# The Dollar Auction

*Teaching Notes*

By J. Keith Murnighan

## Overview

In 1971, Yale professor, Martin Shubik, now emeritus, introduced an exercise that he called the Dollar Auction (The dollar auction game: a paradox in noncooperative behavior and escalation. *Journal of Conflict Resolution, 15*, 109-111). With time and inflation this auction has now become the $20 Auction. It is an attention-riveting exercise that is useful for teaching about auctions, escalation of commitment, loss aversion, emotions, and one-on-one conflict. This exercise can be scheduled early in classes focusing on negotiations, general management, organizational behavior, or decision making. It can then be connected to any number of concepts that might be introduced later in the course. Alternatively, it can be used at the end of a course to show how seductive some of these concepts can be.

The exercise takes about 2 minutes to explain, 5-15 minutes to run, and 20-30 minutes to debrief.

It helps to have 20 or more people participating in the exercise to generate sufficient bidding to make the exercise interesting. You may not get enough bidding with groups smaller than 10.

These teaching notes explain the rules for running the exercise, some general recommendations for teachers, and share several stories about extreme outcomes.

## Supplementary Material

Murnighan. (2002). A very extreme case of the dollar auction. *Journal of Management Education*, 26: 56-69.

Malhotra, Ku, & Murnighan. (2008). When winning is everything. *Harvard Business Review* May:78-86.

Ku, Malhotra, & Murnighan. (2005). Towards a competitive arousal model of decision-making: a study of auction fever in live and internet auctions. *Organizational Behavior and Human Decision Processes*, *96*, 89-103.

## Running the Exercise

I always begin by pulling a $20 bill out of my wallet (or 20 € note or another bill depending on the location – the exercise is easily adapted for different currencies, and the amount can also be changed) and saying, “I’d like to auction off a $20 bill.” This usually gets the class’s attention. I then display and describe the rules, one at a time:

*The Rules for the $20 Dollar Auction*:

1) Bidding starts at $1 and proceeds in dollar increments. And, yes, this is for real money.
2) No jump bidding.
3) The auctioneer will give all bidders fair warning before the auction ends.
4) Cartels and collusion among bidders are strictly prohibited. This means no communication, verbal or nonverbal, is allowed.
5) The highest bidder pays the auctioneer what he/she bid and receives $20.
6) The second highest bidder pays the auctioneer what he/she bid.

Each of the rules is accompanied by a bit of explanation. For instance, I emphasize that this exercise really is for real money. I illustrate the $1 increment rule by saying: “bidding will start at $1 and proceed to $2, $3, and so on. If someone bids $4, the next bid will be $5. No one can jump bidding from say $4 to $9.” As the auctioneer, I emphasize that I will give everyone plenty of opportunity to bid. People laugh at Rule 4, but I simply reiterate that this is a rule that is true for almost all auctions. (I enforce this rule in terms of not allowing the two final bidders in the auction to talk to each other. However, it’s almost always impossible to keep classes quiet once the bidding goes beyond $20. For example, classmates often call out advice to the bidders.)

I end by summarizing the last two rules: "Yes, the top two bidders each pay what they bid. The top bidder pays what he/she bid and gets the $20; the second highest bidder also pays what he/she bid but does not get anything in return." This comment always gets a collective, sometimes laughing response, with many people remarking "Oooh!" in a way that seems to say, "I better be careful."

At the beginning of the auction, hands shoot up everywhere. However, many bidders set limits for themselves and do not go far beyond those limits. Thus, many people bid early but drop out when the bidding reaches $10 or $12 or $15. Often, a bidder or two will hold back until the bidding reaches $19; then they will make their first bid, thinking that no one would ever bid $20 (or more) for a $20 bill.

This kind of thinking is truly wishful. Once someone has bid $19, the structure of the exercise creates considerable motivation for the person who has bid $18 to bid $20. Perplexed and surprised $19 bidders then find themselves in the position of having to bid $21 for a $20 bill, in the hopes of avoiding a $19 loss. But then, in exactly the same way, the motivation switches back to the $20 bidder, and they bid $22! Most of the time, the bidding continues well past $20. (One of the reasons that this exercise is so memorable is that everyone but the final two bidders gets to watch and enjoy the process.)

As bidding slows down I typically take a bid and then turn to the previous bidder looking intently at him/her. I give the person a little time to make a bid, but I will also entertain a bid from a new bidder at any time. After bidding reaches $20, there are only occasionally new bidders. If the previous bidder does not seem to want to make a bid, I say slowly: "going once, going twice, sold."

Sometimes the bidding gets carried away. Once the bidding hits $50, I change the bidding to $5 increments, at $200 to $10 increments, at $400 to $20 increments, etc.

After the end of the auction, the class is typically buzzing and excited. I then reach into my wallet and pull out another $20 bill. I announce that we will auction this bill off as well, with the same rules as before. Amazingly enough, people continue not only to bid but to overbid on the second, third, and even the fourth $20. In fact, the high bids on the second $20 often exceed the high bids on the first. Many times the winner and the loser of the previous auction also get involved – providing a clear lesson on emotional involvement! (Read on to find out how many $20 bills you can auction off, one after the other.)

Only after all of the bidding has ended do I tell the class that I will collect the money from the "winning" and the second highest bidders, but that I will not keep it. Instead, I donate the money to a charity of the bidders choosing.

**Discussion**

Question 1: What happened and how can we explain it?

Response: The structure of the exercise can "hook" the two bidders who bid $19 and $20. It's rare for someone to bid for the first time after $20 (although it does happen sometimes for a few bids). Instead, to avoid the loss of $19, the $19 bidder usually bids $21. This puts the $20 bidder in the realm of losses and, instead of losing $20 for sure, they then bid $22. But this puts their counterpart in exactly the same situation that they were just in! And this can go on and on.

Question 2: Why do people stop bidding?

Response: When they realize that they had better cut their losses, or when they fear that the bidding will continue for a long time and that it's best to get out earlier rather than later. Sadly, it's hard to recognize these issues clearly in the middle of the bidding.

Question 3: for the last two bidders: What was your strategy? Your thinking during the bidding? And did you hear your classmates who were yelling advice?

Response: These bidders' answers can lead to a general discussion of the dynamics of this exercise. In particular, long-held folk wisdom on auctions suggests that people occasionally get caught up in auction fever; that is, their adrenaline starts to rush, their emotions block their ability to think clearly, and they end up bidding much more than they ever envisioned. Only recently has research begun to systematically investigate auction fever, and the results suggest that the folk wisdom is valid: people can get excited when they bid, and their emotions increase as auction deadlines approach: (Ku, Malhotra & Murnighan, 2005). Add to this the general tendency to want to avoid losses, and it becomes clear that auctions can be very dangerous. With the increasing popularity of Internet auctions, due caution becomes more important.

In general, it seems that when our emotions take over, we take out negotiations and our decisions personally. We view unresolved conflicts only from our own perspectives rather than as interdependent exchanges. When we add a large audience and competitive motivations, we are in for trouble, as so clearly exemplified by some of our extreme outcomes in the Dollar Auction (see below). These extreme outcomes also show how slow learning can be in auctions. This makes them particularly dangerous.

**Managing Negative Reactions from Students**

Having run this auction many times, I have had a small number of decidedly negative reactions from some students. Most of these negative reactions have come from bidders who feel that they have been "trapped" (Platt, 1973). Not surprisingly, they have not liked either the feeling or the fact that they have lost money in the auction – so they blame me.

My response is to remind them that I displayed all of the rules in advance. When this is not sufficient to help them take responsibility for their actions, I ask them, "Who raised your hand to bid?" or "Did everyone in your class get trapped?" Neither of these questions is very friendly, but asking them sometimes helps a disgruntled bidder see that at least one of the sources of their misfortune was internal.

I also had one non-bidder express outrage about the nature of the exercise. In discussing his concerns at length, I learned that he had a close family member with a gambling addiction, and he felt the exercise encouraged gambling. Nothing could be further from my purpose in using the exercise. My purpose is just the opposite: to illustrate and help participants understand what causes escalation of commitment. After a useful exchange of our points of view, I was more informed and he was OK with the exercise.

**Some Truly Extreme Examples**

The $20 Auction is truly memorable. Bidding generally stops around in the $20s or $30s, but there is wide variability. Sometimes, the bidding gets extreme. Read these real examples to be prepared for anything that might occur with the dollar auction.

*Extreme example 1.* Some years ago I conducted the $20 Auction in Hong Kong with an executive MBA class. This was a group of about 35 executives. Their first auction had stopped at $28, a fairly common stopping point. Their second auction went to $100 and showed no signs of stopping. At that point, I paused to collect myself and to allow the bidders to collect themselves (and maybe even realize the folly of continuing to bid). I reopened the bidding, and it continued to go up, a dollar at a time, all the way to $200! Now, I was exhausted. In addition, the bidding was taking too much time and was no longer instructive for the rest of the class. On the spur of the moment, I told the two bidders that they could each write down their highest bid, privately. The higher bidder would pay what the other bidder had written down and win the $20. The lower of the two bidders would pay $1 less than their bid. (This is a sealed-bid, second-price auction. McAfee and McMillan, 1987, discuss this method and may others.) Their final bids were $250 and $210.

At the time, theirs were the highest bids I had seen in the Dollar Auction. As I thought about it afterward, I concluded that pausing at $100 gave them an easy out. I also thought that letting them make sealed bids in a second-price auction gave them another easy escape. Since then, I have decided to use a different process if the bidding ever hits $100. Thus, when two bidders reach $100, I announce a change in the procedure "to facilitate the process," i.e., "We will now bid in $5 increments."

*Second Extreme Example.* This extreme auction occurred when I auctioned a $20 bill off to an EMBA class at Kellogg. (This is the story that is summarized in the *Journal of Management Education* article noted above.) The bidding for the first $20 bill was extremely active. When (the last two bidders) reached $20, no one else entered the bidding. The "winner" paid $54; the second bidder was on the hook for $53.

As always, the class was enjoying the spectacle. And the noise level did not abate when I pulled out a second $20 bill. Again, they bid quickly, with some fits and starts, until the bidding hit $100. This is when I told them that we would now bid in $5 increments.

When the bidding reached $400, I announced that we would now bid in $10 increments. This led to no pause in the bidding at all. Members of the class were screaming for the bidders to stop, but amid the general tumult, they took no heed. When the bids reached $700, I announced, as calmly and as coolly as I could (even though my knees were shaking) that we would now bid in $20 increments. When the bidding reached $1,200, I mustered all of my remaining resolve and announced that we would now bid in $50 increments.

At each stage, the bidders continued to bid. They went far beyond what I ever imagined would be possible. When we reached $2000—yes, $2000—

they finally stopped bidding. Amazing! The class was in a total uproar.

I have told this story any times. My audiences are always interested if not amazed. But this is only the beginning of my extreme stories, which now include three additional auction events.

**Extreme Auction #3**

This auction involved a group of about 50 Canadian EMBAs. The process played out just as it had before, with a first $20 auction going for a moderate amount, this time about $38. I pulled out a second $20 bill and announced that I would auction this off too, following the same rules as in the first auction.

As is typical, even though they had seen the results of a first auction, the early bidding for the second $20 was excited and quick. Soon it reached $100, at which point the bidding shifted to $5 rather than $1 increments. When it quickly hit $400, I announced that we would now bid by $10s. At about this time, the other class members were starting to hoot and holler.

When bidding hit $700, we began to bid by $20s.

When bidding hit $1200, we began to bid by $50s. One of the two bidders was much slower than the other. When I would look at him with anticipation, he repeatedly shook his head to indicate that he was finished bidding. Then I would say, "Going once, going twice …" and before I could say "Sold" he would raise his hand and bid again.

He did this six, or seven times.

Finally the bidding stopped, at $2050: A new record.

The class was buzzing and people were bursting with comments and questions. Although the discussion was lively, I was able to work my way through my normal analysis of the exercise

This exercise marked the end of my course for this particular class. After we adjourned, I went up to each of the two final bidders, in turn, to see if they were alright. One was engaged in conversation with some classmates, so I went on to the other bidder.

When I got to the other bidder, I could see that he had already finished writing out a check for $2050. Before I could ask him how he was doing, he looked up, saw me, and said, "Thank you." This was a surprise, so I asked him why he had thanked me. He indicated that he was a very competitive person, that he had escalated commitment before in other settings, and this particularly public display was enough to cure him of similar mistakes for the rest of his life. He was thankful that it had happened. He said, 'I've taken the cure.' At the time, I hoped that he was right. When I saw him a year later, he continued to be thankful, and indicated that he had successfully avoided the same kind of mistake.

**Extreme Auction #4**

This next set of extreme auctions occurred with a brand new EMBA class of 47 students. The participants were primarily Western Europeans, but a few were from Eastern Europe. The auction was for 20 € rather than $20. As with many first Dollar Auctions, there were many early bidders, things slowed down as we got to 20 €, and the bidding ended at 29 €.

The second auction proceeded similarly, with the bidding ending at 37 €. It was noteworthy that each of the final two bidders from the first auction bid in the second auction. This is not an unusual event – it seems that the strong emotions that the first auction evokes do not dissipate immediately, so people often bid again, even after they have lost money in the first auction.

I pulled out another 20 € note and did a third auction. There were fewer bidders after the bidding reached 10 €, but the bidding still went past 20 €, finishing at 32 €.

The class seemed lively rather than desultory (which sometimes happens after multiple auctions), so I produced a fourth 20 € note and ran a fourth auction. This time the bidding ended at 25 €.

With each subsequent auction, the last two bidders were abandoned by the other bidders and class members earlier and earlier in the process. In other words, I typically observe that the final two bidders in a first auction often make their first bids at $18 and $19 – they come in late and get hooked as the other bidders disappear. On second auctions, the final two bidders tend to enter and get hooked earlier, at $16 and $17 (or so). On third auctions, it happens earlier, at $13 and $14, and at fourth auctions, at $10 and $11. This is what happened in Germany: people learned, but they didn't learn enough to limit their relatively low bids and two people who found themselves the only bidders, even at a point well below $20, soon realized that they were alone in the bidding. Ironically, they didn't stop and the bidding continued past $20, almost every time. That is what happened here as well.

In this particular class, I impetuously pulled out a fifth 20 € note and ran a fifth auction. It ended at 22€.

I was now down to my last 20 € note, but it was enough to run a sixth and final auction (although I did not reveal that this would be the last auction). The final two bidders got hooked by bidding 8 € and 9 €; everyone else stopped bidding. These final two finally stopped at 19 € - below 20 €, but far past my break-even point of 11 €.

This class ended with six consecutive auctions. All were profitable for the auctioneer. Only one bidder won money, and he won a total of just 1 €. I have no idea how many more 20 € notes I could have auctioned before I lost money on any of them.

This set of auctions provided a pretty clear conclusion: collective learning in this context is very slow. Obviously, this is not a positive conclusion about human nature.

**Extreme Auction #5**

This most recent extreme auction was the first auction in a class of about 50 American and international executives in an American EMBA program, the same program that produced my first $2000 outcome. I pulled a $20 bill out of my wallet and explained the rules.

As usual, the early bidding was fast and furious, with many people entering the fray. Also as usual, the bidding slowed down as it approached $20. Occasionally, only occasionally, someone will enter the bidding after bidding has hit $20. (It is not always just two people who bid against each other after the bidding hits $20.) These bidders, who are sure to lose money unless they somehow get out of the auction, usually explain this strange behavior by saying that they were interested in paying for one of my $20 bills and they planned to ask me to sign it if they were the final winning bidder. This did not happen, however, in this auction; the last two bidders were the only ones who bid past $20.

The final two bidders were a doctor and an entrepreneur; one was a woman (which has not been common when my auctions have resulted in really high bids). When the bidding reached $50, I said, "Now we will bid in $5 increments." (Note: Over time, I have stopped bidding by $1s at an earlier stage in the bidding as it takes so long to get to $100 by ones.) When the bidding reached $300, I announced that we would now bid in $10 increments. The bidding continued unabated, leading the other members of the class to get noisy, restless, and excited. When the bidding hit $700, I announced that we would now bid by $20s. When the bidding reached $1,200, I announced that we would now bid by $50s. The bidding continued to move up, as rapidly as ever.

When we reached $2,000, I announced that we would now bid by $100s. We were now entering new bidding territory, and the excitement level in the class continued to rise.

When we reached $5,000, I announced that we would now bid by $200s.

When we reached $10,000, I announced that we would now bid by $500s.

It was only now that the bidding started to slow down. One of the two bidders took very little time to bid but the other pondered quite awhile each time, pushing me to say. "$10,000 going once, "$10,000 going twice …" - and then would bid again. This process continued, with me saying "Going once, going twice".

The final bid was $15,000. For a $20 bill.

Unlike my other very high (but not this high) bidding outcomes, the class was quiet after the bidding reached $5000 or so. It appeared that they were shocked into silence.

I was both stunned and amazed. I asked the two bidders the obvious question, "why did you bid so much?" One bidder said that she thought that she knew me well and that I would not keep the money, that I would give it to charity (a good prediction), and that she gave quite a bit of money to charity anyway. Thus, she implied that she might redirect some of her other contributions to satisfy this commitment. She almost sounded rational.

The other bidder indicated that he wanted to win.

He also indicated that he had set his limit at $10,000. Neither of these comments seemed particularly rational, either then or now.

Both bidders contacted me later that day to discuss their plans for donating the money to charity. They asked if they could donate to a set of charities of their own choosing, and if they could spread their donations over several months. Thus, although I did not coordinate their contributions, I have every reason to believe that this auction, in about 10 minutes, generated almost $30,000 for charity.

I also had a conversation with the winning bidder, about 9 months after the auction. I was curious whether she had reduced her normal charitable giving because she had given so much as a result of the auction. She replied quickly, saying “No, I now give more.” This suggests that her bidding in the auction was not simply an enjoyable activity that led to contributions that she would have made in another way anyway; instead, it suggests that the auction had its own effects that were independent of her normal charitable activity.

**Conclusions**

“When Winning is Everything,” our *Harvard Business Review* paper, appeared in May, 2008. The title was chosen by the editor, not by us. We liked the title a lot, and the auction that generated $30,000 for charity provides another notable example of “competitive arousal,” which we discussed in the HBR paper. Competitive arousal depends on three things: rivalry, time pressure, and being in the spotlight. All three characteristics – a perfect storm – provided the context for the $15,000 auction: executive MBAs are notoriously competitive; I created time pressure by focusing directly on them when their counterpart had bid, and by saying, “Going once, going twice, …”; and they were finishing their first class in a two-year program – they had only been in class with their other 48 class members for a total of 10 days. They would continue to be together in class with them for over 18 more months. Thus, it would not be surprising if they felt as if they were under a spotlight.

The research that we report in *HBR* references the earlier $2000 auction; it also describes the experiences of companies that became embroiled in intense competitions to both acquire a new asset and prevent their hated counterparts from acquiring it. In other words, as amazing as the $2000 auction was – this is not a unique event, as evidenced by the $15,000 auction and by organizational acquisitions. An example in the news as I write these notes is American Airlines competition with Delta over the acquisition of bankrupt Japan Airlines. Create a perfect storm of competitive arousal and it will happen again, in this context or another.

Are people amazing? Without a doubt. Do they sometimes do crazy things? Also no doubt. Does money exacerbate the likelihood of crazy action? This is something that we can leave for future research, but recent events in the economy suggest that it is probably likely. Thus, our work is cut out for us as business school professors, and hopefully this amazing story can help us help people make better decisions, even in the heat of the moment.