Persuasive Puffery

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Sellers tend to exaggerate

- “World’s best hotdogs!”
- “That suit looks perfect on you!”
- “Our service can’t be beat!”

How can such “puffery” be persuasive?

- Seller has clear incentive to exaggerate
- Buyers should anticipate this and ignore seller
- So puffery preys on credulous buyers
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Court ruled Papa John’s slogan of “better ingredients, better pizza” was puffery

FTC definition: Puffery is “term frequently used to denote the exaggerations reasonably to be expected of a seller as to the degree of quality of his product, the truth or falsity of which cannot be precisely determined.”
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How model puffery?

Signaling game (e.g., Spence, 1973)?
- But messages are not costly

Persuasion/disclosure game (e.g., Milgrom, 1981)?
- But messages are not verifiable

Screening game (e.g., Stiglitz, 1975)?
- But no commitment by receiver

Puffery seems just like “cheap talk”
- Costless, unverifiable messages with no commitment by receiver (Crawford and Sobel, 1982)
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What does "World’s best hotdogs" mean?

- "Don’t eat our hamburgers!"
- "Our service can’t be beat!"
- "Good thing because you’ll need it."
- "That suit looks perfect on you!"
- "Better than the other one."
Puffery as comparative cheap talk

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Can be a lot of information in puffery
Marketing literature seems consistent

Marketing experiments find puffery is surprising credible

- Puffery of a product’s attribute raises buyer impressions of it
- But also lowers buyer impressions of other attributes

Overall puffery is sometimes persuasive

- Tends to raise purchase intent when intent is low
- And lower purchase intent when intent is high
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When does communication raise the probability of a sale?

- Buyer utility for good \( i \) is \( V_i + \varepsilon_i \)
- Buyer has expectation \( E[V_i] = v_i \)
- Buy good \( i \) if \( v_i + \varepsilon_i > \max_{j \neq i} \{ v_j + \varepsilon_j \} \)
- Assume logit model so \( P_i = e^{v_i} / (1 + \sum_j e^{v_j}) \)
- Suppose \( V_1 = \beta_1 \theta_1 - p_1 \) where seller knows \( \theta_1 \)
- Should seller reveal \( \theta_1 \) to buyer?
- \( P_i \) is S-shaped so first convex then concave
- Information induces greater dispersion in \( v_1 \)
- So on average information raises \( E[P_i] \) if \( P_i \) is low
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- So on average information raises $E[P_i]$ if $P_i$ is low
We show that convexity of $P_1$ for low values and concavity for high values extends to a broad class of discrete choice models. Then just use Jensen’s inequality.

**Proposition**

On average for different realizations of a seller’s information, truthfully disclosing information raises (lowers) the probability of a sale if this probability is sufficiently low (high) for all $V_i$. 
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Example with one good and outside option

- $V_1 = \beta_1 \theta_1 - p_1$
- $\beta_1 = 4, \ p_1 = 4$
- $Pr[\theta_1 = 0] = Pr[\theta_1 = 1] = 1/2$
- No info:
  - $v_1 = 4E[\theta_1] - 4 = -2$, $P_1 = e^{-2}/(1 + e^{-2}) = .119$
- Good news:
  - $v_1 = 4(1) - 4 = 0$, so $P_1 = .5$
- Bad news:
  - $v_1 = 4(0) - 4 = -4$, so $P_1 = .024$
Communication of seller information raises probability of a sale on average when probability is low

So, ex ante, a seller would like to commit to truthfully revealing information

But a seller with bad information would like to lie and claim to have good information

So most of the literature looks at verifiable information

Can puffery also be persuasive?
Example of puffery that pushes one attribute

- Suppose $V_1 = \beta_1 \theta_1 + \beta_2 \theta_2 - p_1$
- Seller knows $\theta_1, \theta_2$ and buyer knows $\beta_1, \beta_2$
- $\Pr[\theta_1 = 1, \theta_2 = 0] = \Pr[\theta_1 = 0, \theta_2 = 1] = 1/2$
- $\Pr[\beta_1 = 4, \beta_2 = 0] = \Pr[\beta_1 = 0, \beta_2 = 4] = 1/2$
- No information revealed:
  - Half time $v_1 = 4E[\theta_1] + 0E[\theta_2] - 4 = -2$
  - Half time $v_1 = 0E[\theta_1] + 4E[\theta_2] - 4 = -2$
- Seller indicates $\theta_1 > \theta_2$ so $E[\theta_1] = 1, E[\theta_2] = 0$
  - Half time $v_1 = 4(1) + 0(0) - 4 = 0$
  - Half time $v_1 = 0(1) + 4(0) - 4 = -4$
- Seller indicates $\theta_2 > \theta_1$ so $E[\theta_1] = 0, E[\theta_2] = 1$
  - Half time $v_1 = 4(0) + 0(1) - 4 = -4$
  - Half time $v_1 = 0(0) + 4(1) - 4 = 0$
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Puffery increases variance of buyer valuations

\[ V_1 = \beta_1 \theta_1 + \beta_2 \theta_2 - p_1 \]

- No info: \( v_1 = -2 \) so \( E[P_1] = .119 \)
- Puffery of attribute 1: \( v_1 = 0 \) or \( v_1 = -4 \) so \( E[P_1] = .262 \)
- Puffery of attribute 2: \( v_1 = -4 \) or \( v_1 = 0 \) so \( E[P_1] = .262 \)
Previous example a bit suspicious

Suppose again $V_1 = \beta_1 \theta_1 + \beta_2 \theta_2 - p_1$

But assume $\theta_i$ uniform i.i.d. so prior $E[\theta_i] = 1/2$ or $a_i = 1/2$

And assume $\beta_i$ normal i.i.d. with mean $\mu$ and variance $\sigma^2$

Seller puffs up one attribute at expense of other

Suppose two messages $m \in \{m^1, m^2\}$ where $m^1$ interpreted as $\theta_1 \geq \theta_2$ and $m^2$ interpreted as $\theta_1 < \theta_2$

Use notation $a_i^j = E[\theta_i | m^j]$

Then by uniformity $(a_1^1, a_2^1) = (\frac{2}{3}, \frac{1}{3})$ and $(a_1^2, a_2^2) = (\frac{1}{3}, \frac{2}{3})$
Persuasive puffery – example

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Persuasive attribute puffery – example

\[ E[\theta_i] = \frac{1}{2} \]

\[ E[\theta_1|\theta_1 > \theta_2] = \frac{2}{3} \]

\[ E[\theta_2|\theta_1 > \theta_2] = \frac{1}{3} \]

\[ E[\theta_1|\theta_1 < \theta_2] = \frac{1}{3} \]

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- \((a_1, a_2) = (\frac{1}{2}, \frac{1}{2}), (a_1^1, a_2^1) = (\frac{2}{3}, \frac{1}{3}), (a_1^2, a_2^2) = (\frac{1}{3}, \frac{2}{3})\)
- No information: \(v_1 = \beta_1 (1/2) + \beta_2 (1/2) - p_1\)
- Message 1: \(v_1 = \beta_1 (2/3) + \beta_2 (1/3) - p_1\)
- Message 2: \(v_1 = \beta_1 (1/3) + \beta_2 (2/3) - p_1\)

- No information \(\text{Var}[v_1] = \sigma^2 (1/2)^2 + \sigma^2 (1/2)^2 = (1/2)\sigma^2\)
- Message 1: \(\text{Var}[v_1] = \sigma^2 (2/3)^2 + \sigma^2 (1/3)^2 = (5/9)\sigma^2\)
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So puffery increases variance - and therefore increases probability of a sale when probability is low
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This example with two goods

- $\theta_{1j}$ i.i.d. on $[0, 1]$, and $\theta_{2j}$ i.i.d. on $[0, 1.2]$
- $\beta_1$ and $\beta_2$ normal, mean 10 and variance 5
- Prices same, $p_1 = p_2 = 10$
- Without puffery:
  - $P_1 = 5.4\%$, $P_2 = 58.2\%$
- With attribute puffery:
  - $P_2 = 10.7\%$, $P_2 = 50.2\%$
General results: Puffery of product attributes

- Example assumes $\theta_i$ iid and $\beta_i$ iid
- But if buyer is already leaning toward one good is that a problem?
- Seller has an incentive to pander to buyer preferences – buyer anticipates this and “discounts” puffery of that good
- Using results from Chakraborty and Harbaugh (2010) show puffery is still credible

**Proposition**

*For random coefficients, puffery of an attribute of product $i$ strictly raises (lowers) sales if sales are sufficiently small (large) for all $V_i$.***
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For random coefficients, puffery of an attribute of product $i$ strictly raises (lowers) sales if sales are sufficiently small (large) for all $V_i$. 
Negative puffery

- What if seller has information on competing product?
- Could then engage in negative puffery and credibly highlight weakness of that product
- Good idea when market share is low
- (But in logit example not as good as highlighting own strength)

**Proposition**

For random coefficients, negative puffery by the seller of product $i$ about an attribute of product $j$ strictly raises (lowers) sales of product $i$ if sales of product $j$ are sufficiently large (small) for all $V_i, V_j$. 
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Comparative advantage puffery

Puffery that highlights the comparative advantage of own product
Increases variance in buyer valuations for your product
  - Pulls in some buyers
  - And pushes some buyers away

Increases variance in buyer valuations for competing product
  - Pulls in some buyers (some from you)
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Proposition
For random coefficients, puffery of an attribute that is the comparative advantage of product i relative to that of product j strictly raises (lowers) sales of product i if sales of product i are sufficiently small (large) for all $V_i$ and $V_j$. 
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For random coefficients, puffery of an attribute that is the comparative advantage of product i relative to that of product j strictly raises (lowers) sales of product i if sales of product i are sufficiently small (large) for all $V_i$ and $V_j$. 
Could also compare own overall quality with competitor’s
Surprisingly, this can be credible!
But definitely not a good idea if there is insufficient uncertainty over coefficients

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For fixed coefficients, puffery of the overall value of product i or negative puffery of the overall value of product j strictly lowers sales of product i.
Absolute Advantage Puffery

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For fixed coefficients, puffery of the overall value of product $i$ or negative puffery of the overall value of product $j$ strictly lowers sales of product $i$. 
Can unverifiable puffery beat full verifiable disclosure?

- Disclosure of all information helps a seller (on average) when $P_i$ is convex.
- Puffery (always) helps a seller when $P_i$ is quasiconvex.
- So if $P_i$ is quasiconvex but not convex then puffery can be better.
- Hotdogs and hamburgers example?
- Seller can be better off credibility indicating that one is better and nothing more.
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Puffery as cheap talk

- Definition of puffery seems to be that of “cheap talk”
- One dimensional cheap talk models require some commonality of interest between expert and decision maker
- But what if seller only interested in making a sale?
- Suppose seller knows about two attributes of product
- Seller benefits from cheap talk if probability of a sale is low
- Fits results from the marketing literature?
Persuasion vs cheap talk games in advertising

Persuasion game approach

- “Objective/verifiable/hard information”
- Meaning of a message clear – but will the seller disclose it?
- In equilibrium usually have unravelling so all types disclose
- Good information types benefit, bad information types lose
- Regulation focuses on preventing lying

Cheap talk game approach

- “Subjective/nonverifiable/soft information”
- Meaning of messages endogenous to seller incentives
- Buyers must be knowledgeable, sophisticated
- Seller always benefits if low probability of a sale
- Legal exception for puffery seems to make sense
- Regulation should focus on making incentives transparent?
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