Justifying Rational Choice
The Role of Success*

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1. Introduction

The theory of rational choice can be interpreted in several ways. One can regard the theory as representing the choices of agents. The theory is interpreted as an empirical hypothesis for further research. Alternatively, one can regard the theory as an axiomatic modeling assumption for social theory. However, in this essay I will not discuss these descriptive and predictive interpretations of the theory. I will be concerned with the normative interpretation of the theory. On this interpretation the theory of rational choice is a systematic account of how agents ought to choose so as to realize their goals or preferences. The theory is, therefore, instrumentalist. The theory is neutral with regards to the goals or preferences of the agent. It takes these as a given input for its recommendations.

So far I have been talking as if there is one, unproblematic account of how to choose. However, as we shall see, that is not the case. There are several competing proposals for the rational procedure of choice. How do we determine which one is correct? Since the theory is supposed to be instrumentalist and neutral it is only natural to assume that the actions recommended by the rational choice procedure should be successful; successful, that is, in terms of the goals and preferences of the agent. If a procedure fails to produce successful choices, it cannot be the correct procedure of choice. And if a choice is successful then the procedure that recommends it is *ipso facto* rational. This gives us two related claims about the role of success in the justification of a choice procedure. First, success is necessary to establish the rational acceptability of a procedure of choice. Secondly, success is sufficient to establish the rationality of the proposed procedure of choice.

These two claims together form the doctrine of *pragmatic foundationalism*.[1] It has been advocated by authors such as David Gauthier and Edward McClennen.[2] Gauthier has attacked standard game theory and McClennen has criticized standard decision theory. They did this by showing that there are situations where agents do worse than they would on their alternative theories (*constraint maximization* and *resolute choice*

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1 This term is coined by Edward McClennen in McClennen 1990, p. 4–5.

2 Gauthier 1986, 1994, 1997 and McClennen 1990.

respectively), thus using success as a necessary condition. Moreover, in defending their own views, they claim that since their alternative theory is more successful than the standard theory this shows the rational superiority of resolute choice and constraint maximization. Therefore, they treat success as sufficient for rational acceptability.

Appeals to claims of pragmatic foundationalism are not only found in the periphery of rational choice literature. For example, the first claim, i.e., that success is necessary, is used to argue against intransitive preferences. The *money pump* argument demonstrates that agents with such orderings fail to realize success in their own terms. Similarly, the *Dutch book* argument shows that agents whose probability assignments do not satisfy the standard rules of Bayesian probability calculus will fail to be successful.[3]

The claims of pragmatic foundationalism seem relatively unproblematic in the context of so-called normal form decision problems under certainty. In such contexts the agent has to make only one choice to realize the desired outcome, and chance does not play a role at all. In such a situation, if the choice procedure does not recommend the best or one of the best outcomes, surely it fails as a rational procedure. Similarly, if X is the best outcome, and there is a procedure that recommends X, that procedure must be a rational one.

Things become more complicated when we introduce probabilities and uncertainty. In such situations the relation between success and rationality is not as straightforward as it is under certainty. In this essay I will abstract from these problems of choice under uncertainty and concentrate instead on a special context of choice, to wit, choosing over time. I will discuss only those decision problems over time which involve certainty. As we will see there are special problems for decision making over time which are absent from the 'one-shot' case. These problems cast a new light on the idea that success is part and parcel of the justification of a choice procedure. I will argue against pragmatic foundationalism. Success is neither sufficient nor necessary to establish the rational acceptability of a choice procedure.

The remainder of this essay is organized as follows. Section two introduces three alternative choice procedures for rational choice over time. In addition, I give a rather crude pragmatic argument that uses success to identify the correct procedure of choice in those cases. Sections three and four discuss a general problem with this type of argument. The result of which is that success is neither sufficient nor necessary to establish the rational choice procedure and that there are reasons to doubt it is necessary. Sections five and six illustrate this general conclusion with a concrete example.

2. Conditions of planning

Suppose that an agent faces the choice between three outcomes, A, B, and C. At t = 1 she can choose to go 'down' and end up with outcome B, or to go 'across' and have an additional choice at t = 2 between A and C (see figure 1). Suppose that she prefers A to

[3] Whether these arguments do show what they are supposed to show is a much-debated matter. See Hampton 1998 and Schick 1986.

B and B to C. Then rationality dictates that she goes 'across' at t = 1 and 'across' at t = 2 so that she ends up with A. Suppose, however, that her preferences over time are *unstable*. That is, at t = 1 she orders the available alternatives as follows: A > B > C but at t = 2 she orders C > A.[4] If this is the case, the agent needs to make an 'up-front' choice as to what path to follow through the tree. That is to say, she needs to make a *plan*. A plan is a detailed specification how to choose at each choice point that can be reached by the application of the plan. In this tree, there are three plans, each leading to a different outcome.[5] Which plan is rationally acceptable? That depends crucially on what principle of rational choice is correct for deciding over time.[6]

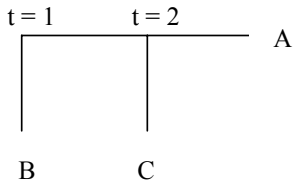

Figure 1

First, the agent could plan at t = 1 to go 'across' to choose A at t = 2. This seems a rational plan because she most prefers A from all the alternatives available at t = 1. However, at t = 2 her available options are reduced to A and C. Since she prefers C to A, when the feasible options are reduced to A and C, she will go 'down' at t = 2. So our agent plans to go to A, but fails to execute that plan at t = 2. Such an agent is *myopic*: she plans certain moves, but forgets about her plan at the time of execution.[7] Most authors agree that myopia is a bad idea. Just following what you prefer most at the time of action leads to pragmatically disagreeable results. Myopia can result in self-defeating choices. In this case, the myopic agent ends up with C, her least preferred outcome overall.

Several authors have argued that instead of being myopic, the rational agent should be *sophisticated*.[8] The agent in figure 1 should anticipate that at t = 2 she no longer will opt for A but choose C instead. Therefore, so the argument goes, A is not a feasible plan, or as Wlodek Rabinowicz puts it, A is not *performable*.[9] A plan is performable if the

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4 Where '>' stands for the preference relation 'is strictly preferred to'.

5 As will become clear, it is only when the agent's preferences are unstable over time, that the alternative choice procedures I am about to discuss have a different result. Therefore, pragmatic arguments will select among candidate choice procedures only in these contexts.

6 There are clear links between these discussions in decision theory and recent developments in action theory, especially Bratman 1987, who analyzes intentions as (part of) plans for future action. I will not go into these connections in this essay. However, I believe this is one of the most promising developments for the integration of the two dominant (types of) theories of human action, i.e., rational choice theory and action theory.

7 The term was first coined by Strotz 1956.

8 To name but a few: Strotz 1956 and Rabinowicz 1995.

9 Rabinowicz 1995. The notion of performability is closely related to the idea of backward induction.

agent does not have a reason to deviate from the plan after she has started its execution. In figure 1 the agent has only two performable plans: the plan leading to B and the plan leading to C. Since at t = 1 B is preferred to C, the only acceptable plan is the plan leading to B. Therefore, pragmatic consideration seem to call for sophistication.

However, we have to ask the question *why* the plan leading to A is not performable. The reason is simple. Sophistication requires that the agent, in her deliberation about her plan, regards the choice at t = 2 as if she faces them for the very first time. This requirement of *separability* forbids the agent from considering her choice at t = 2 as part of an overall plan.[10] Suppose, however, that the correct procedure of rational choice does not require separability. In that case, the plan leading to outcome A will be available (or if you will, performable). Since A is preferred to B, pragmatic considerations require that the correct procedure of choice does not require separability. This means that the pragmatically superior procedure of choice is a form of *resoluteness*. The agent should plan to choose A and resolutely pursue that option at t = 2.

It seems then that success completely determines the rationally acceptable planning procedure. It is both necessary and sufficient to identify the rational planning procedure. An agent with unstable preferences should plan resolutely. We have a completely *pragmatic justification* for resoluteness.

3. Two conceptions of justification

However, for many – including me – this conclusion is too fast. J. David Velleman has argued that success is neither necessary nor sufficient for determining the rationality of a principle of rational choice.[11] Whereas success arguably is an appropriate requirement of the choice of an action (or in our case that of a plan) it is not a proper determinant for the choice *how* to act or plan. This latter choice, the choice for a procedure that identifies the rational choice or the rational plan, cannot be guided by considerations of success. This latter choice is not the object of practical reasoning but of theoretical reasoning. Therefore, success is the wrong sort of criterion for assessing the correctness of this choice.

For suppose it were. That is, suppose that the correct procedure of rational planning is not something we *discover*, but something that is object of *practical deliberation* much in the same way as we deliberate about the choice of plan. That would mean that the evaluation of a proposed procedure of rational choice (i.e., the correct procedure for rational planning) is itself an instance of rational choice, which is supposedly constrained by the same procedure. This, so Velleman argues, begs the question of the rationality of that procedure. Consequently, demonstrating that the adoption of a particular procedure

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Indeed, the whole idea of sophisticated choice can be regarded as an implication of backward induction.

[10] The term 'separability' comes from McClennen 1990. Note that myopia is committed to this demand of separability as well.

[11] Velleman 1997.

of rational planning (whether it is myopia, sophistication or resoluteness) brings success is irrelevant for establishing the rationality of that procedure itself.

I hesitate to endorse Velleman's conclusions. I share his intuition that the problem of identifying the correct procedure of rational planning is a matter of theoretical reasoning and not a practical choice. However, the claim that a pragmatic justification is question begging is acceptable only if one shares that intuition. Let me explain. Let us assume that the argument in favor of resoluteness is valid. That is, for pragmatic reasons one should choose a resolute planning procedure. Why would one accept this as an argument in favor of resoluteness? The answer the pragmatist gives us is that acceptance brings success. Suppose a critic would not be satisfied and would demand why success is a proper criterion for acceptance of resoluteness. The pragmatist cannot and would not give any other answer: acceptance brings success – period. This is question begging only if one thinks that the acceptance of an argument is a matter of belief, that is, if one thinks that such acceptance is a matter of truth. And this is exactly what the pragmatist will deny in this context. For her the proper ground for acceptance of a choice procedure is not whether it is appropriate but whether acceptance will bring success.[12]

It may seem that there is no difference between a procedure bringing success or it being appropriate against the background of instrumental rationality. However, things start to look very different if we look at situations where the procedure for deciding itself has consequences other than the choice it recommends. A good example is the so-called *toxin puzzle*.[13] The story is that an eccentric millionaire will give you a million dollars if you can form the plan now to drink a vial of toxin tomorrow that will make you sick for a day or two. Given that you prefer one million dollar to a few days of being sick should you be resolute and drink the toxin tomorrow? Tomorrow there is no reason to drink the toxin so a sophisticated chooser will not plan to drink it. A myopic chooser might form the plan but the millionaire will recognize that the plans of a myopic chooser are not worth the paper they are written on. Only a resolute chooser will be believed. Thus resoluteness pays here. However, it pays not because resoluteness recommends the best plan but because the procedure itself is beneficial. This effect is relevant for its justification according to the pragmatist. His critic, however, will argue that this it amounts to arguing that if it "pays" to believe that resoluteness is rational you should believe it. It seems that this is not the right sort of criterion for belief acceptance.

What emerges here is that the pragmatist has an alternative picture of what a successful justification of a rational planning procedure should look like. Whereas the critic of the pragmatist position will accept a planning procedure if she believes such a procedure to be appropriate, the pragmatist will accept such a procedure only if doing so

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[12] Note that stronger pragmatic positions are possible as well. One can imagine a pragmatist who thinks of every instance of theory acceptance as a matter of choice which is to be determined by whether or not acceptance will bring success. Here I have limited pragmatism to the domain of theories of rational choice.

[13] Kavka 1983.

will bring success. How should we decide between these two rival conceptions of justification?

4. Rational choice procedures: imperfect or pure?

The different picture of justification is not the only thing that divides the pragmatist and her critic. There is a further difference in how they regard the status of the justified procedure of planning. This becomes apparent once we look at some of the characteristics of pragmatic justifications. First, any argument that demonstrates that the proposed principle in question systematically leads to sub-optimal results provides sufficient grounds for the pragmatist to reject that principle. Therefore, a successful pragmatic justification should be *self-supporting*. The application of a justified planning procedure should not have results that undermine the reasons for accepting it in the first place. A good example of failure on this count is the argument against myopia in section two.

The second characteristic is that self-support is extended to the acceptance of the theory. Any argument that demonstrates that the acceptance of a principle of choice itself is unsuccessful would count against that principle from the point of view of the pragmatist. Whereas the first type of consideration operates at the level of the *application* of the proposed procedure of choice, this consideration operates at the level of *acceptance* of the proposed procedure of choice. This characteristic is what sets pragmatic justifications apart from their non-pragmatic alternatives. An example of failure of this type is the standard objection against utilitarianism that acceptance of it actually leads to less overall happiness.[14]

In short, a successful pragmatic justification for a planning procedure needs to demonstrate that both the application and the acceptance of the theory will lead to success. This is all that such a justification needs to establish. There are no further questions as to why success would count as the proper criterion.

Suppose that there is at most one rationally acceptable planning procedure that satisfies this criterion. If this is the case, we can characterize such a procedure as a *pure* procedure of rational planning: following the procedure is both necessary and sufficient for realizing success.[15] The procedure is sufficient for success since it is established by the pragmatic demonstration that its application leads to success. The procedure is necessary for success because it is the only procedure that could lead to success.

The non-pragmatist has a completely different idea about the status of the justified planning procedure. A critic of pragmatic justifications like Velleman assumes a parallel between action and belief. To believe X implies that one believes X is true. However, whether it is rational to believe X depends on the procedures through which one came to the conviction that X. Although such procedures aim for the truth they are typically fallible in that respect. Therefore, the procedure for belief acceptance is an *imperfect* procedure. Following the procedure is neither necessary nor sufficient for the belief to

[14] There are ways for the utilitarian to avoid this criticism. For example, see Pettit 1991.

[15] The characterization of procedures as 'pure' or 'imperfect' follows Rawls 1971.

be true. Similarly, the fact that X happens to be true is neither necessary nor sufficient for the rationality of the belief that X. One may come to believe X, a true belief, because of a completely spurious procedure.

Velleman's argument presupposes that the relation between the rationality of an action and that action having success is analogous to the relation between rational belief and truth. Whether or not a plan is rational depends on the procedure. However, whether or not the procedure is rationally acceptable is not determined by the success of the plans it recommends. If this is a correct way of thinking about the relation between rationality and pragmatic success, we have reasons to doubt that pragmatic success is necessary (let alone sufficient) to establish the rationality of a particular planning procedure. Just as a belief can be rational without being true, a plan can be rational without bringing pragmatic success.

So we do not just have rival conceptions of justification, we also have different pictures of the status of justifiable procedures of planning. Whereas the pragmatist thinks of these latter as pure procedures her critic thinks of them as imperfect procedures. These differences are related. If one has the intuition that success is the proper criterion for acceptance of a planning procedure, then one will characterize such a procedure as a pure procedure. This gives us a way to settle one issue between the pragmatist and non-pragmatist. Above I suggested that it is just an intuition whether or not success is the proper criterion for theory acceptance. We now have the tools to throw some light on this issue. For if it is true that belief and action are analogous, the critic has an important argument for the claim those rational planning procedures are imperfect procedures. If that is correct, then (*modus tollens*) it cannot be the case that the proper criterion for acceptance of a planning procedure is the question whether or not doing so will have success. Therefore, the question to answer is whether there is such an analogy between belief and action as Velleman has suggested.

As we saw above, pragmatists reject this analogy between belief and action. David Gauthier argues for this rejection as follows:

> A person's life may go better if he forms a belief that is not well supported by procedures directed at truth, and he may sometimes be in a position to recognize this. Although life may go better if he performs an action that is not well supported by the procedures directed at success, he cannot be in a position to recognize this at the time of performance and so cannot suppose it rational to eschew such procedures on that account. (Gauthier 1994, p. 700)

Stated in this way there is a dis-analogy between the rationality of belief and that of action. For example, life in Russia under Stalin may go better for a person if she were to believe everything the communist party claims, even if this contradicts the outcome of procedures directed at the truth. Her life may go better because she will not be suspected by the security forces as a contra-revolutionary element.

However, the same is not true for action. A person might perform an action that is irrational although her life will actually go better as a result of it. For example, a person's life might go better if she were to buy a ticket in the national lottery in which the expected

benefits are marginal in comparison to the cost of the ticket, if it turns out that it is in fact a winning ticket. However, she cannot be in a position where she realizes that this is the case (i.e., that it is in fact a winning ticket) and it not being rational to buy the ticket. Therefore, rationality in belief and rationality in action do not stand in the same relation to one's life going better. Gauthier concludes that the analogy between the rationality of belief and that of action does not hold. Consequently, there is no reason to suppose that rational planning procedures are imperfect procedures.

I am not convinced that this argument disproves the analogy between action and belief. It does not state the analogy correctly. The question should be whether success (i.e., one's life going better) plays the same role for the rationality of an action, as truth for the rationality of a belief. In the first line of the passage quoted above Gauthier talks about a person's life going better if he were to form an irrational belief. Further down he compares this with a person's life going better if he were to perform an irrational action. However, that is not the proper analogy. What should be compared to life going better is the totality of one's true beliefs. Thus, we should compare whether one can entertain more true beliefs if one ignores the procedures directed at truth with the question whether one's life could go better if one ignores the procedures directed at pragmatic success.

Once we state the analogy this way, there is a clear parallel between action and belief. It might be the case that one will entertain more true beliefs if one ignores the procedures directed at the truth in some particular case, but, just as is the case with action, one cannot be in a position to recognize this when one forms the belief. One cannot because such recognition will, in any plausible procedure for belief acceptance, play a deciding role. For example, it may be that ignoring the available scientific evidence for the relation between mass and the gravitational acceleration of the Earth will lead Galileo to come to believe a true belief, for example, that this acceleration is constant. However, Galileo cannot be in a position where he realizes that the gravitational acceleration is constant (e.g., through observation after dropping his linked weights) and eschew the scientific *method* as a result because the scientific method will endorse his conclusions after this realization. The parallel between action and belief is not threatened by Gather's point as long as we assume plausible procedures for belief acceptance. Therefore, we have every reason to assume that the rationally justified planning procedure is an imperfect procedure. Success is neither necessary nor sufficient for establishing the rationality of a planning procedure. The pragmatist conception of justification is incorrect unless there is a different argument to the effect that rational choice procedures are pure. I am not aware that such an argument exists.

If this is correct, pragmatic justifications are indeterminate. Following the rationally superior procedure is neither necessary nor sufficient for attaining success. We need additional arguments to demonstrate the rational superiority of resoluteness or indeed any of the other planning procedures.

5. The inapplicability of pragmatic arguments to unstable preferences

In order to assess the plausibility of the complex, general and abstract observations of the last two paragraphs, I propose that we look into the argument of section two again. There it was claimed that in the example of figure 1 the agent with unstable preferences realizes the best overall outcome (A) by being resolute. However, this conclusion is too fast. What warrants the assumption that A is the best outcome? Given the preference ordering of the agent we know that of all the three alternatives A is the best. However, once we restrict the domain of outcomes from {A, B, C} to {A, C}, A no longer is the preferred option. This is *all* we know. It is insufficient proof for the claim that A is the best outcome.[16] (Remember that 'success' was defined in terms of the goals and preferences of the acting agent.)

There are several reasons why A may not be the best outcome. Here, I will discuss just one reason, in order to introduce a counter-example to the foundationalist claim that success is necessary for the determination of the rational procedure for choosing over time.[17] It could be the case that this agent's preferences are intransitive. That is, A > B and B > C but C > A. Note that this particular ordering of the alternatives is compatible with the information we have about the agent's preferences. If her preferences are intransitive there is no best outcome because there is always another outcome that is better in a pair-wise comparison. In other words, in this situation there is no best outcome. If there is no best outcome pragmatic arguments are inconclusive because they simply do not apply.

It seems then that we can dismiss the pragmatic argument for resoluteness in our example. We have formal reasons to doubt its applicability because we cannot be sure that there is a best outcome in the first place. The presence of such an outcome is essential for establishing the rationality of one of the three planning procedures if pragmatic considerations are necessary to establish the superiority of any of the procedures. If this is correct, we may have identified a class of examples of unstable preference orderings in which success is not even a necessary condition for the rationally acceptable planning procedure.

This tentative conclusion is only valid if there is at least one rationally superior planning procedure in cases of intransitivity. I believe we can identify such a planning procedure here. Which procedure is rational depends on the complete, "thick" description of the situation. As it turns out, pragmatic arguments do play a role in the identification

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[16] In this connection it should be noted that the main advocate of resolute choice, Edward McClennen, would not endorse the conclusion that A is the best outcome in our example. McClennen claims that an outcome is best if and only if the *ex ante* self and the *ex post* self agree as to what is best. In those cases, and only in those cases, one can claim the superiority of resolute choice. I disagree with McClennen that these are the only contexts of choice where resoluteness is rational. In the next section I give an example of the rationality of resoluteness in the absence of a best outcome. Furthermore, I am not convinced that in all cases where there is a clear best outcome, resoluteness is required.

[17] I discuss other reasons and other examples in Verbeek 1999 and Verbeek 2004.

of this procedure. However, this role is one that does not allow us to claim necessity (let alone sufficiency) for success.

6. The minimax Regret Chooser

Consider an agent who orders her prospects so as to minimize her possible regret.[18] She considers for each prospect what could have happened under the same conditioning event had she chosen otherwise. Suppose this person faces a decision tree like that of figure 1. Suppose moreover that outcome A is a lottery which, depending on certain events (E_1, E_2 or E_3), will either give her \$10, \$0 or \$3. B stands for a lottery that gives \$2, \$4 or \$10 under the same conditioning events. C, finally, will give \$10, \$5 or \$1 under those events. Suppose this agent lacks all knowledge of the likelihood of any of these states. In such a case she decides to take that course of action that will minimize her maximal regret. In order to determine this she looks at what she could have had under the conditioning event had she chosen otherwise. The maximum difference between what she actually got and what she could have had given the conditioning event is the amount of regret of that particular prize. She does this for each prize and each event and then she determines the maximum possible regret. Next, she opts for the lottery with the smallest maximal regret.

If we compare A, B and C in a table we can calculate the maximum possible regret (see figure 2). We see that the pattern of figure repeats itself here. When comparing A, B, and C, A is the most preferred option. However, if we limit the range of comparison to just A and C, as will be the case at t = 2, C is preferred over A (see figure 3).[19]

	E_1	E_2	E_3	*regret*	E_1	E_2	E_3	Max. regret
A	\$5	\$2	\$10	A	5	8	0	8
B	\$10	\$5	\$1	B	0	5	9	9
C	\$0	\$10	\$4	C	10	0	6	10

Figure 2, calculating the maximum possible regret when comparing A, B and C.

	E_1	E_2	E_3	*regret*	E_1	E_2	E_3	Max. regret
A	\$5	\$2	\$10	A	5	8	0	8
C	\$0	\$10	\$4	B	5	0	6	6

Figure 3, calculating the maximum possible regret when comparing A and C

So how should we decide which is overall the rational plan? Inspection of the

[18] Savage 1972, ch. 9.

[19] Note that in this case, the agent has intransitive preferences, for if we compare A and B and B and C respectively, we find that in addition to A > B > C and C > A, A > B and B > C. That is, we have A > B; B > C; but C > A.

preference ordering does not help us. I propose we include in our considerations the standard of evaluation that generates the preference ordering, i.e., the avoidance of regret. One regrets one's choices when one realizes that one could have done better if one had chosen differently given what happened. Regret is a holistic way of evaluating outcomes. Each outcome is judged against the background of what could have been the case had the agent chosen otherwise. This means that the agent should include outcomes that are no longer available as result of previous choices in the assessment of the outcomes. In other words, at $t = 2$ she might still regret not having chosen "down" in figure 1 to realize B. Even if she does not, as is the case in this example, she should still include B in the assessment of the choice ahead of her at $t = 2$. Therefore, given her standard of evaluation she should plan to realize A and stick to that plan. Resoluteness then is the most rational way of planning in this case.

Several things should be noted about this conclusion. First, we arrived at this conclusion only after closer inspection of the situation. The preference ordering alone did not supply us with enough information about the best way of planning. In other words, we looked at other factors than success. Therefore, success is indeed not sufficient (as we predicted in section four). Secondly, since the ordering of the agent is intransitive, there is no most successful outcome. Yet there is a rationally superior outcome. Therefore, success is not necessary, as was predicted in sections three and four). Third, the endorsement of resoluteness in this case depends crucially on the thick description of the standard of evaluation. We could not deduce it from the general, formal aspects of the situation. After we established the true nature of the standard of evaluation of the minimax regret chooser we could point to A as the rationally acceptable outcome.

I conclude that, based on our abstract and general discussion in sections three and four as well as the concrete example in this section, success is neither sufficient nor necessary for determining the correct theory of rational choice over time.[20] Consequently, pragmatic foundationalism is incorrect.

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[20] In Verbeek 2004 I speculate about the proper role of success in justifying a theory of rational choice.

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