

Logical Varieties of Instrumental Reasons

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ABSTRACT

Instrumental reasons play a central role in our practical deliberations because we apply the distinction between reasonable and unreasonable not only to beliefs, but to actions also. The question of what one has an instrumental reason to do is an important substantive question that is relevant to the general theory of practical reasoning and to ethics, too. It will be my object in the present study to show that we have different kinds of instrumental reasons, which depend solely on their logical structure. To this end, I shall in the first section deal with the validity of instrumental reasoning in general. In the remainder of the paper I outline five types of instrumental reasons and show how they depend on their logical structure. In so doing, I hope to shed some light on the concept of instrumental reasons, which is not well understood.

KEYWORDS

Instrumental reasons, instrumental reasoning, practical reasoning, preferential reasoning, practical inference

1. Introduction

Since Aristotle it has been common among philosophers to distinguish between theoretical and practical reasoning. We do not only want to work out what is the case, we also reason about what to do. Arguing that the selling of human organs should be outlawed because allowing them to be sold will inevitably lead to a situation where only the rich will be able to afford transplants is a simple example of practical reasoning. Practical reasoning is, however, a many-faceted activity that includes a variety of distinct types of arguments. Some are studied in deontic logic, and the theory of games is concerned with reasoning when our choices are not independent of how other people choose. In this essay, I have nothing to say about these types of practical reasoning. I shall here confine myself to instrumental reasons only.

Although there is a vast literature on instrumental reasons, I think it is fair to say that the concept of an instrumental reason for acting is still not well understood. Philippa Foot once wrote that she did not understand the idea of a reason for acting and wondered whether anyone else did either (see Railton 1997, 53), and it seems to me that the situation has not changed

much. Philosophers still often assume, or write as if they assume, that if doing a certain action is necessary for achieving an agent's end he has at least a *pro tanto* reason for performing that action.¹ This view is, however, oversimplified for a number of reasons. In this article I shall focus only on one such reason: the fact that there are different kinds of instrumental reasons that depend solely on their logical structure. Astonishingly, this fact has escaped the notice of most writers in the field of practical reasoning, and this has led to common misconceptions about instrumental reasons. For instance, Hubin (1996, 44) holds that we have reasons to perform those actions that promote states of affairs which we intrinsically desire,² and Kearns and Star (2008) hold that a reason for one to act in a particular way is, in effect, to say that one ought to act in that way (p. 32). As will become clear in what follows, such views are erroneous.

In short, the aim of this paper is to shed some light on the concept of instrumental reasons by outlining five types of such reasons, all of which depend solely on their logical structure. However, before going on to a detailed consideration of instrumental reasons and their logical determination, some clarifications are called for.

(i) For ease of exposition, I shall here only be concerned with reasoning under certainty. Reasoning is said to be under certainty if the arguer knows, at least for practical purposes, of each of his options what the outcomes of his taking it would be. Certainty is the simplest case of instrumental reasoning because no probabilities enter.

(ii) In the present work I am not concerned with practical rationality. Authors often do not clearly distinguish between instrumental reasons and instrumental rationality (see e.g., Beardman 2007; Hubin 2001; Raz 2005). Practical rationality is broader and more complex than the concept of a practical reason and it depends on a number of issues that we need not here explore. For instance, it implies epistemic problems and, according to Searle (2001), it even involves metaphysical issues such as the problem of free choice.

(iii) Many authors have a too narrow conception of instrumental reasons. On their view, such reasons serve only to promote the realization of the agent's ends, which are given antecedently (see Heath 1997, 453). It is worth observing, however, that this describes only the standard neo-Humean

¹ Compare to this Korsgaard (1997, 215). She is, however, no supporter of this view.

² This view is shared by Beardman (2007) only with the qualification that the means must be "necessary and available" (p. 259).

account of instrumental reasons, which is admittedly the most influential theory of practical reasons but by no means the only one. Instrumental reasons need to be construed more broadly. If an agent has an instrumental reason for ϕ -ing (where ' ϕ ' stands in for some verb of action or for verb phrases) then ϕ -ing need not promote one of the agent's contingent desires. It can, for instance, promote the realization of an intrinsic value. In the example given at the beginning, the reasoner may well hold that it is an intrinsic evil that only the rich will be able to afford transplants and this can give him an instrumental reason for holding that the selling of human organs should be outlawed. Put another way, instrumental reasons need not be "desire-dependent", to borrow a term from Searle (2001). There is a controversy in the philosophical literature about whether or not all instrumental reasons are desire-dependent (or "internal") reasons. Searle and other so-called externalists argue that there are also desire-independent reasons. In this paper I shall focus on desire-dependent reasons, but I wish to emphasize that my results are relevant to desire-independent reasons, too.

(iv) Instrumental reasoning is defeasible, and a logic of instrumental reasoning is therefore, in the technical jargon, non-monotonic. This is to say that if a conclusion follows validly from given premises, it need not follow from a larger set of premises, even if the original premises are included. In other words, saying that a conclusion follows defeasibly means that it follows relative to a given set of premises. Considering additional alternatives or new consequences may "defeat" the reasoning. Let a single example serve to illustrate this: You want to fly to Paris tonight, and you can get seats on Air France and Lufthansa. Since the fare on Air France is lower (and there are no other differences) you conclude that you should take Air France. But then you learn that KLM offers a flight to Paris also, for an even lower fare than Air France (again, by hypothesis there are no other differences). This additional premise "defeats" the original reasoning. It no longer follows that you should take Air France; the new conclusion is that you better take KLM. The reasons that I shall be discussing in this paper are therefore only *pro tanto* reasons that can be overridden by new outcomes or by further alternatives.³

So far, everything in this paper has been a matter of preliminary ground

³ Philosophers have long been aware of this feature of practical reasoning (see e.g., Geach 1966) and have therefore held that practical reasoning is only *prima facie* valid (e.g., Audi 1991; Clarke 1985; or Kenny 1978), that it provides only *pro tanto* reasons (e.g., Kagan 1989) or reasons "other things being equal" (e.g., Baier 1953).

clearing. Now we have to go to work on the constructive part. In the pages that follow I shall in Section 1 outline when instrumental reasoning is valid. In the remainder of this essay I shall explain the logical varieties of instrumental reasons.

2. *On the Logic of Instrumental Reasoning*

As I have already mentioned, in this paper I shall argue that there are varieties of instrumental reasons that are determined by the logical structure of a piece of reasoning. To be reason-giving, this reasoning needs to be valid (or the agent needs at least a justification for believing that it is valid). Therefore, I need first to explain when instrumental reasoning is valid.⁴ In this section I shall explain the basics of its logic, leaving details for subsequent sections.

I want to start with a simple example: “I believe that my garden will only grow if I water it. I want the garden to grow; and therefore I prefer to water it.” This is a description of an elementary piece of instrumental reasoning.⁵ Like all reasoning, it is an activity that takes place in the reasoner’s mind and it takes us from existing states of mind, the “premise-states”, to a new state, the “conclusion-state”, to adopt Broome’s (2001, 176) terms. At an intuitive level, this is valid reasoning. But what makes instrumental reasoning valid? In a nutshell, instrumental reasoning is valid if

⁴ I take it for granted here that a piece of instrumental reasoning can be logically valid. This view is by no means beyond dispute. Many logicians and philosophers endorse it, but several writers have argued against it. Since a consideration of this issue would take us beyond the confines of the present work and I have argued for the validity of practical arguments elsewhere (see Spielthener 2007), I shall not pursue this issue further here.

⁵ Throughout this essay I shall assume that the conclusion of instrumental reasoning is an *intentional attitude* (e.g., your preferring x to y or your being indifferent between x and y) and not a normative statement such as “I ought to prefer x to y ”. In everyday life we tend to attach deontic modalities to the conclusion of our reasoning. For instance, we might say that given my premises I *ought* to water the garden. This is grammatically correct but it misrepresents the logic of what is said. What we should rather say is something like ‘It ought to be that if I believe that my garden will only grow if I water it and I want the garden to grow then I water the garden.’ More technically, the ‘ought to’ should govern the entire reasoning rather than its conclusion. We attach modalities to the conclusion in theoretical reasoning also; for instance, when we say that Smith *must* be happy if everyone is happy. We are, however, aware that strictly speaking we should rather say ‘It is necessary that Smith is happy if everyone is happy’ since we know that the premises of a valid argument do not necessitate the conclusion.

(and only if) the set consisting of the premises and the negation of the conclusion is inconsistent. For definiteness, let me state this basic fact in the following principle of valid instrumental reasoning:

(P) A piece of instrumental reasoning that consists of the premises P_1, \dots, P_n and the conclusion C is valid iff the set $\{P_1, \dots, P_n, \neg C\}$ is inconsistent.

The key notion is now “inconsistency”, which may seem a suspect notion because it is not plain when the premises of a piece of instrumental reasoning and the negation of its conclusion are inconsistent. My next objective is therefore to explain when instrumental reasoning is inconsistent.

To understand the concept of practical inconsistency, we need to be clear that the premises and the conclusion of a piece of instrumental reasoning are intentional attitudes (not statements or propositions). In our simple example, the premises are your belief that the garden will grow only if you water it and your wanting the garden to grow. The conclusion is your preference for watering the garden. Beliefs and preferences have contents, which I take to be propositions.⁶

The point to emphasize now is that a piece of instrumental reasoning is not inconsistent because its contents are inconsistent in the sense that it is impossible for all of them to be true. What renders instrumental reasoning inconsistent is rather a special logical relationship between the contents of its premises and the conclusion. These preparatory explanations will need refinement. We will get to this in the pages that follow where I have more to say about this logical relationship by distinguishing reasoning that has a preference as its conclusion from reasoning that derives a dispreference or concludes in an indifference.

3. Reasoning for Preferences

⁶ This view is not uncontroversial. Some authors have doubted that the contents of intentional states are always propositions. For instance, Rabinowicz and Rønnow-Rasmussen (2004) hold that also *things* and *persons* can be the contents of such attitudes (p. 393). But others have convincingly argued that beliefs and preferences are propositional attitudes. We do, for instance, not prefer coffee to tea as such but rather drinking coffee to drinking tea (Hansson, 2006); and Searle (2001) holds that “all desires have whole propositions as intentional contents (thus ‘I want your car’ means something like ‘I want that I have your car’) ...” (p. 248-9). Assuming that preferences and beliefs are propositional attitudes has the additional advantage that I can use propositional logic for analysing practical reasoning and for assessing its validity.

This essay is concerned with instrumental reasons, i.e., reasons given by pieces of instrumental reasoning. Since instrumental reasoning requires at least an implicit comparison of available alternatives and the sets of their outcomes (if there is no choice we do not reason what to do), I shall focus here on dyadic (or comparative) valuations, which indicate a relation between two (or more) relata. The two fundamental comparative value concepts are (strict) preference and indifference. They are usually denoted by the symbols ‘>’ and ‘~’ respectively; and ‘ $a > b$ ’ is commonly taken to mean both that a is preferred to b and that b is dispreferred to a . I take the term ‘ $a > b$ ’ to mean that the agent assigns more value to a than to b , and ‘ $a \sim b$ ’ to mean that he values a and b equally. With these preliminaries out of the way, I can now explain when instrumental reasoning that has a preference as conclusion is valid.

A fresh scenario will help. Suppose that a mountaineer wants to scale a peak. He justifiedly believes that there are only two routes: The eastern route that leads to the peak and the southern route, which leads to a glacial lake. The mountaineer prefers standing on the peak to reaching the lake and he therefore prefers taking the eastern route rather than the southern one. This is a description of a piece of *prima facie* valid instrumental reasoning. It is a special kind of instrumental reasoning because its conclusion is a preference. We can call it instrumental reasoning for a preference. The mountaineer can express his conclusion in different ways—for example, by holding that he must take the eastern route. As we shall see, we need to distinguish between the conclusion of a piece of reasoning (which is an intentional attitude) and the expression of this attitude. There is quite a broad range of modal words that can be used for expressing the conclusion of a piece of practical reasoning.

In order to assess the validity of this reasoning, it is helpful to translate it into symbolic form. This requires augmenting propositional logic by the dyadic preference and indifference relations $\phi > \psi$ and $\phi \sim \psi$ where ‘ ϕ ’ and ‘ ψ ’ can stand for simple propositions (in terms of propositional logic) or for compound propositions. Let ‘ e ’ mean ‘I take the eastern route,’ ‘ s ’ mean ‘I take the southern route,’ and let us use ‘ p ’ for ‘I will be standing on the peak,’ and ‘ l ’ for ‘I will reach the lake.’

If we interpret the reasoning as suggested (writing ‘ B ’ for ‘I believe that’ and ‘>’ for ‘I prefer that’—assuming that the mountaineer expresses his reasoning to himself in the first person), we get this formalization: $B(e \rightarrow p)$,

$B(s \rightarrow l), p > l \Vdash e > s$. Let me explain. On the left side of ‘ \Vdash ’ (the “double turnstile”) are the premises of the reasoning and on its right side is the conclusion. The premises ‘ $B(e \rightarrow p)$ ’ and ‘ $B(s \rightarrow l)$ ’ stand for the reasoner’s beliefs; the premise ‘ $p > l$ ’ and the conclusion ‘ $e > s$ ’ refer to his preferences. This piece of instrumental reasoning takes the reasoner from three “premise-states” to a “conclusion-state”.

In the previous section, I have claimed that instrumental reasoning is valid iff its premises and the negation of the conclusion are inconsistent. This is to say that the piece of preferential reasoning under consideration is valid iff the set $\{B(e \rightarrow p), B(s \rightarrow l), p > l, \neg(e > s)\}$ is inconsistent. Now, on the plausible assumption that $(e > s) \oplus (e \sim s) \oplus (s > e)$ —that is, the assumption that e and s are commensurable on an ordinal level—it follows from $\neg(e > s)$ that $(e < s) \oplus (e \sim s)$.⁷ Therefore, we can replace the above set by the set $\{B(e \rightarrow p), B(s \rightarrow l), p > l, (e < s) \oplus (e \sim s)\}$ and test it for inconsistency.

Intuitively, this set is inconsistent. (i) Believing that you can reach the peak if you take the eastern route, (ii) believing that you get to the lake if you take the southern route, (iii) preferring to stand on the peak and at the same time (iv) preferring to take the southern route is, to adopt a term from I. Kant, an “inconsistency in will”. You would prefer doing something that entails an outcome you disprefer and you would disprefer performing an action that entails an outcome you prefer. I think upon reflection it is clear that holding (i) to (iv) is holding a practically inconsistent set.

On the assumption that the reasoner, valuer, and agent are the same person (which is not always the case), we can now generalize the considerations in the previous paragraph as follows: A set that consists of the premises of a piece of reasoning and the negation of its conclusion is inconsistent if the preferred relatum of the negated conclusion (in our example s) logically entails a state of affairs that is (in this piece of reasoning) dispreferred to the state that is entailed by the dispreferred relatum of the negated conclusion (in our example e). This way of putting it is admittedly somewhat unwieldy. It will therefore be helpful to rely on the following simpler but equivalent explanation of practical inconsistency that does not refer to the negated conclusion ($\neg C$) but to the original conclusion (C) of the reasoning:

(E) The set $\{P_1, \dots, P_n, \neg C\}$, consisting of the premises P_1, \dots, P_n and the conclusion C , is inconsistent if the preferred

⁷ I use the symbol ‘ \oplus ’ for the exclusive disjunction of two statements, as usual in Boolean algebra.

relatum of the conclusion C entails a state of affairs that is (in this piece of reasoning) preferred to the state that is entailed by the dispreferred relatum of the conclusion.

In our example, the preferred relatum of the conclusion C is e and the dispreferred relatum is s . The preferred relatum e , together with the propositional contents of the premises $B(e \rightarrow p)$, $B(s \rightarrow l)$ —that is, $(e \rightarrow p)$ and $(s \rightarrow l)$ —entails p , which the mountaineer prefers to the state l that is entailed by the dispreferred relatum s . The set $\{B(e \rightarrow p), B(s \rightarrow l), B(p > l), (e < s) \oplus (e \sim s)\}$ is therefore inconsistent.

Now, from the principle of valid instrumental reasoning (P) and (E) we can deduce the following rule of inference for instrumental reasoning that has a preference as its conclusion:

(RIP) Instrumental reasoning for a preference is valid if the preferred relatum of the conclusion entails a state of affairs that is (in this piece of reasoning) preferred to the state that is entailed by the dispreferred relatum of the conclusion.

It is easy to use this rule for proving the validity of a piece of instrumental reasoning. Let us return to our example. Since the preferred relatum e entails p , which the mountaineer prefers to the state l that is entailed by the dispreferred relatum s , his reasoning is valid. It is worth mentioning that (RIP) states only a sufficient condition for the validity of a piece of instrumental reasoning. Whether it also provides a necessary condition is a question that I have not attempted to answer here.

3.1. *Conclusive reasons for acting*

Valid reasoning is not necessarily reason-giving. But when does a piece of valid instrumental reasoning provide a reason for acting? There is much disagreement on this and I shall be very brief about this issue here because the details are more than we need. Some hold that an agent has a reason for ϕ -ing if he believes that ϕ -ing stands in an appropriate instrumental relation to his end (e.g., Beardman 2007), while others insist that this belief must be justified or true (e.g., Williams 2001). Furthermore, on a traditional account of instrumental reasoning, any desire can generate reasons for acting. On this view, valuations are not justifiable because reason has nothing whatever to

do with the choice of ends.⁸ Other writers, however, hold that we have a reason for taking the means to an end only if we have a reason to pursue that end.⁹

I side with those philosophers who require a justification for the belief premises, the valuational premises, and the inferential belief. That is to say, I am in agreement with those authors who hold that an agent has a reason for the conclusion if he has a justification for the premises and is justified in believing that these premises logically support the conclusion.¹⁰

The mountaineer in our example has therefore an instrumental reason for preferring the eastern route to the southern route, if he is justified in believing that the eastern route leads to the peak while the southern route leads to a glacial lake, if, in addition, he has a reason for preferring the peak to the lake, and if he is justified in believing that these premises logically support his preference for the eastern route.¹¹ I wish to emphasize here that throughout this essay I assume that the agent has these justifications.

I can now explain why the mountaineer in our example has a conclusive reason for taking the eastern route. The logical anatomy of his reasoning is quite simple. The preferred relatum of the conclusion (taking the eastern route) entails a state of affairs that is preferred to the outcomes entailed by any of its alternatives. (Our example is a particularly simple case of reasoning because there is only one alternative to taking the eastern route.) In general terms, if the structure of a piece of instrumental reasoning is such that the preferred relatum of the conclusion logically entails an outcome that stands highest in the agent's ranking and choosing any alternative entails a worse outcome, then the agent has a logically conclusive instrumental reason for choosing this relatum. In our example, the mountaineer has therefore a conclusive reason for taking the eastern route.

⁸ Compare to this Nozick (1993, xiv) and Maurice Allais is quoted by Broome (1995, 104-5) as saying, "It cannot be too strongly emphasized that there are no criteria for the rationality of ends as such other than the condition of consistency. Ends are completely arbitrary."

⁹ Among them are Audi (2004), Korsgaard (1997), Raz (2005) and Schroeder (2007), who holds that we have a clear intuition that there is no reason to do what promotes irrational desires (p. 120).

¹⁰ Compare to this the large literature on closure for justification in epistemology.

¹¹ Strictly speaking, an agent needs to satisfy a number of further conditions for having an instrumental reason. For instance, he needs to have the beliefs and preferences *at the same interval of time*. However, since I am in this paper concerned with the varieties of practical reasons that depend on their logical structure, this is not the place for a full-scale discussion of these issues.

It is worth noticing that an agent can have a conclusive reason for acting, even if this action has a bad outcome. The proof is short and simple. The reasoning $B(a \rightarrow x^-)$, $B(b \rightarrow y^-)$, $x^- > y^- \vdash a > b$ is valid (‘ x^- ’ and ‘ y^- ’ indicate negative outcomes); and the agent has a conclusive reason for a -ing. This shows that the logic behind the so-called “Principle of the Lesser Evil” is sound. This principle holds that if we have to choose between two evils, the lesser evil ought to be chosen. An agent can thus have the strongest possible reason for choosing an evil.

In our everyday discourse we may express this conclusive reason by saying that the mountaineer must take the eastern route. Observe, however, that we can use any of a number of phrases to express conclusive reasons because ordinary language does not uphold a sharp distinction between different deontic modals. For example, we could say just as effectively that the mountaineer has to take the eastern route or that he ought to do so.

From a logical point of view, conclusive reasons are the strongest kind of practical reasons. Acting on them is always (pro tanto) reasonable and not acting on them is always (pro tanto) unreasonable. We shall see below that there are also logically weaker instrumental reasons for acting.

3.2. Better reasons for acting

Let us revise our initial example. There is now a western route too, which leads to a plateau. The mountaineer prefers the peak to the lake and the lake to the plateau.¹² To clarify the logical structure of this piece of reasoning, it will be helpful to formalize it—using ‘ w ’ for ‘I take the western route’ and ‘ a ’ for ‘I reach the plateau.’ The premises $B(e \rightarrow p)$, $B(s \rightarrow l)$, $B(w \rightarrow a)$, $p > l$, $l > a$ logically entail the conclusion $(s > w)$.¹³ That is to say, the mountaineer should prefer the southern route to the western route; and since we assume that he has a justification for the premises, he has a better reason for taking the southern route.

In general, if the structure of a piece of instrumental reasoning is such

¹² Throughout this paper I shall assume that agents are not inconsistent in the sense that they prefer one thing to a second, the second to a third, and the third to the first. However, I do not assume that the outcomes are *completely* ranked. They may only be partially ordered, but completeness is, of course, not excluded.

¹³ This can easily be proved. The preferred relatum s , together with the propositional contents of the premises $B(e \rightarrow p)$, $B(s \rightarrow l)$ and $B(w \rightarrow a)$ —that is, $(e \rightarrow p)$, $(s \rightarrow l)$ and $(w \rightarrow a)$ —entails l , which is preferred to the state a that is entailed by the dispreferred relatum w . By (RIP), the reasoning is therefore valid.

that the preferred relatum ϕ of the conclusion logically entails an outcome that is preferred to the outcome that follows from an alternative ψ then an agent has a logically better reason for ϕ -ing than for ψ -ing.

It is to be noted that taking the southern route is a necessary means for an end of the mountaineer. Nonetheless, he has now only a weaker reason than in the example of the previous subsection. This is so because the logical strength of a practical reason does not only depend on the outcome of an act, but also on the alternatives of this act. In the case under consideration, the outcome of taking the southern route is not preferred to the outcomes entailed by any of its alternatives. It is only preferred to the outcomes of some of its alternatives and therefore the agent has only a better reason but not a conclusive reason for taking the southern route.

Since better reasons are weaker than conclusive reasons, acting on a better reason is not always reasonable. In our example, it is not reasonable to take the southern route because there is a better alternative available. But sometimes it is reasonable to act on a better reason. Taking the eastern route is better than taking the southern route and the mountaineer chooses rationally if he takes it. Alternately, it can be unreasonable not to act on a better reason (e.g., not to take the eastern route), but sometimes it is not unreasonable not to act on such a reason (e.g., not to take the southern route).

We can express this kind of instrumental reason in different ways. Colloquially, we may say that taking the southern route is better than taking the western route or by holding that the southern route is preferable to the western route.

4. Reasoning for Dispreferences

Sometimes the conclusion of a piece of instrumental reasoning is a dispreference. Let us reconsider the scenario from Subsection (2.1). The mountaineer wants to scale a peak and there are only two routes—the eastern route, which leads to the peak, and the southern route to a glacial lake. Since the mountaineer prefers the peak to the lake, he disprefers taking the southern route, which he may express by saying that he must not take this route.

For definiteness, let us symbolize this piece of reasoning, using the variables from Section 2. The formalized valid argument is then $B(e \rightarrow p)$,

$B(s \rightarrow l), p > l \not\models s < e$. This argument is valid iff the premises and the negation of the conclusion are inconsistent—which is to say that it is valid iff the set $\{B(e \rightarrow p), B(s \rightarrow l), p > l, \neg(s < e)\}$ is inconsistent. Again, on the plausible assumption that $(e > s) \oplus (e \sim s) \oplus (s > e)$, it follows from $\neg(s < e)$ that $(e < s) \oplus (e \sim s)$; and for this reason we can replace the above set by the set $\{B(e \rightarrow p), B(s \rightarrow l), p > l, (e < s) \oplus (e \sim s)\}$ and test it for practical inconsistency.

To avoid tedium, I shall not repeat my reasoning from Section 2 which applies, upon changing what needs to be changed, to our scenario too. But from the principle of valid instrumental reasoning (P) and analogous considerations as in Section 2, we get this rule of inference for instrumental reasoning that has a dispreference as its conclusion:

(RID) Instrumental reasoning for a dispreference is valid if the dispreferred relatum of the conclusion entails a state of affairs that is (in this piece of reasoning) dispreferred to the state that is entailed by the preferred relatum of the conclusion.

In our simple scenario, the dispreferred relatum of the conclusion is s , and the preferred relatum of the conclusion is e . The dispreferred relatum s , together with the propositional contents of the premises $(e \rightarrow p)$ and $(s \rightarrow l)$ entails l , which is dispreferred to the state p that is entailed by the preferred relatum e . Hence, by (RID) the reasoning is valid.

4.1. *Conclusive reasons against acting*

If the structure of instrumental reasoning is such that the dispreferred relatum of the conclusion logically entails the worst outcome (that is, an outcome such that none is worse in the agent's estimation) and there is at least one alternative that entails a better outcome, then the agent has a logically conclusive reason against choosing this relatum. In our elementary example, there is an outcome to which the mountaineer prefers every other—reaching the lake. He has therefore a conclusive reason against taking the southern route.

In the introduction I have claimed that we need not have a reason for taking a necessary means to our ends. In order to see why this is so, it is once more helpful to consider our simple example. Suppose that the mountaineer wants both, standing on the summit and reaching the lake, but he prefers the former. Taking the southern route is then still a necessary means to his end of

reaching the lake. But he does not have a reason for taking this route. He has rather a reason against taking it.

Logically seen, conclusive reasons against acting are the strongest reasons that we can have for not performing an act. It is therefore always (pro tanto) unreasonable to perform such an act, but it is not always reasonable not to perform it. Since this last claim may not be quite clear, I wish to labour this point a bit. If there are more than two options, not choosing the worst option is tantamount to choosing any of its alternatives. If the agent chooses an option that is better than the worst alternative but worse than some other available alternative, then he does not choose the worst option but his choice is still unreasonable.

It goes without saying that we need not express a conclusive reason against performing an action by holding that we must not choose it. We can alternatively use words like ‘illicit’ or ‘forbidden’, which are often used as synonyms of ‘must not’; and sometimes it would be even more natural to say ‘You can’t ϕ ’.

4.2. *Worse reasons for acting*

Let us now return to the scenario considered in Subsection (2.2). There are now three routes. The western one leads to the plateau, which is dispreferred both to the lake and the peak. Therefore, the mountaineer draws the conclusion that taking the western route is worse than taking the southern route. By formalizing this reasoning, using the variables from Subsection (2.2), we get $B(e \rightarrow p)$, $B(s \rightarrow l)$, $B(w \rightarrow a)$, $p > l$, $l > a \vdash w < s$. According to (RID), this reasoning is valid because w (the dispreferred conclusion relatum) entails—together with the propositional contents of the belief premises— a , which is dispreferred to l that is entailed by s (the preferred conclusion relatum).

The logical structure of this reasoning is such that the outcome of taking the western route is worse than the outcome of taking the southern route. The mountaineer has therefore a logically worse reason for taking the western route than for taking the southern one. Generally speaking, if ϕ -ing entails an outcome that is worse (in the agent’s estimation) than the consequences of ψ -

ing then the agent has a worse reason for ϕ -ing than for ψ -ing.¹⁴

Acting on such a reason is always unreasonable because there is necessarily a better alternative available. Not acting on a worse reason is, however, not ipso facto reasonable. Our example can make clear why this is so. Not taking the western route can mean taking the southern route, which is not reasonable because there is an even better option available—taking the eastern route.

Of course, ordinary speech usually replaces the stilted term ‘worse reason’ with something plainer. We may say that it is better not to take the western route or that taking the latter is not as good as the former.

5. Reasoning for Indifferences

To illustrate reasoning that has an “indifference”-conclusion, we can return to the simpler version of our example with two routes only. We assume now that the mountaineer is indifferent between standing on the summit and reaching the lake. He is therefore indifferent between the two routes, which he may express by saying that it does not matter which one he takes.

In order to see things in a better light, it will again be helpful to translate the reasoning into symbolic form. If we use the same variables and the symbol ‘ \sim ’ for denoting the indifference relation we get this formal argument: $B(e \rightarrow p), B(s \rightarrow l), p \sim l \vdash e \sim s$. The first two premises express beliefs and the third premise and the conclusion express the agent’s indifferences.

As I have argued in Section 1, this reasoning is valid iff the set consisting of the premises and the negation of the conclusion is inconsistent. That is to say, it is valid iff the set $\{B(e \rightarrow p), B(s \rightarrow l), p \sim l, \neg(e \sim s)\}$ is inconsistent. Assuming that e and s are commensurable, this set is inconsistent if $\{B(e \rightarrow p), B(s \rightarrow l), p \sim l, (e > s) \oplus (e < s)\}$ is inconsistent— $(e > s) \oplus (e < s)$ follows from $(e > s) \oplus (e \sim s) \oplus (s > e)$ and $\neg(e \sim s)$. Once again, it is this set which we need to test for inconsistency.

Let us first consider it on an intuitive level. If you believe that taking the eastern route has an outcome that you value equally to the outcome of taking the southern route then you are practically inconsistent if you are not indifferent between these routes too (except you can show that the routes are

¹⁴ It may be illuminating to draw attention to the fact that the agent has a worse reason for taking the southern route than for taking the eastern route, too. This can easily be proved by using our formalization.

different with respect to some other relevant factors, which, of course, changes our example). I think this is obvious upon consideration. In the light of this, we can now formulate the following inferential rule for reasoning that has an indifference as its conclusion:

(RII) Instrumental reasoning that has an “indifference”-conclusion is valid if the relata of the conclusion entail indifferent states of affairs.

To return to our example, the relata of the “indifference”-conclusion are e and s , which entail the indifferent states p and l . Hence, the reasoning is valid.

5.1. *Optional reasons for acting*

If a piece of valid instrumental reasoning for an indifference is such that the relata of the “indifference”-conclusion entail outcomes such that the agent prefers no other to them then the agent has a reason, which, for want of a better term, I label ‘optional reason’. Let us return once more to the case of the mountaineer. Since he is indifferent between the peak and the lake and there is no better option available, he has an optional reason for taking either of them.

The case of Buridan’s ass may be useful for further clarifying this type of reason. In that famous story a donkey was standing between two bales of hay, neither appealed to him more than the other. Being indifferent between the bales, that unfortunate creature saw no reason for moving one way rather than the other and starved in the midst of plenty. Given his indifference, that donkey had reasons of equal logical strength for going right and for going left. But notice that he did not have an optional reason for moving neither side. It was a logical mistake that he neither moved to the right nor to the left because he had an option that bested the two alternatives he pondered. The donkey should have reasoned as follows—using ‘ l ’ for ‘I go left,’ ‘ r ’ for ‘I go right,’ and ‘ b ’ for ‘I can eat a bale of hay’: $B(l \rightarrow b)$, $B(r \rightarrow b)$, $B(\neg(l \vee r) \rightarrow \neg b)$, $(b > \neg b)$, therefore, $(l \vee r) > \neg(l \vee r)$. That is to say, he had a conclusive reason for going left or right. Logic did not tell him to which side, but tossing a coin would have settled the issue.

Acting on optional reasons is never unreasonable because if you have such a reason there is no better option available. Not acting on them is unreasonable in cases where the agent chooses an alternative that is worse. It

is not unreasonable if he chooses one of the other options at the top. In our simple example, not choosing the eastern route was tantamount to taking the southern route. This was a reasonable choice, given that these routes were the mountaineer's only options. In ordinary speech, optional reasons can be expressed in different ways. The mountaineer could have said that he can take the eastern (or southern) route, that he has the option of taking either of them, or that choosing one of them is possible or permissible.

As I have just outlined, the mountaineer had an instrumental reason for taking the eastern route. But—and this is the point—this does not imply that he ought to take it (pace Kearns and Star 2008). If we express reasons for acting by using deontic modalities we can sometimes use the word 'ought'. It is appropriate if we have conclusive reasons. But if we have logically weaker reasons (e.g., optional reasons) then we need to choose weaker deontic terms.

The upshot of what I have been saying in this essay is as follows. In all scenarios considered in the previous sections, different instrumental reasons were generated depending solely on the different logical structure of the reasoning. Take that mountaineer again and suppose that there is the eastern, southern, and western route and that he prefers the peak to the lake and the lake to the plateau. He has then not just an instrumental reason to take one of the routes. He rather has a conclusive reason for taking the eastern route; a better reason for taking the southern route than for taking the western route; a worse reason for taking the southern route than for taking the eastern route, and a conclusive reason against taking the western route. Furthermore, if he is indifferent between the peak and the lake he has optional reasons for taking the eastern route and for taking the southern route.

In this study I have been trying to explain the logical determination of instrumental reasons. However, I do not for a moment mean to imply that the kind of justification which an agent has for his premises is irrelevant to practical reasons. But a consideration of this issue would have taken us beyond the confines of the present work.

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