In a recent article in this Journal, J.V. Howard [1] puts forward an interesting idea with respect to the achievement (or "rationality") of cooperation in the PD game. On closer inspection I do not think that the idea provides a sound argument for the choice of the cooperative strategy, although in general I am sympathetic with arguments pointing to the choice of the cooperative strategy in the PD game.

Put in simple terms the author's idea is to apply a version of the Tit-for-Tat strategy, which has turned out to be very successful in the iterated PD game, also to the one-shot PD game.

He does so by introducing a "model" of the PD in which the individual players are substituted by computer programs of two types: the first type embodies the non-cooperative strategy D, the second type is a program which recognizes its own type. If it recognizes that its opponent is identical to itself, it plays C. Otherwise, it plays D. This is called the Mirror strategy program.

Now the author's contention is that the Mirror program will do better than the non-cooperative program, which plays D in all cases, because if there are for instance five non-cooperative programs and five Mirror programs, then one (not all!) non-cooperative program playing once with each of the other four non-cooperative programs and with each Mirror program will get 9 points (using the pay-off matrix [1], p. 203), whereas one Mirror program playing once with every other Mirror program and with each of the five non-cooperative programs will get 13 points. Hence the author's conclusion: under certain assumptions it can be sensible to play cooperatively even in a single-shot PD game. This conclusion is not warranted unless the assumptions are made explicit. If they are spelled out, they prove to be very strong in that they "define away" most of the intricacies of the PD game, such that the author's conclusion may be logically correct, but rather trivial.
I have no problems with substituting players by programs. Indeed, as the author points out, this method has been fruitfully employed by Axelrod [2] in order to explore the properties of the Tit-for-Tat strategy in the iterated PD game. But if one does so, one should take care of incorporating the characteristics of the PD game into the programs.

I have also no problems with the introduction of an additional "recognition phase" for the Mirror program, although some game theorists certainly would argue that the original PD game presupposes isolated players, excludes communication and hence also "recognition" of other players. I think this is an unnecessary assumption, since the central problem of the PD game remains the same with or without communication.

But then my problems begin. It is certainly not true that the Mirror program always does better than the non-cooperative program. Consider the example given above but with nine non-cooperative programs and one Mirror program. In this case it makes no difference if one chooses the non-cooperative or the Mirror program, both programs will get 9 points. In fact, in order for the Mirror program to gain from cooperation there must be at least one additional Mirror program with which it can cooperate after recognizing it as identical. Hence we have to assume that there must be at least two Mirror programs, if we want to conclude that the Mirror program will do better than the non-cooperative program.

For the $n$-person or $n$-program PD this assumption may be seen as an additional restriction, but for the 2-person or 2-program PD it is fatal, because in this case we would assume in advance what we wanted to conclude, i.e. that it is sensible to play cooperatively. Or from another angle: the introduction of two Mirror programs as players in the 2-person PD immediately changes the payoffs such that the cooperative strategy becomes a dominant strategy. But if we have only one Mirror "player" the result will be the non-cooperative outcome.

The next problem concerns the "automatic" translation of the recognition or non-recognition of another program into a specific choice of strategy by the Mirror program. If I recognize my fellow-player to be of the cooperative type it does not necessarily follow that I also choose the cooperative strategy, because looking at the payoff matrix I may realize that I am better off if I choose to defect. The translation of recognition into strategic choice obviously suppresses this kind of consideration and