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How to make and defend a proposal in a deliberation dialogue

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Abstract. In this paper it is shown how tools developed in argumentation theory and artificial intelligence can be applied to the development of a new dialectical analysis of the speech act of making a proposal in a deliberation dialogue. These tools are developed, modified and used to formulate dialogue pre-conditions, defining conditions and post-conditions for the speech act of making a proposal in a deliberation dialogue. The defining conditions set out what is required for a move in a dialogue to count as the making of a proposal by one of the parties. What is required are the conditions that (1) the move fit the requirements of the argumentation scheme for practical reasoning, and (2) the premises are propositions describing common goals of both parties or propositions that they reasonably consider means to achieve these goals. The analysis goes beyond the standard speech act approach by specifying not only the normative requirements for making a well-formed proposal, but also the requirements for responding to it by questioning or criticizing it, and the requirements for defending it.

Key words: argumentation schemes, artificial intelligence, critical questions, electronic democracy, formal dialogue systems, practical reasoning, profiles of dialogue

Studying the normative requirements of making and defending a proposal in formal dialogue systems is fundamentally important not only in linguistics, philosophy and communication, but also in computer science. In multi-agent communication systems of the kind now commonly used on the Internet, electronic agents used by search engines for electronic commerce, and for many other applications, carry out communicative actions, like asking a question, making a request, or making a proposal, so another agent on the Internet can reply appropriately. FIPA (the Foundation for Intelligent Physical Agents) has set up standards and communication policies for such dialogue exchanges. It has been argued that they can be refined using tools from argumentation and AI (Reed and Norman 2003). Electronic democracy is an especially important application. Electronic democracy is set in a deliberation framework of dialogue where a choice needs to be made between different alternative proposals for action, for example proposals on which cities a new train system should go through.[1] The problem is how

such a deliberation process can best be structured so that voters, or those involved in making the decision, can be presented with information and alternatives, can ask questions, can put forward proposals, can present arguments that give reasons for choosing an alternative, can offer criticisms and rebuttals of opposed arguments, and can help to arrive at a decision based on having considered arguments both for and against the proposals considered. An essential component required to solve this problem is a clear and precise analytical model explaining what a proposal is, that identifies the structure of how rational arguments for and against it are fitted into the proposal.

This paper presents a solution to the problem by putting forward a dialectical analysis of the speech act of making a proposal, based on seven tools recently developed in argumentation theory and artificial intelligence: (1) an argumentation scheme for practical reasoning (Walton 1990),[2] (2) related argumentation schemes, like argumentation from consequences (3) a formal model of deliberation dialogue (Hitchcock et al. 2005), (4) analyses of the speech act of making a proposal in the argumentation literature (Kauffeld 1998; Aakhus 2005), (5) the dialectical notion of commitment in dialogue (Hamblin 1970; Walton and Krabbe 1995; Singh 1997), (6) argument diagramming (Reed and Rowe 2005) and (7) profiles of dialogue (Krabbe 1999). The analysis embeds the traditional speech act approach into a broader argumentation approach by treating the speech act of making a proposal as equivalent to making a definable type of move in a rule-governed formal structure of dialogue. It is shown how the speech act of making a proposal is closely related to its partner notion of putting forward an argument in a dialogue, and how both notions are closely related to practical reasoning. It is shown how making a proposal implicitly contains a commitment to arguments that can be offered in support of it, and to attacks made on it.

According to the new dialectical analysis, the speech act of making a proposal is defined as special kind of move in a dialogue exchange that has pre-conditions, defining conditions, and post-conditions for its correct use. If all three conditions are met, the move (speech act) is executed and a successful move is returned, but if any of the conditions are not met, a failed move is returned. The dialogue type is that of a formal deliberation, where one party practically reasons with another, based on their common goals and commitments. The structure holding the sequence of argumentation together is the argumentation scheme for practical reasoning with its accompanying set of critical questions. Instead of being defined in terms of the beliefs and intentions of the speaker and hearer, the predominant approach in the literature on speech acts, the analysis is set in terms of argumentation moves and commitment rules in formal dialogue structures.

1. Reasoning and argument in deliberation

In (Walton 1990) a distinction is drawn between reasoning and argument. The analysis is based on the assumption that reasoning can be used for a variety of purposes. For example, reasoning is used in explanations as well as arguments. Reasoning is defined as a process of inference in passing from certain propositions known or assumed to be true to other propositions in a chaining forward sequence in which the conclusion of one inference can also function as a premise in the next one. Reasoning can be linear, can have a tree structure, or can even be circular in some cases. In (Walton 1990a, p. 405) a distinction is drawn between practical and theoretical reasoning. Practical reasoning is defined as a kind of goal-directed reasoning that seeks out a prudential line of conduct for an agent in a particular situation (p. 405). Theoretical reasoning, in contrast, seeks evidence that counts for or against the truth of a proposition (p. 405).

The belief-desire-intention (BDI) model of reasoning is based on the assumption that a rational agent that has desires and intentions can realize them by acting on its beliefs (Wooldridge 2002, chapter 4). According to Hitchcock (2002), the BDI model was first articulated by Aristotle (1928) (*Nicomachean Ethics* III, 1112b 15–20) who wrote that good deliberation begins with a wish for some end and follows through not only by a means that is a first step for attaining it, but also with additional means that may be needed to carry out that first step.[3] The conclusion, on Aristotle's account of practical reasoning, is a decision to take action. On Bratman's (1987) version of the BDI model, to form an intention to do something is to adopt a plan, and thus intentions, as well as desires (wants) and beliefs, need to be seen as components. Pollock (1995) added what he called "likings", as well as desires. Pollock's system, as noted by Hitchcock, is solipsistic, in that it does not allow for dialogue between agents, and does not allow for the considerations of the interests of others. A problem for the BDI model is that beliefs are not transferred from the premises to the conclusion of a practical inference. If I believe that proposition A, and proposition B is logical consequence of B, it need not follow that I believe that B. Searle (2001, p. 241) poses the problem as one of seeking patterns of practical validity such that acceptance of the premises of the valid practical argument commits one to acceptance of the conclusion. However, acceptance, another word for commitment, does not require or necessarily imply belief.

According to the BDI model, an agent has a set of beliefs that are constantly being updated by sensory input from its environment. From these beliefs, the agent builds up desires that are then evaluated to form intentions. (Wooldridge 2002; Paglieri and Castelfranchi 2005). The BDI theory of rational action by an agent is based on a theory of practical reasoning (Wooldridge 2000, p. 7). The BDI model has been implemented in

computing using procedural reasoning systems in which an agent has data structures that correspond to its beliefs, desires and intentions (Wooldridge 2002). In a procedural reasoning system, these desires and intentions are realized through the use of what is called a plan library, a collection of plans representing routine sequences of actions that can be used by an agent to achieve a state of affairs in accord with its desires. Each desire defines a possible course of action that the agent may take when deliberating. The BDI model is the framework chosen by the majority in analytical philosophy to represent intelligent deliberation by an agent using practical reasoning. For example, Searle's analysis of practical reasoning (2001) is based on the BDI model.

The alternative to the BDI model is the commitment model, in which two agents (in the simplest case) interact with each other in a dialogue by making moves that take the form of speech acts. Each agent has a commitment set, and as it makes a move, commitments are inserted into or retracted from its commitment set, depending on the type of move (speech act). A commitment is a proposition that an agent has gone on record as accepting (Hamblin 1970). One type of speech act is the putting forward of an argument. The two models are centrally different because a commitment is not necessarily a belief. Belief implies commitment but not vice versa. Belief is more of a psychological notion whereas commitment is more of a procedural notion based on dialogue rules. Bratman often expresses his view of practical reasoning in terms of commitment (1987, chapter 7). Bratman et al. (1988, p. 347) wrote, "The fundamental observation of our approach is that a rational agent is committed to doing what she plans". Advocates of the BDI model often shift to the language of commitment when they discuss the inferential link between the premises and conclusion of a practical inference.

Commitment is the fundamental notion used to model the notion of argument in the formal dialogue structures of the kind needed to analyze informal fallacies (Hamblin 1970). According to the new dialectical definition proposed in (Walton 1990a, p. 411) an argument is a social and verbal means of trying to resolve, or at least contend with, a conflict or difference that has arisen between two parties engaged in a dialogue. According to this definition, an argument necessarily involves a claim that is advanced by one of the parties, typically an opinion that the one party has put forward as true, and that the other party questions. The purpose of an argument is to settle this dispute by examining the reasons that can be given by each side for and against its own views and the views of the other side. The complicating factor in this definition is that argument, so defined, is a pragmatic notion. Reasoning can be aimless, but argument is essentially goal-directed, and takes place in a particular situation (p. 411). An argument always has to be seen not only as a chain of reasoning, but such reasoning as used for a purpose in a context of goal-directed dialogue. The complicating factor is that there can

be many different types of dialogue, although six basic types are recognized as fundamental.

One of these types, as indicated, is called the deliberation. The collective goal of the deliberation, as indicated in Table I, is to decide which is the best available course of action among the set of proposals for action that has been offered. In a reason-based deliberation, each of these proposals has been articulated, defended, criticized, and refined, as the deliberation proceeded. Note that this collective goal of the dialogue is different from the individual goals of each of the participants. Consideration of shared goals is very important in a deliberation.

Deliberation has tended to be neglected as a type of dialogue featured in artificial intelligence and law, perhaps because the central paradigm of legal reasoning is that of argumentation in a trial, which would seem to be a kind of persuasion dialogue, or at any rate not to be classifiable as deliberation. Although the expression "jury deliberation" is commonly used to describe what a jury does, this expression can be misleading. What a jury presumably does is better classified as a process of evaluating the arguments presented on both sides during the persuasion dialogue in the argumentation of the trial, and arriving, by discussion of the evidence presented, at a conclusion on which side has fulfilled its requirements of burden of proof.

On the other hand, deliberation is a process that judges, lawyers, and other participants in the justice system often carry out. A lawyer may have to deliberate on whether to take on a case. A judge may have to deliberate during a sentencing hearing on what kind of action would be appropriate in the case of a defendant who has been found guilty at the prior trial stage. But as indicated in the introductory section of this paper, one of the most prominent kinds of instances where deliberation has been prominent in studies on artificial intelligence and law has been in the area of electronic democracy.

Some sort of action is required in a deliberation, and thus a choice must be made. Typically, in a deliberation, doing nothing at all has consequences, and is therefore a form of action called an omission, a negative form of action. Thus in deliberation the participants are always confronted by a practical problem of this sort that requires a decision on how to take action. The deliberation dialogue is a group activity in which it is assumed that although the participants have differences of opinion, they also share common goals, and want to move ahead in taking a collective action to carry out some task. Deliberation is a type of dialogue in which a group of agents collaborates to make a decision about what course of action to take. Deliberation involves making a choice among a set of alternative courses of action, premised on goals and values, and is thus based on practical reasoning. The purpose of the deliberation dialogue is for the group to move ahead in a situation where a problem is confronted in relation to a specific situation.[4] In contrast, the

Table I. Six basic types of dialogue

Type	Initial situation	Party's goal	Goal of dialogue
Persuasion	Conflict of opinions	Persuade other party	Resolve or clarify issue
Inquiry	Need to have proof	Find and verify evidence	Prove (disprove) hypothesis
Negotiation	Conflict of interests	Get what you most want	Reasonable settlement that both can live with
Information-seeking	Need information	Acquire or give information	Exchange information
Deliberation	Dilemma or practical choice	Co-ordinate goals and actions	Decide best available course of action
Eristic	Personal conflict	Verbally hit out at opponent	Reveal deeper basis of conflict

purpose of the persuasion dialogue is for one party to rationally persuade the other party to accept her (the first party's) thesis, a designated proposition. The role of the other party is to express doubts about the argument of the first party, or to put forward an opposing thesis. Thus the persuasion dialogue is about the truth of proposition being disputed, while the deliberation, in contrast, is about actions that are thought to be prudent means for carrying out a goal, or set of common goals.[5]

Those engaging in deliberation are always confronted by a practical problem. What course of action can they take in the given circumstances that will satisfy everybody, and fulfill their common goals, without causing circumstances perceived to be adverse? This question may be identified with what Hitchcock et al. (2005) call the governing question in a deliberation. In their formal model, a deliberation dialogue arises out of a need to take action to solve a problem expressed in a governing question like, "How should we respond to the prospect of global warming?" During the course of the deliberation dialogue, proposals are made that purport to offer solutions to the problem confronted. A proposal put forward posits a course of action that is being recommended by the proponent who puts it forward as a solution to the global problem of the deliberation, answering the governing question. Thus the speech act of making a proposal has a function somewhat similar to the speech act of putting forward an argument. It has a conclusion, and that conclusion is an action. The action is one, it is claimed, that is a choice that will solve the basic problem of the deliberation. In making a proposal, there is also an assumption that reasons can be given supporting this course of action as a prudent one, in the circumstances, that will solve the problem encountered. There's also an assumption that the proponent is willing to defend the proposal against objections to it by the other side. As shown below, however, the strength of defending depends on the stage of the deliberation process. At an early "brainstorming" stage, the need may not be so great.

It will be suggested by the examples presented in Section 2 that the speech act of making a proposal in deliberation can be analyzed much more fully as a connected sequence of argumentation moves in a dialogue than as a speech act, based on the speaker's and hearer's intentions and beliefs. It will be shown how making a proposal is a species of argumentation. The examples will illustrate how examining real cases where proposals are made in deliberations, to grasp the nature of the proposal, it is necessary to see how arguments are brought forward to defend it. It may also be necessary to consider arguments brought against it that offer reasons to rebut the proposal, or arguments offering a counter-proposal that is held to be better than the original proposal. Hence it will become apparent that the speech act of putting forward a proposal is much more like the speech act of putting forward an argument than it previously seemed on the traditional speech act

type of analysis due to Searle (1969) that has been predominant in the literature.

2. Examples of making and attacking a proposal

In this section, three brief but real examples of deliberation are presented in which a proposal is made, and then objections to it are raised. In the first example, deliberation is seen at work at a town hall meeting in which a vote needs to be taken on some specific issue of concern. Looking at the full transcript of the meeting and analyzing all the arguments and counter-arguments in it would be a lengthy task. It was a debate in a Rhode Island Assembly on whether or not to bring in no-fault insurance, fully described in Lascher (1999), and cited in more abbreviated form as an example of deliberation dialogue in (Walton 1998, p. 169). The example as presented below is only a brief summary of the argumentation described in the two longer descriptions of the debate.

THE NO-FAULT INSURANCE EXAMPLE

> One side proposed bringing in a new system of no-fault insurance in Rhode Island, arguing that insurance rates were too high, and that paying the premiums had become burdensome. The goal of both sides was presumably to lower insurance rates if possible. The opposed side argued that the proposed no-fault system would unfairly make good drivers pay for bad drivers, and would fail to lower insurance premiums.

This example is one of a deliberation dialogue, in which two groups engaged in discussion with each other, are arguing from what they take to be their common commitments. The point of disagreement is that each side is doubtful that the proposals for action put forward by the other side will fulfill the central goal both agree on. This case could be considered one kind of paradigm, because there were two sides, for and against, and each used practical reasoning to support its side, often by using argumentation from consequences. The no-fault side argued, for example, that the change to no-fault insurance would reduce costs of coverage. The opposed side argued, for example, that no-fault unfairly makes good drivers pay for bad drivers.

In this kind of case of a deliberation dialogue, each side puts forward some general or global action that it advocates. The no-fault side advocates changing to a no-fault system. The opposed side argues for retaining the status quo. Or to take another kind of case, in a parliamentary debate, one

side has put forward a bill. The bill is, in effect, a proposal for action. After both sides have had a public discussion, they vote to pass the bill into law or not. There is no space to analyze an extensive example of a deliberation dialogue here, like the kind of case that can easily be found in a legislative debate. However, even this brief example containing the essential elements of a proposal in a deliberation will be helpful as a case to analyze by the methods developed below.

The next example is taken from the letters to the editor page of *Newsweek* (October 10, 2005, p. 15), where the Mail Call asked readers to ponder on how the costs of Hurricane Katrina should be paid for by the government. One letter made this proposal: ''A practical way to pay for hurricane reconstruction would be with a motor-fuel tax on gasoline, diesel and ethanol.'' The letter then suggested an accompanying action, saying that the U.S. Treasury could post a running tally on the Internet telling everyone how much tax has been collected at that time, and giving an estimated date at which the tax would end. The part of the letter quoted below then proposed three reasons supporting the proposal.

THE KATRINA EXAMPLE

> Such a tax would serve three purposes; with every fill up, Americans would be aware of the need to sacrifice and contribute to the rebuilding effort; it would put a much-needed damper on oil demand; and we would not go further into debt borrowing against our future.[6]

This example fits a pattern that is very common. First, the proposal is made by setting out a course of action that is expressed in general terms and endorsed as practical means of carrying out the goal set in the question. Then more detail is given about how the proposal could be accompanied by specific actions, like setting up an Internet tally. Finally, three reasons are given as grounds for supporting the proposal. In this instance, as is very common in a typical case, the reasons use argumentation from consequences (to be defined in Section 3). Three outcomes are cited as good consequences of the proposal.

A problem with the Katrina example is that it is not an explicit case of deliberation dialogue between two agents. It is a letter to the editor in which the author simply makes a proposal and then gives several reasons to support it. Even so, the example can be viewed as an instance of putting forward a proposal that implicitly presupposes a deliberation context. The author puts forward his proposal for a new motor-fuel tax, and by giving three arguments to support the proposal, he presupposes the possibility that many readers would be skeptical about accepting such proposal. In other words, the

context of dialogue is one in which a proponent is putting forward a proposal to an audience or readership, many of whom would be expected to have serious doubts about it. In order to respond to these doubts therefore, he puts forward three arguments that support the proposal. Thus as in all cases of deliberation, there is a pro side and contra side to the proposal. Hence we can say that, at least implicitly, there is a deliberation dialogue involved. The given text in which a proposal is put forward is sometimes accompanied by explicit arguments defending them or attacking them, but in many instances, important parts of these arguments are not explicitly stated.

The term 'good' here refers to consequences that the readers of *Newsweek* would presumably like, or be committed to, or would put a positive value on. Since these readers would be committed to all three statements, the proponent is using them as premises in his argument to support his proposal as the conclusion of a practical inference based on these premises. These implicit parts of the argumentation need to be brought out by analysis of the text of discourse containing the proposal.

The same kind of argumentation from consequences can be found in the next example of a proposal described in a news report, but in this example counter-argumentation objecting to the proposal was reported in a subsequent new article. In the second article, the proposal was counter-attacked by opponents who put forward some interesting opposed argumentation. In the first news report (Burke 2005), a former Olympic marathon runner and a Tasmanian Liberal Senator, said to be a nutrition and health expert, were reported as joining forces to call for a plan to send details of children's weight and fitness levels home in report cards. Their aim was to combat the growing problem of childhood obesity. The proposal is described in this quotation from the report (p. 2).

THE REPORT CARD EXAMPLE: FIRST PART

> Recent studies show part of the problem with childhood obesity is that parents do not recognize their child has a weight problem, and are reluctant to encourage their children towards healthier lifestyles. The proposal says children should be subject to weight, flexibility, muscular and cardio-respiratory endurance tests at school once a year, and compared to other students in the country.

A few days later, another news article (Anonymous 2005) reported a reply from the Dietitians Association of Australia (DAA) responding with a counter-argument. This argument made the objection that putting fitness and obesity rankings on school report cards may do more harm than good in the

battle against childhood obesity. The argument is quoted from the report (p. 17) below.

THE REPORT CARD EXAMPLE: SECOND PART

> There is a real risk that solely focusing on a child's weight and reporting it openly on their report card may increase the already hurtful stigmatization that comes from being fat and unfit. This can also have a negative impact on self-esteem and body image and may lead to unhealthy eating practices, including drastic attempts at weight loss, which is potentially dangerous in growing children. Schools are far better to role-model healthy food choices via a healthy school canteen, by not using inappropriate foods in fundraising activities and by ensuring adequate nutrition content in their curriculum. They also have the opportunity to provide good nutrition information in conjunction with health services to parents who need to provide support at home.

This two-part example is an interesting one, because the first part of it is an example of a proposal that is made and supported by arguments, while the second part represents several counter-arguments made by a group opposed to it.

All three examples are fairly brief, and are texts of discourse quoted or described from printed sources. In all three cases, we have a text of discourse representing the example, and we can work with that. These examples are quite useful for the purposes of this paper, because they are not too long or complex, and yet they still contain features of the kind we want to analyze. Later, in Section 9, once we have developed the analytical tools needed for the job, we return to studying these three examples.

3. Practical reasoning

Practical reasoning is a cognitive structure that has been studied in philosophy for some time, and has recently been taken up in computing as the central type of reasoning most fundamental to artificial intelligence. Recent work on e-democracy (Atkinson et al. 2005) has shown that practical reasoning is the central thread in the kind of deliberation needed when users choose an action from a set of proposed alternatives in a public forum. The argumentation scheme for practical reasoning, along with its associated set of critical questions (Walton 1990) is the key structure of reasoning used in the model of rational deliberation implemented in the Parmenides system

(Atkinson et al. 2004, 2005a). In the simplest kind of practical inference (Walton 1990), the first-person pronoun 'I' is taken to represent a rational agent of the kind now used in multi-agent systems (Woodridge 2000). An agent has goals, knowledge of its particular situation, a capability for taking action, and an ability to collect data about real or potential consequences of its actions. An agent's knowledge is typically uncertain, incomplete, and changing. It will be shown how the simple form of practical inference (Walton 1990) is the place to start.

SIMPLE FORM OF PRACTICAL INFERENCE

I have a goal, *G*.
Carrying out this action *A* is a means to realize *G*.
Therefore, I ought (practically speaking) to carry out this action *A*.
A simple example of the kind commonly given to illustrate this type of reasoning is the following case.
My goal is to be in Brussels before 3:00 pm this afternoon.
If I take the KLM flight leaving Amsterdam at 11:30 this morning, I will be in Brussels before 3:00 pm this afternoon.
Therefore, I should take the KLM flight leaving Amsterdam at 11:30 this morning.

This case seems simple on the surface, but there may be complications. I may be able to take a later flight and still get to Brussels before 3:00 pm, and that might be a better choice. Or I may find out that the meeting that afternoon been be cancelled, and I can take an even later flight, saving me some time to do other tasks in Amsterdam. Or I may find that I have other urgent matters that need to take priority, and thus I may decide not to go to Brussels at all. Thus more complex forms of practical reasoning may need to be considered as argumentation schemes (Walton 1990).

Practical reasoning is evaluated by supporting the premises or the inferential link between the premises and the conclusion, or by attacking the argument by criticizing it. There are three ways of criticizing practical reasoning. The first is to attempt to rebut the argument by attacking one of the premises of the argumentation scheme, arguing that it has not been adequately justified, or even that it is false. The second is to undercut the argument by asking one of a number of critical questions that match the scheme. The third is to mount a counter-argument designed to rebut (refute) the original argument from practical reasoning by arguing for an opposite conclusion. The distinction between the second and third methods corresponds to the two ways of attacking an argument called undercutters and rebuttals by Pollock (1994). A rebuttal defeats an argument by mounting a stronger opposed argument that has the negation (opposite) of the original

conclusion as its conclusion. An undercutter attacks the inferential link of the original argument used to derive the conclusion from the premises. Critical questions act more like undercutters, but they can sometimes also defeat an argument based on practical reasoning. Walton (1990) put forward an analysis in which the process of evaluation of practical reasoning mainly focused on five critical questions, each of which correspond to a premise of the given practical inference.

CRITICAL QUESTIONS FOR PRACTICAL REASONING

CQ_1: Are there alternative means of realizing A, other than B?
CQ_2: Is B an acceptable (or the best) alternative?
CQ_3: Is it possible for agent a to do B?
CQ_4: Are there negative side effects of a's bringing about B that ought to be considered?
CQ_5: Does a have the goals other than A, which have the potential to conflict with a's realizing A?

This analysis turned out to be somewhat cumbersome to employ, however. In a more recent analysis, (Walton 2005) the argumentation scheme and critical questions for practical reasoning have been restructured. In this new formulation, a basic scheme is taken to represent the more simple cases of practical reasoning.

BASIC SCHEME FOR PRACTICAL REASONING

I have a goal G.
Bringing about A is necessary (or sufficient) for me to bring about G.
Therefore, I should (practically ought to) bring about A.

The reason for taking this simple scheme as basic is to preserve the explanatory power of practical reasoning. An argument taking the form of the basic scheme is evaluated by asking one or more of the following appropriate critical questions.

CRITICAL QUESTIONS FOR BASIC SCHEME FOR PRACTICAL REASONING

(CQ1) What other goals do I have that should be considered that might conflict with G?
(CQ2) What alternative actions to my bringing about A that would also bring about G should be considered?

(CQ3) Among bringing about *A* and these alternative actions, which is arguably the most efficient?[7]
(CQ4) What grounds are there for arguing that it is practically possible for me to bring about *A*?
(CQ5) What consequences of my bringing about *A* should also be taken into account?

The asking of any one of these critical questions can defeat the argument. Thus the most common and typical kinds of cases of practical reasoning are defeasible. Evaluating the argument as strong or weak depends on a balance of considerations, and especially on the burden of proof, and how it shifts back and forth at any given point in a deliberation dialogue. Critical questions act as undercutters that challenge the inferential link between the premises and the conclusion of a practical inference. However, an argument based on practical reasoning can also be attacked by counter-arguments that rebut, or even defeat the original argument. How such attacks work and should be evaluated as detracting from the strength of the original argument, and how the original argument should be evaluated as weak or strong by some standards, are controversial issues. Not all problems of how to understand and formally model practical reasoning have been solved.

The basic problem for evaluating practical reasoning can be expressed in the following four principles, each reflecting a view that may be hold on how a practical inference is rationally binding on a rational agent in deliberation. There are many variations on these three propositions, depending on what standards are used to define 'following from'. The three types of standards are those of deductive validity, inductive strength and presumptive strength, based on tentative plausibility conferred by defeasible argumentation schemes. There are three possible standards to consider initially.

(P1) If I believe a proposition, and a second proposition follows logically from that first proposition, it follows that I believe the second proposition.
(P2) If I believe a proposition, and a second proposition follows logically from that first proposition, it follows that I am committed to the second proposition.
(P3) If I am committed to a proposition, and a second proposition follows logically from that first proposition, it follows that I am committed to the second proposition.

The first principle does not hold, unless you mean by belief something like rational belief. The second principle only holds because, in general, belief implies commitment. The third principle does not hold, in any strict form either, for the same reason as the first two, namely that it is possible for an agent to be committed to an inconsistency. I might be committed to an inconsistency, perhaps without realizing it, but it does not follow that I am committed to any proposition that might be chosen at random. However, it will be argued that a fourth principle does hold in a qualified way.

(P4) If I am committed to a proposition, and a second proposition follows from that first proposition in virtue of the correct application of an argumentation scheme, it follows that my commitment to the second proposition should be open hold as well, subject to critical questioning.

On the fourth approach, the one taken here, argumentation schemes are defeasibly binding on a proponent who has put an argument forward that fits one of the schemes. They are binding in the sense that the proponent is committed to defending that argument, and to answering appropriate critical questions matching that scheme.[8] Such argumentation is essentially defeasible in nature, certainly in the most common kinds of cases of deliberation like those cited in the examples in Section 2.

The last critical question, CQ5, is an especially common and important one for evaluating practical reasoning. It assumes some common standard of value in a deliberation concerning what can be taken to be "good" or "bad" consequences. This valuation can then be taken as the basis for two very common forms of argumentation called argument from positive consequences and argument from negative consequences. The latter is a form of argument commonly used to attack practical reasoning. However, the basic scheme for practical reasoning does not take values into account. Below, we will present a model of value-based practical reasoning that does. But here we state the two basic argumentation schemes for argumentation from consequences (Walton 1996, p. 75).

First, there is the scheme for argument from positive consequences.

ARGUMENTATION SCHEME FOR ARGUMENT FROM POSITIVE CONSEQUENCES

Premise: If p is brought about, good consequences will plausibly occur.
Conclusion: p should be brought about.

There is also the scheme for argument from negative consequences (Walton, 1996, p. 75).

ARGUMENTATION SCHEME FOR ARGUMENT FROM NEGATIVE CONSEQUENCES

Premise: If p is brought about, bad consequences will plausibly occur.
Conclusion: p should not be brought about.

According to the account in (Walton 1996, pp. 76–77), the following three critical questions match each scheme.

CQ1. How strong is the probability or plausibility that these cited consequences will (may, might, must) occur?
CQ2. What evidence, if any, supported the claim that these consequences will (may, might, must) occur if *p* is brought about?
CQ3. Are there consequences of the opposite value that ought to be taken into account?

Positive or negative consequences, judged by some standard of value like that used in connection with the scheme for practical reasoning, are cited as reasons to support the proposed course of action. A proposal for action put forward by a proponent in a dialogue is defeated if she fails to answer any of these critical questions adequately, once the respondent asks one. In any given case, argument from consequences can be undercut or refuted if it fails to answer appropriate critical questions that have been or might be asked in a dialogue. Critical questions tend to act as undercutters of an argument, while counter-arguments, like argumentation from negative consequences, act as defeaters.[9]

We now proceed to explain the basic components of deliberation dialogue, in light of the foregoing explanations of deliberation and practical reasoning, especially keeping in mind the controversies about these matters. In Section 7, value-based practical reasoning is introduced and explained, and then in Section 9, argumentation schemes for positive and negative argumentation from consequences are presented. Then in Section 9, the tools developed in the preceding sections are applied to the three examples of deliberation in Section 2, showing how all the tools and structures explained in the previous sections need to be fitted together. Finally, in Section 10, it is shown how the resulting structure needs to be fitted into a dialectical analysis that defines of the speech act of making a proposal in terms of pre-conditions, defining conditions and post-conditions in a deliberation dialogue containing practical reasoning.

4. Formal models of rational deliberation dialogue

There are many speech events, or real culturally and institutionally structured contexts of dialogue in which deliberation takes place. There are deliberations in political debates, for example in parliaments and legislative assemblies. Each type of deliberation is different, and has different rules, special characteristics, and burdens of proof. Another example is the kind of deliberation that takes place as public opinion goes through several stages in response to a problem reported in the media. This kind of deliberation is disjointed and fragmentary, as the media first sensationalizes a "story", if it is

exciting or provocative, and then it may be eclipsed by a more exciting story, leaving the public in the dark (Yankelovich 1992). To try to improve the quality of deliberation on public issues, deliberative democracy has been advocated as a model of democratic public decision-making to remedy some of these deficiencies.

Deliberative democracy rests on the principle of reason-based deliberation, defined in (Walton 2004, p. 300) as the assumption that when a group of people come together and deliberate, the conclusion they arrive at, if their deliberations were good, is reason-based. This principle does not require that deliberation always comes to the right conclusion. It means is that if the deliberation is a good one, that has thoroughly enough considered all the relevant arguments on both sides of the issue, or choice to be made, and has weighed the relative merits of each thoughtfully and with critical thinking, the conclusion arrived at by the deliberation can be properly said to be supported by adequate evidence. Indeed, Gordon's pleadings game (Gordon 1995) is motivated by the notion that a legal decision is justified by the very fact that the correct procedure has been used.

Typically however, such evidence is not conclusive, because deliberation about any decision in a real case takes place under conditions of uncertainty and lack of knowledge, due to the rapidly changing circumstances of the case, as new data comes in. According to Aristotle's very useful definition, deliberation is about things that are variable and change with circumstances (*Nicomachean Ethics* 1094, 19), culminating in a choice on what to do, and hence, he wrote, we must be content with premises that "indicate the truth roughly and in outline" (*Nicomachean Ethics* 1094, 19–23). It follows that reasoning in deliberation, on his analysis, is based on premises that are defeasible generalizations "only for the most part true" (1094, 23). Despite all these very important reservations about the fallibility of the kind of practical reasoning used in deliberation, the principle of reason-based deliberation can warrant such reasoning by offering evidential supporting weight to a conclusion.

Deliberation can be studied empirically, by examining short examples like the ones presented in Section 2, and long examples of the kind represented by a typical legislative debate, town hall meeting, or other forum. Deliberation can also be studied from a normative point of view by constructing formal dialogue models exhibiting how rational deliberation should be conducted according to rules and procedures that would guide the dialogue along towards its goal of solving some problem by choosing the arguably best course of action.

In the formal model of deliberation of Hitchcock et al. (2005), a number of speech acts are defined, including locutions for opening the dialogue, for making assertions, for justifying assertions, for asking for justification of assertions, for making commitments, and for retracting them. The locution of proposing is described as that of suggesting of possible action options

appropriate to the governing question of the deliberation dialogue. Each deliberation dialogue has a so-called governing question that represents the problem to be solved or the issue to be discussed in the dialogue as a whole. This governing question defines the global success conditions for all of the argumentation in the dialogue. The proposal option is described as a mechanism to identify possible action options, enabling an agent to advocate an action, and to accept action options proposed by others. Within this formal model, it might be useful to identify the structure of the speech act of making a proposal more precisely.

Hitchcock et al. (2005) based their formal model of deliberation dialogue on the five-stage model for negotiation dialogue of Hulstijn (2000).

Stage 1: Opening the dialogue.
Stage 2: Sharing information.
Stage 3: Making proposals and counter-proposals.
Stage 4: Confirming accepted proposals.
Stage 5: Closing the dialogue.

In Hulstijn's model, the making of proposals and counter-proposals occupies the middle stage, where much of the argumentation offered by both sides is presented and criticized.[10]

In the model of Hitchcock et al. (2005) both participants in the dialogue are agents who have goals and who are presumed to have the capability of practical reasoning. In one kind of move, a participant can *propose* a proposition. In another kind of move, a participant can *prefer* one action-option over another. In a third kind of move, one participant can ask another to *justify* a proposal. All such moves are coordinated in a formal deliberation dialogue that has eight stages.

1 Opening of the deliberation dialogue, and the raising of a governing question about what is to be done.
2 Discussion of: (a) the governing question; (b) desirable goals; (c) any constraints on the possible actions which may be considered; (d) perspectives by which proposals may be evaluated; and (e) any premises (facts) relevant to this evaluation.
3 Suggesting of possible action-options appropriate to the governing question.
4 Commenting on proposals from various perspectives.
5 Revising of: (a) the governing question, (b) goals, (c) constraints, (d) perspectives, and/or (e) action-options in the light of the comments presented; and the undertaking of any information-gathering or fact-checking required for resolution.
6 Recommending an option for action, and acceptance or non-acceptance of this recommendation by each participant.
7 Confirming acceptance of a recommended option by each participant.
8 Closing of the deliberation dialogue.

In the model, proposals are initially made at stage 3, and then evaluated at stages 4, 5 and 6. Especially at stage 5, much argumentation taking the form

of practical reasoning would seem to be involved. Questions, actions, goals and facts are interrelated at this stage in an argumentative way. So how are actions woven together with goals in chains of reasoning that can be used in argumentation that leads to a decision on answering the governing question? When a proposal for action is put forward by one party, what form should such a proposal take as a speech act? This question is vitally important, for the structure of the speech act of putting forward a proposal will determine what sort of reply is relevant, and this, in turn, will set up the mechanism for judging when a sequence of argumentation is relevant in the deliberation dialogue or not.

To begin to answer these questions, we now present a simpler and more artificial example of a deliberation, comparable to the three examples presented in Section 2, except that it is an artificially crafted case illustrating how such moves like presenting, supporting and attacking a proposal are structured as sequences of moves in a dialogue format. Atkinson (2005, p. 210) offered an example of a transcript of a deliberation dialogue conducted in accordance with the PARMA protocol used in the Parmenides system for electronic democracy. Two parties called A and B discuss where and what type of holiday they want to take. A proposes going on a beach holiday while B proposes going on a skiing holiday. In the example, it is an important unstated point that holidaying together is more important than where they

Table II. Summer holiday deliberation dialogue

Move	Party	Move
1	A	Let's go to one of the Greek islands.
2	B	Let's go to a skiing resort.
3	B	There would be lots to do during the day and at night.
4	B	We would have a really good time.
5	A	There would be lots to do during the day and night.
6	A	Because it's a beach resort.
7	A	The Greek islands are nice and hot during the summer months.
8	A	I like to spend my holidays in the sun.
9	A	Spending my holidays in the sun helps me to relax.
10	B	We went on a similar beach holiday last year.
11	B	The beach holiday proposed this year will be just the same.
12	A	I would like to do something different this year.
13	A	Going skiing means going on holiday to somewhere that's in a cold climate.
14	A	I want a holiday in the sun.
15	B	The skiing proposal will be an activity holiday.
16	B	An activity holiday is different from we are used to.
17	B	It will be more exciting than we are used to.

go. Table II presents only the first part of the content of the dialogue from Table B.10 in Atkinson (2005, pp. 210–211).

The governing question is the issue of where the two parties would like to go for their summer holiday together. At move 1, A proposes going to one of the Greek islands, a beach holiday, while A move 2, B proposes going to a ski resort, indicating a skiing holiday, They presumably can't do both, so the proposals are alternatives representing a conflict about what they should do. It is a kind of conflict about what it is best for the two parties to agree on as a course of action that signals the onset of a deliberation dialogue.

Right away, after making its proposal, each party offers argumentation to support it. At move 3, B supports his proposal by arguing that there would be lots of things to do during the day and at night too, at a ski resort. At move 5, A says the same about the beach resort. Each of the arguments either supports the speaker's position or attacks the hearer's position by referring to goals or values they presumably share, or by citing positive or negative consequences of each proposal. In this dialogue, we can see that each party is using practical reasoning, based on common goals, to argue for selecting certain actions as better than others. This kind of reasoning is used to support a party's own proposal as preferable over that of the other side. It is also used to justify one's own proposals, and to question or attack the other party's proposal.

This example leads us to consider how the moves in such a formal deliberation dialogue format could be codified so that standard types of moves could be defined for defending or attacking a proposal. How Hitchcock et al. manage such moves in a formal deliberation dialogue is based on two key moves, *prefer* and *ask_justify*, that they define as follows.

> **prefer(Pi, *a, b*)**: Participant Pi indicates a preference for action-option *a* over action-option *b*. This locution can only be uttered following utterance (possibly by other participants) of assert(Pj,*evaluation,e*) locutions of at least two evaluations *e*, one of which has *a* as its first argument, and one *b*. This combination rule ensures that preferences expressed in the dialogue are grounded in an evaluation of each action-option according to some proposed goal, constraint or perspective, and thus contestable. This locution inserts (*prefer, a, b*) into *CS*(*Pi*), the Commitment Store of Pi.
>
> **ask_justify(Pj, Pi, *type, t*)**: Participant Pj asks participant Pi to provide a justification of proposition *t* of type *type*, where *t* is in *CS*(*Pi*).

Suppose that a respondent has requested that a proponent justify a proposition *p* she proposed. According to the rule governing such a move, the

proponent must reply by retracting *p* or making a justification move giving a reason for the respondent to accept *p*.

The no-fault insurance example in Section 2 might provide an illustration. The two parties begin the deliberation by agreeing on common goals. Both want lower insurance rates. However, while one side thinks that the new system of no-fault insurance would produce lower insurance rates, the other side doubts this claim. Each side offers reasons to support its contention. One side cites statistics on what took place in other states. The other side argues that the no-fault system in other states has failed to lower premiums. They agree on a central goal, but differ on the issue of whether the proposals put forward by the other side will achieve it.

The shift from the *prefer* move to the *ask_justify* move is interesting from a dialectical point of view. When each side offers reasons to support its claim, the combination of moves suggests that the making of a proposal, by indicating a preference for a course of action that will lead towards solving the problem posed by the governing question, is closely connected to the providing of a justification for the proposal. Some questions are raised about how the moves should be connected. I suggest that the speech act of making a proposal combines two moves. One states a proponent's preference for an action while the other makes it either permissible or obligatory for the respondent to question that preference by asking for a reason to justify it. It may also be implied that when the proponent makes the proposal, she must be open to this follow-up questioning move by the respondent, and must reply to it by providing such a justification, or otherwise the proposal will be defeated. But how this combination of moves should work now begins to sound complex. The process whereby the two moves are connected in sequence in a dialogue almost begins to sound like it is based on fundamental dialectical notions like burden of proof and openness to questioning and refutation.

5. The speech act of proposing

The analysis of speech acts that has been developed in linguistics and philosophy is based on a BDI model in which a speaker and hearer are seen as agents that carry out actions to realize intentions. In the standard account, a type of speech act corresponds to an attitude being expressed. For example, a statement is said to express a belief, while a request expresses a desire: ''Speech acts, whatever the medium of their performance, fall under the broad category of intentional action'' (Bach 1998, p. 3). In speech act theory, a speech act is said to have two parts: an illocutionary force and a proposition. The illocutionary force distinguishes between the types of action involved. For example a distinction is drawn between an assertion and a proposal on

the basis that each represents a different type of action with different characteristics. The proposition describes the content of the speech act. For example, in the case of an assertion, it is the proposition that is asserted. Speech act theory has been influential in computer science, especially in multi-agent communication systems. It has been used by FIPA (the Foundation for Intelligent Physical Agents) to define communicative actions, like asking a question or making a request, using a BDI model.

Some useful research is available in the literature on argumentation that has linked the speech act of making a proposal to the notions of burden of proof and openness to questioning and refutation. The act of making a proposal has three essential components, according to the analysis proposed by Kauffeld (1998, p. 248). In his analysis what is proposed is a proposition (statement) that must be addressed by the speaker to the hearer in a way in that meets the following conditions.

1. The speaker must present a statement of resolve, like "We should invest in Northern Securities", and act as if this statement expresses a determination or conclusion the speaker has reached.[11]
2. The speaker must openly give it to be believed that she is speaking with the intention of answering doubts and objections regarding the statement put forward.
3. The speaker must overtly intend that her statement and commitment to advocacy provide the hearer with reason to raise questions, doubts and objections with regard to the proposition.

Kauffeld sees each of these conditions as essential to some utterance's properly being classified as the making of a proposal. For example (p. 248), commenting on the first condition, he writes that the utterance of the following sentence would be an absurdity ("semantically odd"): "I propose that we invest in Northern Securities; mind you, I'm not saying we should do that". Following up on Kauffeld's approach, Aakhus (2005) has defined the speech act of proposing in a way that fits the standard framework for speech acts of Searle (1969). Aakhus's classification of the properties of making a proposal contrasts it with other speech acts of a more familiar kind that have been identified in the literature.

In Searle's (1969) classification of speech acts, proposing lies between a directive, a speech act in which the speaker tries to get the hearer to carry out a course of action, and a commissive, a speech act that commits the speaker to a course of action. In the speech act of proposing (Aakhus 2005), there is a future act that requires collaboration (joint action) between the speaker and hearer, and the speaker tries to get the hearer to take part in it. To distinguish proposing from the related speech acts of requesting and promising, (Aakhus 2005, p. 7) presents the following table.

Table III. Felicity conditions for requesting and for proposing

Act	Request (Searle 1969)	Propose	Promise (Searle 1969)
Propositional Content	Future act A of H.	Future act A of H + S.	Future act A of S.
Preparatory Condition	H is able to do A. S believes H is able to do A. It is not obvious to both S and H that H will do A in the normal course of events of his own accord.	H and S are able to contribute to the accomplishment of A. It is not obvious to both S and H that either S or H can do A of their own accord in the normal course of events. Doing A will leave neither S nor H worse off than not doing A.	S is able to do A. S believes S is able to do A. It is not obvious to both S and H that S will do A in the normal course of events of his own accord.
Sincerity Condition	S wants H to do A	S believes A will mutually benefit H and S or that if it benefits S it will leave H no worse off.	S intends that in uttering to do A he is under the obligation to do A.
Essential	Counts as an attempt to get H to do A.	Counts as an attempt to enlist H in mutually bringing about A.	Counts as an attempt to commit S to do A.

The speech act analysis in Table III presupposes a framework in which two parties are acting together to solve a problem and take turns in attempts to collaborate in doing so. The speaker's purpose of proposing in such a context is to get the hearer to consider some proposition as worthy that he has doubts about or would otherwise tend to dismiss or overlook (Kauffeld 1995). The dialectical context is one where the speaker has a burden of proof, and the purpose of the speech act of proposing is to shift that burden to the hearer (Kauffeld 1998). The successful proposer must put forward the proposal in a way that draws out the doubts and objections against it, paving the way for its acceptance.

Aakhus's analysis follows Searle's standard BDI format for speech act analysis. Such an analysis presupposes a speaker and a hearer, and is expressed in terms of consequences and their mutual benefits. Kauffeld's analysis is partly dialectical, expressed in terms of doubts and questions, commitment to advocacy, and providing the hearer with a reason. But it is also partly BDI, expressed in terms of belief, intention, resolve, and determination. Both are based on psychological attitudes of two interacting agents, but both also have something of a dialectical flavor, presupposing a dialogue structure in which a speaker and a hearer take turns making moves an orderly way. In this structure, the making of a certain kind of move by one party imposes specific requirements on subsequent moves and internal states (beliefs and desires) of one or both parties. Both also seem to portray the speaker's role as that of putting forward an argument of some sort designed to enlist the help or acceptance of the party in the hearer role. Kauffeld's analysis especially emphasizes that the hearer has the roles of asking questions and expressing doubt.

It is an interesting question to ask whether these two BDI-style analyses can be reformulated in terms of types of moves and commitment rules in dialogue, in such a way that the moves could be fitted in to a formal deliberation dialogue that makes no essential reference to BDI notions. Singh (1997), as an alternative to the BDI model, has proposed a commitment model. In his model, an agent's commitment in practical reasoning is defined in terms of sequences of actions in deliberation that have a longer-term focus than just on carrying out a present action. Following this commitment-based approach, Singh (1999) developed a classification of speech acts based on Hamblin's (1987) notions of intelligent deliberation and whole hearted satisfaction.

Wholehearted satisfaction requires the rational agent to not only bring about the right outcome, but to know how, in a practical sense of this phrase, to bring it about in a certain way[12]. The notion of living up to a commitment can then be defined in terms of wholehearted satisfaction. To say an imperative is wholeheartedly satisfied in Hamblin's terms means essentially that the agent did everything he reasonably could to fulfill the

requirements of that imperative. This doesn't require that he actually carried out the action stated in the imperative. It only means that he would have done it if it hadn't been for circumstances that prevented him, or that he didn't need to do it because he knew that it would come about anyway. It essentially requires that he did everything he reasonably could, given his knowledge of the situation and the possible histories of the world during the sequence of times in which he acted. Examples cited (p. 16) are the following statements.

John is bound to take out the garbage.

The court is bound to hear the witness.

According to this analysis, action commitment is defined in relation to what an agent should or should not to do to live up to this commitment.

As an example of living up to a commitment Walton and Krabbe (1995, p. 18) took the statement that John is bound to take out the garbage. It would not be consistent with living up to this commitment that John takes the next flight to Guangzhou, leaving the garbage where it is (unless he really thinks that taking such a flight would turn out to be a way to go about this task). But suppose John has reset the alarm for 6:30 yet his son Bill already took out the garbage at 6:15. In this case, we may still say that John has lived up to this commitment to take out the garbage, even though the associated imperative was not literally satisfied. We would also say that John has lived up to this commitment to taking out the garbage even if, unknowingly, what he took out was a garbage bag stuffed with sweaters that his son put into place where the garbage bag usually is. The most important thing about this analysis to state here is that, on the Walton and Krabbe account, commitment is not defined as a state of mind of the subject in the BDI sense. We do think of it as a state of an agent, where an agent is participant in a dialogue, but not an internal state of the agent's mind – a belief, a desire, or an intention. We think of a state, meaning a definite set of circumstances that could be legal, moral, or social. It is the set of circumstances that determines what the person is committing to doing.

The classification and definition of speech acts using Hamblin's notion of wholehearted satisfaction depends on the practical knowledge of the speaker. Singh (1999), following Hamblin, has given an analysis of speech acts based on this notion of wholehearted satisfaction using a branching model of possible times, representing the idea that the world may develop in any of several ways depending on an agent's actions and commitments. This analysis of speech acts is commitment-based, because it requires no essential reference to the beliefs, desires or intentions of the agent. Instead, it is expressed in a model in which commitments are wholeheartedly satisfied or not by the carrying out of an action.

On the commitment in dialogue model, as opposed to the richer and explicitly psychological BDI model, speech acts, like making of a proposal or an assertion, are seen as types of moves in a dialogue that are governed by rules. For example, a pre-condition rule is that to make a certain type of move, the point in the dialogue where this type of move is allowed has to be right. Once the move is made, it has to fit an identifier that defines the type of move, and the format in which it is made. After the move is made, commitments will be inserted into the commitment stores of both parties, according to the commitment rules for that type of move. Moreover, at the next move, the respondent has to reply to that move in an appropriate way, as defined by the dialogue (turn-taking) rules. Hitchcock et al. presented such rules for deliberation dialogue, but a better analysis of the speech act of making a proposal could lead to significant refinements in their formulation.

The next problem that needs to be discussed is also quite a broad and general one. It concerns the syntax, or logical form of action locutions. Hitchcock et al. treat the contents of proposals as action-options, but also sometimes treat them as propositions. In the analysis of practical reasoning put forward in Walton (1990), an action statement is parsed as having the form, "Agent *a* brings about state of affairs *p*" where the *p* variable stands in for a proposition that can be made true or false by the agent. The analysis of action commitment in (Walton and Krabbe 1995, pp. 15–21), based on Hamblin's notion of wholehearted satisfaction (Hamblin 1987), uses the schema '*X* is committed to *A*-ing', where *A* is an action. Walton and Krabbe (1995) treated such a statement as equivalent to the less formal locution '*X* is bound to *A*'. No theory of the logical form of action statements has been universally accepted, in philosophy, linguistics or computing. This remains a significant problem for the analysis of speech acts, because they are essentially actions. The problem cannot be solved here, but to move ahead with the study of proposing, we adopt the syntax of bringing about. It will be assumed that there is a set of propositions (statements), *p, q, r*,..., that represent states of affairs that an agent can be bring about. For example, if *q* represents the state of affairs that the pen is on the desk, agent *a*'s action of putting it on the desk by bending over and picking it up can be parsed by some locution like saying that *a* brought it about that the pen is the desk by bending over and picking it up.[13]

Assuming that action locutions can be managed, the central question now addressed is how a commitment-based model of practical reasoning can be used to develop a dialectical analysis of the speech act of making a proposal in a framework of deliberation dialogue. In the analysis proposed (no irony intended), it will be assumed that actions are complex, and fall into sequences. Thus to analyze any given instance of a speech act of making a proposal, there will be a central action that is cited along with a set of

accompanying actions. We assume that such a sequence of actions can be described using locutions of bringing about, and using tree structures (of the kind formalized by Hamblin and Singh) in which deliberation leading to action can be broken down into a sequence of actions leading to some outcome.

6. A dialectical model of the speech act of making a proposal

The concept of making a proposal is highly distinctive as a characteristic of deliberation dialogue, as opposed to other types of dialogue like persuasion. Persuasion is different because the main speech act is that of putting forward an argument designed to gain the other party's commitment to a conclusion by giving reasons for her to accept the conclusion as true. In persuasion dialogue, there is a burden of proof that determines how strong such an argument needs to be, to fulfill the requirement of successful persuasion. On the other hand, the speech act of making a proposal in a deliberation dialogue is quite similar to the speech act of making an offer in a negotiation dialogue. Still, making a proposal in a deliberation dialogue has its own distinctive characteristics.

When one party puts forward a proposal in a deliberation dialogue, the speech act performed is closely related to practical reasoning. It is a proposal to take action of some sort, and the action is proposed on the grounds that it fulfills a goal (or set of goals) of the hearer (or those of the group). Thus the logical rationale behind any instance of a speech act of proposing a particular course of action is this: this action is a good idea to carry out because, arguably, it will fulfill the collective goals that you and I are committed to, and it has no defeating reasons against it (like negative consequences, or other rebuttals of the kind characteristic of practical reasoning). In any deliberation dialogue, as the dialogue proceeds, several competing proposals for different actions will be put forward. The job of the deliberation is to choose between (among) them, and pick the best one. The best one is the one that is arguably better than the others, because it is a better argument as an instance of practical reasoning. But how do you pick the best one? This question brings us to matters of burden of proof in the deliberation type of dialogue.

According to the theory of deliberation put forward in (Walton 1998, p. 162), deliberation is argued out on a basis of burden of proof, because any real practical problem requires timely action, and even doing nothing (delaying a decision) is a form of action with consequences. Hence, there may not be enough time and resources to resolve the issue definitively one way or the other, as one might do by conducting an inquiry. Thus such decision-making tends to be carried out on a basis of risk, on the principle of

tutiorism, or being on the safe side.[14] Typically in a deliberation, there will be several proposals, each of which is open to objections or worries that it might have bad consequences of a kind that may be difficult to deal with in the future. Typically, none of the proposals is perfect in every respect, but all of them may be worth considering, in that none is entirely worthless. Hence we have to judge one against the others, asking which is one is best, or the least objectionable. This is where argumentation comes in. We have to look at the pros and cons of each proposal, and each argument for and against each proposal.

By adopting this dialectical approach to argumentation, the BDI components of Kauffeld's and Aakhus's analyses can be eliminated. A set of dialectical conditions that clarify the speech of making a proposal provide the target for assessing the adequacy of any commitment-based model of the speech act of making a proposal in deliberation.

DIALECTICAL ADEQUACY CONDITIONS FOR DEFINING THE SPEECH ACT OF MAKING A PROPOSAL

The Proponent's Requirement (Condition 1). In making a proposal, the proponent puts forward a statement (proposition) that describes an action and says that both proponent and respondent (or the respondent group, in a greater than 2 multi-agent case) should carry out this action. The putting forward of this statement is done in such a way that it commits the proponent to carrying out that action, and urges the respondent to take on commitment to it as well.[15] The statement has the logical form of the conclusion of a practical inference. It is often described in the literature as a practical ought-statement. Thus the statement contains an action, and also expresses an attitude toward that statement, saying essentially, "We ought to do it".

The Respondent's Requirement (Condition 2). The proponent puts forward the statement with the aim of offering reasons of a kind that will lead the respondent to become committed to it, either now or at some later point in the dialogue. These reasons are practical in nature. The premises that provide the reasons are directed to the goals of the respondent, and to actions that can be accepted by the hearer as means to attaining these goals. The inference link between these premises and the conclusion (the statement to be proved by the proponent) is the argumentation scheme for practical reasoning.

The Governing Question Requirement (Condition 3). As condition 2 makes clear, the proponent essentially puts forward an argument. As with putting forward any other argument in a type of dialogue like a deliberation or critical discussion, there is presupposed some initial doubt or conflict of opinions, and the job of the proponent is to overcome that doubt, while the

job of the respondent is to express it. Thus the role of the respondent is to ask questions that cast the prudential reasonableness of the action in the statement into doubt, and to mount attacks (counter-arguments and rebuttals) against it.

Condition 3 relates to the global structure of the dialogue, whereas conditions 1 and 2 are more localized to the part where the proposal was made. Condition 3 relates to the global burden of proof and the roles of the two parties in the dialogue as a whole. The reformulation of condition 3, above, brings out something very important, namely the connection between proposing and what is often called the burden of proof in a dialogue. Kauffeld's main thesis about the speech act of proposing (1995, p. 79) is that proposing is a device that has a kind of potency to affect the distributive force of arguments by changing "the distribution of responsibilities and obligations" of "the participants in an argumentative exchange". If his analysis is on the right track, the way to analyze proposing is to study not only the pre-conditions and post-conditions of the speech act of proposing, but also how, in a more global manner, making a proposal at some point in dialogue affects the outcome of the dialogue as a whole. In particular, what needs to be studied is how the burden of proof of questioning shifts back and forth as a speech act of proposing is made by one party in a dialogue and then reacted to by the other party or parties who are affected by it or who are doubtful about it. The following extension of the argumentation in the no-fault insurance example provides an illustration.

The Burden of Proof Dialogue

	No-fault side	Opposed side
1	I propose a no-fault system	On what grounds?
2	The insurance rates are too high under the existing system.	How can you prove that a no-fault system would lower the rates?
3	How can you prove that a no-fault system would not lower the rates?	It's up to you to prove that a no-fault system would lower the rates.
4	No, it's not.	Yes, it is.
5	You made the claim that a no-fault system would lower the rates.	No I didn't. Where did I say that?
6	Your argument depends on that claim.	Not really, I just know that the rates are too high under the existing system.
7	Unless you can prove that a no-fault system would lower the rates, your argument fails.	I just know that the existing system is bad, and that we need to move to a new one.
8	OK, but your only reason is that it would lower the rates. I don't think this is true.	Well then, prove that it's not true.

From such examples, we can see that the speech act of making a proposal is very much like the speech act of putting forward an argument, and involves the same problems arising from disputes about burden of proof. The proposal itself can be seen as a claim put forward, with a burden of proof very much like that attached to the speech act of putting forward an argument.

The making of a proposal advocates a proposition for action that needs to be supported, if questioned or attacked, by putting forward other propositions that are offered as reasons in favor of accepting the proposal. On the analysis advocated here, these other propositions are linked to the proposition that is the proposal by practical reasoning, including related schemes like argumentation from consequences. Thus the underlying source of the problem can be traced to the argumentation scheme for practical reasoning. In any deliberation dialogue, action needs to be taken, because of some problem, dilemma or decision that faces the agent, or group of agents. Typically, in general outline, there are two sides to the issue. For example, as in the no-fault insurance case, the agents need to decide whether to carry out the action of changing to a new no-fault system or not, and each side forms up. It may seem that generally speaking, the burden of proof lies on the side that advocates change, for there is generally a conservatism in sticking with an existing institution. However, as the burden of proof dialogue above shows, this burden of proof can shift back and forth during a dialogue, depending on the moves and counter-moves made. Burden of proof can vary, not only with the type of dialogue and the global issue (the governing question in the case of a deliberation), but with specific argument moves and counter-moves.

In other cases, there may be a problem to be solved. For example, suppose the patient has high blood pressure, and that is seen to be a problem, for example, because it could cause a stroke or heart attack, and these outcomes are bad. The solution is to lower blood pressure, but the problem is how to do that without having other undesirable consequences. Several proposed solutions to the problem may then be considered and comparatively evaluated. Each takes the form of an argument, or more accurately, a proposal that can be evaluated by examining the arguments for and against. Burden of proof may be affected by factors of safety, suggesting caution and being on the safe side, if there is doubt or uncertainty about which course of action is best. Values can be involved in such case, and we now turn to considering this factor.

7. Value-based practical reasoning

Electronic democracy is addressed to the kind of situation where proposals for action (like where to put in a new train system) are being considered. Thus the context is one of a deliberation framework of dialogue in which a choice between different alternative proposals for action needs to be

discussed, examining the pros and cons of each by asking for the reasons the involved parties offer for supporting one proposal or rejecting another. Such a deliberation process can be structured electronically so that the voters, or those involved in making the decision, can be presented with information and alternatives, and can then ask questions, put forward arguments that give reasons for choosing an alternative, offer criticisms and rebuttals of opposed arguments, and arrive at a decision based on having considered a whole range of arguments both for and against their own views. Gordon and Karacapilidis designed and implemented a system (1997) used to enable interested citizens and representatives of public interest groups to take part in electronic discussions with government officials planning public projects like zoning ordinances (Gordon and Richter 2002). The system was based on a dialogue model of argumentation, incorporating a notion of collaborative goal-directed reasoning leading to a decision for action on an issue being discussed. The form of argumentation woven throughout the whole fabric of such a deliberation dialogue is called practical reasoning, in which an agent considers means of carrying out a goal by examining alternatives, and thus arrives at a course of action as a conclusion of the reasoning process (Wright 1972; Walton 1990).

New systems of e-democracy for multi-agent deliberation between a human agent and a computer (Atkinson et al. 2004, 2004a, 2005) have constructed a formal model of practical reasoning based on the model in (Walton 1990) except that it takes the values as well as the goals of the users of the system into account. In the model (Atkinson 2005, p. 61) Walton's notion of a goal is separated into three elements: states, goals and values. In her model, states are defined as sets of propositions about the world to which we can assign a truth value. Goals are propositional formulae on this set of propositions. Values are functions on goals. Values are said to be different from goals, as they provide the reasons that an agent has for wanting to achieve a goal. The formalization is based on the following six primitives: (1) a finite set of distinct actions, (2) a finite set of propositions, (3) a finite set of states representing circumstances (4) a finite set of propositional formulae called goals, (5) a finite set of values, and (6) a value function mapping each goal onto a pair of values and signs. A sign can be positive or negative, or can indicate that one goal is equal to another in value. In the model (Atkinson, p. 63) the following argumentation scheme for practical reasoning is adopted.

ARGUMENTATION SCHEME (AS1) FOR PRACTICAL REASONING

In the circumstances R
we should perform action A

to achieve new circumstances S that realize goal G
which will promote some value V.

Atkinson is mainly concerned with using the argumentation scheme for practical reasoning to apply a theory of persuasion over action, as she calls it, to develop a structure that enables two parties to engage in rational deliberations on what action to take in a given set of circumstances known to both. She applies this structure as the underlying model of reasoning used to build computer programs, like the PARMA protocol for e-democracy. She doesn't specifically address the problem of defining what a proposal is, as a type of speech act, but she does explain how practical reasoning should be evaluated by critical questioning, showing precisely how a proposal for action should be attacked. This formal model is extremely useful for seeing how the speech act of making of a proposal fits into computer systems for electronic deliberation.

According to this formalization of practical reasoning, a proposal for a particular action can be attacked by denying any one of the statements which must obtain for the proposal to be valid (Atkinson 2005, p. 66). Some of these premises relate to the action realizing the goal. Others concern the realization of the claimed value. Using this model, Atkinson (p. 63) adds the following three critical questions to the prior set of Walton.

Are the circumstances such that doing A will bring about the goal G?
Does goal G promote value V?
Is goal G possible?

Bringing in these additional critical questions expands the original set of critical questions from those of Walton (1990), resulting in 16 critical questions that can be asked by a respondent when challenging a proposal for action based on practical reasoning. This approach yields a method of evaluating practical reasoning by expressing each of the critical questions as an attack that can be made on an instance of practical reasoning (p. 71).

SIXTEEN ATTACKS ON A PROPOSAL FOR ACTION (ATKINSON 2005, P. 71):

1 Disagree with the description of the current situation.
2 Disagree with the consequences of the proposed action.
3 Disagree that the desired features are part of the consequences.
4 Disagree that these features promote the desired value.
5 Believe the consequences can be realized by some alternative action.
6 Believe the desired features can be realized through some alternative action.
7 Believe that the desired value can be realized in an alternative way.
8 Believe the action has undesirable side effects which demote the desired value.
9 Believe the action has undesirable side effects which demote some other value.
10 Agree that the action should be performed but for different reasons.
11 Believe that the action will preclude some more desirable action.

12 Believe that the circumstances as described are not possible.
13 Believe that the action is impossible.
14 Believe that the consequences as described are not possible.
15 Believe that the desired features cannot be realized.
16 Disagree that the desired value is a legitimate value.

Consider a system for electronic deliberation, like a dialogue between a government computer system presenting information on an issue requiring a decision for political action, and the citizens who can interact at a computer terminal by asking questions and presenting arguments. Such a dialogue can be automated using this formal model of practical reasoning and critical questioning. A proposal for action can be cast into the practical reasoning model specifying the requirement for defending and attacking it.

To better accommodate this system, and place it in relation to existing argumentation schemes, the scheme for practical reasoning needs to be classified in relation to some other schemes that are often intertwined with it in argumentation. One of these schemes is argument from consequences, in both its positive and negative form – see Section 3 above. This pair of schemes depends on some way of assigning positive or negative values to consequences of actions. Thus there is another pair of schemes that is even more fundamental in everyday argumentation.

SCHEME FOR ARGUMENT FROM POSITIVE VALUES

If I carry out action A, it will promote value V.
Value V is a positive value.
Therefore I should carry out action A.

SCHEME FOR ARGUMENT FROM NEGATIVE VALUES

If I carry out action A, it will promote value V.
Value V is a negative value.
Therefore I should not carry out action A.

The research project of classifying schemes has been started, and for this project it is important to recognize how more complex schemes, like the one for the slippery slope type of argument, for example, can be classified as subspecies of simpler schemes, like argument from consequences. (AS1) is a complex form of practical reasoning that joins argumentation from values to instrumental practical reasoning.

To display the proper classification structure of Atkinson et al.'s model of practical reasoning, a new formulation of the argumentation scheme for practical reasoning needs to be built on the simpler, instrumental scheme.[16] This new formulation takes the basic scheme to represent only instrumental practical reasoning while the new scheme represents a kind based on values. The difference resides in the premise that has been added to account for values.

SCHEME FOR VALUE-BASED PRACTICAL REASONING

The Goals Premise: I have a goal *G*.
The Values Premise: *G* is supported by my set of values, *V*.
The Means Premise: Bringing about *A* is necessary (or sufficient) for me to bring about *G*.
Conclusion: I should (practically ought to) bring about *A*.

This scheme for value-based practical reasoning needs to have its own set of matching critical questions.

CRITICAL QUESTIONS FOR VALUE-BASED PRACTICAL REASONING

The Goals Question (CQ1): What other goals do I have that might conflict with *G*?
The Values Question (CQ2): How well is *G* supported by (or at least consistent with) my values *V*?
The Alternatives Question (CQ3): What alternative actions to my bringing about *A* that would also bring about *G* should be considered?
The Maximal Efficiency Question (CQ4): Among bringing about *A* and these alternative actions, which is arguably the best of the whole set, in light of considerations of efficiency in bringing about *G*?
The Maximal Value Question (CQ5): Among bringing about *A* and these alternative actions, which is arguably the best of the whole set, in light of my values *V*?
The Possibility Question (CQ6): What grounds are there for arguing that it is practically possible for me to bring about *A*?
The Consequences Question (CQ7): What consequences of my bringing about *A* that might have even greater negative value than the positive value of *G* should be taken into account?

In some cases, values do not need to be taken into account at all, and the basic scheme can be used. In other cases, values are important factors that need to be taken into account. To evaluate these cases, the scheme for value-based practical reasoning should be applied. Both the basic scheme and the value-based scheme have been presented so far as representing the solitary reasoning of a single agent who examines the arguments for and against various alternative actions that are being considered as means to solve a problem or realize a goal that agent has. But of course, to use practical

reasoning to offer a formal definition of the speech act of making a proposal, (at least) two parties are involved, presumably engaged in deliberating with each other.

Which then is better for use in evaluating cases of value-based practical reasoning, the seven critical questions or the 16 attacks on a proposal for action? There is a general problem about burden of proof that affects both the basic scheme for practical reasoning and the value-based scheme, and that involves argument from consequences as well. When a proponent puts forward an argument fitting one of these schemes, and the respondent asks one of the appropriate critical questions, is that enough to defeat the argument until such time as the proponent puts forward an appropriate reply? Or is the burden of proof on the respondent to back up his criticism with evidence to support it, before the argument is defeated? This question affects how argumentation schemes can be represented by argument diagrams, and is highly significant as an issue of methodology (Reed and Walton 2003). If critical questions could be represented as implicit premises of an argument on the argument diagram, the diagramming technique would be more powerful, because it could model dialogue factors like critical questions. But if critical questions cannot be so represented on an argument diagram, some additional way of modeling dialogues has to be used. To deal with the problem, it needs to be recognized that some critical questions do not appear to require a burden of proof to act as defeaters, while other do (Walton and Godden 2005). In the case of the basic scheme for practical reasoning, it appears that all the critical questions function as implicit premises and each seems to require some sort of answer to make the argument plausible as representing a proposal that should be taken seriously. But one can easily see how disputes about burden of proof can arise, for example with (CQ5), the consequences question, or even with use of argumentation from consequences used to attack the proposal put forward. This problem is a general one for argumentation schemes, and indeed the problem of burden of proof is a fundamental one for argumentation theory as a whole. We will return to this fundamental problem once the examples of making a proposal in deliberation from Section 2 have been analyzed in Section 9.

8. Pre-conditions, post-conditions and formal definition of making a proposal

A speech act, or type of move in a dialogue, like putting forward an argument or making a proposal, performs roughly the same function in all of the six basic types of dialogue. Specific conditions for the successful use of such a speech act vary from one type of dialogue to another. In general however, there will be three basic characteristics of any type of move that have to be defined. These are the pre-conditions of the move, the conditions defining the

move itself, and the post-conditions that state the result of the move. For some speech acts, like that of making an assertion, it may be fairly easy to define all three types of conditions. You can make an assertion any time in a dialogue, and then the proposition that was asserted goes into your commitment store. But if the other party questions it, you are obliged to either defend it or retract it.

Defining the pre-conditions, defining conditions and post-conditions for the speech act of putting forward an argument has proved to be more controversial. Generally, the appropriate point in a dialogue to put forward an argument is that where the other party has questioned a claim that you have made. Hamblin (1970) calls this kind of request for justification in his formal model of dialogue a why-question of a certain type. However, it would appear that participants in a persuasion dialogue of the most general kind should be reasonably free to put forward an argument at any appropriate point. It is a controversial question in argumentation theory precisely how the speech act of putting forward an argument should be defined (Krabbe 2005). But let's say this issue could be settled. Then there is a question of what the post-conditions are for the speech act of putting forward an argument. Does the other party have to accept the conclusion of the argument unless he immediately critically questions the argument or poses counter arguments? Setting down such a requirement as mandatory would make it much simpler to answer the question of how argument in persuasion dialogue represents a model of rational argumentation.[17] But it is extremely dubious whether this requirement models the notion of argument either in everyday conversational discourse or in legal argumentation. Indeed, it seems that that it does not (Walton 2003).[18]

The obligation to defend an assertion is sometimes called burden of proof or burden of production, referring to the need to produce evidence to support a claim made. The other party must, at the next move, accept what was asserted as a commitment, or question or criticize it in an appropriate way. This much is clear in outline. However, such matters are defined and implemented precisely will depend on the type of dialogue. Such matters can only be defined and analyzed properly by looking at the rules and properties of the dialogue as a whole. Atkinson et al. (2004b, p. 153) have presented the syntax for a formal deliberation dialogue called the PARMA action persuasion protocol. This syntax comprises two layers. One is an inner layer in which the topics of conversation are presented formally. This layer of appears to correspond to what we think of as the dialogue structure of a conversation. The other one is an outer layer comprising locutions that express the illocutionary force of the inner content. This layer seems to correspond to the defining the conditions for the speech acts used by both parties in the dialogue. The speaker utters the locution 'enter dialogue' to enter the dialogue. Once the speaker has entered the dialogue he can utter the locution 'leave' dialogue, and the post-condition of uttering this

speech act will be that the speaker has left the dialogue. By other locutions the speaker indicates that he is finished making his move and when this occurs his turn is finished. The speaker and hearer can switch roles. And each can accept or reject a denial of his or her position.

A commitment store is associated with each participant recording the commitments made by each party during the course of the dialogue. Atkinson et al. (2004b, pp. 154–155) have specified pre-conditions and post-conditions of the types of moves (locutions) made by the parties in deliberation dialogue. The commitment-based nature of their specification of conditions for proposing an action was made explicit: "commitments in this protocol are dialogical – i.e., statements, which an agent must defend if attacked may bear no relation to the agent's real beliefs or intentions". Five of their locutions are for the speech act of making a statement, while the other five are for the speech act of asking a question. The five locutions for making a statement are: (1) state circumstances, (2) state action, (3) state consequences, (4) state logical consequences, and (5) state purpose. The five locutions for asking a question are: (1) ask circumstances, (2) ask action, (3) ask consequences, (4) ask logical consequences and (5) ask purpose. In Atkinson's scheme, the argument for positive values is incorporated in AS1, and that from negative values is addressed through CQ9. How these locutions are used in deliberation dialogue is illustrated in the summer holiday deliberation dialogue in Table II. A new formal dialectical definition of the speech act of making a proposal will next be framed to help provide a deeper analysis.

According to the new formal definition of the speech act of making a proposal, two parties are engaged in a deliberation dialogue, the proponent who puts the proposal forward, and the respondent, representing the agent or group of agents to whom the proposal is directed in the deliberation context. What is proposed is a proposition. It is assumed that there are two (in the simplest case) agents a and b, engaged in a deliberation dialogue D that has a governing question Q. It is assumed that there is a set of propositions (statements), $p, q, r,...$, and that these propositions can be contained in speech acts, and that they can also represent states of affairs that can be brought about. The speech act of asserting p contains the proposition p. For example, if p represents the state of affairs agent a might be able to bring about p by bending over and picking up the pen and putting it on the desk.

The new dialectical model of the speech act of making a proposal, in which a proposes proposition p to b, is to be regulated in deliberation dialogue by a set of essential conditions. The central defining condition sets out the conditions defining the structure of the move of making a proposal. It sets the requirement that to count as the making of a proposal, the move made in the dialogue must fit a certain kind of multi-agent practical reasoning structure. In this type of move, a puts forward three propositions, where the term 'we' is used to refer to both a and b, or in a case of more than two

participants, to all taking part in the deliberation dialogue. These three statements are called the reasons for the proposal.

SCHEME FOR MULTI-AGENT PRACTICAL REASONING IN DELIBERATION DIALOGUE

The Goal Statement: We have a goal *G*.
The Values Statement: G is supported by our common set of values, *V*.
The Means Statement: Bringing about *q* is necessary (or sufficient) for us to bring about *G*.

The second condition defining the structure of the move is that, based on these three assertions as reasons, *a* draws an inference to a conclusion that is a proposition of the following form.

The Proposal Statement: We should (practically ought to) bring about *q*.

According to this condition, on any occasion in deliberation when a move of making a proposal is made, it will always be seen as having this multi-agent practical structure. This structure will then determine what the effects are on the other agents in the dialogue.

The central post-condition, called the response condition, is that, at all subsequent moves of the deliberation dialogue, after *a* has made a proposal, the rationale of the proposal must be open to critical questioning by *b*. This requirement clarifies the nature of the relationship between the *prefer* move and the *ask_justify* move in the formal structure of deliberation dialogue of Hitchcock et al. studied in 4 above. What sort of connection should there be between these moves, and how should the notions of burden of proof and openness to questioning be represented? Using the scheme for value-based practical reasoning helps clarify this relationship. In particular, *a* should be open to answering doubts and objections corresponding to any one of the seven critical questions for value-based practical reasoning listed in Section 7. The response condition set by these critical questions helps to explain how and why the maker of a proposal needs to be open to questioning and to requests for justification. More than that, however, the proposer needs to be open to counter-proposals, and must be held to giving reasons why her proposal is better than the alternatives. This leads us to considerations of burden of proof.

Another post-condition is that if *b* asks any one of these critical questions in the deliberation dialogue, and *a* fails to answer the question appropriately, the proposal immediately defaults (is defeated). The grounds of defeat are that insufficient reasons have been given to support the proposal adequately. Another condition is that the reason statements are rightly considered by *a* to be commitments of both *a* and *b* in the dialogue. It is assumed that the inference from the reason statements to the proposal statement fits the argumentation scheme for value-based practical reasoning. According to the

new definition, the proponent proposes the proposition to the respondent if and only if: (1) there is a set of premises that the proponent is committed to, that fit the premises of the argumentation scheme for practical reasoning (2) the proponent is advocating these premises, that is, he is making a claim that they are true or applicable in the case at issue, (3) there is an inference from these premises fitting the argumentation scheme for practical reasoning, and (4) the proposition is the conclusion of the inference. This definition performs the interpreter function in any formal dialogue system. It checks whether any move made in the dialogue fits a defined speech act or type of move that is recognized as legitimate.

Now let's summarize the main points of the new dialectical analysis of the speech act of making a proposal.

DIALOGUE CONDITIONS FOR MAKING AND DEFENDING A PROPOSAL

Pre-conditions

Move identification condition. Two parties, the proponent and the respondent, are engaged in a deliberation dialogue, and the proponent puts forward a proposition, saying she *proposes* it.

Relevance condition. The pre-condition is that there is a governing question of the dialogue, and that the proposition proposed is related to it in an appropriate way at the move where it was put forward.

Defining Conditions

Condition defining the function of the move. The proposition is taken to represent an action, and by making this move, the proponent is advocating that both parties commit to carrying out this action as a joint undertaking in their deliberations

Conditions defining structure of move. The proposition is taken to fit the conclusion slot in the scheme for multi-agent practical reasoning. It is assumed that there is a set of premises that fit the premises of the argumentation scheme for multi-agent practical reasoning, and that an inference from these premises fits the scheme.

Post-conditions

Proponent's commitment condition. The proponent is committed to the proposition, as soon as he makes the proposal move, and to any premises she might offer as claimed to support it.

Response condition. At the next move, it is possible for the respondent to criticize the proposal in one or more of five appropriate ways: (1) the goal premise, the means premise or the values premise can be questioned, (2) the premises can be attacked by counter-arguments alleging that one or more of them is false, (3) the inferential link between the premises and conclusion can be undercut by asking critical questions matching the scheme for practical reasoning, of the kind listed in Section 7, (4) the practical reasoning can be rebutted by counter-arguments, like argument from negative consequences, rebutting the proposition (conclusion), or (5) a counter-proposal for a different proposition can be put forward.

Respondent's commitment condition. If the respondent fails to respond in one of the five above ways at the next move, he becomes committed to the proposal.

According to the relevance condition, the proposal must fit as a solution that could solve the problem posed in the governing question Q of the deliberation dialogue D. These notions of fit require further analysis. In the model of Hitchcock et al., the governing question postulates some goal that needs to be realized, and that what is needed is some action. The proposal fits as a solution that could solve the problem posed in the governing question if it is, at least arguably, such an action.

Once the proponent has put forward a proposal for some proposition, how should the respondent have to react to it at the next move? The answer is comparable to the case of the speech act of putting forward an argument, as discussed above. If the respondent fails to react to the proposal in one of the five ways stated in the response condition, then the respondent should be assumed to have accepted the proposal. In other words, the post-condition defines how the commitment stores of the parties are affected at the next move after the proposal is put forward. The proponent is already committed to the proposal in the manner already indicated, and the respondent becomes committed to it unless he challenges it in one of the five ways.

This much said, an important qualification has to be made. The dialogue conditions for making and defending a proposal stated above need to be seen as applying only to the making of a proposal in a later stage of the deliberation dialogue where recommendations for options for action are being put forward. This qualification is important because proposals can, in some

instances, be put forward tentatively in brainstorming sessions.[19] In such a case, the proposal being put forward is not necessarily being recommended as an action that should be taken immediately. Instead, participants in the deliberation dialogue may be only at this stage of suggesting possible options for action appropriate to the governing question, without meaning to require any confirmation of acceptance of the recommended option at that point in the dialogue. In drawing this important distinction, a central reference needs to be made to the different stages in the formal model of deliberation dialogue cited in Section 4 above. As noted there, Hitchcock et al. (2005) put forward a model of formal deliberation dialogue that has eight stages. Stage 2 is the suggesting of possible action-options appropriate to the governing question. Stage 6 is the recommending of an option for action, and acceptance or non-acceptance of this recommendation by each participant. The precise qualification that needs to be made is that the dialogue conditions for making and defending a proposal, as stated above, apply only to the making of a proposal at stage 6, and not necessarily to the putting forward of a proposal in a tentative manner at stage 2.

It would appear that the respondent's commitment condition marks a key difference between the speech act of making a proposal and the speech act of putting forward an argument. As shown in Walton (2003), when a respondent puts forward an argument in a persuasion dialogue, even if the argument is structurally correct (valid) and the respondent is committed to the premises, it does not need to follow that the respondent becomes committed to the conclusion at his next move. In contrast, it would seem that in a deliberation dialogue, when a proponent makes a proposal, the respondent should become committed to the proposition proposed, at his next move, unless he criticizes it in one of the five ways set in the response condition. This lack of parallel between arguing and proposing needs further study, but it is worth noting the contrast.

9. Analysis of examples

In this section, we reconsider the three examples in Section 2, where an agent has put forward a proposal to another agent in a deliberation and offered arguments to support the proposal. The software tool *Araucaria* (Reed and Rowe 2005)[20] is applied to these examples to show how the making of a proposal is more like an argument than the traditional speech act analysis reveals. *Araucaria* aids a user when constructing a diagram of the structure of an argument by using a simple point-and-click interface, which may be then saved in a portable format called *AML*, or Argument Markup Language, based on *XML* (Reed and Rowe 2002). The user inserts the text to be analyzed as a text document into *Araucaria* and uses the cursor to highlight each

statement in the text that appears in the left box on the screen. Each proposition (premise or conclusion) in the argument appears as a node, represented as a text box containing the proposition. The user also draws in arrows from each premise to each conclusion it supports, and can also put in refutations, marked with a double arrow. Implicit premises can also be inserted, and are marked with a hyphenated border. The result is an argument diagram connecting all the premises and conclusions in a diagram that appears in the right box on the screen. Arguments as presented in a given text can generally be analyzed in a simple way, and then later, in more depth, showing more implicit premises.

Implicit premises of practical reasoning in deliberation are often based on what Aristotle (1939) called *endoxa*, statements that seem to be true by the majority and the wise (*Topics* 100b23). Barnes (1980, p. 500) translates *endoxon* as "reputable" or "of good repute", suggesting that *endoxa* are not only public opinions, but ones that are generally supported by the current consensus of scientific opinion. They are opinions generally accepted by the public, but also by the experts. They could be called generally accepted opinions. The account of *endoxa* in the *Topics* (100b22–24) defines them as follows: "those opinions are reputable that are accepted by everyone or by the majority or by the wise." In making and defending a proposal, the argumentation often rests on generally accepted opinions of the audience that are not explicitly stated as premises. Inferences drawn by practical reasoning from *endoxa* in public deliberations tend to be fallible, and inherently subject to critical questioning. Reasons in a public deliberation are convincing when their probative weight is evaluated against opposing arguments that have been given in a deliberation so far.

The argumentation in the no-fault insurance example can be classified as an instance of argument from consequences. It is argued that the no-fault system would have a bad consequence, that is, it would unfairly result in good drivers paying for bad drivers. The other side argued that the no-fault system would fail to lower insurance premiums. Since it is assumed that the outcome of having lower insurance premiums is a value, or positive goal for both parties, this argument could also be viewed as a species of argumentation from consequences.

At first sight, it does not appear that the no-fault insurance example represents a deliberation dialogue, because it does not appear that two agents are involved and are engaging in dialogue. However, the no-fault insurance example is implicitly an instance of deliberation dialogue, because there are two sides, the pro and contra, on the proposal of bringing in a new no-fault insurance system. Each side presented an argument. The opposed side argued that the no-fault system would unfairly make good drivers pay for bad drivers. The statement is an attack on the proposal to bring in a new no-fault insurance system.[21] In the diagram in Figure 1, this attack is joined by a

double arrow to the proposal, indicating it is diagrammed as a refutation (rebuttal). The failure to lower insurance premiums is taken as a disadvantage of the proposal of the no-fault system. It is a disadvantage in the sense that it would fail to bring about something that is a positive value, even though one might expect that it would have this positive consequence. Thus the argument can be seen as an attack on the expectation that the majority would have to the effect that a no-fault system would lower insurance premiums. Not literally everyone would have this opinion, but it could be reasonably expected that it would be a generally accepted opinion. This opinion can be classified as an *endoxon* of the kind defined in Section 2. This in Figure 1, the denial 'The no-fault system would fail to lower insurance premiums' is diagrammed as a refutation of the opposed claim it is joined to by a double arrow. But to analyze the no-fault insurance more deeply, we now need to confront the problem posed by the burden of proof dialogue (Section 6).

The argument diagram takes us only so far in analyzing and evaluating the argument in this example. We can model the proposition that the no-fault system would fail to lower insurance premiums as a refutation on the diagram, and classify it as an *endoxon*, a premise that would be generally - accepted, but such a proposition is not beyond challenge, as the burden of proof dialogue showed. The argument diagram technique is useful to a point, but has its limits when used as a tool to address such problems of burden of proof. Dialogue protocols used to regulate shifts in burden of proof of the kind that occur in persuasion dialogues (Prakken et al. 2005) can be applied to deliberation dialogue. The tool needed is a protocol by which a meta-dialogue is embedded into a deliberation dialogue. For example, in the burden of proof dialogue for the no-fault insurance example, at any given move in the dialogue where a burden of proof deadlock has arisen, there is a shift to a meta-dialogue. In the meta-dialogue, several factors are taken into

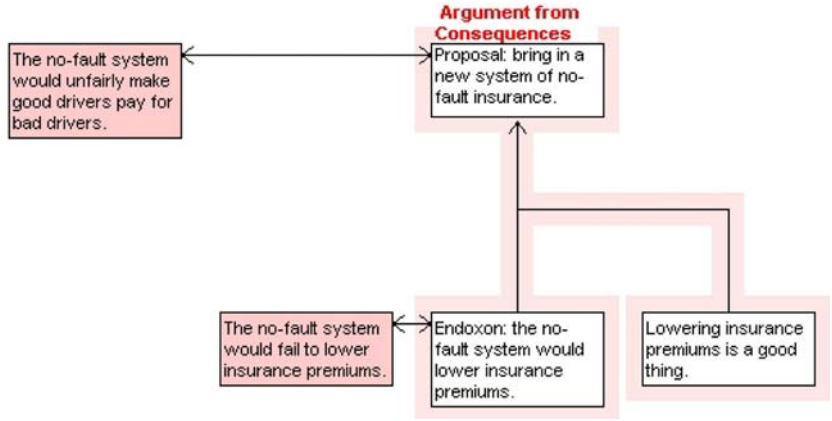

Figure 1. Argument diagram for the no-fault insurance example.

account to make a ruling on the deadlock, including the type of dialogue, the global issue (the governing question in the case of a deliberation), the type of speech act at the specific move where the dispute about burden of proof arose, and the argumentation scheme (where the move is an argument, a proposal, a refutation, or other type of move fitting an argumentation scheme). When the burden of proof dispute has been ruled on in the meta-dialogue interval, the argumentation shifts back to the main dialogue. In the case of the burden of proof dialogue extending the no-fault insurance example, it might be ruled that even though it is generally accepted that bringing in a no-fault policy would lower rates, the advocate of the no-fault proposal should give at least some evidence for this claim if the discussion is to proceed further. Whether in fact this would be the ruling would however depend on the specifics of the case.

The above analysis of the argumentation in the no-fault insurance example could be carried out in more depth, but the relatively simple analysis of it offered above is enough to bring out many of the most important features of how the making of a proposal in a deliberation can be analyzed by making the argumentation surrounding it more explicit. It can be suggested that applying this method of analysis to a more detailed case study of the argumentation to the full case as described by Lascher (1999) would be an interesting research project. For reasons of limitations of space, we keep the analyses of all three examples treated here at a simple level.

In the Katrina example, the author writes that the tax he proposes would serve three purposes. One might try to analyze the argument by taking the author literally, and expressing these three purposes as goals. Then one might fit the actions described in the case with these goals into sequences of practical reasoning. However, a simpler way to analyze the argument is to see the three reasons that the author offers to support his proposal as consequences that have positive value in supporting the proposal. This way of reconstructing the argument would use argumentation from consequences as the key argumentation scheme.

In the Katrina example, three reasons supporting the proposal were given. We begin by stating the governing question, the proposal, the accompanying action, and the three reasons supporting the proposal.

> Governing Question: Mail Call asked readers to ponder on how the costs of Hurricane Katrina should be paid for by the government.
>
> Proposal: A practical way to pay for hurricane reconstruction would be with a motor-fuel tax on gasoline, diesel and ethanol.
>
> Accompanying Action: The U.S. Treasury could post a running tally on the Internet telling everyone how much tax has been collected at that time, and giving an estimated rate at which the tax would end.

Here are the three reasons supporting the proposal:

Reason 1: With every fill up, Americans would be aware of the need to sacrifice and contribute to the rebuilding effort.
Reason 2: It would put a much-needed damper on oil demand.
Reason 3: We would not go further into debt borrowing against our future.

It can now be displayed in a diagram how the argumentation schemes for practical reasoning and argument from positive consequences can be used to analyze the proposal made in the Katrina example, using the argument diagramming system *Araucaria*.

Each of the three reasons 1, 2, and 3 represents an independent argument offered in support of the proposal. Reason 1, taken together with the accompanying action is represented as a linked argument. The proposal is related to the governing question by a sequence of practical reasoning by presenting a means for solving the problem posed in the governing question.

The analysis represented in Figure 2 is relatively simple, but brings out some of the most important components of the proposal in a helpful diagrammatic representation. As noted above, however, we could work up a deeper but more complex analysis that shows the practical reasoning links between goals and means. A first move in such an analysis would be to break the reasoning down into the following components.

Goal: to get funding for government-provided reconstruction costs of Hurricane Katrina.
Goal: to make Americans aware of the need to sacrifice and contribute to the rebuilding effort.
Goal: to put a much-needed damper on oil demand.
Goal: not go further into debt borrowing against our future.
Action: to have the government collect a motor-fuel tax on gasoline, diesel and ethanol.
Action: to have the U.S. Treasury post a running tally on the Internet telling everyone how much tax has been collected at that time, and giving an estimated rate at which the tax would end.
Implicit Assumption: if with every fill up, the U.S. Treasury posted a running tally on the Internet telling everyone how much tax has been collected at that time, giving an estimated rate at which the tax would end, it would make Americans aware of the need to sacrifice and contribute to the rebuilding effort.
Implicit Assumption: collecting a motor-fuel tax on gasoline, diesel and ethanol would put a much-needed damper on oil demand.
Implicit Assumption: collecting a motor-fuel tax on gasoline, diesel and ethanol would mean there would be no need to go further into debt borrowing against our future.
Conclusion: the proposal to collect a motor-fuel tax on gasoline, diesel and ethanol is practically justified.

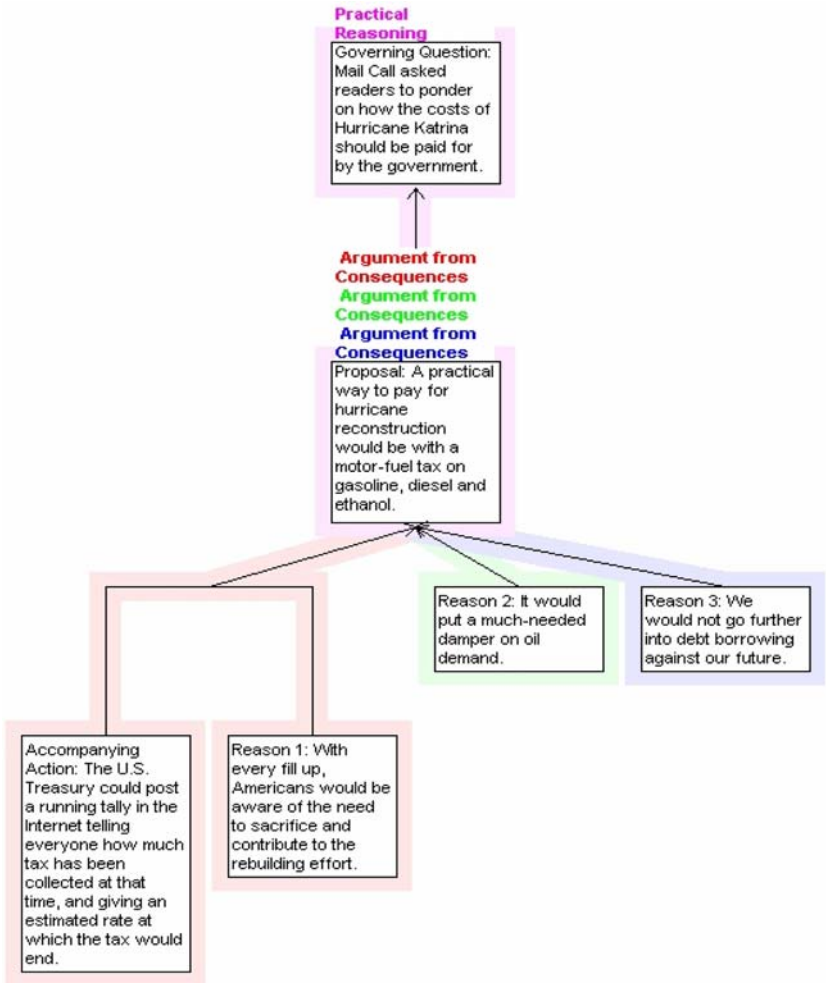

Figure 2. Argument diagram for the Katrina proposal.

Conclusion: the proposal to have the U.S. Treasury post a running tally on the Internet telling everyone how much tax has been collected at that time, giving an estimated rate at which the tax would end, is practically justified.

By linking these components into sequences of practical reasoning, a deeper analysis than the one above could be produced. We do not attempt to make such refinements here, but pass on to the third example.

In the report card example, the first part contained a proposal put forward by the senator and the health expert.

Proposal: Children should be subject to weight, flexibility, muscular and cardio-respiratory endurance tests at school once a year, and compared to other students in the country.

The problem the proposal is supposed to deal with is the perceived problem of childhood obesity. The senator was quoted in the article as saying, ‘‘a drastic

response was needed to (deal with) the doubling of childhood obesity in the last decade, leading Australia to be among the top three heaviest nations'' (part in parentheses inserted). Another part of the problem is that parents do not realize their children are overweight or unfit. The solution advocated is to have a report card that would inform parents if their child is overweight or unfit.

What is especially interesting in this example is how the respondent (the DAA) attacks the proposal in the second part by bringing forward two kinds of objections. One is to put forward an argument from negative consequences, based on the following three premises.

P1: The report card proposal can have a negative impact on self-esteem and body image.

P2: The negative impact on self-esteem and body image may lead to unhealthy eating practices, including drastic attempts at weight loss.

P3: Drastic attempts at weight loss are potentially dangerous in growing children.

In addition to this counter-argument, the other type of objection is to offer a set of four alternative solutions to the problem.

A1: Schools can role-model healthy food choices via a healthy school canteen,

A2: Schools can role-model healthy food choices by not using inappropriate foods in fundraising activities.

A3: Schools can role-model healthy food choices by ensuring adequate nutrition content in their curriculum.

A4: Schools can provide good nutrition information in conjunction with health services to parents who need support at home.

Each of these alternatives is claimed to be ''far better'' than the report card proposal, as a way to solve the problem.

This example, like the first two, can easily be structured using an argument diagram to show how the counter-arguments are posed as refutations of the proposal. We shall not do this, however, but merely summarize some of the main features such an analysis would bring out. The governing question is the perceived problem of childhood obesity in Australia. The proposal to have a report card is put forward as solution to this problem. The objections made in part two of the example fall into two categories. The first is composed of argumentation from negative consequences. The second is an argument to the effect that the problem of childhood obesity in Australia can be solved by other means, namely the four alternative solutions A1–A4. These other means are claimed to be better, presumably on the grounds that they do not have the same negative consequences cited as objections to the original proposal. But should the four alternative solutions be classified as a counter-proposal, or perhaps as four counter-proposals? Or are they merely alternative means that would (supposedly) accomplish the same goal? This is a borderline issue. They are perhaps not quite specific enough to constitute a proposal. But they could easily be put forward as a proposal, or parts of one. They fit as a proposal in principle, precisely because they fit the model of

practical reasoning as means to carry out the goal of solving the expressed problem of obesity of children.

Next we examine the deliberation dialogue represented in Table II. In the summer holiday example, agent A put forward a proposal for a beach holiday and offered arguments to support it. Agent B disagreed, offering arguments against A's proposal, and putting forward a counter-proposal for a skiing holiday. Agent B offered arguments supporting this proposal, and agent A offered arguments against B's proposal. These two opposed proposals can be called the beach holiday proposal and the skiing holiday proposal. Agent A put forward the beach proposal while agent B put forward the skiing proposal. The part of the argumentation relating to the beach proposal is represented in the *Araucaria* diagram in Figure 2. A's proposal and the reasons offered in support of it are pictured on the right. B's objection to the proposal is an attack, represented on the left as a refutation, or rebuttal of the proposal. Two reasons, connected together in a lined argument, are offered to support the rebuttal.

We can analyze the argumentation in the beach holiday proposal further. Implicit premises could be added concerning the goals and values of the two agents, exhibiting the practical reasoning. How the argumentation scheme for practical reasoning can be applied to such cases has already been shown in Figure 3.

However, it would be good to analyze an example in which an implicit premise has been added. Hence we construct an argument diagram for the proposal for the skiing holiday, shown in Figure 4. The text box joined to B's proposal by a double arrow is displayed as A's attack directed to rebutting B's proposal. A puts forward a convergent argument representing two separate lines of argument in support of her claim, 'Going skiing means going on a holiday to somewhere that is not a cold climate'. A made the explicit statement, 'I want a vacation in the sun' as her reason supporting this claim, but in Figure 4, there is also an implicit premise, 'Going on a holiday to somewhere that is in a cold climate would not fulfill my goal of having a holiday in the sun'. The argumentation in both the beach and the skiing proposals could be analyzed further, but we shall not do so here.

There are some main points shown by the argument diagrams in Figures 3 and 4 that deserve further comment. Each diagram shows how the supporting arguments feed into the proposal and how counter-arguments can be mounted against it. Something of a dialogue is also shown, because how each argument belongs to an owner, either agent A or B, as is shown. Any given case of the making, defending and attacking of a proposal can be analyzed, to some degree, using such a diagram. However, what the diagram doesn't represent, at least very deeply, is the structure of the deliberation dialogue. The machinery needed to analyze a case of the making of a proposal in an example given in a text of discourse is therefore quite elaborate. We need not

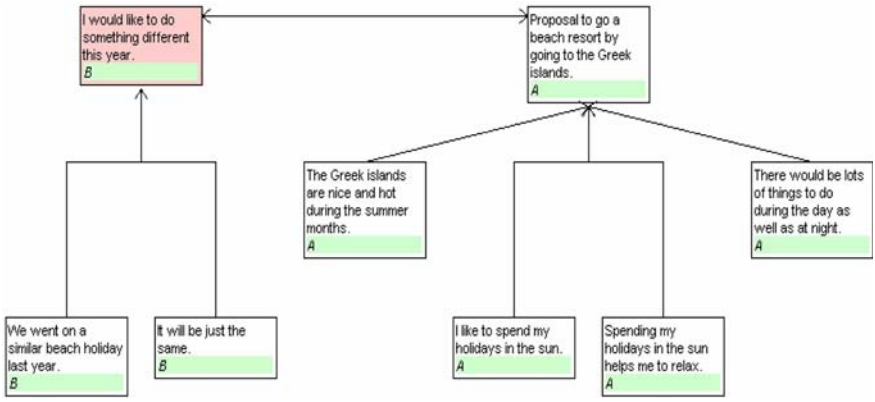

Figure 3. Argument diagram for the beach holiday proposal.

only the argument diagram representing the structure of the argument, along with its support and attack data, but also a way of tracking how each argument fits into the structure of the deliberation as a whole, as outline in Section 4. There may be a shorter way to do this, however, without having to bring in the whole dialectical apparatus of deliberation dialogue to analyze any brief and fairly simple example of the kinds shown in Section 2.

The profile of dialogue is a tool that can be applied to arguments given in relatively small examples where the context of dialogue matters, but where only a small number of dialogue moves and counter-moves are involved. Krabbe (1999) has shown how profiles of dialogue can be used to analyze argumentation in cases where characteristics of a particular short sequence of moves need to be represented. Vreeswijk (1997) and Reed (1998) have shown how ordered dialogue sequences of moves (essentially profiles of dialogue) technique have been useful in multi-agent computing. The profiles technique

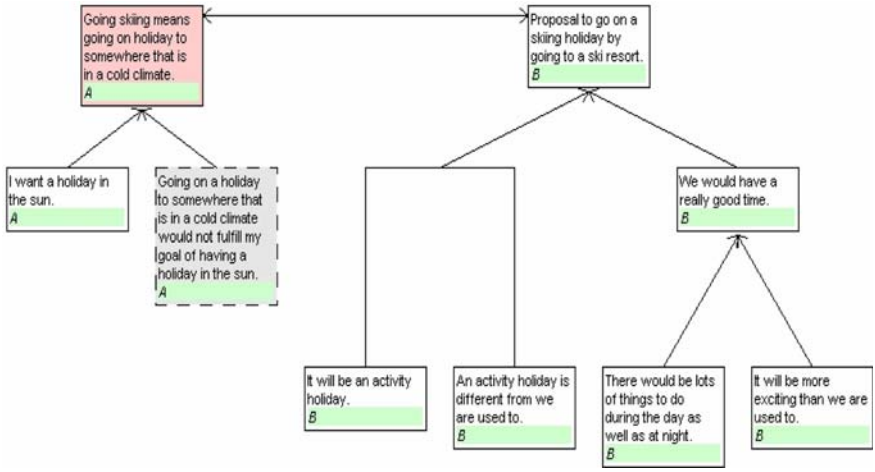

Figure 4. Araucaria diagram for the skiing holiday proposal.

is described in (Krabbe 1999). In connection with the study of informal fallacies, and other kinds of problems dealt with in applying logic to specific cases, typically a short case comprising a few lines or a paragraph of text is dealt with. Instead of bringing the whole apparatus of a formal model of dialogue to bear on a relatively small case, a focus on a short sequence of moves at a local level that are part of a longer dialogue may be enough.

Table II could be taken as a preliminary example of a profile of dialogue where the moves have been put in an orderly sequence. But usually profiles are expressed as a tableau with two columns, each one representing the moves each party made at each turn, so that the moves are connected in the right order – not necessarily the same order they took in the real example of dialogue supposed to be represented by the tableau. Thus a profile would structure the dialogue by virtue of how each move is connected in a formal system of dialogue with each preceding and following move. Thus Table II is not really a profile of dialogue in a strict sense. It needs quite a bit of cleaning up by further analysis of the argumentation sequences in it before it might qualify as a profile of dialogue. In the case of the sequence of deliberation displayed by the example in Table II, this cleaning up is not an easy or simple job, because the argumentation in the example is actually quite complex. What can be done here that would be helpful is to analyze the sequence of argumentation in Table II by building a semi-profile that shows how the argumentation pictured in Figures 3 and 4 fits into the connected sequence of deliberation dialogue. This fitting together of the argumentation in the dialogue is shown in Table IV.

As shown in Table IV, the argumentation structures in Figures 3 and 4 fits into the semi-profile at certain points. For example, as shown in the analyses of moves 10, 11 and 12 in the rightmost column, linked argument structures represented in one of the argument diagrams (Figures 3 and 4) need to be embedded into the sequence of dialogue to show how goals and actions are connected in practical reasoning. To get a better analysis of these arguments, implicit assumptions need to be added. We have only carried out the analysis in a relatively superficial way here, to show in outline how the tools can be applied to a real case of deliberation. A well-worked out profile of dialogue for the argumentation in the whole sequence of deliberations would need to have many details filled in.

One important lesson of these examples is that the making of a proposal always needs to be analyzed by taking into account the argumentation surrounding it. It is easy to see that, in such cases, the proposal made is the conclusion of an argument in a context of deliberation dialogue. Why and how it represents an argument in such a context is only revealed when two factors are made explicit. One is the explicit or implicit premises in the argument. The other is the opposition to the argument, expressed by attacks, doubts, questions or attempted refutations directed against it. In

Table IV. Semi-profile of the summer holiday deliberation dialogue

Move	Party	Move	Analysis
1	A	Let's go to one of the Greek islands.	Proposal offering an answer to governing question of where to go for holiday.
2	B	Let's go to a skiing resort.	Proposal offering an answer to governing question of where to go for holiday.
3	B	There would be lots to do during the day and at night.	Reason in support of skiing proposal made at move 2.
4	B	We would have a really good time.	Goal of having a good time fulfilled by actions of having lots to do (move 3).
5	A	There would be lots to do during the day and night.	Reason in support of Greek island proposal made at move 1.
6	A	Because it's a beach resort.	Implicit premise: At a beach resort there would be lots to do during the day and at night.
7	A	The Greek islands are nice and hot during the summer months.	Part of linked argument supporting Greek islands proposal.
8	A	I like to spend my holidays in the sun.	Part of linked argument supporting Greek islands proposal.
9	A	Spending my holidays in the sun helps me to relax.	Part of linked argument supporting Greek islands proposal.
10	B	We went on a similar beach holiday last year.	Factual assertion.
11	B	The beach holiday proposed this year will be just the same.	Connected to move 10 and move 12 as one of a set of premises (10, 11, 12) rebutting the Greek island proposal.
12	A	I would like to do something different this year.	Connected to move 10 and move 11 as one of a set of premises (10, 11, 12) rebutting the Greek island proposal.
13	A	Going skiing means going on holiday to somewhere that's in a cold climate.	Rebuttal of the skiing proposal made at move 2.

Table IV. Continued

Move	Party	Move	Analysis
14	A	I want a holiday in the sun.	Repetition of statement made at move 8.
15	B	The skiing proposal will be an activity holiday.	Factual assertion.
16	B	An activity holiday is different from we are used to.	Assertion linked as premise with assertion made at move 15. Implicit premise that doing something different is a value.
17	B	It will be more exciting than we are used to.	Supports B's assertion at move 4 that we would have a good time.

some cases, an example of the speech act of making a proposal is accompanied in the given text of discourse by an explicit statement of these two factors. In other cases, like the three examples above, the proposal is a mixture where some of its elements are explicit and other are implicit. However, it is quite possible to just make a proposal without explicitly stating any reasons for or against it. In such a case, the proposal is best seen as a function, or empty placeholder, into which arguments for and against need to be fitted in. It must be open to counter-arguments and opposed proposals, and open to presenting argument that support the proposal and defend it against these attacks.

10. Evaluating argumentation supporting and attacking proposals

The new dialectical analysis has been primarily addressed to the problem of how to analyze the speech act of making a proposal by seeing how it contains the potential for argumentation in a context of deliberation dialogue. It has been shown how making a proposal contains both the potential for a proponent's defending it and the potential for a respondent's attacking it. But a basic question remains. How should we evaluate the making of proposal in a given case as weak or strong, relative to the arguments that have offered to support it, balanced against those used to attack it? We will not try to fully answer the evaluation question here. However, by using the tools deployed above, like the scheme for practical reasoning, the matching critical questions, and the argument diagrams, we have put an argumentation-based analysis into place. The basic structure of this analysis is summarized in Figure 5.

This argumentation-based analysis sets up a structure in which evaluation of the speech act of making a proposal in a deliberation dialogue is made possible. The whole remainder of the diagram below the first box is the justification needed to support the making of the proposal. The basis of the justification needed to defend the proposal, if it is questioned or attacked, is the scheme for practical reasoning, as displayed in Figure 5. This basic structure, however, in order to be used to evaluate specific cases, needs to be embedded into a deliberation dialogue context containing dialectical presumptions about the specifics of the case. Below, the ten dialectical presumptions needed for evaluating any given case of the speech act of proposing are stated.

Before listing these presumptions, however, we need to turn to a related question. How does the Parmenides structure for the deliberation system for e-democracy approach evaluation? On this analysis, the making of the proposals and the arguments put forward to defend and criticize them are based on practical reasoning. But there are some differences between this approach and the argumentation-based structure when it comes to the issue of how to evaluate proposing. According to Atkinson et al. (2004b, p. 152) a proposal

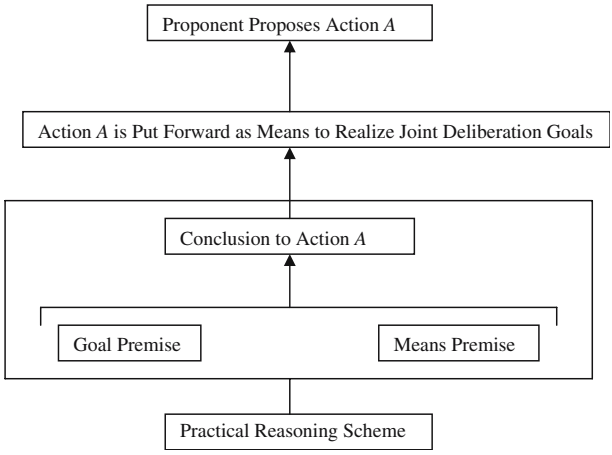

Figure 5. Basic structure of the argumentation-based analysis.

for action may be attacked in sixteen ways. The sixteen attacks (Atkinson 2005, p. 71) were listed is Section 7 above. Some of these attacks deny the truth or validity of the elements of the proposal, while others argue that the same consequences can be achieved by a different action. A third group of attacks argue against the action because of its undesirable consequences. In Table V, the sixteen attacks on a proposal for action are listed in the left column, and each type of attack is classified according to the foregoing analysis of proposing and schemes related to practical reasoning in the right column. Using the new dialectical analysis as a basis, comments can be made on how each of these attacks can be categorized as a clearly definable type of dialogue move, shown in the right column in Table V.

The approach of the Parmenides system is based on using the value-based scheme for practical reasoning in a BDI framework where the argumentation is evaluated by taking into account the attacks on the initial practical reasoning argument. Evaluation is carried out by balancing the relative worth of the attacks of the second party as arguments against the initial argument of the first party.

The argumentation-based structure as a method for evaluating proposals summarized in Figure 5 is simpler than the Parmenides structure. On the former structure, there are basically three ways that a respondent can use to attack a proposal made by a proponent. This evaluation structure is displayed in Figure 6.

The first form of attack, represented by the upper arrow, is to attack one of the premises of the practical reasoning. The second form of attack, represented by the middle arrow, is to attack the inferential link between the premises and the conclusion. The third form of attack is to argue that the conclusion is false by presenting another sequence of reasoning supporting the negation of the original conclusion. An important feature of this

Table V. Set of attacks on a proposal for action in the parmenides system

	Type of attack	Argument basis
1.	Disagree with a description of the current situation.	Dispute a fact
2.	Disagree with the consequences of the proposed action.	Argument from consequences
3.	Disagree that the desired features are part of the consequences.	Argument from consequences
4.	Disagree that these features promote the desired value.	Dispute the means premise
5.	Believe the consequences can be realized by some alternative action.	The alternatives question
6.	Believe the desired features can be realized through some alternative action.	Counter-proposal
7.	Believe that the desired value can be realized in an alternative way.	Maximal value question
8.	Believe that an alternative action realizes the desired value.	Support counter-proposal
9.	Believe the action has undesirable side effects which demote the desired value.	Argument from consequences and argument from values
10.	Believe the action is undesirable side effects which demote some other value.	Argument from consequences and argument from values
11.	Agree that the action should be performed but for different reasons.	Different argument for same conclusion
12.	Believe the action will preclude some more desirable action.	Goals question and values
13.	Believe the action is impossible.	The possibility question
14.	Believe the circumstances or consequences as described are not possible.	Argument from consequences
15.	Believe that the desired features cannot be realized.	Possibility question
16.	Disagree that the desired value is worth promoting.	Values premise

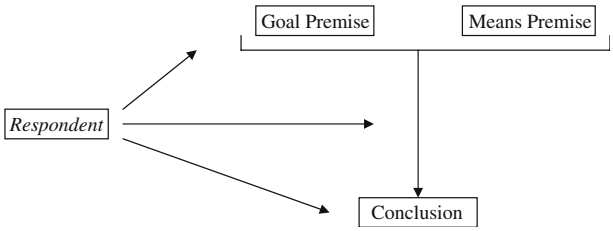

Figure 6. Three forms of attack on a proposal in the argumentation structure.

approach is that a distinction is drawn between critical questions that act as Pollock-style undercutters and refutations (counter-arguments) that act as Pollock-style defeaters.

Either system can be used to evaluate the putting forward, defending and attacking of proposals in deliberation dialogue. But one might ask whether one system is better than the other. The Parmenides system is relatively easy to deploy, as it avoids the difficult and currently controversial question of how to model critical questions in proposition-based systems like the current systems of argument diagramming. On the other hand, it can be argued that the argumentation-based system also has some advantages. It does model the distinction between questioning and refuting, and thus may have more promise in dealing with the problems of burden of proof cited in Section 7. It also breaks down the schemes for argument from values, practical reasoning and argument from consequences into a system of classification so that we can see how the more complex schemes are built up from the simpler ones. We could sum up the main difference between the two systems as follows. The argumentation system is simpler, and thus has explanatory power when analyzing a proposal made in a deliberation. The Parmenides system is more complex, because it takes values into account as reasons behind goals, but this complexity, allowing for sixteen types of attacks, is better suited to the needs of e-democracy.

There is one other very large question that there has been no space to try to fully answer in this paper. The problem concerns embeddings of one type of dialogue into another (Walton and Krabbe 1995). In the early stages of deliberation, much of the dialogue may be of the information-seeking dialogue. The better informed a deliberation is, the better are its chances of reaching an intelligent decision to move ahead with an action that will meet the collective goals of the dialogue. So there can be shifts from information-seeking dialogue to deliberation dialogue. Also, in arguing about whether the premises of a practical inference should be reasonably accepted or not, persuasion dialogue may be involved. Indeed, practical reasoning may often be attacked by raising questions about whether some proposition of fact is true, or whether some action really is a means that will carry out a goal. Thus there can be shifts from deliberation to persuasion dialogue and then back

again. Tracking the nature of such shifts has to be beyond the scope of this paper, but is another important topic for future research.

Another important topic for future research is the study of conditions for retractions of commitment to a proposal by either the proponents or the respondent. A new formal analysis of the speech act of making a proposal in a deliberation dialogue has been presented by McBurney and Parsons (2005, unpublished, Section 3.1). According to this formal definition, the making of a proposal by an agent is a proposal that a specific action be undertaken by another agent conditional upon a state of the world formula which may be null. This state of the world is represented by a propositional formula, which may be represented what they call a ''clock tick''. They make clear in their definition of the speech act of making a proposal that when an agent utters this speech act, it expresses a willingness to accept the proposal at the time it made it. I would argue that this definition is not only compatible with the dialogue conditions for making and defending a proposal set out in Section 8, but supports and extends them. This new formal framework extends prior research on formal models of deliberation dialogue by separating the identity of an agent who first articulates a proposal for action from the identity of any agent who may then retract the proposal. The new problem addressed is to state the conditions for retraction of a proposal once it has been made. Problems of stating conditions for retraction of a proposal, parallel to problems of stating conditions for retraction of commitments in a dialogue, are inherently more difficult from those of stating conditions for making a commitment. Hence in this paper I do not investigate conditions for retraction of proposals, but cite the recent research of McBurney and Parsons (2005, unpublished) as a means of moving forward to investigate this important problem.

Having identified an argumentation move as a proposal, and having analyzed its argumentation structure, how should we rationally weigh its worth as a proposal against criticisms and objections that either have been or might be brought to bear against it? The new dialectical method is to use the scheme for practical reasoning, along with other schemes that may be involved, along with the sets of critical questions matching these schemes. However, these tools need to be used in a normative framework built on ten requirements of a normative model of deliberation.

TEN NORMATIVE REQUIREMENTS FOR EVALUATING PROPOSING

(DPR1) The agents have agreed to engage in a deliberation dialogue that begins by formulating a governing question.

(DPR2) There are goals both assume they share, but it is also expected that there are other goals they do not hold in common, or even disagree on.

(DPR3) There are values both assume they share, but it is also expected that there are other goals they do not hold in common, or even disagree on.
(DPR4) There is a given set of presumed facts or circumstances known to both agents.
(DPR5) These facts can be updated as the dialogue proceeds, changing the circumstances.
(DPR6) Although they agree on many of the presumed facts of the case, it is to be expected they will disagree about some.
(DPR7) The proposal is based on (1) the common goals the agents are presumed to share, (2) ways and means known to the agents as routine ways of doing things (actions) that can be analyzed by a theory of action based on "bringing about", and (3) practical reasoning.
(DPR8) A proposal can be supported by arguments that weave (1), (2) and (3) together.
(DPR9) A proposal can be criticized in five ways: (1) the goal premise, the means premise or the values premise can be questioned, (2) the premises can be attacked by counter-arguments alleging that one or more of them is false, (3) the inferential link between the premises and conclusion can be undercut by asking critical questions matching the scheme for practical reasoning, (4) the practical reasoning inference can be rebutted by counter-arguments, like argument from negative consequences, alleging that the conclusion is false, (5) a proposal arguing for a different action can be put forward, and it is contended that the arguments for this opposed proposal are stronger.
(DPR10) Argumentation in the dialogue as a whole is to be judged on a balance of considerations basis, assuming a rational agent will give up advocating a proposal that is defeated by argumentation of the other agent.

On the new dialectical approach, the structure of the speech act of making a proposal in deliberation automatically sets all ten requirements into place as normative assumptions of rational deliberation dialogue. The ten requirements need to be evaluated based on the argumentation in the case, considered on the balance of considerations in the dialogue. On this approach, the making of any proposal in each individual case of any real example of deliberation needs to be evaluated based on the data given in the text of discourse of the case. The argumentation in the case needs to be analyzed by considering the argument both for and against the proposal (if any have been given, or can be articulated), using tools like the scheme for practical reasoning, other argumentation schemes, argument diagrams, formal models of deliberation dialogue and profiles of dialogue.

This paper has applied a practical reasoning model, long known in the philosophical literature, to formal models of deliberation dialogue found in the artificial intelligence literature, adding the value-based variant to the original model. The result was to build a deeper and more sophisticated model of the speech act of making a proposal than was possible in the original literature on speech acts in linguistics and argumentation theory.

Deliberation, although important, has tended to be neglected as a type of dialogue featured in studies in AI and Law so far. It is hoped that this paper will help to overcome this neglect by providing a better structure of the speech act of making a proposal so that existing formal models of deliberation dialogue can be better developed, and better applied in a more realistic way to applications like electronic democracy.

By concentrating on several simple examples, this paper has set up a basic structure for an analysis of the speech act of making a proposal that shows how practical reasoning schemes are embedded in the speech act itself. The model sets up normative requirements for deliberation dialogue showing a rational arguer both how to properly support the making of a proposal, and how to appropriately attack a proposal that has been made by another party in the deliberation dialogue. The normative conditions that should be put in place when analyzing or evaluating such arguments and refutations are summarized in ten normative requirements for evaluating the speech act of making a proposal.

Notes

[1] Gordon and Karacapilidis (1997) designed and implemented a system used to enable interested citizens to take part in such electronic discussions, based on a dialogue model of argumentation.

[2] Atkinson et al. (2004, 2005) employed practical reasoning as the central component in their Parmenides system for e-democracy. They used a value-based variant of the original basic scheme, and it is this variant that will principally be applied here.

[3] Aristotle's comment can be constrasted with insights of the Harvard School of negotiation (Fisher et al. 1983), which sees mediation as beginning with trying to identify the interests of the parties.

[4] Deliberation can be solitary, but even then it has a dialogue structure because the agent needs to identify and evaluate the strongest possible arguments on proposed solutions to the problem. Deliberation can also involve large groups of agents, and many proposals for action, but the argumentation on any given point reduces to two sides, the pro and the contra. The goals of the agents have to be taken into account, but since they may conflict, argumentation is often necessary to resolve or at least discuss the conflict.

[5] Despite this clear contrast, there can be borderline cases in real examples of discourse. In some cases, one party tries to persuade the other party to carry out an action. And in some cases, there can be a dialectical shift from a deliberation dialogue to a persuasion dialogue during the same sequence of argumentation (Walton and Krabbe 1995). We return to discussing problems of shifts below.

[6] Gary L. Dikkers, letter to the editor, 'Paying for Katrina', *Newsweek*, October 10, 2005, p. 15.

[7] Only efficiency is considered under the basic scheme, but both CQ3 and CQ5 clearly require choosing the "best" alternative, or judging good and bad consequences. Values are considered in the value-based scheme taken up in Section 7 below.

[8] More work needs to be done on the relationship of the commitment model and the BDI model before these four standards can be formulated more precisely. Some hold that belief generally implies commitment while other doubt or deny this implication.

[9] Recent research (Gordon and Walton 2005) has shown, however, that critical questions can differ in force – some critical questions can be treated as presumptions of an argument while other act as exceptions. An undercutter attacks, but is not attacked by, the argument it undercuts, whereas rebutting arguments attack one another.
[10] Hulstijn's model of negotiation contrasts with the approach of the Harvard School (Fisher et al. 1983), which requires the identification of interests at an early stage.
[11] The utterance, "I propose that we should invest in Northern Securities, but mind you, I'm not saying we should do that" would not be absurd during a brainstorming session, where the point is to collect alternatives to discuss, without committing the participants to the suggested ideas.
[12] Hamblin's notion of wholehearted satisfaction is defined in terms of what he called a partial i-strategy, as explained in Walton and Krabbe (1995, p. 17). A formal list of notations and definitions for action-state semantics can be found in the appendix to (Walton and Krabbe 1995, pp. 189–195).
[13] Segerberg (1984) has presented a formal theory of action that models how an agent brings about one state by bringing about another one, showing how such actions can be combined into sequences representing action routines. Horty and Belnap (1995) have developed a formal analysis of the key notion of an agent's bringing about something at one time by something he does at another time.
[14] Tutiorism is a principle much argued about in the history of casuistry, and was associated with schools of though called rigorism, laxism and probablism (Jonsen and Toulmin 1989). It had to do with making ethical decisions under conditions of uncertainty, where safety must be balanced against other factors like legal or ethical obligations.
[15] Often achieving a goal depends on joint action by the participants. Strictly, therefore, the proponent is committed to carrying out its part in some joint action. For simplicity, we here present only the most basic kind of case where only two parties are deliberating together on how to proceed. In more complex cases, third parties are involved. For example, in a democratic debate about government policy, citizens propose and deliberate about actions, but the chosen actions are carried out by the government.
[16] An early version of a paper on practical reasoning, first read at The Norms, Reasoning and Knowledge in Technology Conference, June 3–4, 2005, Boxmeer, Holland, contained only the basic scheme. Katie Atkinson read a commentary on this version that helped me, along with comments by other participants, to make many improvements, and among them to add the new scheme.
[17] This raises the issue of tacit commitment. It is tedious to make a participant explicitly accept everything he does not disagree with, but sometimes commitments made this way come as a shock to people.
[18] This account of the post-condition can be put forward at least tentatively, even if, as in the case of the speech act of argument discussed above, such a tight rule may be too strict in many instances, and allowances may have to be made for flexibility in different types of dialogue. Indeed, in the analysis of commitment rules of dialogue in (Walton and Krabbe 1995), a careful distinction was drawn between rigorous persuasion dialogues and permissive persuasion dialogues. It may be that a comparable distinction needs to be made in deliberations. We've already recognized above that there are considerable variations in different deliberation speech events, implying that different species of deliberation need to be recognized.
[19] I would like to thank Tom Gordon and Trevor Bench-Capon for pointing out the need for this qualification, and for showing how the analysis needs to be modified to deal with it.

[20] *Araucaria* can be downloaded for free at: http://www.computing.dundee.ac.uk/staff/creed/araucaria/.
[21] The use of the term 'unfairly' suggests that values are involved, the value of fairness in particular, also suggesting a dialogue in which there is a dispute with two sides implicitly involved.

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