

Each Choosing Best Lands Both on the Worst

— Whether the other cooperates or defects, defecting pays — and yet the pair lands on a total of **2**, exactly **1/3** of the **6** that mutual cooperation would give — nobody made a mistake and the whole came out lowest — [Paper 437]

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— *From thinking to syncing.* —

Abstract

If each chooses what is best for themselves, the whole is expected to be better too. This paper shows that it need not be—nobody makes a mistake and the pair lands where the total is smallest. No new theorem or law is claimed. First, if the other cooperates, defecting pays, 5 against 3 (Section 2). Second, if the other defects, defecting still pays, 1 against 0. Defection pays either way, which makes it a dominant strategy (Section 2). Third, this is the core of the paper. The pair lands on a total of 2, the smallest of the three outcomes (Section 3). Fourth, mutual cooperation would total 6, exactly 3 times as much (Section 3). Fifth, because $2R > T + S$ holds, mutual cooperation is the largest total (Section 2). Sixth, the separator is whether one looks at each person or at the pair (Section 4). Keywords: prisoner's dilemma, game theory, dominant strategy, Nash equilibrium, Pareto efficiency.

Scope of this paper (scope note): No new theorem or law is claimed—the prisoner’s dilemma, dominant strategies, Nash equilibrium and Pareto efficiency are all standard (since 1950).No theorem is proved—neither existence nor uniqueness of equilibrium is proved; numbers are put into one payoff table.Repetition is not treated—it is known that cooperation can be sustained under repetition. Only the one-shot case is treated here.No real situation is fitted—applications to arms races, the environment or price competition are not the subject.No morality is argued—defecting is not called wrong nor cooperating right; only the numbers in the table are examined.The payoff values are not asserted—5, 3, 1, 0 are representative, and any numbers satisfying $T > R > P > S$ and $2R > T + S$ give the same conclusion.Relation to earlier papers: Paper 436 showed that changing how the price is set makes honesty optimal—there a rule was changed to fix an incentive; here a rule aligns incentives the wrong way.Paper 300 showed that common root and distinct root can be decided—“best for each” and “best for the whole” are distinct roots by that criterion.Paper 435 showed that constancy at every term does not settle the total—there too a property of the parts did not become a property of the whole.Paper 417 showed that the ceiling on chain length is not a fact about animals—here too the structure, not the participants, settles the outcome.What is added is putting the four payoffs side by side to establish dominance in numbers, giving the totals for three outcomes, showing that the landing point is the smallest total, giving the ratio to mutual cooperation as 3, placing a lowered T as the other side of the boundary, and placing the separator at “each or the pair”.

1. Notation and the Question

Setting: Two players simultaneously choose to cooperate or defect, with payoffs

Self / Other	Cooperate	Defect
Cooperate	$R = 3$	$S = 0$
Defect	$T = 5$	$P = 1$

The dilemma requires $T > R > P > S$ and $2R > T + S$. Here $5 > 3 > 1 > 0$ and $6 > 5$, so both hold.

Observation 1.1

If each chooses what is best for themselves, the whole is expected to be better too.Everyone pursuing gain, and the sum rising with it—a familiar idea.

Observation 1.2

But that is the case where the choices do not affect each other. Where the other's choice changes one's own payoff, the account differs—and here it does.

Question: If each chooses best, where do the two land.

2. Defecting Pays Either Way

Computation 2.1: For each choice by the other, compare one's own two moves.

Other	Cooperating gives	Defecting gives	Better
Cooperate	3	5	defect
Defect	0	1	defect

Observation 2.2

Whatever the other does, defecting pays. $5 > 3$ and $1 > 0$ —this is what a dominant strategy means.

Observation 2.3

So there is no need to read the other. The answer is settled without reading—the same shape as the second-price rule of Paper 436, pointing the other way.

Computation 2.4: Compare $2R$ with $T + S$.

$2R = 6 > T + S = 5$. Mutual cooperation is the largest total.

Observation 2.5

Without this condition there is no dilemma. If $2R < T + S$, alternating defection totals more—only with both conditions does “all should cooperate and none will” arise.

3. The Landing Point Is the Smallest Total

Computation 3.1: Take the totals for the three outcomes.

Outcome	Total
Cooperate, cooperate	6
Cooperate, defect	5
Defect, defect	2

Observation 3.2

Mutual cooperation is the largest at 6. Best for the whole—and nobody goes there.

Observation 3.3

Mutual defection is the smallest at 2. And pursuing each one’s best lands there—which is the core of the paper.

Observation 3.4

The gap is a factor of 3.6 against 2—a sizeable difference arising with nobody in error.

Observation 3.5

Nobody is in error. Both chose the move that paid best in the situation they faced—each calculation is correct.

Observation 3.6

So “because they were foolish” does not explain it. The cleverer they are, the more surely they reach 2—cleverness is making the outcome worse.

4. The Separator

The separator: does one look at each person, or at the pair.

Observation 4.1

Looking at each person, defecting is right. Hold the other fixed and compare—defection is higher in both cases.

Observation 4.2

Looking at the pair, cooperating is right. Compare the totals—6 is the largest.

Observation 4.3

These are distinct roots by the criterion of Paper 300. Both are called “the best”—one a comparison with the other held fixed, one a comparison of the pair.

Observation 4.4

And the two cannot both be followed within one table. One must be chosen—which is not a contradiction: two different questions have two different answers.

Computation 4.5: Place the other side of the boundary. Lower T below R , to 2.5.

Then $T < R$, so if the other cooperates, cooperating pays. Defection is no longer dominant.

Observation 4.6

So what makes defection dominant is a single inequality, $T > R$. Not the people, not the culture—move one entry of the table and it goes.

Observation 4.7

To be honest—only the one-shot case is treated here. It is known that cooperation can be sustained under repetition—so it is not claimed that cooperation is impossible.

Observation 4.8

One last thing—the payoff values are representative. Any numbers satisfying $T > R > P > S$ and $2R > T + S$ give the same conclusion—what acts is not the numbers but the two inequalities.

5. Roll Call and Closing

1. If the other cooperates, $5 > 3$ (Computation 2.1): **defecting pays.**
2. If the other defects, $1 > 0$ (Computation 2.1): **defecting pays.**
3. Defection either way (Observation 2.2): **a dominant strategy.**
4. $2R = 6 > T + S = 5$ (Computation 2.4): **cooperation totals most.**
5. Mutual cooperation totals **6** (Computation 3.1): **the largest.**
6. Mutual defection totals **2** (Computation 3.1): **the smallest.**
7. And that is where they land (Observation 3.3): **the core.**
8. A factor of **3** (Observation 3.4): **with nobody in error.**
9. At $T = 2.5$ dominance goes (Computation 4.5): **the other side of the boundary.**
10. The separator is each or the pair (Observation 4.3): **distinct roots by Paper 300.**

Closing: If each chooses what is best for themselves, the whole is expected to be better too—but that is the case where the choices do not affect each other, and where the other's choice changes one's own payoff the account differs. Each one's best is indeed to defect—if the other cooperates, $5 > 3$; if the other defects, $1 > 0$; so defecting pays whatever the other does, which is what a dominant strategy means, and there is no need to read the other at all. At the same time $2R = 6 > T + S = 5$ holds, so mutual cooperation is the largest total. Without that condition there is no dilemma: if $2R < T + S$, alternating defection totals more. And yet the landing point is the smallest total—the three outcomes total **6**, **5** and **2**, and pursuing each one's best lands on **2**. The gap is a factor of **3**, a sizeable difference arising with nobody in error. Both chose the move that paid best in the situation they faced and each calculation is correct—so “because they were foolish” does not explain it. The cleverer they are, the more surely they reach **2**, and cleverness is making the outcome worse. One thing separates them—does one look at each person, or at

the pair. Hold the other fixed and defection is higher in both cases; compare the totals and cooperation is highest. They are distinct roots by the criterion of Paper 300: both are called “the best”, but one is a comparison with the other held fixed and one a comparison of the pair. The two cannot both be followed within one table, which is not a contradiction—two different questions have two different answers. And what makes defection dominant is a single inequality, $T > R$: lower T to 2.5 and cooperating pays when the other cooperates. Not the people, not the culture, but one entry of the table. To be honest—only the one-shot case is treated here. It is known that cooperation can be sustained under repetition, so it is not claimed that cooperation is impossible. One last thing—the payoff values are representative. Any numbers satisfying $T > R > P > S$ and $2R > T + S$ give the same conclusion, so what acts is not the numbers but the two inequalities.

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