Is Game Theory an applied form of Decision Theory? Is Game Theory just a case where "reasoning from our opponent's perspective" sharpens our credences before maximizing expected utility? Here are some cases of potential conflict.

Dominance?

A claim from Game Theory:

(GT1) Rational players never choose strongly dominated strategies in strategic situations.

And another from Evidential Decision Theory:

(EDT) Dominance reasoning may be irrational when outcomes are not probabilistically independent of choices.

It seems like these principles can come into conflict, when player's choices in a decision theoretic situation are probabilistically (while perhaps not causally) related to each other. Here's an example.

> **Twin-Prisoner's Dilemma**. You discover that you have a long lost "reasoning twin". Reasoning twins are known to reason in incredibly similar ways in strategic situations, independently of upbringing. By contrast, their values can develop in radically different ways. You've never met your special twin but discover that he/she favors a cause very strongly that you find frivolous but not harmful ("save the Xs" for some frivolous X). You support a cause your twin, bizarrely, feels the same way about ("save the victims of flood disaster"). You're now put in the following a simultaneous game with your reasoning twin: you choose either "A" or "B" where the following table gives the payouts to charities supporting your respective causes.

	A	B
A	\$1000 \$1000	\$2000 \$0
B	\$0 \$2000	\$100 \$100

> When "reasoning twins" have played this game before, they have almost always (regardless of how sophisticated their reasoning) both chosen "A" or both chosen "B". What should you pick?

What does Game Theory instruct? And Evidential Decision Theory? (And what about Causal Decision Theory?)

Predictive v. Causal Knowledge

Why is Nash-Equilibrium important? One reason was that in repeated games, *sometimes* strategies gravitated towards components of Nash equilibrium (recall the "2/3rds game"). Another was supposed to be that if players could *predict* each others' moves, we get Nash equilibria. That is:

(GT2) When it is common knowledge that players are rational and can predict each others' moves, chosen strategies will make up a Nash-Equilibrium strategy profile.

Let me reprint the reasoning (from handout 12) that led to this conclusion in a two-player game:

> Suppose <A, B> is played and is not a Nash equilibrium. Then player one (say) might benefit from switching their strategy to <A',B>. But by [the assumption that it is common knowledge that players can predict each others' moves, and will behave rationally], player one was in a position to know B was being played, and was rational, and hence playing to optimize her outcomes, but she didn't optimize her outcomes.

This is supposed to be a *reductio* of the claim that a Nash equilibrium fails to be played.

A concern: recall that Casual Decision Theory tells us to ignore the probabilistic influence of our action in certain cases. Namely:

(CDT) When assessing the rational thing to do, one should ignore the probabilistic influence of one's actions on outcomes provided it is not causal influence.

Accordingly, there may be a flaw in the above argument (for the Causal Decision Theorist). What it is?