Advanced HCI
Lecture 4

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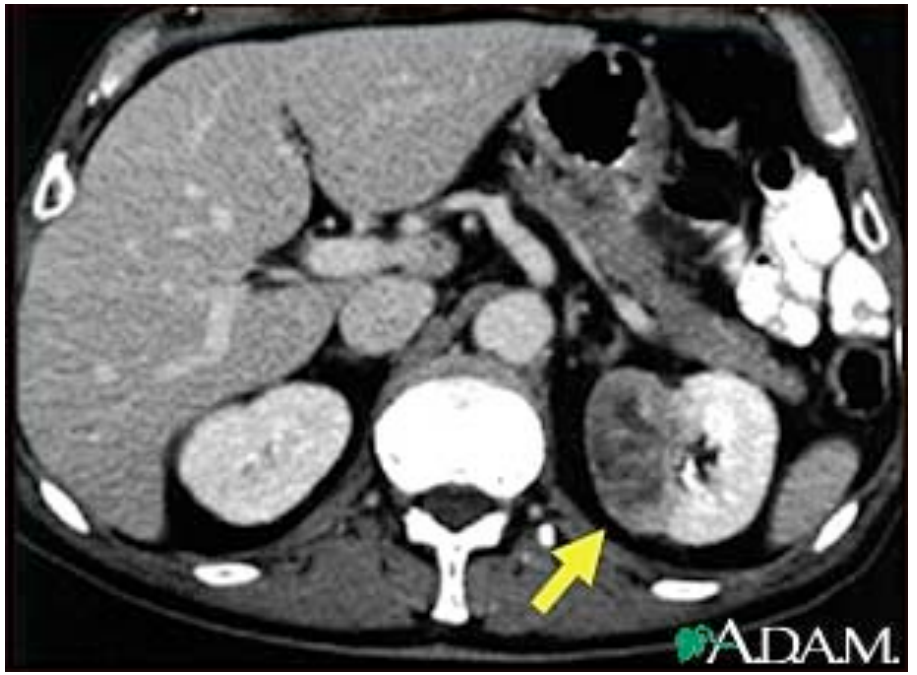
Last week

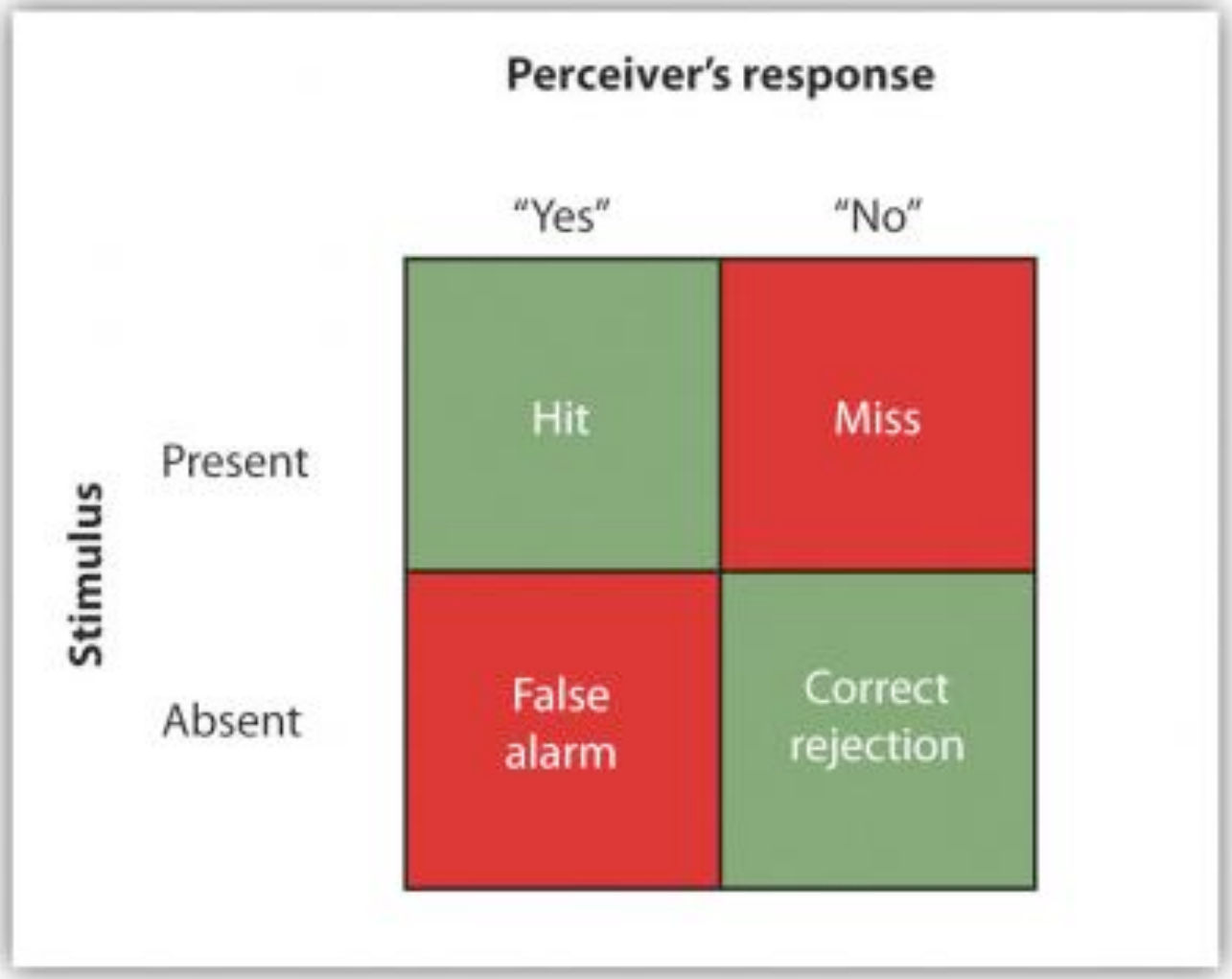
- We looked at Signal Detection Theory.
- Used it to explain how clinicians make decisions about whether or not there is a tumor present given a CT-scan.
- And suggested how it might be used to inform design of technologies for presenting and visualising CT-scan displays.



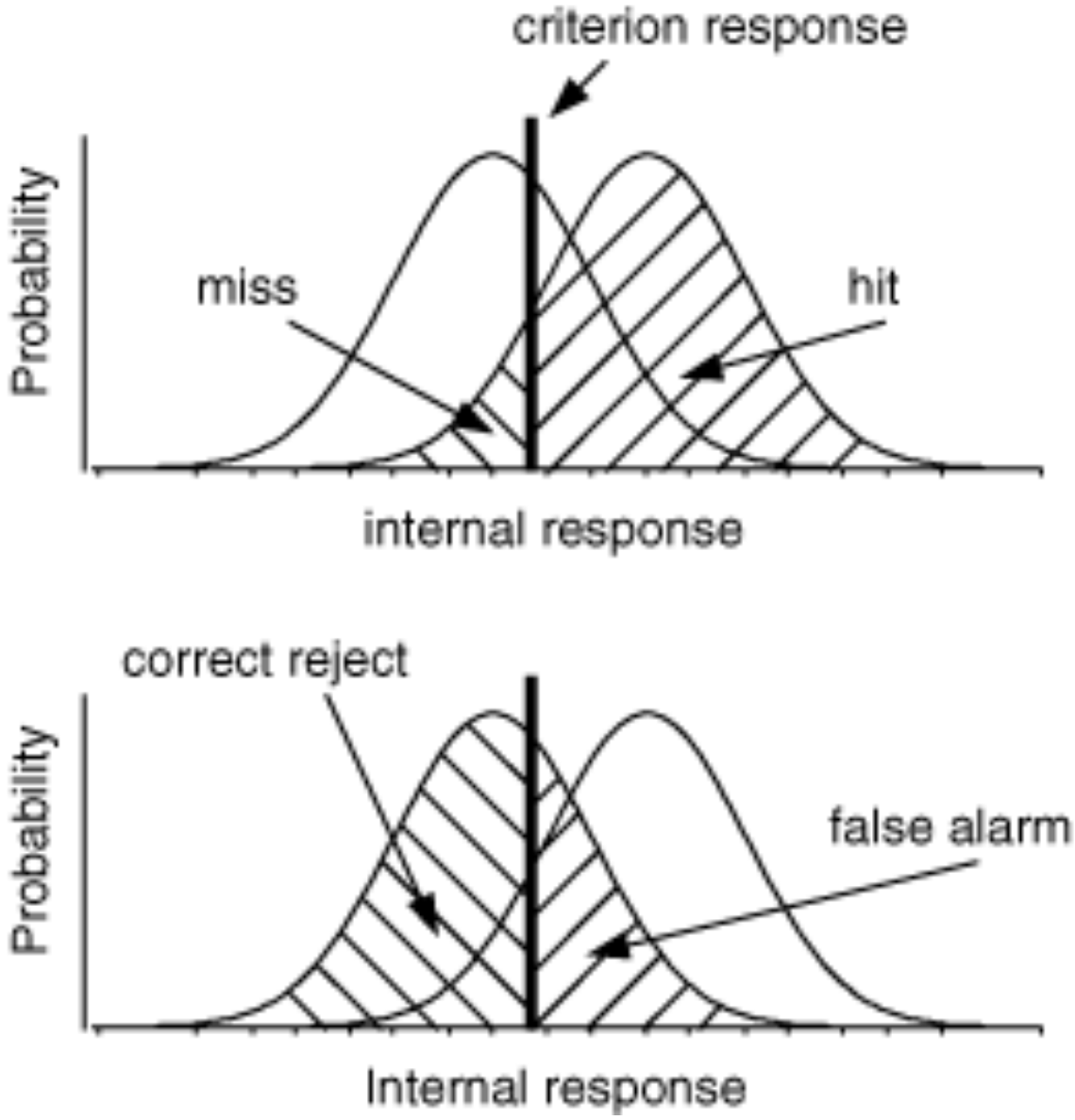
monitor

phone tablet

- David C. Dugdale, III, MD, Professor of Medicine, Division of General Medicine, Department of Medicine, University of Washington School of Medicine; Read more: http://www.umm.edu/imagepages/1168.htm#ixzz27rhUeKUo



given the stimulus there are two components to generating the perceiver's response...


criterion response
Probability
miss
hit
internal response
correct reject
false alarm
Probability
Internal response

Adaptive Interaction

- **People choose what to do by finding strategies that exist within the space defined by three things:**
- **The environment**. Bounds imposed by the environment including computers, tablets, smartphones etc.
- **Bounds** imposed by human psychology, including memory, vision, and motor-systems.
- A **utility function**. People have goals, preferences, tasks. They must weight various trade-offs including, for example, speed and accuracy.

Trust in Online Markets

How to decide whether to trust a vendor?

environment

- Online Markets.
- As well as choosing products people also choose vendors.
- They choose who to buy from on the basis of a range of attributes.
- Price is important, of course, but so are features of the vendor such as reliability of delivery.
- How reliable is the vendor at delivering the advertised product with the required quality?
- But there is considerable **uncertainty** about who is reliable...

fraud

- On balance online markets have more problems with fraud than offline markets.
- Gartner (2002) concludes that "Internet transaction fraud is 12 times higher than in-store fraud."
- A U.S. Department of Justice (2002) survey also cites high levels of online fraud,
- ... pointing especially at frauds common on auction sites that "induce their victims to **send money** for the promised items, **but then deliver nothing** or only an item far less valuable than what was promised (e.g., counterfeit or altered goods).'"

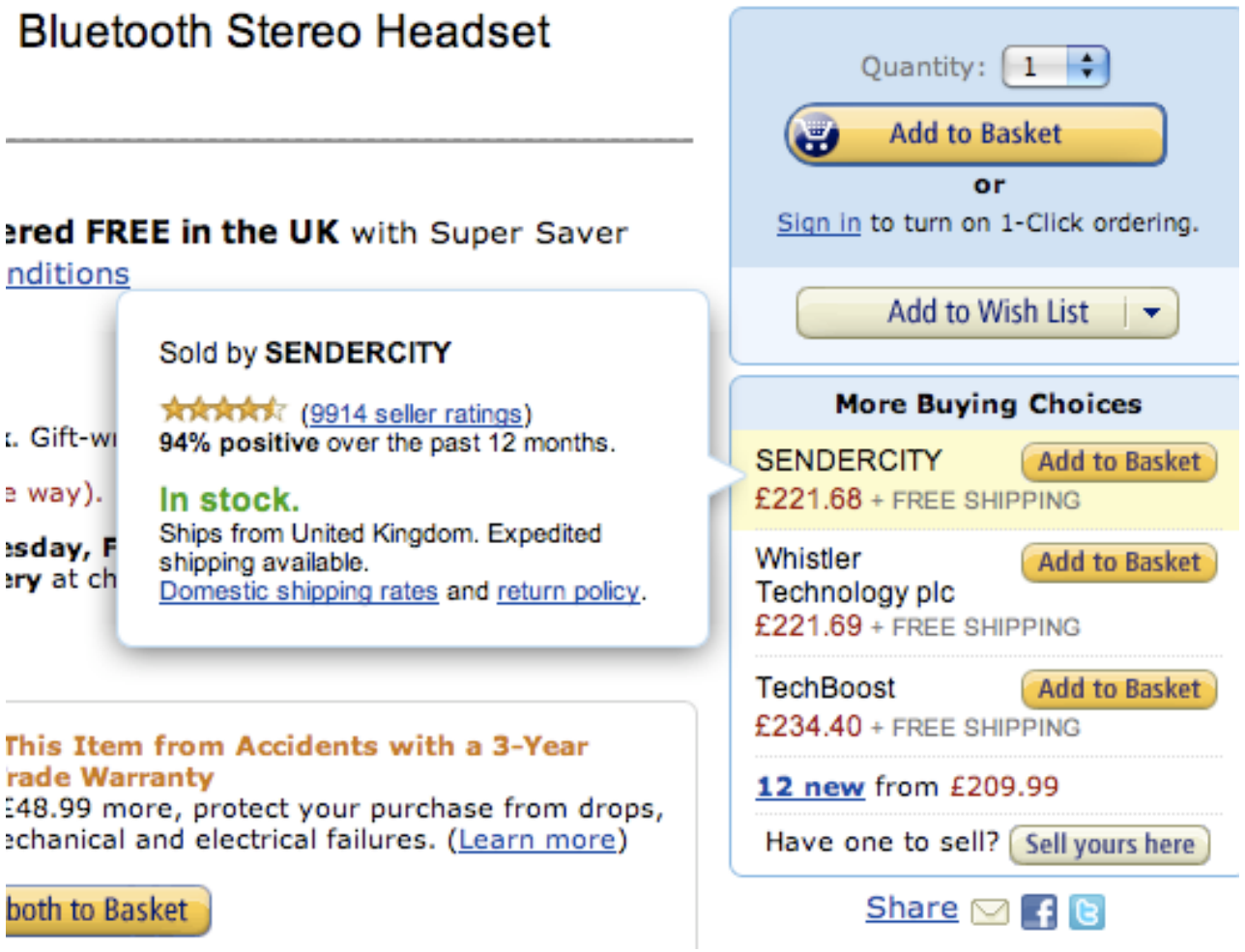
Can good interaction design reduce purchasing uncertainty?

- provide stronger **legal enforcement**? ... but this is prohibitively expensive.
- Promote trust? ...
- The power of reputation to promote trust in business transactions is closely associated with networked communities, places where there is a good deal of interpersonal communication as well as exchange. Trust can be promoted through **feedback** mechanisms...
-

feedback

- Many online markets rely on electronic "feedback" systems to promote trust in transactions.
- feedback enhances **reputation**.
- *"Gemma is a good person to do business with because John, Oscar and Alice think highly of her."*
- *"Gemma is a good person to do business with because lots of newspapers say so."*
- *"Gemma is a good person to do business with because we have had a good working relationship in the past."*

- In many sites feedback is in the form of comments and also star ratings.
- Often ratings are aggregated.



online versus offline

- but despite the presence of feedback mechanisms online still suffers from more fraud than offline!
- How might we explain this difference?
- How might things be improved?

can we explain the difference between online and offline markets?

- *There is feedback in both online markets and traditional markets...*
- If we can learn about the differences between offline and online markets perhaps we can design better online markets?
- Bolton et al. suggest that the flow of information -- that is, the source of the information -- differentially influences trust.
- long-term relationships play a larger role in offline markets.
- online feedback systems may provide fewer incentives to trust or to be trustworthy than traditional markets, despite feedback.

in traditional business communities...

- ... the patterns of information flow and contact that promote trust often interact in subtle ways. Vietnam's free market reform in the mid-1980s illustrates how effective informal reputational controls can be. At the time, there was **little in the way of legal protection, but markets nevertheless flourished**. (McMillan, 2002, p. 59),
- "People in the same line of business would **meet each other every day** in teahouses and bars... to discuss the reliability of particular customers.... About half of a sample of entrepreneurs said that they had had no prior connections with the businesses that were to become long-standing trading partners."
- Thus, in traditionally networked communities, interaction between members **promotes trust in two ways**.
- (1) the pattern of interaction promotes long-term relationships; a business partner whose trust has been rewarded is, all things equal, more likely to return to do future business.
- (2) information about individual reliability is transmitted by word of mouth to third parties, some of whom are prospective future trading partners.

online...

- But one of the great advantages of online markets is the **opportunity to trade with a larger, fluctuating set of partners**. This means less reliance on longterm relationships.
- In data collected from eBay over a five-month period, Resnick and Zeckhauser (2002) found that **89% of all encounters were one-shot**.
- One ... does not require personal contacts in this trading community,
- ... feedback information from large numbers of distributed buyers can easily be collected, processed, and disseminated.
- Field studies of online auction platforms show that feedback systems have some of the desired benefits: **reputable online sellers are more likely to sell their items** (Resnick and Zeckhauser, 2002), and **can expect price premiums** (e.g., Lucking-Reiley et al. 1999).

Amazon’s feedback even allows for selling of used-books

- Amazon's used-books market platform for independent dealers (brick-and-mortar bookstores as well as private individuals) provides a simple but illustrative example of how these systems work. Sellers post the price and a description of the book's condition on Amazon's site. Buyers pay through Amazon, who
- takes a percentage, but sellers ship directly to buyers.
- The moral hazard problems inherent in the seller's side of the deal-stipulating the book's condition
- and the shipping-is addressed through the feedback system in which buyers are invited to post comments on the transaction that future buyers can view when deciding whether to make a purchase.

feedback can be so damaging that some companies "manage" it

- online reputation 'management' has become a business in its own right.
- one negative post can be very bad for a retailer...

http://www.theedesign.com/blog/2010/spot-negative-feedback-from-organic-search-results-and-turn-it-around

indirect v. direct reciprocity

- One way of stating the difference between online and traditional reputation networks is to note that they emphasize different types of reciprocity.
- Traditional markets rely more on **direct reciprocity**: "I trust you because you were trustworthy with me before."
- Online markets rely more on **indirect reciprocity**: "I trust you because you were trustworthy with others before."
- Indirect and direct exhibit **different information flows**.
- In direct reciprocal dealings, traders make decisions based on information from their own past transactions, and their present dealings produce information that they themselves will use in the future.
- In indirect reciprocal dealings, reputational information is obtained from others, and others will use information from the present dealings in the future.

hypotheses

- Bolton et al. (2004) examined how well markets based on indirect reciprocity build and sustain trust in comparison to markets based on direct reciprocity.
- They test the **information hypothesis**: It is the information per se, independent of its flow, that matters.
- In contrast, it is possible that the flow of information is critical.
- Granovetter (1985), for example, in discussing market trust, argues that people put more stock in information acquired "from one's own dealings."
- This suggests that direct reciprocity is a more effective way of developing trust even when sufficient information for indirect reciprocity is present. Call this the **personal history hypothesis**.

three markets

- in the **strangers' market**, individual buyers and sellers meet no more than once and the buyer has no information about the seller's transaction history. Here the moral hazard has full force, because the actions of the seller are not conveyed to future prospective customers.
- in the **feedback market** an online feedback system tracks seller histories of shipping decisions and provides this information to prospective buyers. This affords the type of indirect reciprocity associated with online markets.
- in the **partners market** the same buyer seller pairs interact repeatedly. This affords the type of direct reciprocity associated with more traditional markets.

an experiment

utility

- We need to consider the utility function of both the seller and the purchaser.
- When we have two utility functions like this we have a situation that is often modeled with game theory.
- The particular class of games that are useful for understanding purchasing decisions are called reputational games.

start with £35.00

start with £35.00

£35.00

new bubble head

cost of bubble head is £20.00

buyer

seller

value of bubble head is £50.00

feedback

start with £35.00

start with £35.00

£35.00

new bubble head

cost of bubble head is £20.00

buyer

seller

value of bubble head is £50.00

gain is £15.00

gain is £15.00

feedback

start with £35.00

start with £35.00

£35.00

fails to ship

buyer

seller

gain is £0.00

gain is £70.00

feedback

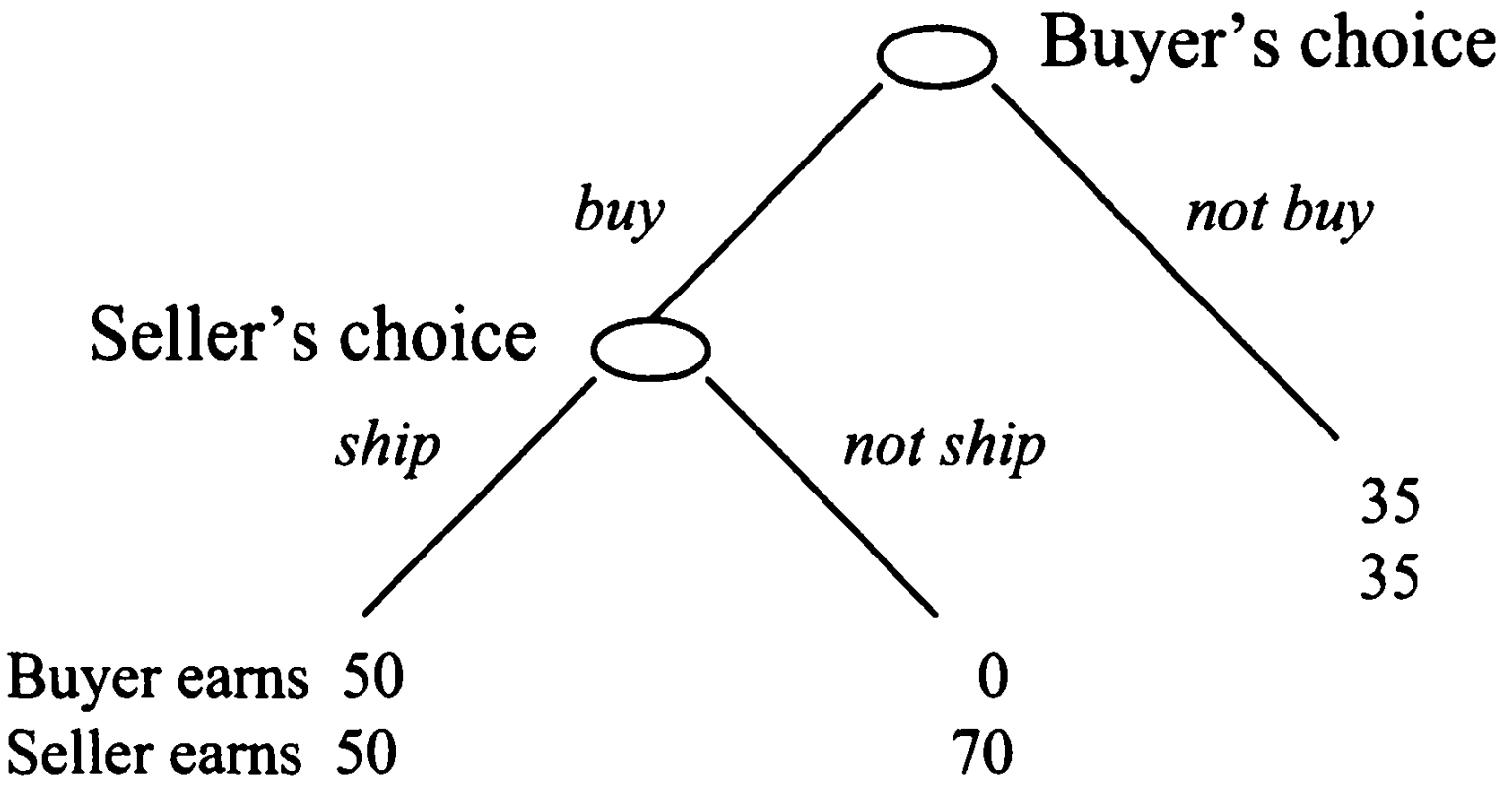
the trading game

- transactions take place over a series of rounds.
- At the beginning of each round, a potential buyer is matched with a potential seller.
- The buyer then chooses whether to purchase an item at a fixed price. If the purchase order is sent, the seller decides whether to ship or simply keep the buyer's money.
- On receiving the money from the buyer, the seller has no immediate financial incentive to ship the item.
- Thus, a transaction that is in both parties' interests may be impeded either because the seller proves untrustworthy, or because the buyer, anticipating this risk, chooses not to trust.

- Both the seller and the buyer are endowed with 35, which is the payoff when no trade takes place.
- The seller offers an item for sale at a price of 35, which has a value of 50 to the buyer.
- The seller's cost of providing the buyer with the item-costs associated with executing the trade, shipping, handling etc., as well as production costs is 20.
- Therefore, each successfully completed trade increases efficiency by creating a consumer surplus of 15 and a net profit of 15 for the seller.

- If the buyer chooses to buy the item, he sends his endowment of 35 to the seller, who then has to decide whether to ship the item.
- If the seller does not ship, he receives the price plus his endowment of 35 for a total of 70. If he ships, he receives the price minus the costs plus his endowment for a total of 50.
- If the buyer chooses not to buy the item, no trade occurs. This is how buyers can choose with whom to trade and with whom not to trade.

the buyer seller encounter



hypotheses

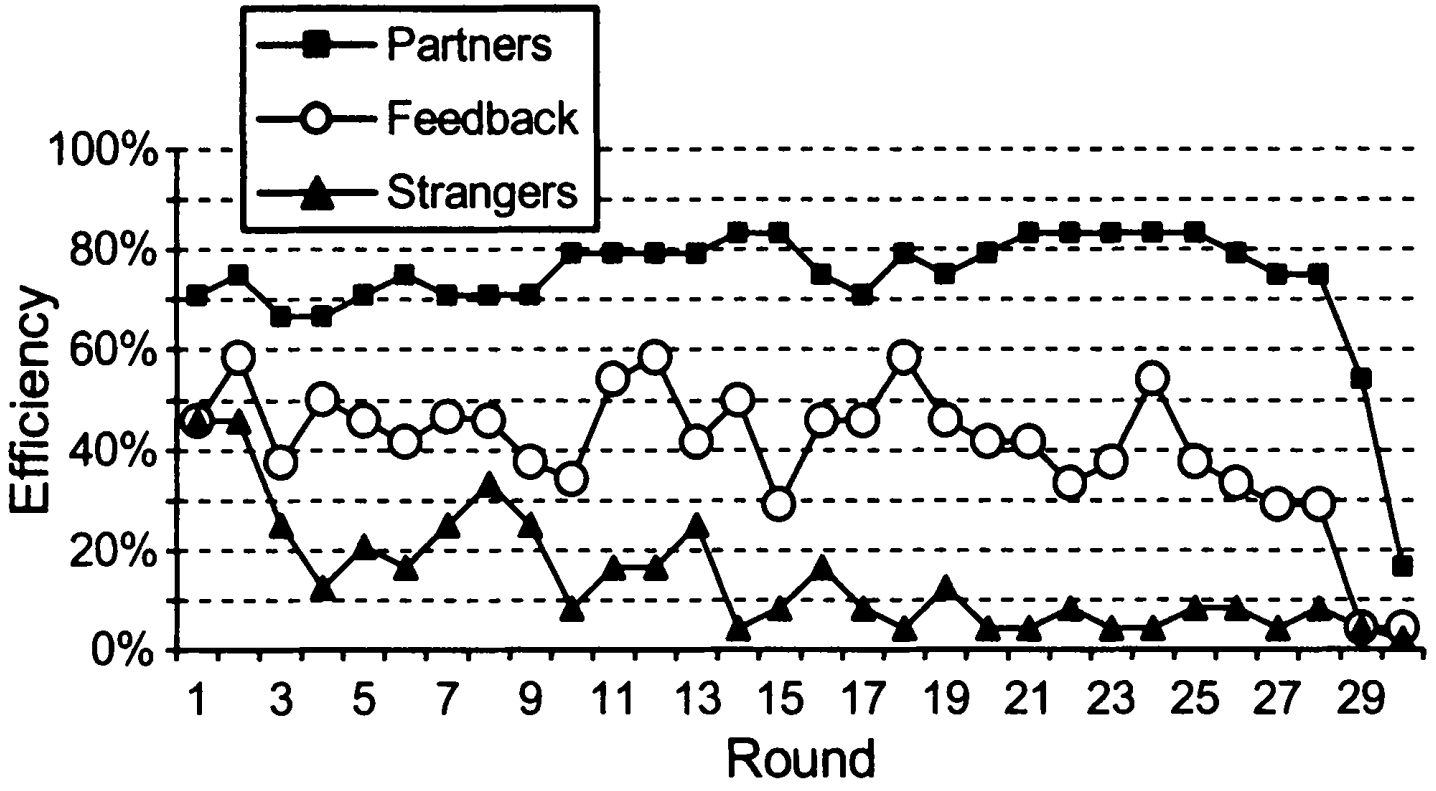
- the information hypothesis - information about trustworthiness is equally valuable wherever it comes from.
- the personal history hypothesis - information about trustworthiness that is acquired through personal history of interaction is more valuable.
- the value of information may be a reality of the **environment** - people may be more trustworthy in pairwise business relationships; or it may be a **bound** - just something that people believe irrespective of its truth.

reasons that the personal history hypothesis might reflect the structure of the environment...

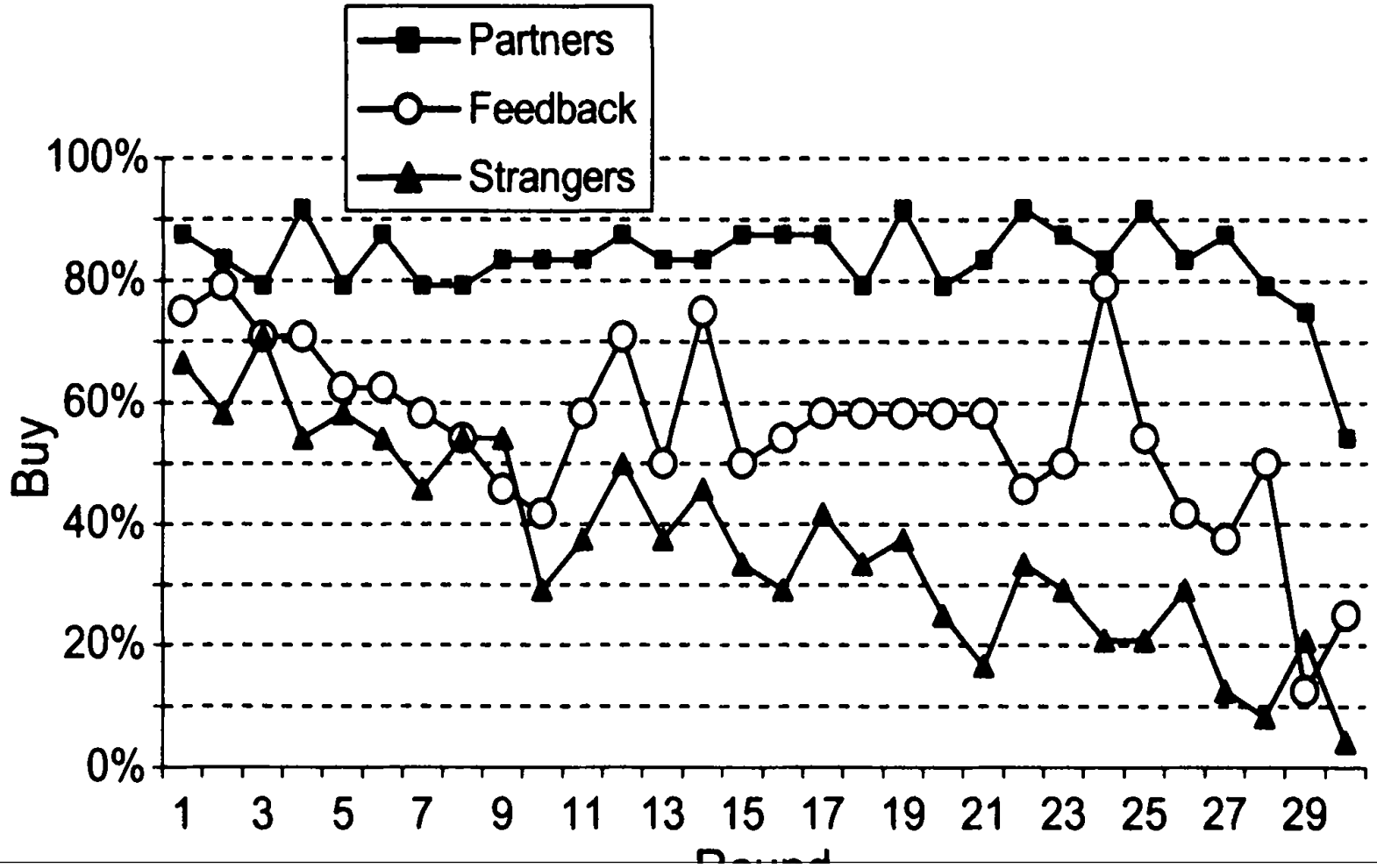
- According to Granovetter (1985) first-hand information:
- is cheaper to gather
- is often more detailed
- offers the promise of future business that provides a great motivation to be trustworthy
- often becomes overlaid with social content.

results

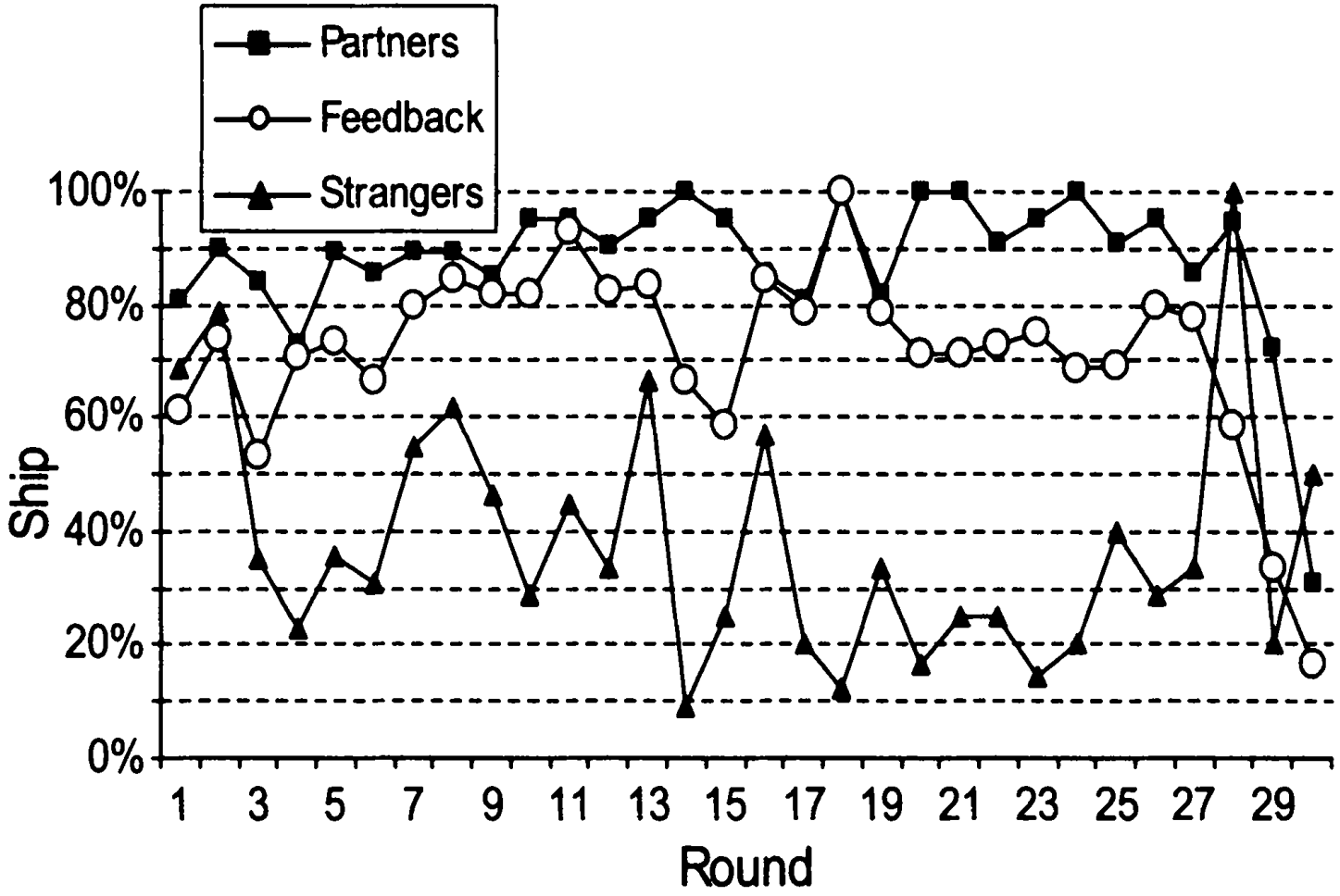
efficiency measured as how often the gain from trade is realized by round



trust measured as the percentage of buying per round



trustworthiness measured as percentage of shipping per round



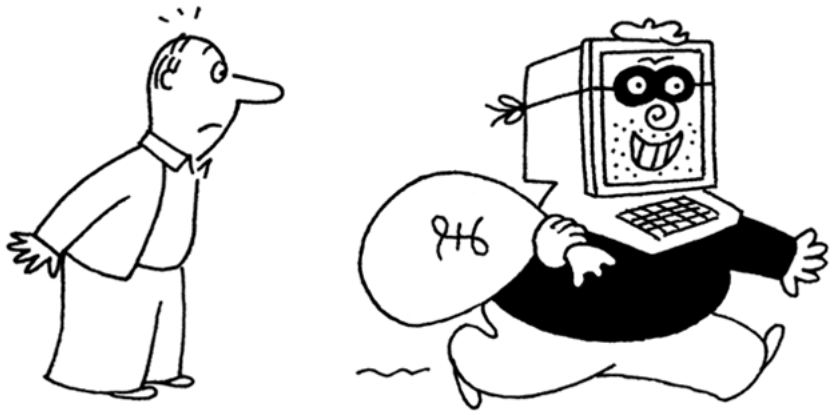
discussion

- the same pattern can be observed in all three graphs.
- feedback market appears not to work as well as personal interaction (the partners market).
- strangers market is hopeless -- but this is not surprising.
- this does not bode well for online markets.

the value of your own experience

- One of the key findings concerns how a buyer's own experience affects his trust in the entire market.
- Specifically, a buyer whose trust has been betrayed tends to have diminished trust in all sellers, whereas a buyer whose trust has been rewarded continues to trust the market at about the same level as he did before.
- In practice, online feedback is vulnerable to manipulation, and so is less reliable than the feedbacks truthfully generated in Bolton et al.'s experiment.

the problem may be even worse in real feedback markets



- eBay distinguishes four forms of fraudulent feedback: shill feedback (using secondary eBay user IDs to artificially raise the level of your own feedback.
- extortion (demanding any action of a fellow user that they are not required to do, at the threat of leaving negative feedback
- feedback solicitation (offering to sell feedback, trade feedback undeservedly, or buy feedback.

- The value of one's own experience in evaluating the trustworthiness of the market is therefore likely to be greater than our finding already suggests.
- An implication is that the public value of feedback information might be increased by informing market participants about the **shipping probability in the entire market**, and not only about the trustworthiness of individual traders.
- Information indicating positive overall trust in the market might mitigate the negative effects of a trader's own bad experience (while, of course, a negative overall market assessment might serve to aggravate it).

newbie?

- Bolton et al also found that buyers in online markets are rightly reluctant to bear the costs associated with verifying the trustworthiness of newbies. In practice,
- many online market platforms participants can change their identity at no cost, making it impossible for buyers to distinguish a "real" newbie, trading for the first time, from a "deceptive" newbie, an experienced seller who got rid of his bad reputation.
- The probability that a newbie is not trustworthy is therefore likely to be higher on real-life platforms than on our laboratory platform.
- The implication for design is that market platforms should try to gain control over the agents' identities

recent negative feedback

- buyers put more weight on negative than positive feedback, and more weight on recent feedback than old.
- The emphasis on recent negative feedback has also been reported in field studies (Lucking-Reiley et al. 1999 and Resnick and Zeckhauser 2002, among others).
- In an experimental investigation, Keser (2002) found that providing traders with only the most recent feedback information has a positive impact on trust. **Less is more!**
- These findings suggest that relying solely on a cumulative measure of trustworthiness may not be appropriate because it hides information critical to the buyers' decision to trust.

cumulative impact increases incentive to exploit

- Another problem with relying solely on cumulative feedback measures comes from the fact that the seller's actions have diminishing impact in influencing the buyers' assessment of trustworthiness.
- This typically leads to increasing incentives to exploit one's good reputation (see Holmstrom 1999 for a model along these lines in a different context).

discussion

- what claims did Bolton et al. make?
- how does data support their claims?
  - how does it support claims concerning market efficiency?
- what are the implications for interaction design?
- why is making a purchasing decision an example of decision making under uncertainty?
- how might Signal Detection Theory be used to model the purchasers decision?

Reading

- How Effective Are Electronic Reputation Mechanisms? An Experimental Investigation
- Author(s): Gary E. Bolton, Elena Katok, Axel Ockenfels
- Source: Management Science, Vol. 50, No. 11 (Nov., 2004), pp. 1587-1602
- Published by: INFORMS
- Stable URL: http://www.jstor.org/stable/30047967
- Accessed: 15/06/2010 05:43