Identity, information and situations

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Teaching material

Motivation

Individuals have a strong desire to protect their *self-image/identity* - the answer to "who are you?" (Akerlof and Kranton '00)

E.g. a female, a black, a generous person, a good father, etc.

Identity is relevant in politics, religion, gender, health, human capital accumulation ("acting white")...

How it works:
the identity "prescribes" behaviors: what one should do in a given situation, and violating the prescription is psychologically costly.

Prescriptions may be different from actions that maximize the material benefits: *identity trade-off* (e.g., reluctant donors)

To reduce/avoid the identity trade-off:
information avoidance (e.g., moral wiggle room)
avoidance of situations (e.g., crossing the street to escape a fundraiser)

Motivation

Models in the literature:

- ✗ are mostly applied to social dilemmas (e.g., Benabou and Tirole '11, Grossman and van der Weele '16, Spiekermann and Weiss '16)
- ✗ account for special cases of information avoidance (e.g., avoidance of perfect information)
- ✗ require specific assumptions (e.g., uncertainty about own identity)

This paper:

- ✓ proposes a general model (a class of models) that jointly accounts for information and situation choices
- ✓ establishes a similarity between information avoidance and avoidance of situations
- ✓ does not require assumptions on the nature of the identity trade-off
- ✓ allows for identifying prescriptions from behavior

Preview of the results

- Information avoidance is akin to a preference for commitment (avoidance of situations)
- The cost of information is not necessarily increasing in its "informativeness"
- Demand for beliefs can be used to identify prescriptions from behavior. Similarly, preference for commitment
- Unified rationalization for: excess entry in competitive environments, women's limited labor market participation, flexibility stigma, opting-out social dilemmas

Setting

- States of the world Ω (relevant uncertainty)
- Actions: $f : \Omega \to X$, X payoffs (e.g., monetary outcomes or allocations)
- Menus: finite sets of actions $F = \{f_1, f_2, \ldots, f_n\}$
- Utility: $u : X \to \mathbb{R}$ measures "material benefits" (what the *homo oeconomicus* likes)
- Prior: $\hat{p} \in \Delta\Omega$

Epistemic situations

Akerlof and Kranton (2000)

> *"Prescriptions indicate the behavior appropriate for people in different social categories in different situations...agents follow prescriptions, for the most part, to maintain their self-concepts...violating the prescriptions evokes anxiety and discomfort in oneself...".*

Given a menu F and a belief $p \in \Delta\Omega$ (the prior or a posterior),

(F, p) is called epistemic situation

For each epistemic situation:
(1) Prescription: $f_{F,p} \in F$, Convexity assumption: if $f_{F,p} = f$ and $f_{F,q} = f$, for all $\alpha \in [0, 1]$, $f_{F,\alpha p+(1-\alpha)q} = f$

(2) Payoff-maximizing actions: $f^*_{F,p} \in \operatorname{argmax}_{g \in F} \mathbb{E}_p[u(g)]$

They may be different $f^*_{F,p} \neq f_{F,p} \implies$ identity trade-off

Moral wiggle room

Dana et al. (2007), Dictator game with or without uncertainty

Without uncertainty:

		ω_2
a		$(6, 1)$
b		$(5, 5)$

74% of the dictators select b

Example: Moral wiggle room

With uncertainty:
each state has probability 0.5. But dictators can freely learn the state before deciding:

	ω_1	ω_2
a	$(6,5)$	$(6,1)$
b	$(5,1)$	$(5,5)$

Only 56% decide to learn the state and under ignorance choose a.

Moral wiggle room and epistemic situations

	ω_1	ω_2
a	$(6,5)$	$(6,1)$
b	$(5,1)$	$(5,5)$

Under uncertainty $(a \cup b, \hat{p})$, a is the payoff maximizing action *and* the prescription (if one sees himself as fair) $f_{a \cup b, \hat{p}} = a$

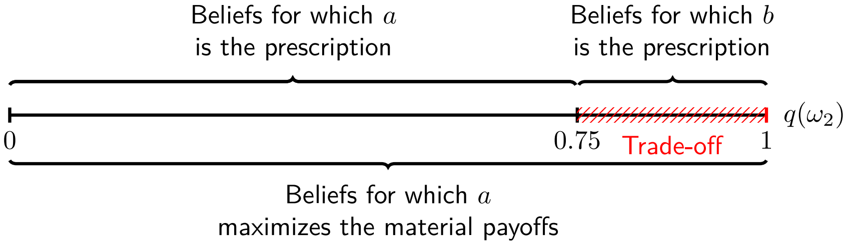
In state ω_1, $(a \cup b, \delta_{\omega_1})$ a is the payoff maximizing action *and* the prescription (of an non-selfish) $f_{a \cup b \delta_{\omega_1}} = a$

In state ω_2, $(a \cup b, \delta_{\omega_2})$, a is the payoff maximizing action but the prescription (of an non-selfish) is $f_{a \cup b, \delta_{\omega_2}} = b$

Learning the true state potentially generates the identity trade-off.

Trade-off regions

Sets of beliefs in which the identity trade-off is present (assumed to be convex sets).
Possible trade-off regions in the moral wiggle room:



The black solid line is the probability of state ω_2. The prescription is a for all beliefs assigning a probability of less than 0.75 to state ω_2 (i.e., $f_{a\cup b,q} = a$ for all q with $q(\omega_2) \leq 0.75$), otherwise the prescription is b. Assuming $u(x,y) = x$, the action a maximizes the material payoffs for all beliefs (i.e., $f^*_{a\cup b,q} = a$ for all q). The red pattern highlights the trade-off region.

The value of an epistemic situation

Each epistemic situation (F, p) has value:

$$(F, p) \longmapsto \underbrace{\mathbb{E}_p[u(f^*_{F,p})]}_{\text{Material value}} - \underbrace{d(f^*_{F,p}, f_{F,p}, p)}_{\text{Psychological cost}}$$

and where $d(f^*_{F,p}, f_{F,p}, p) \geq 0$ and $d(f, f, p) = 0$ (no cost when no trade-off)

Examples:

$$d_\kappa(f^*_{F,p}, f_{F,p}, p) = \begin{cases} \kappa & \text{if } f^*_{F,p} \neq f_{F,p} \\ 0 & \text{if } f^*_{F,p} = f_{F,p} \end{cases}$$

for $\kappa \in [0, \infty]$

$$d_e(f^*_{F,p}, f_{F,p}, p) = \phi\left(\mathbb{E}_p[u(f^*_{F,p})] - \mathbb{E}_p[u(f_{F,p})]\right)$$

where ϕ is a convex and continuous function with $\phi(0) = 0$.

Trade-off between material gains and psychological cost.

Value function in the moral wiggle room

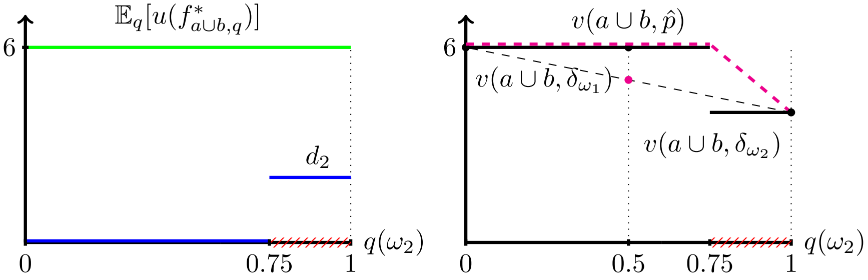


Figure: Moral wiggle room

The moral wiggle room. Left panel: the material value of $a\cup b$ as a function of q under the assumption $u(x,y)=x$, so that $\mathbb{E}_q[u(f^*_{a\cup b,q})]=\mathbb{E}_q[u(a)]=6$ for all q (green line). The cost d_2 (blue line). Right panel: the function $v(a\cup b,\cdot)$, given by the difference between the green and the blue lines of the left panel (black solid line). The smallest concave function that is greater than $v(a\cup b,\cdot)$ (dashed purple line). The value $v(a\cup b,\hat{p})$ (black dot) and the 1/2-1/2 average of $v(a\cup b,\delta_{\omega_1})$ and $v(a\cup b,\delta_{\omega_2})$ (purple dot).

Information acquisition

Exogenous information: a distribution over posteriors $\mu \in \Delta\Delta\Omega$ such that

$$\hat{p} = \int_{\Delta\Omega} p d\mu(p)$$

this is the Bayesian consistency requirement.

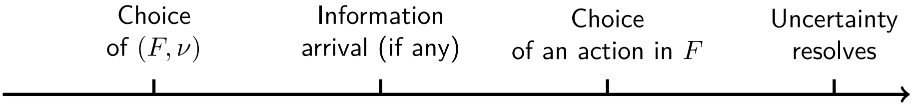


Figure: Dynamic of the choice process with $\nu \in \{\mu, \delta_{\hat{p}}\}$.

Information acquisition

Under ignorance, the ex ante value of a menu F is:

$$v(F, \hat{p}) = \mathbb{E}_{\hat{p}}[u(f^*_{F,\hat{p}})] - d(f^*_{F,\hat{p}}, f_{F,\hat{p}}, \hat{p}).$$

With information acquisition:

$$V(F|\mu) = \int_{\Delta\Omega} v(F, p) d\mu(p) = \int_{\Delta\Omega} \mathbb{E}_p[u(f^*_{F,p})] - d(f^*_{F,p}, f_{F,p}, p) d\mu(p)$$

Succinctly:

$$V(F|\mu) = \underbrace{\int_{\Delta\Omega} \mathbb{E}_q[u(f^*_{F,q})] d\mu(q)}_{W(\mu,F)} - \underbrace{\int_{\Delta\Omega} d(f^*_{F,q}, f_{F,q}, q) d\mu(q)}_{I(\mu,F)}.$$

The term $W(\mu, F)$ is the expected material payoff of F, and $I(\mu, F)$ the average psychological cost. Information always has a positive material value ($W(\mu, F)$ is weakly larger than $\mathbb{E}_{\hat{p}}[u(f^*_{F,\hat{p}})]$ for all menus), but it can also increase the average psychological cost.

Moral wiggle room

	ω_1	ω_2
a	$(6, 5)$	$(6, 1)$
b	$(5, 1)$	$(5, 5)$

Perfect information means $\mu(\delta_{\omega_1}) = \mu(\delta_{\omega_2}) = \frac{1}{2}$. Assume $u(x, y) = x$ and $\hat{p}(\omega) = \frac{1}{2}$:

$$
\begin{aligned}
V(a \cup b|\mu) =& \frac{1}{2}\left(\underbrace{\mathbb{E}_{\delta_{\omega_1}}\left[u(f^*_{a\cup b,\delta_{\omega_1}}(\omega))\right] - d(f^*_{a\cup b,\delta_{\omega_1}}, f_{a\cup b,\delta_{\omega_1}}, \delta_{\omega_1})}_{v(a\cup b,\delta_{\omega_1})}\right) + \frac{1}{2}v(a \cup b, \delta_{\omega_2}) \\
=& \frac{1}{2}\left(u(a) - d(a, a, \delta_{\omega_1})\right) + \frac{1}{2}v(a \cup b, \delta_{\omega_2}) \\
=& \frac{1}{2}6 - \frac{1}{2}d(a, a, \delta_{\omega_1}) + \frac{1}{2}v(a \cup b, \delta_{\omega_2}) = 3 + \frac{1}{2}v(a \cup b, \delta_{\omega_2})
\end{aligned}
$$

Moral wiggle room

	ω_1	ω_2
a	$(6,5)$	$(6,1)$
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Perfect information means $\mu(\delta_{\omega_1}) = \mu(\delta_{\omega_2}) = \frac{1}{2}$. Assume $u(x,y) = x$ and $\hat{p}(\omega) = \frac{1}{2}$:

$$
\begin{aligned}
V(a \cup b|\mu) =& 3 + \frac{1}{2}\left(\underbrace{\mathbb{E}_{\delta_{\omega_2}}[u(f^*_{a\cup b,\delta_{\omega_2}}(\omega))] - d(f^*_{a\cup b,\delta_{\omega_2}}, f_{a\cup b,\delta_{\omega_2}})}_{v(a\cup b,\delta_{\omega_2})}\right) \\
=& 3+\frac{1}{2}\left(u(a) - d(a,b,\delta_{\omega_2})\right) \\
=& 3 + \frac{1}{2}6 - \frac{1}{2}d(a,b,\delta_{\omega_2})
\end{aligned}
$$

Therefore information avoidance $v(a\cup b,\hat{p}) > V(a\cup b|\mu)$ iff $d(a,b,\delta_{\omega_2}) > 0$.

Formally

Definition

There is information avoidance for F if $v(F, \hat{p}) > V(F|\mu)$.

A strict inequality indicates that avoidance must be an "active" choice, hence subject to a strictly positive cost.

Given a menu F, I denote by $\operatorname{cav} v(F, \cdot)$ the concave envelope of $v(F, \cdot)$.

Proposition (Information Avoidance)

If $v(F, \hat{p}) = \operatorname{cav} v(F, \hat{p})$ and the restriction of $\operatorname{cav} v(F, \cdot)$ to the posteriors is not affine,[a] then there is information avoidance for F. If there is information avoidance for F, then $d(f^*_{F,q}, f_{F,q}, q) > d(f^*_{F,\hat{p}}, f_{F,\hat{p}}, \hat{p})$ for at least one posterior belief q.

[a] This condition means that $\operatorname{cav} v(F, \hat{p}) \neq \int_{\Delta\Omega} \operatorname{cav} v(F, q) d\mu(q)$.

See Figure 1 for a concave envelope that is "sufficiently concave."

Nonmonotonicity of the cost of information: Poorly informed altruism

Donation to a charity (c) or no donation (d). Unknown quality $\hat{p}(\omega_h) = \hat{p}(\omega_l) = 0.5$. The payoffs (in utils) are:

	ω_h	ω_l
c	8	0
n	0	4

- Prescription is d for all posteriors assigning a probability larger than $1/5$ to high quality (thus also under ignorance). Otherwise, the prescription is n.
- A donation maximizes the individual's material payoffs for any belief assigning a probability of at least $1/3$ to ω_h (thus, also under ignorance).
- Identity trade-off emerges for any posterior that assigns a probability smaller than $1/3$ and larger than $1/5$ to ω_h.

Nonmonotonicity of the cost of information: Poorly informed altruism

	ω_h	ω_l
c	8	0
n	0	4

Suppose information μ leads to two equally probable posteriors q', q'', with $q'(\omega_h) = 3/4$ and $q''(\omega_h) = 1/4$.

μ is costly because the posterior q'' falls into the trade-off region with a probability of $1/2$.

The value of $c \cup n$ under ignorance is $v(c \cup n, \hat{p}) = 1/2 \cdot 8 - d(c, c, \hat{p}) = 4$ and the value of $c \cup n$ with information is

$$V(c \cup n|\mu) = \frac{1}{2} \cdot [6 - d(c, c, q')] + \frac{1}{2} [3 - d(n, c, q'')] = 4.5 - \frac{1}{2} \cdot d(n, c, q'').$$

So there is information avoidance if $d(n, c, q'') > 1$.

Nonmonotonicity of the cost of information: Poorly informed altruism

Suppose that the individual acquires perfect information $\bar{\mu}$, corresponding to $\bar{\mu}(\delta_{\omega_h}) = \bar{\mu}(\delta_{\omega_l}) = 1/2$.

Then,

$$V(c \cup n|\bar{\mu}) = \frac{1}{2} \cdot [8 - d(c, c, \delta_{\omega_h})] + \frac{1}{2} \cdot [4 - d(n, n, \delta_{\omega_l})] = 6,$$

which is strictly larger than $v(c \cup n, \hat{p})$.

Thus, perfect information is better than ignorance, which is better than partial information ($V(c \cup n|\bar{\mu}) > v(c \cup n, \hat{p}) > V(c \cup n|\mu)$).

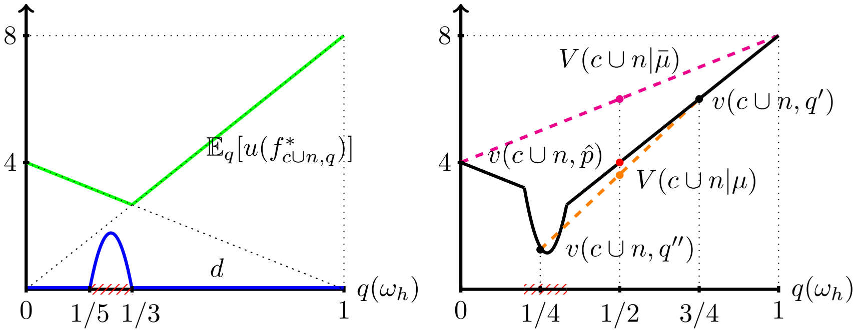

Figure: Poorly informed altruism

Left panel: the material value of $c \cup n$ as a function of q, $\mathbb{E}_q[u(f^*_{c\cup n,q})] = \max\{\mathbb{E}_q[c], \mathbb{E}_q[n]\}$ (green line), and the psychological cost (blue line). Right panel: the function $v(c \cup n, \cdot)$ (black solid line), the value of $v(c \cup n, \hat{p})$ (red dot), the value of $V(c \cup n|\mu)$ (orange dot), which is the $1/2$-$1/2$ average of $v(c \cup n, q')$ and $v(c \cup n, q'')$. The value of $V(c \cup n|\bar{\mu})$ (purple dot), which is the $1/2$-$1/2$ average of $v(c \cup n, \delta_{\omega_h}) = 8$ and $v(c \cup n, \delta_{\omega_l}) = 4$.

When is the cost of information monotone?

Non-monotonicity introduces an asymmetry to the interpretation of information choices from the point of view of an external observer. The rejection of inconvenient information suggests that identity concerns play a role. Conversely, the acquisition of information is inconclusive about the relevance of identity, because worse information could be rejected.

However:

Proposition (Sufficient and necessary conditions for monotonicity)

If $q \mapsto d(f^*_{F,q}, f_{F,q}, q)$ is convex and continuous, better information is more costly for F. Assume that $\hat{p}$ has full support and $I(\nu, F)$ is finite for all experiments ν consistent with the prior. If better information is more costly for F, then $d(f^*_{F,q}, f_{F,q}, q)$ is convex in q.

Avoiding the situation or when less is more

Suppose that the prescriptions in a menu F are identical to the prescriptions in $F \cup G$ (i.e., $f_{F,q} = f_{F \cup G,q}$ for all the posteriors and the prior). In this case, I say that $F \cup G$ is *prescriptively equivalent* to F.

Assumption: the identity trade-off is weakly more costly in $F \cup G$ when it is prescriptively equivalent to F. Formally, $d(f^*_{F \cup G,q}, f, q) \geq d(f^*_{F,q}, f, q)$ for all posteriors and the prior when $F \cup G$ is prescriptively equivalent to F, and call such d *regular*.[1]

Proposition (Avoiding the situation)

Suppose that $F \cup G$ is prescriptively equivalent to F and d is regular. Commitment to F is optimal whenever the additional psychological cost for a posterior q (i.e., $\mu(q)(d(f^*_{F \cup G,q}, f, q) - d(f^*_{F,q}, f, q))$) is larger than the material value of flexibility $W(\mu, F \cup G) - W(\mu, F)$. If commitment to F is strictly optimal, then $f^*_{F \cup G,q} \neq f^*_{F,q}$ for at least one posterior belief q.

[1] For example, d_κ and d_e are regular.

Application: excess entry into competition

- Two actions: enter e or not n with $u(n) = 0$.

- Uncertainty concerns the returns (e.g. the level of future demand or the comparative ability).

- $H = e$ (e.g., early entry) or $N = e \cup n$ (flexibility)

The model is consistent with:

$$V(N|\mu) < V(H|\mu)$$

Even in absence of "overconfidence," i.e., when $\mathbb{E}_{\hat{p}}[u(e)] \leq 0 = u(n)$. A "real men" enters competition even if the expected value of competing is negative.

Inferring prescriptions from behavior: information

Prescriptions are unobservable from the point of view of an external observer. So, how to infer them from choice?

An action $f^* \in F$ is payoff-dominant in F if $u(f^*(\omega)) \geq u(g(\omega))$ for all $\omega \in \Omega$ and all $g \in F$. It follows that $f^*_{F,q} = f^*$ for all beliefs, because $\mathbb{E}_q[u(f^*)] \geq \mathbb{E}_q[u(g)]$ for all $q \in \Delta\Omega$ and all $g \in F$.

Proposition (Inferring prescriptions from information choices)

Assume that f^* is payoff-dominant in $f \cup f^*$. Information avoidance for $f \cup f^*$ implies that f is the q-belief prescription in $f \cup f^*$ for at least one posterior belief q. If information is strictly valuable for $f \cup f^*$, then f is the $\hat{p}$-belief prescription in $f \cup f^*$.

With a payoff-dominant action, information has no material value because the payoff-maximizing action is independent of beliefs. Therefore, observing willful ignorance implies that an alternative action must generate the identity trade-off for at least one posterior. Observing information acquisition implies that the payoff-dominant action cannot be the prescription under ignorance, otherwise ignorance would be optimal.

Inferring prescriptions from behavior: opportunities

I say that the prescriptions are *context-independent*, if adding an action g to a menu F in which f is the q-belief prescription, implies that either f is the q-belief prescription in $F \cup g$ or g becomes the q-belief prescription in $F \cup g$.

Proposition (Inferring prescriptions from choices of opportunities)

Assume that $f^* \neq g$, f^* is payoff dominant in $F \cup g$ and the prescriptions are context-independent. If $v(F, \hat{p}) \neq v(F \cup g, \hat{p})$, then g is the $\hat{p}$-belief prescription in $F \cup g$. If $V(F|\mu) \neq V(F \cup g|\mu)$, then g is the q-belief prescription in $F \cup g$ for at least one posterior belief q.

The presence of a payoff-dominant action f^* in $F \cup g$ equalizes the material values of F and $F \cup g$, so any difference in their valuations must come from the identity trade-off. Context-independence ensures that any variation in the identity trade-off is due to g.

In the paper

- Meta-prescriptions (e.g., prescriptions about learning, flexibility etc.) with applications to "acting white."
- Optimal disclosure to identity-caring individuals. A test that perfectly reveals a preferred state with small probability and is (almost) uninformative otherwise is always acquired.
- Uncertainty about identity.
- Commitment without uncertainty. Costly exit in dictator games