IN DEFENSE OF IMPERATIVE INFERENCE*

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Abstract. "Surrender; therefore, surrender or fight" is apparently an argument corresponding to an inference from an imperative to an imperative. Several philosophers, however (Williams 1963; Wedeking 1970; Harrison 1991; Hansen 2008), have denied that imperative inferences exist, arguing that (1) no such inferences occur in everyday life, (2) imperatives cannot be premises or conclusions of inferences because it makes no sense to say, for example, "since surrender" or "it follows that surrender or fight", and (3) distinct imperatives have conflicting permissive presuppositions ("surrender or fight" permits you to fight without surrendering, but "surrender" does not), so issuing distinct imperatives amounts to changing one's mind and thus cannot be construed as making an inference. In response I argue inter alia that, on a reasonable understanding of 'inference', some everyday-life inferences do have imperatives as premises and conclusions, and that issuing imperatives with conflicting permissive presuppositions does not amount to changing one's mind.

1. Introduction: Imperative arguments and imperative inferences

You are taking a driving lesson, and as an intersection appears at some distance, the instructor tells you: "if there is a stop sign, stop". A few seconds later, as a stop sign has become clearly visible but you show no sign of slowing down, the instructor tells you: "there is a stop sign, so stop". It is natural to understand the instructor as using the imperative premise "if there is a stop sign, stop" and the declarative premise "there is a stop sign" to (validly) infer the imperative conclusion "stop". It is also natural to conclude that imperative inferences occur with some regularity in everyday life. And yet this apparently obvious conclusion has been attacked by several philosophers, notably Bernard Williams (1963), Gary Wedeking (1970), Jonathan Harrison (1991), and Jörg Hansen (2008). My aim in this paper is to counter the arguments of those who are skeptical about imperative inference—for short, the "skeptics". This is part of my larger aim of proposing new foundations for imperative logic (Vranas 2008, 2009a, 2009b).

What exactly are the skeptics denying? Some of them sometimes talk as if they were denying the possibility (i.e., the possible existence) of imperative *arguments*: "There can be … no arguments the components of which are all imperatives" (Harrison 1991: 109). But such denials should probably not be taken literally. In standard logic, an argument (a *pure declarative* argument) can be defined as an ordered pair whose first member is a nonempty set of declarative sentences (the *premises* of the argument) and whose second member is a declarative sentence (the *conclusion* of the argument). Similarly, an *imperative* argument can be defined as an ordered pair whose first member is a nonempty set of imperative or declarative sentences (or both) and whose second member is an imperative sentence.[1] A *pure* imperative argument has only imperative premises,

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[1] In addition to the distinction between declarative sentences and what such sentences typically express, namely *propositions*, there is a distinction between imperative sentences and what such sentences typically express, namely what I call *prescriptions* (i.e., commands, requests, instructions, suggestions, etc.). Given that a declarative sentence (like "you will open the door") can express a prescription, and that an imperative sentence (like "marry in haste and repent at leisure") can express a proposition, I prefer to take the premises and conclusions of arguments to be propositions or prescriptions, not declarative or imperative sentences. However, given that some people might doubt that propositions or prescriptions exist, to avoid irrelevant controversy in this paper I take the premises and conclusions of arguments to be declarative or imperative sentences.

and a *mixed* imperative argument has some (or only) declarative premises. Given these definitions, one can hardly deny that (pure or mixed) imperative arguments exist—unless one denies that (imperative or declarative) sentences or sets of them exist. I submit then that the skeptics should be charitably understood as denying (1) the *usefulness* (not the possibility) of imperative *arguments* (or of imperative logic), on the basis of denying (2) the *possibility* (or the existence, or the usefulness) of imperative *inferences*.

What exactly is an inference? Williams defines an inference as "a sequence of sentences" (1963: 30) which are used in a process of reasoning that satisfies certain conditions. Williams's definition, however, obscures the distinction between inferences and arguments, so I propose to define instead an inference as—to a first approximation—a (token) *process of reasoning* which starts by endorsing certain declarative or imperative sentences (the *premises* of the inference) and ends by endorsing a declarative or imperative sentence (the *conclusion* of the inference).[2] Saying that an inference starts and ends at certain times is compatible with saying that the inference is part of a "larger" process of reasoning which starts earlier or ends later. To every inference corresponds a unique argument (cf. Milo 1976: 13 n. 1), but sometimes to a given argument correspond many inferences (depending on the person who makes the inference, the time at which the inference is made, and so on). An inference is declarative or imperative (pure or mixed) depending on whether its corresponding argument is.

What exactly is it to "endorse" an imperative sentence? To endorse a *declarative* sentence is to believe that the sentence is *true*, but imperative sentences cannot be true. I submit that to endorse an imperative sentence which prescribes that an agent perform an action is to believe that there is a reason for the agent to perform the action.[3] For example, to endorse the imperative sentence "John, do your homework" is to believe that there is a reason for John to do his homework.[4] One can endorse an imperative sentence without *uttering* it: John's father can endorse the above imperative sentence even if the sentence is uttered only by John's mother, and even if the sentence is uttered by no one (John's father can entertain the sentence only mentally). Conversely, one can utter an imperative sentence without endorsing it: I can say to a rich acquaintance "please give me a million dollars" (hoping that she will comply, so that my utterance is not disingenuous or in jest) even if I do not believe that there is any reason for her to comply. (It seems, however, that *usually* people do endorse the imperative sentences they utter.) One can endorse an imperative sentence without believing that it will be *satisfied* (complied with): John's mother can endorse the sentence "John, do your homework" even if she does not believe that John will do his homework. Conversely, one can believe that an imperative sentence will be satisfied but fail to endorse it: I can believe that when your friend tells you "smoke this" you will comply even if I do not believe that there is any reason for you to comply. To introduce a property of imperative sentences somewhat analogous to the property of truth for declarative sentences, say that an imperative sentence which prescribes that an agent perform an action is

[2] This is strictly speaking a definition of an *endorsing* inference; if the premises and the conclusion are not endorsed (or rejected) but are rather entertained only hypothetically, then the inference is *hypothetical* (cf. Clarke 1985: 4). In this paper to simplify I do not examine hypothetical inferences, but I think that what I say about endorsing inferences applies, mutatis mutandis, to hypothetical ones.

[3] What if one *also* believes that there is a conclusive reason for the agent *not* to perform the action? Then one endorses the imperative sentence *pro tanto* but not *all things considered*. The distinction does not matter for present purposes.

[4] Those who hold that normative judgments are not beliefs may replace my talk of *believing* that there is a reason with talk of *judging* that there is a reason, and may fill out their preferred analysis of normative judgments.

binding exactly if there is a reason for the agent to perform the action. Given this definition of bindingness, to endorse an imperative sentence is to believe that the sentence is binding.[5]

With the above concepts in place, in the next three sections I address arguments against the existence (§2), the possibility (§3), and the usefulness (§4) of imperative inferences. I conclude in §5.

2. On the existence of imperative inferences

Hansen argues that "there are no examples of imperative inferences, i.e. logical conclusions in the imperative mood, drawn from at least one premiss in the imperative mood, to be found in ordinary language" (2008: 46). Hansen, however, grants that such inferences "appear in the writings of some philosophers" (2008: 46), so he is only denying the *existence in ordinary language*—not the *possibility*—of imperative inferences (with at least one imperative premise).

Hansen recognizes that *apparent* examples of pure imperative inferences are found in ordinary language; for example, he says that "Read all of Nabokov's novels, so read *Pnin*!" is a sentence that "may be used e.g. by a teacher of a literature course when addressing her students" (2008: 40). To take also an example not discussed by Hansen, a mother may say to her six-year-old son: "John, watch TV if and only if you finish your homework. So if you don't finish your homework, don't watch TV." Hansen, however, argues that such apparent examples of pure imperative inferences need not be *real* examples: the word 'so' (like 'therefore') is sometimes used not to indicate a conclusion but to motivate (as in "the car is broken, so take the bus into town"), and we cannot rule out the possibility that (for example) the literature teacher is "just complementing her first imperative by a second, more specific one", "as we sometimes do to get things done"—for example, when we say "Go there! Go there now!" (2008: 39-40).

To distinguish conclusion-indicating uses of 'so' from motivating and other uses, Hansen proposes a test: if the word 'so' in a given sentence (or passage) is replaced with something like "it follows logically from this", is the resulting sentence (or passage) a paraphrase of the original one? If it is not (in other words, if the original sentence fails the test), then according to Hansen standard uses of 'so' in the original sentence are not conclusion-indicating (2008: 41-2). Hansen then claims that sentences corresponding to apparent examples of pure imperative inferences fail this test. For example, consider:

(1) John, watch TV if and only if you finish your homework. So if you don't finish your homework, don't watch TV.

[5] I have defined what it is to endorse an imperative sentence and what it is for an imperative sentence to be binding only for imperative sentences which prescribe that an agent perform an action. What about imperative sentences which prescribe that an agent perform an action *given* a certain condition (e.g., "John, watch TV if you finish your homework") and imperative sentences which do not prescribe any action (e.g., "let there be light")? Elsewhere (Vranas 2009a) I explain what it is for any imperative sentence (including the above ones) to be *supported* by a reason, and I define an imperative sentence to be binding exactly if it is supported by a reason. Wedeking, however, claims: "It is … unintelligible to speak of there being reasons for a sentence. A sentence is simply not one of the things for which there may be reasons" (1970: 163; cf. 1969: 168; see also: Juárez-Paz 1959: 199-203; Keene 1966: 62; Stevenson 1944: 26). I reply that, even if in standard usage one does not talk about reasons for a sentence, nothing prevents the following terminological move: rather than talking about reasons for an agent to perform an action, talk about reasons for a sentence to the effect that the agent performs the action. Given this terminological move, the partial definition of bindingness that I proposed in the text (for imperative sentences which prescribe that an agent perform an action) is compatible with the complete definition of bindingness that I propose elsewhere.

(2) John, watch TV if and only if you finish your homework. It follows logically from this: John, if you don't finish your homework, don't watch TV.
(3) John, watch TV if and only if you finish your homework. I conclude from this: John, if you don't finish your homework, don't watch TV.

Hansen would argue that (2) and (3) are not paraphrases of (1) because the speaker is commanding (John not to watch TV if he does not finish his homework) in (1) but not in (2) or (3):

> Is the speaker [in (3)] concluding the last sentence? Or is the speaker commanding it? And if so, then why is she saying that she is concluding it? The performative acts of concluding and commanding seem to collide, whereas the acts of stating and concluding seemed to go hand in hand (Hansen 2008: 44; cf. Sellars 1956: 240-1).

I understand Hansen as inferring that the speaker is not commanding (and thus that the speaker is not both concluding and commanding) from the premise that, if the speaker were commanding, then she would not be saying that she is concluding. I reply that the premise is false: if the speaker is commanding, she may be saying that she is concluding to make it clear that she is not *only* commanding: she is not "just complementing her first imperative by a second, more specific one". Similar remarks apply to the declarative case: if someone who utters "John will watch TV if and only if he finishes his homework; I conclude from this that John will not watch TV if he does not finish his homework" is stating that John will not watch TV if he does not finish his homework, she may be saying that she is concluding it to make it clear that she is not only stating it but also inferring it from the claim that John will watch TV if and only if he finishes his homework. So Hansen has found no disanalogy between the imperative and the declarative case, and his argument to the effect that (2) and (3) are not paraphrases of (1) fails.

In response Hansen might grant that someone who utters (3) may be both concluding and commanding (so that the performative acts of concluding and commanding need not "collide"), but might claim that there is still a difference between (3) and (1) which shows that (3) is not a paraphrase of (1): someone who standardly utters (3) may be concluding without commanding, but anyone who standardly utters (1) is commanding (John not to watch TV if he does not finish his homework). In reply consider:

(4) John, watch TV if and only if you finish your homework. So, as a logical consequence: John, if you don't finish your homework, don't watch TV.

If anyone who standardly utters (1) is commanding (John not to watch TV if he does not finish his homework), then so is anyone who standardly utters (4), and then there is no difference between (4) and (1) analogous to the (alleged) difference between (3) and (1). I submit then that (4) is a paraphrase of (1), and thus that (1) passes Hansen's test (or a suitable modification of the test). I take this to be evidence that standard uses of 'so' in (1) are conclusion-indicating, and that imperative inferences (with at least one imperative premise) are found in ordinary language.

3. On the possibility of imperative inferences

I will defend the possibility of imperative inferences first (§3.1) against arguments put forward by Wedeking (1969, 1970) and by Harrison (1991), and then (§3.2) against an argument put forward by Williams (1963).[6]

[6] Let me also briefly address an argument put forward by Sellars (1963: 170-1), which I propose to reconstruct as follows. (1) No *unexpressed* imperative inferences can exist (because "telling to, telling that … are all public performances"). (2) If expressed imperative inferences can exist, then unexpressed ones can also exist (because

3.1. Wedeking's and Harrison's arguments

Can imperative sentences be *premises* of inferences? Wedeking notes that "constructions [like] 'Since open the window' … are not grammatical expressions" and asks: "If there are imperatives which are used as premises in arguments, why may we not make the argument explicit by preceding a premise with 'since', as we may in any normal argument?" (1969: 166, 1970: 162; cf. 1973: 103; Peetz 1979: 110-1). Wedeking, however, in effect answers his own question: the reason why we may not precede an imperative premise with 'since' is that doing so would result in an ungrammatical expression. As Castañeda notes, "it does *not* follow from this grammatical fact that commands cannot be premises. It merely follows that either commands are not premises *or* their premisory role is not signalled by a subordinating conjunction" (1971: 13-4; cf. 1975: 129 n. 5). Moreover, according to the definition of an inference I proposed in §1, it seems clear that imperative sentences can be premises of inferences: a process of reasoning can start by endorsing an imperative sentence.[7] An example is the process of reasoning of the driving instructor in §1, which starts by endorsing the imperative sentence "if there is a stop sign, stop".

Given that, as I said in §1, to endorse an imperative sentence is to believe that the sentence is binding, one might argue that, when an imperative sentence *seems* to be a premise of an inference, the premise is not really the imperative sentence but is rather a declarative sentence (cf. Beardsley 1944: 184) to the effect that the imperative sentence is binding (cf. Engliš 1964: 315-6; Weinberger 1958: 92-5, 1981: 92). To see that this is not so, suppose you are given an exam which consists of four questions, numbered from 1 to 4. The instructions are: "(1) Answer exactly three out of the four questions. (2) Answer at least one even-numbered question." You exclaim: "Wait a moment! The second instruction is redundant: it follows from the first. If I obey the first instruction, I will automatically obey the second one as well." In this example, you endorse the imperative sentence "answer exactly three out of the four questions": you take this sentence to be binding (in other words, you believe that there is a reason for you to answer exactly three out of the four questions), since you believe that there is a reason for you to do well on the exam. Moreover, it is plausible to say that your process of reasoning *starts* by endorsing the above imperative sentence. If so, then that sentence is a premise of your inference—regardless of whether you *also* endorse the declarative sentence "the first instruction is binding". In response one might grant that the imperative sentence is a premise, but might argue that it is *redundant* in your reasoning given the declarative premise to the effect that the imperative sentence is binding. This is an objection to the *usefulness*—not the *possibility*—of imperative inferences,[8] and I address it in §4.[9]

"[r]easoning is something which can go on *in foro interno*"; "[i]t makes sense to suppose that an expressed reasoning could have occurred without being expressed"). Thus: (3) No (expressed or unexpressed) imperative inferences can exist. In reply I reject (1): I can say (silently) to myself "if there is a stop sign, stop" and (a few seconds later) "there is a stop sign, so stop". See also Montefiore 1965: 104-7.

[7] Of course, one might reject my definition of an inference. Indeed, Harrison's claim that imperatives cannot be premises because they cannot be true (1991: 111) may be based on the traditional claim that it is a consequence of "a generally accepted definition of logical inference [that] only sentences which are capable of being true or false can function as premises or conclusions in an inference" (Jørgensen 1938: 290, 1938/1969: 11; cf. Kelsen 1979: 152, 1979/1991: 191; Ross 1941: 55-6, 1941/1944: 32). I see no reason to accept such a definition, however (cf. Bergström 1962: 36), which rules out by fiat the possibility of imperative inferences. Note that my definition of an inference does not allow by fiat the above possibility: one may claim that no process of reasoning can start (or end) by endorsing an imperative sentence, and I go on to examine such a claim in the text.

[8] One might insist that the objection is to the *possibility* of imperative inferences: if a sentence is redundant in an inference, then it cannot be a premise of the inference. I reply that redundant premises in *arguments* are

Can imperative sentences be *conclusions* of inferences? Harrison argues that they cannot: "one cannot conclude 'Shut the door' or conclude that shut the door" (1991: 110). Harrison, however, in effect counters his own objection: "One can say 'So shut the door' and 'Therefore shut the door'" (1991: 110-1; cf. Belnap 1990: 9; Castañeda 1960: 23, 1975: 100). But Harrison continues: "the function of the words 'so', 'therefore' … is not in this context to indicate that '[Shut] the door' is a conclusion. They have some other function" (1991: 111). Harrison's claim is similar to Hansen's claim (§2) that the word 'so' (like 'therefore') is sometimes used not to indicate a conclusion,[10] and the gist of my reply to Hansen in §2 also provides a reply to Harrison: one can sometimes replace 'so' with "so, as a logical consequence", and this suggests that the word 'so' does sometimes indicate an imperative conclusion.[11]

3.2. Williams's argument

Williams argues that "there is not in general anything that can be called imperative inference" (1963: 36):

> [W]e see an objection to construing the schema ["do x or do y; do not do x; so do y"] as anything that could be called a pattern of inference. For the first premiss presupposes permission to do x, and permission to do y; but the second premiss, 'do not do x', obviously has the force of denying permission to do x. Thus the speaker implicitly gives or admits something with his first utterance, which he withdraws with his second; and this can be construed only as the speaker *changing his mind*, or going back on what he first said. This destroys any resemblance of this sequence of commands to an inference; it is essential to the idea of an inference of q from a set of premises P that in reaching q, the speaker should not go back on or change his mind about any of the members of P—the form of an inference is '*given* P, q' (Williams 1963: 32; cf. Harrison 1991: 121-2).

I propose to reconstruct Williams's reasoning as follows:

(W1) The standard utterances of any (nonequivalent) imperative sentences have conflicting permissive presuppositions.[12]

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commonplace; why deny that redundant premises in *inferences* are possible? One might then ask: what determines which sentences (among those that are endorsed during an inference) are premises and which ones are not? I answer that it is probably a (maybe implicit) *decision* on the part of the reasoner to treat (collectively) certain sentences as the starting point in her reasoning. (See also note 14.)

[9] Here is also another objection to the claim that imperative sentences can be premises of inferences: "if A, therefore B, is a valid inference, then A can be used to give 'reasons' for B, but an imperative cannot be used to give 'reasons', and, consequently, an imperative cannot function as a premise" (Espersen 1967: 64; cf. Peters 1949: 539). I reply that an officer's utterance of "open the window and close the door" may well give a soldier a reason to open the window (cf. Espersen 1967: 65; see also Bergström 1962: 33-6).

[10] In contrast to Hansen (§2), who takes the "other function" to be for example that of motivating, Harrison takes it to be that of "giving [justificatory] reasons for an *action*, the action enjoined by the imperative" (1991: 123).

[11] Wedeking also claims: "we should be able to form an analytic conditional with the premises of … [an imperative] argument as antecedent and its conclusion as consequent. But the conditionals thus formed ('If take all the boxes to the station, …') are not merely non-valid, they are simply ungrammatical" (1970: 162; cf. 1969: 166; Harrison 1991: 120-1; Volpe 1999: 71). In reply Castañeda agrees that "inferences that contain imperatives … must correspond to tautologies", but says that they do: he says that "John, go home and study, therefore, John, go home" corresponds to "John, either don't both go home and study, or go home" (1971: 14). Castañeda's reply, however, does not work in general: "run; so if it rains run" is intuitively valid (see Vranas 2009a), but I do not see how "either don't run or if it rains run" could be called a "tautology". I prefer a different reply to Wedeking: there is no interesting notion of an imperative tautology analogous to the notion of a declarative tautology. A declarative tautology is necessarily *true*, but no imperative sentence is necessarily *binding*: even "John, go home or don't go home" is not necessarily binding because it is possible that no reasons exist and thus that there is no reason for John to go home or not go home.

[12] In the quotation that I gave, Williams is not asserting the general claim W1 but is rather talking only about a particular schema. It is reasonable, however, to understand Williams as giving that schema only as an example, and

Thus: (L1) No one can standardly utter any (nonequivalent) imperative sentences without changing her mind. [From W1.]

Thus: (L2) No one can standardly utter first the premises and then the conclusion of an imperative argument (if they include any nonequivalent imperative sentences) without changing her mind. [From L1.]

(W2) An inference corresponding to a given argument can exist only if someone can standardly utter first the premises and then the conclusion of the argument without changing her mind.

Thus: (C) No imperative inference (corresponding to an imperative argument whose premises and conclusion include any nonequivalent imperative sentences) can exist. [From L2 and W2.]

To see the point of the parenthetical parts (about nonequivalence), note that Williams's considerations do not preclude the possibility of imperative inferences corresponding to arguments like "do x or y; so do y or x" (Rescher & Robison 1964: 178). Williams need not deny that imperative sentences can be (non)equivalent: "I do admit that there are certain logical relations between imperatives … What I deny is that this fact enables us in general to apply the notion of inference to imperatives" (Williams 1963: 30).

Williams's reasoning has been extensively discussed in the literature, so why discuss it again? For two reasons. First, most of the numerous published responses to Williams can be understood as attacking W1; to my knowledge it has escaped notice that L1 is false even if W1 is true, and that W2 is also false. Second, I think (as I explain in a note[13]) that the published attacks on W1 fail; but I also think that there are so far unnoticed considerations against W1. In what follows I argue that (1) L1 is false even if W1 is true, (2) W2 is false, and (3) W1 is questionable.

(1) To see why L1 is false even if W1 is true, suppose you are given a three-question exam, and the examiner tells you: "Answer exactly two out of the three questions. But don't answer both the first and the last question." Grant Williams that the examiner's utterances of the above two imperative sentences have conflicting permissive presuppositions: her utterance of the first sentence permits you to answer both the first and the last question, but her utterance of the second sentence forbids you to do so. Still, it is clear that the examiner need not change her mind between her utterance of the first and her utterance of the second sentence, so L1 is false. In response Williams might grant that the examiner need not change her mind, but might claim that

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as holding the general claim W1 in order to reach the conclusion that "there is not in general anything that can be called imperative inference" (1963: 36).

[13] (1) Sosa (1964: 91-8, 1966: 213) attacks—to my mind successfully—the two *arguments* that Williams (1963: 31-2) gives for his claim that standard utterances of "do x or y" presuppose that doing x is permitted, but Sosa's attacks leave unaffected Williams's claim itself. (2) Rescher and Robison (1964: 179; cf. Åqvist 1965: 182-3; Espersen 1967: 96; Hare 1967: 315-7) argue that "alternative-presenting" (as opposed to "choice-offering") utterances of "do x or do y" do not presuppose that doing x is permitted, but Williams (1973: 163-4) replies in effect that such utterances do not express commands (cf. Vranas 2008: 542-3). (3) Rescher and Robison (1964: 177; cf. Gombay 1965: 60-2; Bennett 1970: 316) suggest that standard utterances of "do x and y" and " do x" do not have conflicting permissive presuppositions; but they do, for uttering "do x" permits one to do x without doing y (if this is possible; if it is not, the two sentences are equivalent), whereas uttering "do x and y" forbids one to do this. (4) Hare (1967: 309-17; cf. Bennett 1970: 317-8) argues that permissive presuppositions are Gricean conversational implicatures and are thus cancellable, but Williams replies that he understands permissive presuppositions neither as entailments nor as cancellable implicatures: "my claims that certain commands have certain permissive presuppositions are to be construed in terms of what an utterer is to be taken as having permitted if an utterance of his is to be taken as the commanding of a certain thing" (1973: 162). (5) For further responses to Williams's argument see Geach 1963 and Bennett 1970.

if she does not then in effect she utters only the *single* sentence "answer exactly two out of the three questions, but don't answer both the first and the last question". I reply that this response renders invalid the move from L1 to L2, since in effect it grants that someone can utter first the premises and then the conclusion of a pure imperative argument without changing her mind: someone who does so in effect utters only a single sentence. For example, someone who successively utters "do x or y", "do not do x", and "so do y" need not change her mind; if she does not, then (according to the above response) she in effect utters only the single sentence "do x or y, but do not do x, and so do y".

(2) To see why W2 is false, take a case in which no one can successively utter two imperative sentences without changing her mind. Suppose you are given a three-question exam, and the examiner tells you: "answer exactly two out of the three questions—*any* two questions, at your choice". A minute later, the examiner tells you: "I changed my mind. Don't answer both the first and the last question. So answer either the first two or the last two questions (not both), at your choice." Although the examiner (and anyone else who standardly makes similar utterances) must have changed her mind, it is clear that she can have inferred the last imperative sentence from the first two, so W2 is false.

(3) To see why I think that W1 is false, consider the imperative sentences "don't smoke immoderately" and "if you smoke, don't smoke immoderately". These sentences (i) are not equivalent (the first sentence entails the second one but not vice versa), but (ii) standard utterances of them have the same permissive presuppositions: they forbid everything which entails that you smoke immoderately, and they permit everything else. Similar remarks apply to the sentences "if you smoke, don't drink" and "if you drink, don't smoke". If so, then there are counterexamples to W1. Defending claims (i) and (ii) requires lengthy discussions, which I provide elsewhere (in Vranas 2009a for (i) and in Vranas 2009c for (ii)), so here let me just propose these claims as plausible and conclude only that W1 is questionable. Clearly, regardless of what one thinks about W1, the objections I raised above against L1 and W2 suffice to rebut Williams's argument.

4. On the usefulness of imperative inferences

On numerous occasions, people are presented with sets of imperative sentences: buyers of appliances are supplied with instructions on how to use them (cf. Hamblin 1987: 167), taxpayers are provided with instructions on how to fill out income tax forms (cf. Zellner 1971: 15), children are sometimes given conflicting commands by their parents (cf. Miller 1984: 56), soldiers are sometimes issued conflicting orders by their superiors (cf. Warnock 1976: 293), students are sometimes offered conflicting suggestions by fellow students on what courses to take, about everyone is bombarded with sets of dietary guidelines, and so on. One might argue, then, that imperative inferences occur frequently in everyday life, and one might take this to be evidence that imperative inferences are useful. I do not subscribe to this argument, however, because it is subject to a powerful objection: people who are presented with sets of imperative sentences normally carry out declarative inferences, not imperative ones. A stronger version of this objection was raised by Williams, who argued that, if an agent is presented for example with the imperative sentences "do x or y" and "don't do x", "[t]he only inference that the agent could carry out would be in some form such as: 'I must do x or y; I must not do x; so I must do y', and this is a deontic inference, not an imperative one" (1963: 36; cf. 1973: 164; Zellner 1971: 66-7). Note that the "deontic" inference to which Williams refers is normally part of a "larger" inference which starts by endorsing the above imperative sentences and has those sentences as

premises. Still, even such a larger inference is declarative if it ends by endorsing the declarative sentence "I must do y". Of course the agent may go on to endorse an imperative sentence like "let it be the case that I do y" and thus (pace Williams) may carry out an imperative inference as well,[14] but let me grant that this would happen only rarely because people only rarely give commands to themselves. Does it follow that imperative inferences occur only rarely in everyday life?

No: the above objection relies on the claim that people only rarely give commands *to themselves*, so the objection shows at most that "first-person" imperative inferences occur only rarely in everyday life. Other kinds of imperative inferences need not occur rarely: recall (1) the driving instructor who infers "stop" from "if there is a stop sign, stop" and "there is a stop sign", (2) the examiner who infers "answer either the first two or the last two questions" from "answer exactly two out of the three questions" and "don't answer both the first and the last question", and (3) the exam-taker who says "the instruction 'answer at least one even-numbered question' is redundant: it follows from the instruction 'answer exactly three out of the four questions'". Here are also two other examples. (4) Suppose your daughter asks you when she can invite her friends to the house for a party, and you reply: "invite them either this Saturday or next Saturday". A minute later, you tell her: "Wait! Don't invite your friends next Saturday: I forgot that your grandparents are coming over. So invite them this Saturday." (5) I tell you: "meet me at noon". You reply: "I can meet you at noon only if I skip lunch". I respond: "then skip lunch". The above examples suggest that imperative inferences occur with some regularity in everyday life (even if "first-person" imperative inferences occur only rarely). The examples also respond to the complaint that the purported examples of imperative inferences that command logicians have provided "are without exception utterly contrived, not at all what someone might *say* in the course of an argument" (Wedeking 1969: 164, 1970: 161; cf. Aune 1977: 174).

In response one might grant that imperative inferences occur with some regularity in everyday life, but might claim that imperative inferences are useless because they are *dispensable*: they can always be *replaced* with declarative (maybe deontic) inferences, in the sense that the validity of a given imperative inference amounts to the validity of some corresponding declarative inference(s). (Cf. Aune 1977: 175; Chaturvedi 1980: 474; Harrison 1991: 116; Simon 1965, 1966a, 1966b.) To put the point more vividly, one might say that imperative inferences are "parasitic" on declarative ones (cf. Keene 1966: 62). A related point came up in §3.1: the idea was that an imperative premise is always redundant in one's reasoning given the declarative premise to the effect that the imperative premise is binding.[15] I reply that, even if imperative inferences can always be replaced with declarative ones, it does not follow that imperative inferences are useless. This is because it is not clear *which* specific declarative inferences can

[14] Contrary to Williams, I do not find the notion of the "self-addressed imperative" "deeply suspect" (1973: 164; cf. Hamblin 1987: 87-8; Vranas 2008: 554-5 n. 15). Williams also argues that, when an agent is presented with a set of imperative sentences, in the agent's reasoning these sentences "are not being used by the agent, but quoted", because "his inferential process, fully expanded, would be of the form: 'I must do whatever the wireless tells me: it tells me "do x", so I must do x', etc." (1963: 36). I reply that the agent can instead say to himself "let it be the case that I do x", and can use *this* imperative sentence (rather than the sentence "do x" emanating from the wireless) as a premise. This possibility satisfies the requirement (which I do not endorse) that the premises and the conclusion of a pure imperative inference must be issued by the same person (cf. Moutafakis 1975: 60-1; Wedeking 1969: 149).

[15] If imperative premises are always redundant and some imperative inferences are valid, then some imperative sentences can be validly inferred from only declarative sentences, contrary to what Rescher (1966: 73-4) calls "Poincaré's Principle": "No imperative conclusion can be validly drawn from a set of premises which does not contain at least one imperative" (Hare 1952: 28; cf. Poincaré 1913: 225).

replace a given imperative inference (cf. Belnap 1966: 30; Binkley 1966: 23); for example, can the inference from "surrender" to "surrender or fight" be replaced with the inference from "'surrender' is binding" to "'surrender or fight' is binding" or with (e.g.) the inference from "you will surrender" to "you will surrender or fight"? Depending on how such questions are to be answered, it may turn out that an imperative inference is often *more straightforward* than the declarative inferences with which it can be replaced, so imperative inferences may often be useful even if they are dispensable. As an analogy, even if geometric reasoning can always be replaced with algebraic reasoning (by using Cartesian coordinates), geometric reasoning is often useful because it is often more straightforward than algebraic reasoning. Similarly, in my view it turns out that imperative reasoning is often more straightforward than declarative reasoning: in another paper (Vranas 2009a) I argue that the validity of a pure imperative argument amounts to the validity of *two* related pure declarative arguments. For example, it is more straightforward to reason from (1) "whether or not it rains, run" to (2) "if it rains, run" than to reason from (3) "it rains and you run" to (4) "you run" and from (5) "it rains and you don't run" to (6) "you don't run", although in my view the pure imperative argument from (1) to (2) is valid because the two pure declarative arguments from (3) to (4) and from (5) to (6) are valid.[16] But even if my view is incorrect, the mere possibility that such a view is correct suffices to show that the inference from the dispensability to the uselessness of imperative inferences is invalid.

5. Conclusion

I have defended the existence, the possibility, and the usefulness of imperative inferences against a number of attacks. I suspect that these attacks are at least partly responsible for the fact that nowadays hardly anyone works on imperative logic. So my defense of imperative inference paves the way for the positive task of resuscitating imperative logic, a task I undertake elsewhere.

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[16] More generally, I associate with an imperative sentence I two declarative sentences S and V (the *satisfaction sentence* and the *violation sentence* of I), and similarly for I', S', and V', and I argue that the pure imperative argument from I to I' is (1) what I call *strongly valid* exactly if either V is necessary or V' entails V and S' entails S, and is (2) what I call *weakly valid* exactly if V' entails V and $S' \vee V'$ entails $S \vee V$. (I argue that both kinds of validity are useful.)

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