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Practical Reasoning Arguments: A Modular Approach

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Abstract This paper compares current ways of modeling the inferential structure of practical (goal-based) reasoning arguments, and proposes a new approach in which it is regarded in a modular way. Practical reasoning is not simply seen as reasoning from a goal and a means to an action using the basic argumentation scheme. Instead, it is conceived as a complex structure of classificatory, evaluative, and practical inferences, which is formalized as a cluster of three types of distinct and interlocked argumentation schemes. Using two real examples, we show how applying the three types of schemes to a cluster of practical argumentation allows an argument analyst to reconstruct the tacit premises presupposed and evaluate the argumentative reasoning steps involved. This approach will be shown to overcome the limitations of the existing models of practical reasoning arguments within the BDI and commitment theoretical frameworks, providing a useful tool for discourse analysis and other disciplines. In particular, applying this method brings to light the crucial role of classification in practical argumentation, showing how the ordering of values and preferences is only one of the possible areas of deep disagreement.

Keywords Practical reasoning · Discourse analysis · Values · Classification · Argumentation schemes · Decision-making · Deliberative argumentation

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1 Introduction

The representation of the arguments used for justifying a course of action has long been known as an issue involving complex discussions in such fields as logic and moral philosophy. The very definition of practical reasoning argument is controversial in philosophy (Millgram 2001), as deliberating "rationally about ends" (or "reasoning with a view to an end," see Aristotle, *Nicomachean Ethic*s, 1139a32-33) involves different possible accounts of what counts as "rational"—and as "preferable" or "better than" (Temkin 2012, 13, 14). Similar controversies concern what "to deliberate" (Richardson 1997, 22–23) or "end" (Segerberg 1984) amount to.

In argumentation theory, this type of reasoning becomes of crucial importance when it is expressed as an argument for justifying a decision. The reconstruction of the tacit premises of practical arguments and their assessment has fundamental practical implications in deliberative argumentation. In this framework, the focus is placed on the reasonableness of practical arguments and the grounds thereof, namely on the reasons advanced by speakers in support of a recommendation to act. On this perspective, practical arguments are regarded as grounded on argumentative inferences from goals and values to a choice and a recommendation to act, presupposing the determination of what is good or better, and what can be considered as instantiating a specific value or preference. The representation and formalization of the explicit and tacit dimension of practical arguments is of crucial importance for bringing to light the sources of deep disagreement (Muir 1993; Fairclough and Fairclough 2012; Fairclough 2013), investigating and addressing the conflicts of opinions (Perelman 1968), and developing interaction protocols for dialogues over proposed actions for use in artificial intelligence (Atkinson et al. 2006).

In artificial intelligence, argumentation theory, and discourse analysis, the abstract model of argument used for reconstruction and assessment purposes has been usually configured as an argumentation scheme (called argument from practical reasoning, Walton et al. 2008, 94–95). In its more generic version, widely shared in argumentation theory, it has the following abstract set of premises and conclusion (Brockriede and Ehninger 1963; Clarke 1979; Walton 1990, 1992, 89–90, 2015; Grennan 1997, 163–165; Brun and Betz 2016; Hitchcock 2017, chap. 15):

Argumentation scheme 1: Basic Instrumental Practical reasoning

Premise 1	Agent *A* has a goal *G*
Premise 2	Carrying out this action *B* is a means to realize *G*
Conclusion	Therefore, *A* should bring about action *B*

This scheme has become one of most important references for both theoretical models and practical analyses of deliberative arguments in argumentation theory (see for instance, Hitchcock 2017, 245–246) and discourse analysis (see for instance, Fairclough 2013). Its main advantages consists in its analytical dimension

(guiding the retrieval of the premises taken for granted by the speaker) and its evaluative aspect (providing criteria for dialectically assessing practical arguments based on a list of critical questions) (March 1991; Walton et al. 2008, 94–98).

This argumentation scheme, however, has three crucial limitations. At a theoretical level, two problems have been pointed out, concerning the representation of the reasons for accepting or disagreeing with a proposal. First, the scheme does not include value considerations, overlooking the fact that a goal or a proposal can be agreed upon for different reasons, based on distinct values (Atkinson et al. 2006, 164–165). Second, a proposal is based on an assessment or classification of the available circumstances, as it is advanced in response of a specific state of affairs (Walton et al. 2016). This aspect is not accounted for in the argumentation scheme, which thus cannot be used to examine the possible disagreements resulting from different assessments or evaluations of a state of affairs (Greenwood et al. 2003). The third problem is at the level of analysis, and consists in the lack of correspondence between the abstract scheme and real arguments. Real arguments are complex, as they are characterized by implicit premises and often involve more than one pattern of reasoning. A single scheme cannot capture the complexity of real arguments, failing to unveil implicit assumptions that can be the sources of disagreement.

To address these problems, in this paper we analyze and compare the insights provided by philosophical and argumentative models of rational deliberation (von Wright 1972; Raz 1978, 2011; Walton 2015) and the formalizations of practical reasoning developed in artificial intelligence (March 1991; Russell and Norvig 1995; Bench-Capon 2003a; Atkinson and Bench-Capon 2007). Based on the ideas developed in these different models, we will investigate the structure of deliberative arguments, showing how a course of action can be justified or argued for in different ways and at different levels.

Our goal is to propose a new modular approach to practical reasoning arguments that reveals how the basic instrumental scheme is locked in together with supplementary evaluative and classificatory schemes to form a complex reasoning structure, a cluster of arguments locked in with each other. More specifically, we will describe how six types of argumentation schemes (the building blocks or "modules" of our analysis) are combined to model practical argumentation in deeper detail, allowing the use of implicit premises presupposed in the evaluation of implicit reasoning steps to be made explicit. This structure can be represented visually as an argument diagram, showing how arguments instantiating the schemes fit together to draw an ultimate conclusion from a connected sequence of arguments.

This analytical approach is aimed at deepening and optimizing the assessment of practical reasoning argumentation. By distinguishing the distinct types of arguments hidden within such a cluster of arguments supporting a proposal for action, it is possible to unveil its most critical but often poorly critically evaluated aspects (March 1991). We do this by showing how leading arguments of these kinds can be identified and how weak points in them can be pinpointed using a set of critical questions matching each scheme in the module. By pointing these gaps out, it is possible to detect when a decision proposed is based on a simplified heuristic version of a specific module that overlooks critical questions, necessary qualifications, and unshared presuppositions.

2 Practical Reasoning in Deliberative Argumentation

The analysis of the structure of deliberative argumentation and the assessment of practical arguments is becoming crucial especially in the fields of political science, critical discourse analysis, argumentation and education. In political science, deliberative argumentation is considered the core of democracy, as democratic decisions rest on argumentation and must be justified by argument (Elster 1998, 9). In this perspective, argumentation is regarded as aimed at the "transformation of preferences." As Elster puts it (1998, 7):

> […] arguing aims at the transformation of preferences. I also said that much arguing is about factual matters. These statements are not inconsistent with each other. Individuals have fundamental preferences over ultimate ends and derived preferences over the best means to realize those ends, the gap between the two being filled by factual beliefs about ends - means relationships. Arguments that affect those beliefs will also affect the derived preferences.

This excerpt from Elster brings to light how argumentation in deliberation is focused on the sources of disagreement, which can be interpreted as conflicts of values (preferences over ultimate ends) and conflicts of opinions concerning (factual) means-ends relationships. These two dimensions of disagreements are interrelated, as actions about what to do in order to "map onto values in cause and effect terms" (Dryzek 2012, 94).

Means are actions which are evaluated according to hierarchies of values and result in direct and indirect side effects, whose assessment depends on individual preferences. Values and factual beliefs are not the only components of deliberative argumentation. A proposal on how to act in a specific set of circumstance is assessed based on how such a set is described, or rather "framed." Framing can be defined as a goal-directed description of a state of affairs aimed at making specific features thereof more accessible. As Entman put it (1993, 52):

> Framing essentially involves selection and salience. To frame is to select some aspects of a perceived reality and make them more salient in a communicating text, in such a way as to promote a particular problem definition, causal interpretation, moral evaluation, and/or treatment recommendation for the item described.

A value judgment on an entity or a state of affairs depends on the perspectives from which it is viewed (Chong and Druckman 2007, 105) or "defined" (Schiappa 2003; Walton and Macagno 2015a; Lindgren and Naurin 2017). Framing can alter the accessibility of certain values or considerations, making a specific value or set or values assume priority in one's opinion (Nelson and Oxley 1999, 1043). For this reason, deliberative argumentation plays a fundamental role in democratic deliberation. By means of argumentation it is possible to provide alternative and conflicting accounts of the states of affairs described—thus promoting alternative values (Sniderman and Theriault 2004)—or to question and challenge the existing descriptions of the circumstances and the values promoted through them.

The analysis of deliberative argumentation has been the focus of some basic works in critical discourse analysis and argumentation theory. Fairclough and Fairclough pointed out how the investigation of the different dimensions of deliberative argumentation (narratives, explanations, frames, etc.) can be conducted only by taking into account the practical arguments of which they are part (Fairclough and Fairclough 2012, 3). In their analysis of practical reasoning arguments (which we will refer to also as "practical arguments"), they underscore the crucial role of value pluralism, and how distinct values—often shared by the same agent—and distinct hierarchies of values, can affect the evaluation of a present state of affairs and the claim or proposal. On their view, practical reasoning is a kind of conductive argument. A practical conclusion is usually based on different assessments of a state of affairs grounded on values different in kind and independently relevant to the claim (Fairclough and Fairclough 2012, 38). In this type of argument, the conclusion is arrived at by comparing the distinct pro and con "reasons" with respect to the agent's hierarchy of values.

This model of practical reasoning is a combination of circumstantial premises (involving the selection and description of facts) and normative premises (values or obligations) leading to a claim for action that corresponds to the agent's concerns (Fairclough and Fairclough 2012, 42). The abstract model of practical argument is represented as shown in Fig. 1 (Fairclough and Fairclough 2012, 45).

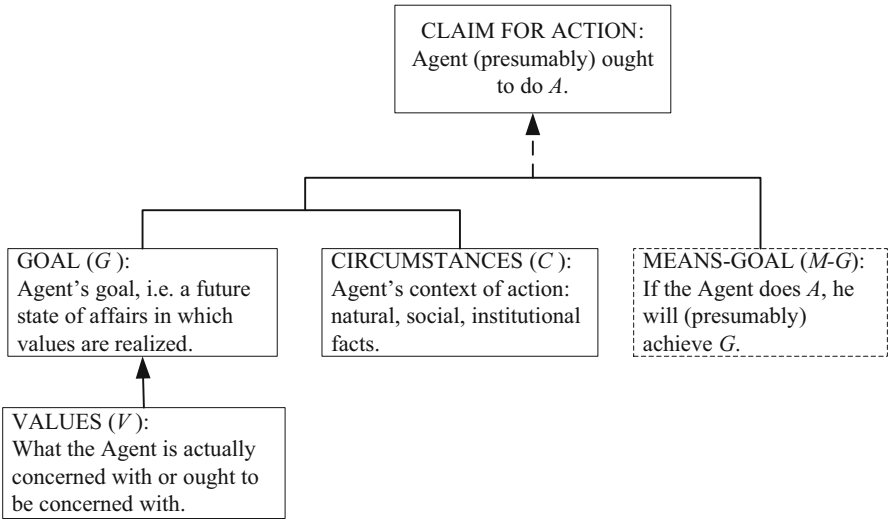

Fig. 1 Fairclough and Fairclough's structure of practical arguments

This form of analysis of practical arguments brings to light the crucial role of values. As mentioned above, values are involved in the assessment of the desired future state of affairs or proposal, and of the means to achieve it. However, values play also a crucial role in the "selection and description of the relevant circumstances" (Fairclough and Fairclough 2012, 46). A state of affairs is described, and the characteristics thereof selected, according to the values that are defended.

The crucial problem is how to account for, describe, and evaluate arguments that are grounded on distinct and often incompatible values (or evaluative dimensions) (Kock 2003, 158). The challenge is to overcome value incommensurability, namely the impossibility of "ranking with respect to a common denominator of value" the conflicting values on which the arguments are based (Kock 2007a, 236). The solution envisaged is focused on the classification of states of affairs. While values can be incommensurable at an abstract level, they can be compared and ranked when applied to specific phenomena, leading to individual preferences (Kock 2007a, 237) that can be discussed. In this sense, deliberative argumentation should be focused on the acknowledgment, comparison, analysis, and discussion (Olmos 2016, 15) of the interpretation and the description of the states of affairs used to argue in favor or against a proposal (Kock 2003, 170; Fairclough and Fairclough 2012, 32).

The importance of deliberative argumentation has been acknowledged also in education. Educational psychology has recently focused on the study of argumentative interactions between learners (Rapanta et al. 2013; Rapanta and Macagno 2016; Schwarz and Baker 2016, 135), both for the purposes of learning to argue and arguing to learn (Kuhn et al. 2014; Andriessen et al. 2003; Von Aufschnaiter et al. 2008). However, as Felton and colleagues underscored, "although argumentative dialogue can improve content learning and argument quality on socio-scientific issues, the benefits are mediated by individuals' task goals while arguing" (Felton et al. 2009, 433). Deliberative argumentation, considered as a goal-driven, collaborative and practical argumentative dialogue, has been found to elicit the best effects both on students' understanding and learning, and on the quality of their arguments, which were more complete, more focused on evidence (Felton et al. 2009, 433; Garcia-Mila et al. 2013; Goldberg and Schwarz 2016; Schwarz and Baker 2016, 187), and was shown to include different types of rebuttals, including deeper, meta-dialogical ones (Macagno et al. 2015; Mayweg-Paus et al. 2016).

The framework of deliberative argumentation leads to considering some important and problematic aspects of the models advanced for representing practical arguments. First, practical arguments cannot be reduced to a practical conclusion (a proposal, such as "Action *X* should be carried out") warranted by a goal premise ("Agent intends to pursue goal *G*") and the sufficient or necessary conditions therefor ("If Agent does action *X*, he will achieve goal *G*"). In order to account for value pluralism (and the meta-discussions on the values underlying practical arguments), it is necessary to take into consideration how means and consequences are assessed and how a state of affairs is described. As Fairclough and Fairclough highlight, specific descriptions of a state of affairs can justify the pursuance of a specific goal and the choice of a specific means thereto (see also

Walton et al. 2016). Second, in order to compare the values and the descriptions of states of affairs involved in conflicting practical arguments and elicit meta-discussions, it is necessary to investigate how descriptions, values, and means-end argumentation are related. Finally, in order to foster critical meta-discussions in deliberative argumentation, it is useful to identify the defeasibility conditions of the different components of practical arguments.

These problems lead to specific challenges related to the representation of the internal justification of a proposal (excluding from our concern external justifications such as the use of power or authority, see Fairclough and Fairclough 2012, 14). Practical arguments are characterized by implicit classifications (descriptions of state of affairs), evaluations (assessments of states of affairs), and judgments on the available means to achieve the intended goal. In order to detect the possible areas of comparison and disagreement, it is necessary to reconstruct what is left unexpressed in the argument, so that the hearer can individuate whether disagreements may arise concerning values, value judgments, descriptions of states of affairs, or the selection of the available means. In order to reconstruct the implicit premises of an argument, it is necessary to represent the argumentation scheme(s) warranting the supported conclusion (Van Eemeren and Grootendorst 1992, chap. 6; Walton and Reed 2005; Walton 2008; Van Eemeren 2015; Walton and Macagno 2016; Macagno and Walton 2017). For these reasons, the following two research questions arise:

1. How is it possible to represent the various types of inferences and argumentation schemes involved in practical arguments?
2. How can we assess the explicit and implicit dimensions of practical arguments dialectically?

To address these issues, we start by introducing a theoretical, philosophical framework that can be used for investigating deliberative argumentation and the analysis of practical arguments. Thus, in Sect. 3 we first present the two most important philosophical approaches to practical reasoning, namely the Belief–Desire–Intention (BDI) model and the commitment model, pointing out some advantages of the commitment-based framework. In Sect. 4, we discuss the extended argumentation schemes in which the means-end inference is combined with values. Next we show how the different dimensions of practical arguments can be represented using distinct argumentation schemes, bringing to light the distinct implicit and explicit inferences and premises. Finally, in Sects. 8 and 9 we show how the different argumentation schemes can be combined as building blocks to represent the complex structure of (real) practical arguments, unveiling their implicit classificatory and evaluative dimensions.

3 The Theoretical Framework: BDI Model and the Commitment Model

The broadest theoretical issue concerning the analysis and evaluation of practical reasoning as a type of argumentation that can be identified as having a precise structure is whether the word ‘intention’ should be used in the major premise instead

of the word 'goal.' The widely accepted BDI model uses 'intention' (or variants such as 'want' or 'desire') instead of 'goal' in the major premise, and 'belief' in the minor premise. On this model, a rational agent revises its beliefs, adding new beliefs and deleting old ones, updating its knowledge as new information comes to be available to it, using its beliefs about its external circumstances to search for means to carry out its goal.

The traditional BDI view is grounded on the attribution of intentions to agents based on other intentions and beliefs about causal connections, which was expressed (and criticized) (Stoutland 2010) by von Wright (1963, 165, 1972, 45) in the following BDI form of practical inference:

Premise 1	*X* intends to make it true that *E* (e.g. *make this hut habitable*)
Premise 2	He thinks that, unless *X* does *A* (e.g. *heat the hut*), he (i.e. *X*) will not attain *E*
Conclusion	Therefore, *X* intends to do *A* (e.g. *heat the hut*)

This scheme is further specified by distinguishing between distinct types of means to an end, namely the "necessary," the "productive," and the "necessary and productive" scheme (von Wright 1963, 165–166; see also von Wright 1972, 45):

> The one is a relation between an act and its consequences. If doing *p* produces a state of affairs *q*, different from *p*, and if *q* is an end of human action, then the doing of *p* is a means to this end. The other type is a relation between acts and their causal requirements. If the production of a state of affairs *q* requires the doing of *p*, and if *q* is an end of human action, then the doing of *p* is a means to this end. I shall call means of the first type productive means, and means of the second type necessary means. A means to an end can be both productive and necessary. When this is the case, we say that the means is the only means to the end in question.

This practical inference has been developed in further approaches by introducing additional factors (Audi 2006, 65), such as the consideration of time (doing *X* no later than time t_1) or possible external variants (*X* intends/sets himself to do *A* unless he is prevented). The characteristic of this pattern is that it is defeasible, meaning that the intention to carry out an action is consistent only with the stated premises, and not with an augmented set (including for example other purposes) (Robins 1984a, 66).

Traditional analytical philosophers continue to use the BDI framework to model practical reasoning. Some researchers influential in artificial intelligence have also followed this course by advocating and adopting a BDI model in which agents that reason towards achieving their collective intentions base their actions on incoming perceptions that update its beliefs. Those following the BDI model in their writings on practical reasoning in artificial intelligence including (Bratman 1987; Bratman et al. 1988; Paglieri and Castelfranchi 2005; Wooldridge 2009), adopted a model of rational thinking as a procedure in which an agent possesses a set of beliefs that are

continually being updated by sensory input coming in from its environment, and a set of desires that are evaluated to form intentions.

The alternative theoretical approach to practical reasoning is the commitment model, in which agents interact with each other verbally in a dialogue structure in which each contributes speech acts (Walton and Krabbe 1995; van Eemeren and Grootendorst 2004). Each party has a commitment set containing the propositions he or she has accepted, judging by his or her speech acts in the previous dialogue. As each move is made, commitments are inserted into or retracted from each set according to commitment rules, depending on the type of move each makes. A commitment of the simplest and most basic kind is a proposition that an agent has gone on record as accepting (Hamblin 1970, 1971). On the commitment-based approach, practical reasoning is modeled in a dialogue format using an argumentation scheme with a set of critical questions matching the scheme.

The BDI and the commitment models are combined in several philosophical theories, leading to some common formal representations of practical reasoning in philosophy. The conclusion of practical reasoning is considered as not necessarily doing something, but setting oneself to do something (von Wright 1963, 169), namely beginning to act with a certain intention (Stoutland 2010, 593). According to this approach, the teleological explanation (attributing intentions to agents) is the conclusion of the inference. Following this mixed type of approach, practical reasoning has been taken to be an inference from a commitment to an intention to a commitment to an action (Audi 2004, 126–128, 2006, 75):

1. A motivational (purpose) premise, representing the commitment to an intention to pursue a certain end (*I want* φ);
2. An instrumental (cognitive) premise (theoretical) premise, linking an end to the means therefor (*my A-ing would contribute to realizing* φ); and
3. A practical conclusion, expressing a commitment to an action (*I should A*).

This basic structure, however, is held to vary, depending on the content of the instrumental (cognitive) premise.

A key difference between the commitment model and the BDI model is that desires and beliefs are psychological notions internal to an agent, while commitments are statements externally accepted by an agent in a dialogue (Hamblin 1970). The main difficulty with the BDI model as an argumentation tool to be applied to the analysis and evaluation of practical reasoning is that it is hard to know or even guess what the beliefs or desires of another person with whom one is engaging in conversation are. In contrast, the commitment model takes into account only what the interlocutors can be considered to be held responsible for based on what they said, did, or took for granted in the previous moves. Commitments are thus directly accessible from the interpretation of textual evidence (Stalnaker 1984, 79–80; Geurts 1999, 4; Geurts 2017; Macagno 2017), without investigating the possible mental states of the agent. Commitments are only indirectly related to beliefs, as a speaker can be committed to a content p without believing that it is true, or commit someone else (presenting a proposition as commonly accepted) even though he cannot know whether p is actually believed or not (Beyssade and Marandin 2009).

The BDI model is more appropriate for psychology, where intentions, beliefs, motivations, desires, and other internal mainsprings of action are the central concern. The commitment model has the advantage that it is a more purely logical approach that does not need to directly concern itself with determining an agent's psychological motivations and beliefs. In the remainder of this paper, the commitment approach will be taken; however, in most instances, it is also possible to utilize the BDI model of practical reasoning if that is the reader's preference. How the two approaches are related is so far an unsolved problem. Drawing a precise distinction between acceptance and belief has proved to be difficult, primarily because there is little basic agreement in analytical philosophy on how to define 'belief' (Engel 2000).

4 Argumentation Schemes for Instrumental Practical Reasoning

The approaches to practical reasoning discussed in the section above highlight the different aspects that need to be taken into account for representing a practical argument. The complexity of this task is twofold. On the one hand, as the BDI models underscore, a proposal can be justified by relying on different types of inference. Thus, we need to distinguish between the schemes from practical reasoning (necessary, productive, and necessary and productive schemes) from other schemes justifying a proposal, namely the sufficient reason scheme and the scheme from rules. On the other hand, the justification of a proposal involves other factors in addition to the means-end relation. As the models of deliberative argumentation point out, values and classifications of states of affairs (necessary for assessing the goal, the means, and the possible alternatives) need to be accounted for.

In order to take into consideration these distinctions and elements within a commitment model, we will use distinct patterns of argument, called argumentation schemes (Walton et al. 2008; Macagno and Walton 2015; Walton and Macagno 2015b), of which Scheme 1 for practical reasoning (in the introduction) is an example. Argumentation schemes are abstract inferential patterns, in which a conclusion is justified based on a specific inferential (namely logical and material) relation and assessed dialectically through a set of critical questions. Argumentation schemes can capture the distinct types and aspects of the schemes justifying a proposal, bringing to light its distinct dimensions.

The first dimension is the rational justification of a proposal about what to do (course of action) (Kock 2007b, 94). Building on the BDI approaches to practical reasoning mentioned in Sect. 3 above, we can distinguish three distinct schemes of argument, namely the practical reasoning argument, the argument from consequences, and the argument from rules. The practical reasoning argument represents the deliberation phase of the decision-making (Westberg 2002, 165) namely the choice of a course of action under uncertainty (i.e. when the means to achieve a goal is doubtful). When there are set operations to achieve specific ends (such as the ones constituting writing or driving), or when the means do not affect or do not affect much the outcome, there is no need to deliberate. However, in some cases the means are uncertain or it is not clear what means are the best ones to achieve an end.

The distinction between the necessary (or constitutive) and productive means can be represented within a commitment model in two distinct sub-schemes of the argument from practical reasoning mentioned in the introduction. In the first case, the argument has the following structure (adapted from Walton et al. 2008, pp. 94–95):

Argumentation scheme 1a: Instrumental practical reasoning with necessary condition

Goal premise	The goal of agent A is to bring about G
Alternatives premise	A reasonably considers the given information that bringing about at least one of [B_0, B_1,…, B_n] is necessary to bring about G
Selection premise	A has selected one member B_i as an acceptable, or as the most acceptable necessary condition for G
Practicality premise	Nothing unchangeable prevents A from bringing about B_i as far as A knows
Conclusion	Therefore, A should bring about action B_i

In this scheme, the agent needs to act in a specific fashion (according to the possible alternatives) if he wants the state of affairs to occur. Unless he acts according one of the possible alternatives, the desired state of affairs will not be brought about. At this point, he needs to choose about whether to carry out such a means or not, evaluating it. A different type of reasoning is the sufficient scheme (adapted from Walton et al. 2008, p. 96):

Argumentation scheme 1b: Instrumental practical reasoning with sufficient condition

Goal premise	The goal of agent A is to bring about G
Alternatives premise	A reasonably considers the given information that each one of [B_0, B_1,…, B_n] is sufficient to bring about G
Selection premise	A has selected one member B_i as an acceptable, or as the most acceptable sufficient condition for G
Practicality premise	Nothing unchangeable prevents A from bringing about B_i as far as A knows
Conclusion	Therefore A should bring about B_i

In this pattern, the paradigm of the possible efficient causes of the desired state of affairs remains open. For this reason, the two patterns have different criteria of evaluation. In the necessary condition scheme, the agent needs to assess whether acting is more desirable than non-acting, i.e. whether the quality of the action is better than the quality of the situation characterized by not bringing about the desired state of affairs. In the sufficient scheme, the agent needs to assess the action in itself, and cannot justify it based solely on its end (which can be pursued in another way). The generic scheme can be assessed using the following critical questions:

CQ_1:	Are there alternative means of realizing G, other than [B_0, B_1,…, B_n]? **[*Alternative Means Question*]**
CQ_2:	Is B_i an acceptable (or the best) alternative? **[*Acceptable/Best Option Question*]**

CQ_3:	Is it possible for agent A to do B_i? [***Possibility Question***]
CQ_4:	Are there negative side effects of A's bringing about B_i that ought to be considered? [***Negative Side Effects Question***]
CQ_5:	Does A have the goals other than G, which have the potential to conflict with A's realizing G? [***Conflicting Goals Question***]

The second argument that can be used to make a decision on how to act is based on reasoning from the consequences of an action to its desirability. The scheme can be represented as follows (Walton et al. 2008, p. 332):

Argumentation scheme 2: Argument from consequences

Premise 1	If Agent A brings about (doesn't bring about) B, then C will occur
Negative consequence premise	C is a bad outcome (from the point of view of A's goals), and bad outcomes should *avoided* by not bringing about their causes
Positive consequence premise	C is a good outcome (from the point of view of A's goals), and good outcomes should be *aimed at* by bringing about their causes
Conclusion	Therefore, B should not/should (practically speaking) be brought about

Also in this case, the scheme can be assessed through the following critical questions:

CQ_1:	How strong is the likelihood that the cited consequences will (may, must) occur?
CQ_2:	What evidence supports the claim that the cited consequences will (may, must) occur, and is it sufficient to support the strength of the claim adequately?
CQ_3:	Are there other opposite consequences (bad as opposed to good, for example) that should be taken into account?

The last argumentation scheme for the justification of an action is the argument from rules. An argument from rules is based on the classification of a state of affairs or agent (a) under a more generic category X, for which a course of action has been established. The argument can be represented as follows (Walton et al. 2008, p. 343):

Argumentation scheme 3: Argument from rules

Major premise	If carrying out types of actions including the state of affairs B is the established rule for X, then (unless the case is an exception), X must carry out B
Minor premise	Carrying out types of actions including state of affairs B is the established rule for a, who falls under X
Conclusion	Therefore B must be carried out

The following critical questions are associated with this scheme:

CQ_1:	Does the rule require carrying out types of actions that include B as an instance?
CQ_2:	Does a fall under X?
CQ_3:	Are there other established rules that might conflict with, or override this one?
CQ_4:	Is this case an exceptional one, that is, could there be extenuating circumstances or an excuse for noncompliance?

By analyzing these schemes, we notice a crucial difference between argument from practical reasoning and consequences, and argument from rules. Argument from rules consists in the application of a rule to a state of affairs having certain characteristics, namely a state of affairs classified in a certain way. The first two schemes presuppose an evaluation of the course of action. In practical reasoning, two factors need to be assessed, namely (1) the higher desirability of the chosen action respect to the alternative actions for pursuing the same goal (practical reasoning); and (2) the desirability of the action considering the goal and its effects. In argument from consequences, only (2) is taken into account. In these two schemes, the defeasibility conditions and the possible attacks can be focused on the evaluation of the alternatives or the premises. Argument from rules can be defeated or weakened only by assuming a system of rules that is applied. A conclusion can be weakened or defeated by showing that the state of affairs can be otherwise described, or can fall under extenuating circumstances or conflicting rules (a falls under extenuating circumstance E/conflicting rule X', therefore B shall not be carried out).

Both the practical reasoning type of argument and the argument from consequences presuppose an evaluation of a state of affairs, which can be carried out only by presupposing a hierarchy of values. The representation of this assessment dimension can be conducted by pursuing two distinct strategies. A first possibility is to include the evaluation (or preference) as a variable of the scheme, thus accounting for the result of the assessment. The second option is to represent the process of evaluation, bringing to light the reasons (namely the values and the hierarchies thereof) underlying an assessment. We will discuss the limits of the first option in Sect. 5 below. In Sect. 6 we will illustrate the second strategy, its advantages, and its consequences—in particular the modification of the analytical structure used for representing decision-making arguments.

5 Value-Based Practical Reasoning

The forms of reasoning illustrated in the Sect. 4 linked the commitment to a goal and to the means for attaining it to a commitment to an action. However, the inference guaranteeing the transmission of commitments, both in the necessary and productive scheme, can be problematic. In the first case, it follows from the premises that, if there is an available action whose performance is necessary for achieving the goal, the agent should carry it out (logic of satisfaction). In the second case, the premises support the performance of an action that is presented as sufficient for the realization of the goal (Raz 1978, p. 9).

Both types of reasoning can lead to unreasonable consequences without a criterion of assessment external to the mere consideration of the means-end relationship. The logic of satisfaction (necessary scheme) results in an agent committing himself to impossible means just because they are the necessary means for an intended goal (Robins 1984b, p. 155). Both the logic of satisfaction and satisfactoriness result in the problem of committing to immoral or unreasonable means (Searle 2005, p. 54), just because they are necessary or sufficient to bring about an intended goal. Raz pointed out this problem with a clear example (Raz 1978, p. 11):

> The main allegedly counter-intuitive consequence of the logic of satisfactoriness is that it leads to massive overkill: blowing up a house is a way of killing a fly, therefore when killing a fly is justified we should blow up the house. But in so far as killing the fly is concerned there is indeed nothing wrong with blowing up the house. We regard this as absurd only because of the other bad consequences of the action. They make us prefer other methods of getting rid of the fly and in fact they are such as to justify putting up with the fly rather than blowing up the house if there is no other way of getting rid of it.

The problem that arises from transferring commitments based only on the aforementioned schemes is that the evaluative and comparative considerations (establishing the desirability of the action independent of its utility for achieving the goal) are not taken into account.

A possible solution to this problem has been developed in the mixed BDI model. In this theoretical framework, the possible conflict of reasons in the transfer of commitments has been addressed by adding a premise concerning the defeasibility of the reason supporting the commitment to an intention (Raz 2011, p. 139), and the defeasibility of the intention considering the reasons supporting it. This intermediate premise presupposes an assessment based on all the relevant circumstances, and is expressed by the notion of "best means, all things considered." This additional premise is included also in the following BDI scheme (see also a comparable scheme in AI, developed by van der Weide et al. 2009, p. 90), which modifies the productive scheme including the notions of preference and sufficient reason not to carry out the means (adapted from Audi 2006, p. 66):

Productive scheme (variant)

Premise 1	*X* intends to make it true that *E*
Premise 2	To do *A* is a way for *X* to attain *E* under these circumstances
Premise 3	There is no other way to attain *E* now which is as preferable to *X* as, or more preferable to *X* than, to do *A*
Premise 4	There is no sufficient reason for *X* not to bring about *A* under these circumstances
Conclusion	Therefore *X* intends to do *A*

In a commitment-based approach, the idea of preference is the ground of the schemes of practical reasoning developed to handle cases of disagreement in persuasion dialogue. Practical reasoning of this sort is represented as an argument

that is aimed to support a conclusion in a dialectical setting. For this reason, the conclusion is a proposal to act in a certain fashion based on the values that can be shared or not shared by the interlocutor (Bench-Capon 2003b, p. 447). The scheme from practical reasoning based on values (henceforth VBPR) is represented as follows (Atkinson and Bench-Capon 2007, p. 858):

Practical reasoning using values

Premise 1	In the current circumstances *R*
Conclusion	We should perform action *A*
Premise 2	Which will result in new circumstances *S*
Premise 3	Which will realize goal *G*
Premise 4	Which will promote some value *V*

This scheme has an associated list of critical questions, which are represented as follows:

CQ_1:	Are the believed circumstances true?
CQ_2:	Assuming the circumstances, does the action have the stated consequences?
CQ_3:	Assuming the circumstances and that the action has the stated consequences, will the action bring about the desired goal?
CQ_4:	Does the goal realize the value stated?
CQ_5:	Are there alternative ways of realizing the same consequences?
CQ_6:	Are there alternative ways of realizing the same goal?
CQ_7:	Are there alternative ways of promoting the same value?
CQ_8:	Does doing the action have a side effect which demotes the value?
CQ_9:	Does doing the action have a side effect which demotes some other value?
CQ_{10}:	Does doing the action promote some other value?
CQ_{11}:	Does doing the action preclude some other action which would promote some other value?
CQ_{12}:	Are the circumstances as described possible?
CQ_{13}:	Is the action possible?
CQ_{14}:	Are the consequences as described possible?
CQ_{15}:	Can the desired goal be realized?
CQ_{16}:	Is the value indeed a legitimate value?

The positive aspects of this scheme concern the fact that it represents the various reasons why a proposal can be defeasible. More specifically, an action *A* can be not sufficient to bring about goal *G*, either due to the causal relationship between *A* and *G* (*A* may not have the believed effects), or the ordering of preferences (*A* may result in consequences less desirable than goal *G*) (Atkinson et al. 2006, p. 200). Moreover, the critical questions allow evaluating various aspects of the practical reasoning (ranging from the assessment of side effects and alternative courses of

action to the evaluation of preference ordering and the possibility of performing the action).

The weaknesses of this pattern are related to (1) the inference represented by the scheme, (2) the simplification of the reasoning schemes involved, and (3) the complexity of the evaluation through the critical questions. The first two criticisms are theoretical, and concern the inference represented by the VBPR scheme (1) and the relationship between practical reasoning and other schemes of reasoning (2).

Relative to the first issue, the value-based scheme does not specify any conditional premise from which the conclusion can be drawn, and thus it appears as a list of premises and a conclusion more than a conclusion supported by premises through a specific reason or justificatory link (Audi 2006, p. 86). Consequently, it is unclear whether the scheme proceeds from the proposal of an action, whose evaluation is based on its possible consequences, or from the choice of the best means to achieve an intended goal.

The second theoretical issue concerns the specific relations between circumstances, values, goals, and actions. As mentioned above, the VBPR scheme does not make clear the inferential relation between goals and actions. Similarly, it does not specify how a goal can promote a value (a reason to act held by the agent), and how this can affect the evaluation of an action. In this sense, the scheme does not provide any inferential relation on which the conclusion of the argument can be grounded. The inferential relations are left implicit and evaluated through the list of critical questions, which presuppose them.

The last problematic aspect of the scheme is related to the theoretical and operational dimension of the critical questions. The questions do not address inferential relations, but at the same time assess them. In particular, CQ5, CQ6, and CQ7 presuppose that the consequences are intended in order to achieve a goal and promote a value, and more importantly, CQ7 implies that the action is evaluated in comparison with other alternative actions. CQ8, CQ9, CQ10, and CQ11 concern the relationship between actions and values, presupposing that the action is evaluated considering its direct and indirect consequences and the courses of actions precluded by the concerned action. These presupposed relations are not stated in the argument structure, and can be only imagined. The second concern relative to the evaluation dimension of the scheme is the functionality of having a list of 16 critical questions to consider without a clear order of priority, addressing distinct and only partially related aspects of the scheme. The questions thus organized provide detailed or even exhaustive criteria for attacking an argument (Atkinson et al. 2006; Atkinson and Bench-Capon 2007), but they are not functional for assessing it, as the questions are not directly related to an inferential relations, and thus it is not clear how they can affect the relationship between premises and conclusion. From a practical point of view, the user needs to go through all the questions and assess all the possible weak points instead of choosing the most effective strategy for attacking an argument or evaluating it.

The weaknesses of the VBPR scheme highlight the importance of this scheme. The idea of merging values with actions allow accounting for a crucial aspect of practical reasoning, namely its relationship with the ordering of values and the classification of an action or a state of affairs in terms of promoted values. However,

the problems pointed out in the scheme lead to considering an alternative model for representing the various factors involved. To this purpose, we will represent the evaluation of a state of affairs as a distinct type of reasoning, conceiving the representation of practical arguments as a combination of distinct, implicit and explicit argumentation schemes. In Sect. 6 we will illustrate the schemes for representing the process of evaluation. In Sect. 7, we will present the scheme from classification used for "framing" the state of affairs that will be then evaluated.

6 Evaluating Choices

The evaluation of the various possible means to achieve a goal can be described as a type of assessment based on the relationship between an action and its possible foreseeable consequences. A means needs to be evaluated by taking into account its foreseeable consequences (as well as the wanted effect and the side-effects) (von Wright 1963, pp. 129–130). However, its intended effect needs to be compared with all its possible negative consequences, which, even if unintended, determine the preferences among the means. The unavoidable harm (via negative consequences) needs to be compared and minimized; the avoidable harm needs to be generally avoided (von Wright 1963, p. 131). According to this criterion, the agent in the necessary scheme needs to assess the possible good and harm resulting from performing and forbearing to perform an act, while in the sufficient scheme he needs to consider only the intended and foreseeable consequences of the act. Finally, the choice between the possible means to bring about a desired state of affairs needs to be made considering the possible harm resulting from each option, and the good and negative consequences resulting from the choice of the ones that minimize the harm.

This type of evaluation corresponds to a pattern of reasoning linking actions and goals different from the practical reasoning. It proceeds from an action to its effect, evaluating it as the necessary or productive cause of a desirable or undesirable state of affairs (Rigotti 2008). We can represent this type of reasoning as a variant of the aforementioned argument from consequences whose outcome is a judgment on the desirability of the concerned action (based on the principle that" the desirable moves desire" as its final cause, Aquinas, *On Evil* (2003), Q. 1., art. 1., 53, 58; see id., Q. 3, art. 3, 152), and not directly a directive (adapted from Walton et al. 2008, p. 332):

Argumentation scheme 4: Argument from consequences to evaluation

Premise 1	If agent *A* brings about (don't bring about) *B*, then *C* will occur
Consequence premise	*C* is a good (bad) outcome (from the point of view of *A*'s goals)
Evaluation premise	That whose production is good is itself also good, and vice versa; that whose destruction is bad is itself also good, and vice versa *(De Topicis Differentiis*, 1190A 7-1190B 1)
Conclusion	Therefore, *B* is good (bad)

This scheme presupposes an evaluation of a consequence, which can be taken into account at a separate level of analysis addressing the relationship between values and commitment.

The argumentation scheme from consequences, in both its practical and evaluative version, is grounded on how an agent assesses a state of affairs (a consequence), and commits himself to its desirability. The simplest type of reasoning underlying an evaluation is the argument from values (Bench-Capon 2003a; Walton et al. 2008, p. 321), namely the classification of a state of affairs (or action) under a value, or rather abstract reason to act (Westberg 2002, p. 160). This pattern can be represented as follows:

Argumentation scheme 5: Argument from values

Premise 1	Value *V* is positive (negative) as judged by agent *A*
Premise 2	The fact that value *V* is positive (negative) affects the interpretation and therefore the evaluation of the action/state of affairs *C* instantiating it (If value *V* is good (bad), it supports (deters) commitment to *C*)
Conclusion	*V* is a reason for retaining (retracting) commitment to *C*

For example, having an affair with a married woman (*C*) can be evaluated under two conflicting values, pursuing pleasure (in this case sexual pleasure) and avoiding sin or vice (in this case adultery). Depending on the value chosen, the assessment of *C* can be positive (*C* is good and desirable) or negative (*C* is bad and not desirable). Clearly, the "instantiation" of a value, namely the classification of a state of affairs under a reason to act (*Rhetoric* I, 7) or to prefer an action over another (*Topics* 116a 28–34), may vary depending on the consideration and weighting of the various dimension of the state of affairs and the personal dispositions (hierarchy of values) (Westberg 2002, p. 93; *Nicomachean Ethics* 1095a 18–27; *Topics* 115b 19–27).[1]

This structure of schemes underlying the evaluation of consequences (and, therefore, actions) presupposes in turn a process of classification. A state of affairs can be evaluated only after it has been classified. Depending on the way the agent chooses to classify it, the evaluation will change, as it will instantiate a different

[1] "Further, a man of a given disposition makes chiefly for the corresponding things: lovers of victory make for victory, lovers of honour for honour, money-loving men for money, and so with the rest. These, then, are the sources from which we must derive our means of persuasion about Good and Utility" (Aristotle, *Rhetoric* 1363b 1–5). "In the same way also it is in certain places honourable to sacrifice one's father, e.g. among the Triballi, whereas, absolutely, it is not honourable. Or possibly this may indicate a relativity not to places but to persons: for it is all the same wherever they may be: for everywhere it will be held honourable among the Triballi themselves, just because they are Triballi. Again, at certain times it is a good thing to take medicines, e.g. when one is ill, but it is not so absolutely" (Aristotle, *Topics* 115b 19–27).

value. For this reason, classification is a deeper level of reasoning presupposed by practical reasoning.

7 Classifying Reality

The assessment of the means to pursue an end and the evaluation of the consequences to be sought or avoided depend on the factors that an agent takes into account in classifying the concerned state of affairs. On this Aristotelian view, the decision-making process is based on what is classified as desirable (αἱρετόν) or objectionable (φευκτόν) (Aristotle, *Topics* III, 1, 116a 18; Aristotle, *Nicomachean Ethics*, 1113a15). The classification of a state of affairs as desirable or not desirable is not a cognitive operation, or rather it is not only a purely intellectual judgment (Westberg 2002, p. 162). Rather, the agent selects certain aspects of a complex state of affairs in order to classify it under a specific category or quality (Schiappa 1998, 2003; Macagno and Walton 2008a), instantiating a specific value. We can represent the classification of a state of affairs (Walton and Macagno 2009; Walton and Macagno 2010) as an argumentation scheme (Walton et al. 2008, p. 319):

Argumentation scheme 6: Argument from classification

Premise 1:	If some particular thing *a* can be classified as falling under verbal category *P*, then *a* has property *Q* (in virtue of such a classification)
Premise 2:	*a* can be classified as falling under verbal category *P*
Conclusion:	*a* has property *Q*

This scheme can be assessed dialectically by considering the circumstances of the action that is to be assessed.

CQ_1:	What evidence is there that *a* definitely has property *P*, as opposed to evidence indicating room for doubt about whether it should be so classified?
CQ_2:	Can *a* be classified otherwise?

The first critical question points out the possibility that the circumstances taken into account are only a selection of the relevant ones, and that taking into consideration also other circumstances would lead to a different evaluation (Bowlin 1999, 6: 82). The second critical question concerns the choice of the definition, or rather evaluative criterion (Macagno and Walton 2014, chap. 5). Depending on the selection of the circumstances or the aspects of a state of affairs, the evaluation can change (Entman 1993; Druckman 2002; Lakoff 2010). For example, the killing of a man to save the lives of other people can be grounded on value-based practical reasoning inasmuch as it is an instance of "saving lives." However, such an

argument might fail to hold if other relevant circumstances and values are taken into account.

8 A Modular Approach to Practical Reasoning

The three reasoning steps involved in practical reasoning, or rather groups of argumentation schemes representing distinct reasons for different types of (final or intermediate) conclusions that can be challenged, constitute building blocks that can be used for analysing or constructing arguments in support of choices or decisions. Using the method proposed in this paper, the three types of schemes need to be combined to provide a deeper description of the argument structure. In particular, we can associate the three groups of schemes to three interrelated levels of analysis, ranging from the less complex but also less specific and fine-grained level to the deepest one.

1. *Level 1* The first and simplest level of analysis is constituted by the justification of an action, which includes the schemes from practical reasoning, from consequences, and from rules. At this level, only the relationship between an evaluation (or classification) and the choice of an action is taken into account. By distinguishing the different scheme used, it is possible to outline the type of possible criticisms available, namely whether it is necessary to investigate or question the evaluation relied upon or the classification presupposed.
2. *Level 2* At this level, the evaluation of the distinct alternatives (in case of practical reasoning) and the consequences of an action are represented. In particular, by distinguishing between argument from consequences to an evaluation and argument from values it is possible to understand the type of criticisms that can be advanced. An argument from consequences to evaluation can be questioned by considering side-effects or other causal relations, in addition to the quality of the resulting state of affairs. In turn, the quality of the resulting state of affairs can be assessed by an argument from values. Argument from values represents the assessment itself based on the reasons an agent has to consider a state of affairs as desirable or not, based on personal or cultural hierarchies of values (Perelman and Olbrechts-Tyteca 1951).
3. *Level 3* This level is the deepest level of analysis and represents the classificatory reasoning presupposed by evaluation. A state of affairs needs to be classified in a certain fashion in order to become a premise in an argument from rules, from consequences, or from values.

These three levels and the corresponding schemes can be used to show the generic structure of the arguments pro and contra a certain action, or unveil the deeper values or classifications underlying an argued for choice or a conflict of opinion. On this perspective, argumentation schemes can be conceived as modules that work as argument building blocks. Alone, they can provide a global representation of the argument structure; however, a detailed and deep analysis can be provided by combining the blocks to develop a more complete picture of the tacit premises and underlying (implicit or partially explicit) arguments.

9 Applying the Modular Approach

In this section we provide two real examples—taken from the 2015 talks between Putin and Obama concerning the intervention in Syria—in order to explain how argumentation schemes can provide the building blocks for analysing practical arguments.

In the 2015 discussions between the United States and Russia concerning the political situation in Syria and the possible roles of the two countries, the different positions of Putin (supporting Assad in fighting against the Isis) and Obama (starting political transition with departure of Assad and then intervening) are supported by distinct arguments, which were presented as follows[2]:

Argument 1

> Mr. Putin said it was "an enormous mistake to refuse to cooperate with the Syrian government and its armed forces, who are valiantly fighting terrorism face-to-face," conveniently ignoring the fact that Mr. Assad's main target has always been his domestic opposition, not the Islamic State. He portrayed Mr. Assad as a force for stability and said the only solution "is to restore their statehood where it has been destroyed."

This argument can be represented as shown in Fig. 2.

This diagram represents Putin's argument in favor of supporting Assad's regime as a combination of argumentation schemes. At the most superficial level (Level 1), the argument can be analyzed as a linked argument from practical reasoning, one of which is grounded on an argument from consequences. Level 2 represents the complex reasoning leading to the evaluation of the cooperation with Assad, grounded on an argument from values (stability is desirable) and from consequences to evaluation (if something leads to stability, it is desirable). At this level, it is possible to detect the implicit values and hierarchies of values underlying the assessment, as "stability" cannot be evaluated separately from other values that are breached by Assad's government. The deepest level is Level 3, representing the classification of the outcome of Assad's repressions as an instance of "stability." The argumentation scheme from classification allows bringing to light the problematic definitory statement of what counts as "stability" (resistance to changes vs. situation of absence of changes) and more importantly the omission of other elements (internal opposition, infringement of human rights, etc.) that would undercut the positive evaluation of this concept.

This type of analysis allows reconstructing the implicit arguments and, more importantly, the premises that are taken for granted, such as the specific values and hierarchy thereof used for the assessment and definitions of terms applied for classifying Assad's policies. By distinguishing the different schemes used, it is possible to detect the most questionable argumentative steps and attack them with

[2] Putin and Obama Have Profound Differences on Syria. Editorial, *The New York Times* 28 September 2015. Retrieved from http://www.nytimes.com/2015/09/29/opinion/putin-and-obama-have-profound-differences-on-syria.html on 20 November 2017. Fabrizio Macagno would like to thank his colleagues from the ArgLab for suggesting this interesting case, which was used for discussion in our of the permanent seminars.

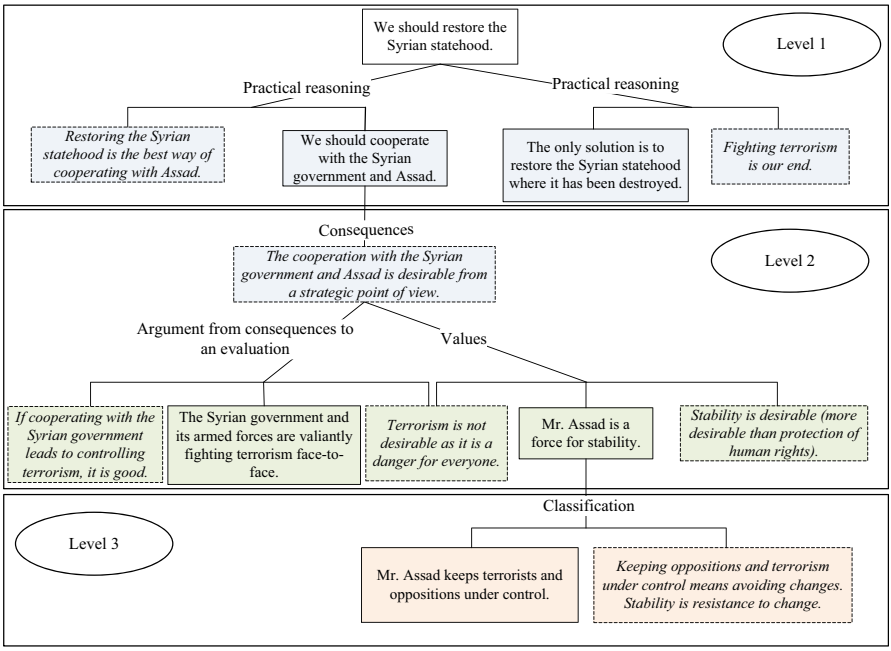

Fig. 2 A modular reconstruction of Putin's practical argument

specific critical questions or counterarguments, pointing out the premises that can be objected to by specific possible criticisms.

The aforementioned analysis allows representing in detail also Obama's reply, aimed at undermining Putin's argument from classification (Level 2 of Figure at the bottom of Fig. 2 above):

Argument 2

> Mr. Obama correctly argued that in 2011 Mr. Assad "reacted to peaceful protests by escalating repression and killing that, in turn, created the environment for the current strife," which the Islamic State has been able to exploit. He said Mr. Assad and his allies "cannot simply pacify the broad majority of a population who have been brutalized by chemical weapons and indiscriminate bombing," and Mr. Obama reiterated his call for a "managed transition" away from Mr. Assad to a more inclusive government.

Figure 3 represents the same modular approach to argument analysis. The argument from practical reasoning (at the top of the diagram) is the Level 1 of analysis, which is a counterargument of Putin's argument. At this level, Obama undermines Putin's practical reasoning by pointing out that the solution of supporting Assad is not morally justifiable.

In Fig. 3, Level 2 shows the linked argument from values, grounded on a hierarchy of values represented in the dotted box under the two value premises. This conjoined argument provides the grounds for the aforementioned premise of the

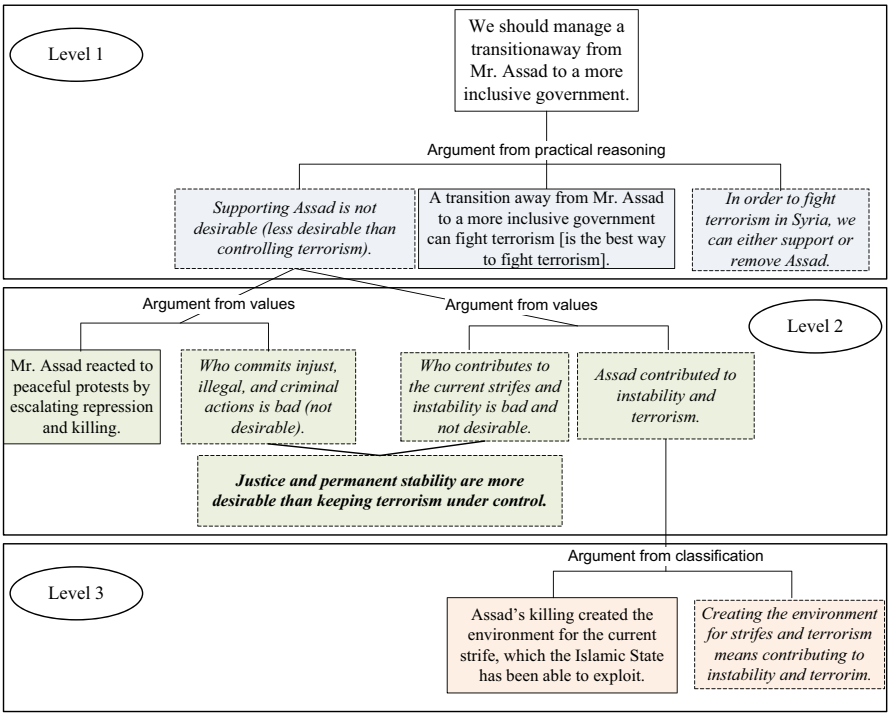

Fig. 3 A modular reconstruction of Obama's reply to Putin's argument

practical argument. Level 3 of the analysis brings to light the classification that underlies Obama's categorization of Assad as an "element of instability," which is the starting point for the assessment of Level 2, based on the actions committed by the Syrian leader and the consequences thereof on the growth of terrorism.

This type of modular approach allows the reconstruction of the premises that can be considered the implicit source of deep disagreements. The first aspect that can be noticed is the presence in Obama's argument of an implicit hierarchy premise, which is not necessary in the reconstruction of Putin's argument. Putting provides an assessment based on a single element (contribution to controlling terrorism), without mentioning or taking for granted other rebutting factors (breach of human rights) that are shared. The reconstruction of Obama's argument reveals a twofold strategy. First, it is possible to detect an appeal to justice (in addition to stability), which is presented as more valuable than temporary stability (control of terrorism). Second, the analysis reveals a counter-classification of Assad, who is defined as a cause of instability and terrorism. This classification does not undercut directly Putin's one, but qualifies it. By adding this argument to Putin's implicit classificatory argument, it cannot be concluded that Assad is a force for *permanent stability*, as he caused instability. He can be only considered as a force for temporary control of terrorism. The reconstructed implicit premises allow making

the grounds of disagreement explicit, and individuating the possibilities and the targets of possible meta-dialogical discussions.

The analyses of Argument 1 and 2 displayed in Figs. 2 and 3 illustrate how the modular approach works to bring to the surface assumptions and an underlying structure that might be not at all obvious. At the top level of Fig. 3, we see two linked arguments, each of which is an instance of the basic instrumental scheme for practical reasoning. At the next level down, we see how argument from consequences is connected to the instance of argument from practical reasoning shown on the left. At the next lower level, we see how both argument from consequences to an evaluation and argument from values are additional parts of the modular structure of the overall argumentation. At the bottom level, we see how argument from classification is used to support one of the premises of the argument from values shown just above it.

At the top level of Fig. 3, we see again an instance of the instrumental scheme for argument from practical reasoning. However, at the level below that, we see how there are two instances of argument from values supporting the one premise of the instrumental practical reasoning argument. In this convergent argument structure, two separate instances of argument from values are revealed that are connected to the instrumental argument from practical reasoning displayed at the top level. This structure could have been modeled using the argumentation scheme for value-based practical reasoning, but by applying the modular approach which separates out the two arguments from values from the main argument from practical reasoning, it is revealed how each scheme is a part of the whole structure of the overall argumentation. Finally, at the bottom right, we see how argument from classification forms a linked argument structure supporting one of the premises of the rightmost argument from values.

By breaking down the structure of the whole sequence of argumentation into its atomic components, we have revealed how argument values support basic practical reasoning in the example, and how argument from classification in turn supports argument from values. These implicit connections are made explicit through the use of the argument diagramming tool, and this exercise can be very instructive for a beginner to argumentation studies to see how each separate component argument can be individually evaluated through the use of critical questions matching each of these argumentation schemes.

10 Conclusions

This paper proposes an approach to the formalization and representation of practical reasoning arguments within the commitment model that overcomes the limitations of the existing accounts. The traditional BDI models merge different inferential patterns of argument together into one large and tangled package, conflating values and intentions into practical reasoning in a way that impedes progress on developing a useful argumentation tool. The VBPR approach to practical reasoning fails to distinguish and clearly represent all the distinct inferential steps needed to justify a practical conclusion. The modular approach has the advantage of bringing to light

different types of inferences used to support a course of action in a useful way. The modular approach reveals how to account for the meta-level reasoning used to justify an evaluation.

The model we propose is defined as modular in the sense that it represents the complexity of practical reasoning argumentation through the combination of distinct argumentation schemes. Using two examples, we showed how the modular approach reveals the complexity of practical reasoning used in realistic argumentation through the combination of three different types (or groups) of argumentation schemes. The first type is aimed at justifying a course of action, and includes three schemes (argument from practical reasoning, argument from consequences, and argument from rules). The second type concerns the evaluation of a state of affairs, and is composed of the argument from values and from consequences to evaluation. The last type of argument represents the classification of a state of affairs, namely the selection of the features that are relevant to a further evaluation. The three types of argumentation schemes are interrelated, as a course of action can be justified only by presupposing an evaluation, and an evaluation presupposes a classification. In this sense, the analysis is modular, as each type of scheme addresses a specific dimension, referred to as "level," of the complex argumentation and contributes to describing it in detail.

The two examples analyzed in Sect. 9 make clear how arguments from values are connected to basic practical reasoning in real examples, and how arguments from classification are connected to argument from values. As shown in the examples, such implicit connections can be made explicit through the use of argument diagramming so that each single argument in the module can be individually evaluated through the use of critical questions matching the argumentation schemes.

The modular approach can be used to represent implicit premises that are the sources of deep disagreement. The interconnected schemes bring to light the implicit ordering of values and preferences, and more importantly the presupposed classificatory premises (Finlayson 2007), which constitute the hidden and even deeper sources of disagreement (Naess 1966, p. 92–93). The framing of a state of affairs consists in selecting the dimensions and aspects that the agent decides to make available to the interlocutor (Macagno and Walton 2008b; Walton and Macagno 2009), and thus become premises on which the justification of the relevant course of action can be discussed and rationally evaluated (March 1991).

The six types of schemes laid out in this paper bring out the argumentative structure of practical argumentation in real examples, allowing an analyst to bring out the tacit premises presupposed in evaluating in detail the steps involved. Moreover, these schemes allow the user to select a level of granularity that can be thought of in terms of levels of analysis. An argument can be described at different levels of granularity as a generic justification of a course of action, as a justification based on an evaluation, or as a justification grounded on an assessment resulting from a classification of a state of affairs. Most importantly, applying the modular method allows an argument analyst to detect and criticize the weak points in a complex chain of argumentation, and ask the specific critical questions applicable to the controversial aspects of each component.

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