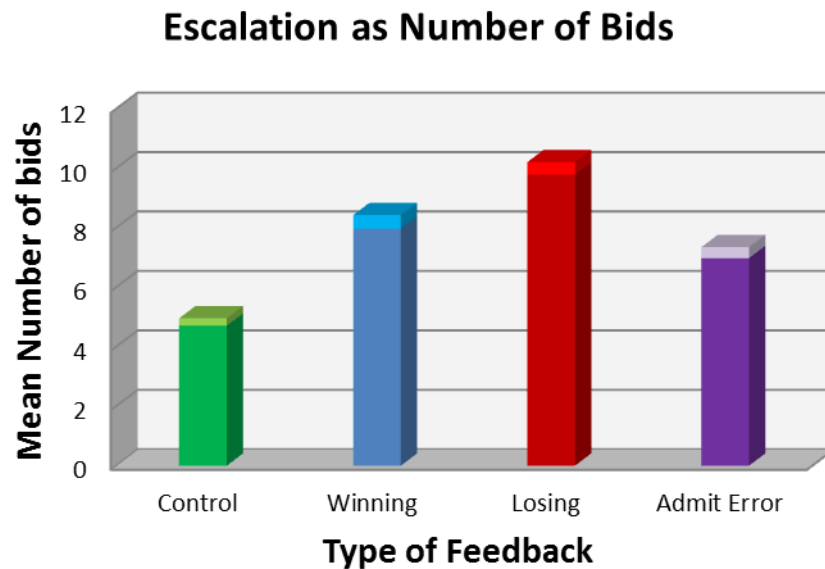
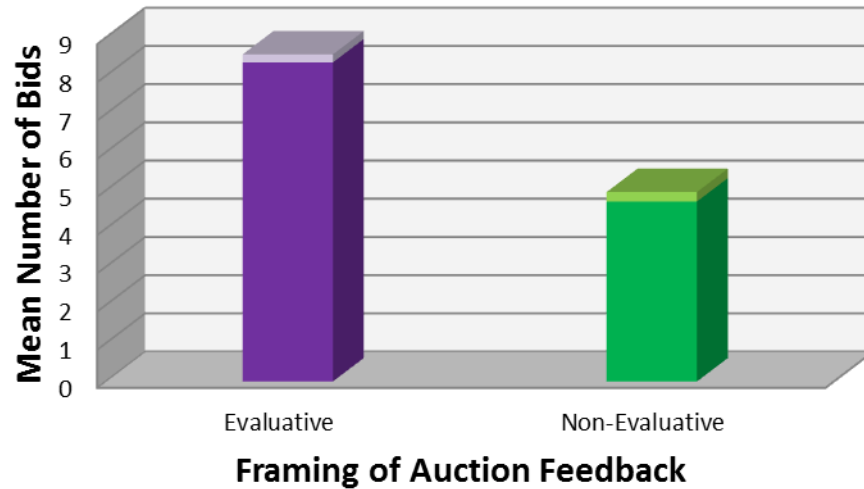


Figure #1 (above) presents escalation as mean number of bids for the four experimental groups identified by type of feedback. Figure #2 (below) presents escalation as mean number of bids for subject grouped by non-evaluative feedback (control) and all evaluative feedback groups. Figure #3 shows t-score and p-values for pairwise comparisons between each evaluative group, non-evaluative vs combined evaluative, and individual evaluative groups vs the other combined evaluative groups.

## Evaluative vs Non-Evaluative Feedback



### Pairwise Welch-Corrected T Scores and p-values For Differences Between Experimental Groups

	Winning	Losing	Admit Error	All Evaluative
Non-evaluative N=6	t=0.956 p=0.192	t=1.715 p=0.057	t=0.759 p=0.236	t=1.79 p=.046*
Winning N=5		t=0.435 p=0.337	t=0.247 p=0.41	t=0.18 p=0.43
Losing N=9	t=0.435 p=0.337		t=0.752 p=0.233	d=0.719 p=0.483
Admit Error N=6	t=0.247 p=0.41	t=0.752 p=0.233		d=0.654 p=0.264

### Discussion

The literature on escalation of commitment treats the two main psychological theories, prospect theory and self-justification theory, as mutually exclusive and jointly exhaustive alternatives. Likewise, each theory purports to explain all cases of escalation. However, experiments testing both theories clearly demonstrate escalation in some cases. We believe our experimental results provide strong support for the hypothesis that escalation exhibits content effects like those in the reasoning literature. Specifically, evaluative framing (as opposed to non-evaluative framing) appears to cause greater escalation than any particular sort of evaluative information. Thus, the bulk of escalation appears to result from framing choices using evaluative frameworks, with only small differences attributable to the specific information associated with the two theories. We perform pairwise comparisons between mean bid numbers for all experimental groups as well as between each group

and the class of all alternative evaluative groups. Only the t-scores for differences between the non-evaluative control group and the combined evaluative group have significant p-values. Within the evaluative groups, the data indicates that framing in terms of winning and losing (prospect theory) causes greater escalation than admission of error (self-justification theory).

The hypothesis that evaluative framing causes the majority of escalation of commitment also accommodates research suggesting affective states influence escalation. The connection between affect and evaluative decisions has been demonstrated at both the psychological and neurophysiological level.

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