Anticipatory Thinking with Argument Schemes

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Abstract

In previous work we proposed a set of argument schemes for arguing about the putative intentions of foreign actors and for responses to their actions, and created an argument diagramming tool providing those schemes as cognitive building blocks. In this paper we define an intentional argument scheme for anticipatory thinking and propose that an argument diagramming tool can further support anticipatory thinking.

Introduction

Critical thinking about international politics often involves reasoning about the beliefs, goals, appraisals, actions, and plans of actors such as foreign governments. In previous work (Green et al. 2019), we analyzed arguments in expert-written reports on international affairs in terms of argument schemes. Argument schemes were originally proposed by argumentation theorists to describe acceptable, but not necessarily deductively valid, and possibly defeasible, generic patterns of reasoning used in law, science and everyday conversation (Walton et al. 2008). Examples of such patterns include Argument from Expert Opinion and Reasoning to the Best Explanation.

Based primarily upon an article on the Russian government's strategy for increasing Russia's global influence (Weinberger 2016), we defined a set of schemes tailored for arguing about the putative intentions of foreign actors and for responses to their actions. Our goal was to provide this set of argument schemes to students and analysts of international affairs. Although the schemes could be used to analyze the argumentation in existing reports on international affairs, our intent was for them to be used as cognitive building blocks for constructing new arguments from collected evidence. To further support argument construction, we developed an argument diagramming tool, AVIZE (Argument Visualization and Self-Evaluation), that provides this set of argument schemes. Anticipatory thinking (AT) is defined in the call for papers as "the deliberate and divergent exploration of relevant possible futures." We contend that the process of AT should include making arguments for the hypothesized futures and challenging those arguments. In this paper, we define an intentional argument scheme for AT and propose that an argument diagramming tool can be used to support individual or collaborative construction, evaluation, and communication of arguments in AT.

AVIZE's Argument Schemes

AVIZE provides a set of argument schemes tailored to international affairs for constructing arguments in this domain. For example, the Plan Distraction scheme is defined as follows. (Capitalized terms such as Actor and Protagonist are place holders for countries used so that the schemes can be applied to many different situations, not just the cases we analyzed when defining the schemes.)

Plan Distraction Scheme
Premises:
1. Actor does Acts to divert Protagonist's attention from Other Acts.
2. Actor believes that Protagonist would oppose Other Acts, otherwise.
Conclusion: Actor does not want Protagonist to oppose Other Acts.

An example of this type of argument appeared in (Weinberger 2016): *Putin has kept international attention riveted on Russian operations in Syria while escalating military deployments and political operations across Europe, the Middle East, and Asia.* (The conclusion, that Putin/Russia does not want the U.S. to oppose the military deployments and political operations, is implicit.)

Argumentation theorists have proposed posing critical questions associated with each argument scheme as a means of challenging an argument. In AVIZE, all of the schemes include two critical questions: How reliable is the source of each premise? How likely is each premise? In addition, the Plan Distraction scheme described above

includes the questions: In the Actor's view, are the consequences of Acts/Other Acts acceptable?

We manually analyzed the 33-paragraph article on Russia's global strategy as containing the following sequence of instances of our schemes: Plan Distraction, Coercion, critical question of Coercion, Resist Coercion, Plan Deception, Inferred Plan, Coercion, Increasing Boldness, Coercion, Inferred Plan, Inferred Plan, Resist Coercion, Practical Reasoning, Avoid Negative Consequences, Avoid Negative Consequences, and Practical Reasoning. Schemes that we identified in other articles include Inferred Positive/Negative Appraisal and Behavior Pattern. (While most of the scheme names are suggestive of their purpose, it should be noted that the name 'Practical Reasoning' is used in argumentation theory to refer to an argument for a plan of action.) Since the schemes were derived from analysis of expert-written reports, they should be helpful to students and analysts in creating arguments of their own or for analyzing the arguments of others.

New Argument Scheme for AT

Although the scheme set developed for AVIZE was not based on analysis of examples of anticipatory thinking, two of the schemes – Increasing Boldness and Behavior Pattern – could be used for AT. Here we propose that by manually analyzing examples, additional schemes useful for AT could be identified. For example, now we will consider a report written several years ago warning of a Russian attempt to influence the election of a pro-Russian government in the Ukraine. The report noted that a large march of Orthodox supporters was headed to the capital, where they would be met by Nationalist supporters. It stated that there was evidence that the march had been infiltrated by provocateurs and predicted that clashes between the two groups would ensue, leading to a loss of popular support for the current anti-Russian government, resulting in the election of a pro-Russian government.

This anticipation of possible future events could be modeled with a chain of arguments, each of which can be analyzed in terms of the Intentional Cause to Effect (IC2E) scheme, which we define as follows.

Intentional Cause to Effect (IC2E)
Premises:
   1. Actor has Distal Goal consistent with Value.
   2. Actor has Proximal Goal, consistent with that Distal Goal.
   3. Actor does (will do) Intervention to bring about Proximal Goal.
   4. Intervention is (will be) feasible in the then present Circumstances.
Conclusion: Actor causes (will cause) Proximal Goal to be achieved.

The first prediction, that the two sides will clash, is based on the argument that Russia (R) has a distal goal of the election of a pro-R government in the Ukraine, which is consistent with the value of R having increased global influence; R has a proximal goal of fomenting clashes between the two sides (consistent with that distal goal); R inserted provocateurs into the march in order to bring about clashes between the two sides when they meet in the capital; therefore clashes will occur between the Orthodox and Nationalists in the capital (due to R's intervention).

The next prediction, that the current anti-R government will lose popular support, is based on the argument that R has the distal goal described above; R has a proximal goal of loss of popular support for the anti-R government (consistent with that distal goal); clashes will occur between the Orthodox and Nationalists in the capital (due to R's intervention); therefore the current anti-R government will lose popular support (due to R's intervention). The final prediction, that a pro-R government will be elected, is based on the argument that R has the distal goal described above; R has a proximal goal of the election of a pro-R government (identical to that distal goal); that the anti-R government will lose popular support (due to R's intervention); a group of pro-R candidates are available to run for office; therefore a pro-R government will be elected (due to R's intervention).

This chain of arguments is summarized in Figure 1. By convention, premises are connected by an upward pointing arrow to a conclusion. The name of the scheme (IC2E) appears to the right of the arrow. Entailments of conclusions are connected by horizontal arrows labeled 'Entails'. For example, the claim that Russian intervention will cause the two groups to clash entails the claim that the two groups will clash.

Any of the arguments in the chain could be challenged by providing counterarguments or posing critical questions. We propose at least the following critical questions for IC2E. Note that the last three questions refer to the arguer's beliefs about the Actor's beliefs.

IC2E Critical Questions
   1. How reliable is the source of each premise?
   2. How likely is each premise?
   3. How likely is the Proximal Goal to be achieved by Actor's Intervention in the given Circumstances? Are there factors unknown or ignored by Actor that may impede its success?
   4. In Actor's view is Proximal Goal likely to be achieved by Intervention in the Circumstances?
   5. In Actor's view is Intervention feasible in the Circumstances?
   6. In Actor's view are the consequences of Intervention acceptable, or would they inhibit Actor from performing Intervention?

Figure 1 shows a challenge to the argument at the bottom of the tree using the first critical question, i.e., how reliable is the evidence that R has inserted provocateurs? Also, the third critical question is shown as challenging the final (top-most) argument. Furthermore, by adding IC2E to a repertoire of argument schemes, one may build complex arguments involving more than just causal reasoning about an actor's intentions. For example, as shown in Figure 1, the premise that R has a distal goal of the election of a pro-R government could be justified itself by a Behavior Pattern argument, i.e., based upon R's past behavior in other countries. Because of the potential complexity of the arguments for and against alternative scenarios, we propose that an argument diagramming tool, such as one described in the next section, be used to visually support individual or collaborative construction, evaluation, and communication of arguments in AT.

Argument Diagramming in AVIZE

AVIZE[1] was designed to support critical thinking by a process in which users must evaluate possibly conflicting evidence from a variety of sources such as different print or broadcast news organizations; construct a graphical representation of arguments for a hypothesis using that evidence and argument schemes; challenge the arguments; and defend the argument against the challenges. As shown in Figure 2, potential evidence (with accompanying metadata such as source) is presented in a panel on the left side of the screen. Argument scheme definitions and critical questions are presented in a panel on the right hand side of the screen. The center of the screen is a drag-and-drop style argument diagram construction workspace. Figure 3 shows an example of an argument so constructed.

Related Work

A variety of argument diagramming tools have been developed to support critical thinking (Van Gelder, 2007; Shum et al. 2006; Loll and Pinkwart 2013). Some comprehensive intelligence analysis systems also provide tools for argument diagramming (Toniolo et al. 2015; Pioch and Everett 2006; Schrag et al. 2016; Tecuci et al. 2016). However none of these tools provide argument schemes tailored to plan recognition in international affairs (as in AVIZE) or anticipatory thinking involving intentions in that domain, e.g., the IC2E scheme.

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[1] A prototype implementation of AVIZE is available at https://github.com/greennl/AVIZE. Work is underway to improve the tool for use in an undergraduate AI Ethics course using a set of argument schemes tailored to AI Ethics.

Conclusion

The Intentional Cause to Effect scheme defined above could be added to the scheme set of AVIZE to support AT. By analyzing further examples of AT, other relevant schemes could be identified. A graphical tool such as AVIZE could be used by students and analysts to make AT assumptions, claims, and challenges visible. In the long term, using argument schemes for AT such as IC2E to generate arguments automatically, it may even be possible to use them to hypothesize future events.

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Figure 1. Summary of chain of IC2E arguments in Ukraine example. ('PxGoal' stands for 'proximal goal'. Challenges are shown connected by links with a crossed circle.)

R will cause pro-R gov to be elected

Entails → *pro-R gov will be elected*

CQ: PxGoal3 not likely to succeed …

⊗

IC2E

R has [PxGoal3: pro-R gov to be elected]

R will cause anti-R gov to lose popular support

Entails → *Anti-R gov will lose popular support*

Feasible

IC2E

R has [PxGoal2: anti-R gov to lose support]

R will cause clashes between O and N

Entails → *Clashes between O & N will occur*

Feasible

IC2E

R has [PxGoal1: clashes between O & N]

R inserted provocateurs to bring about clashes …

⊗ — CQ: not reliable

Feasible

R has [Distal Goal: pro-R gov to be elected] consistent with [Value: increased R global influence]

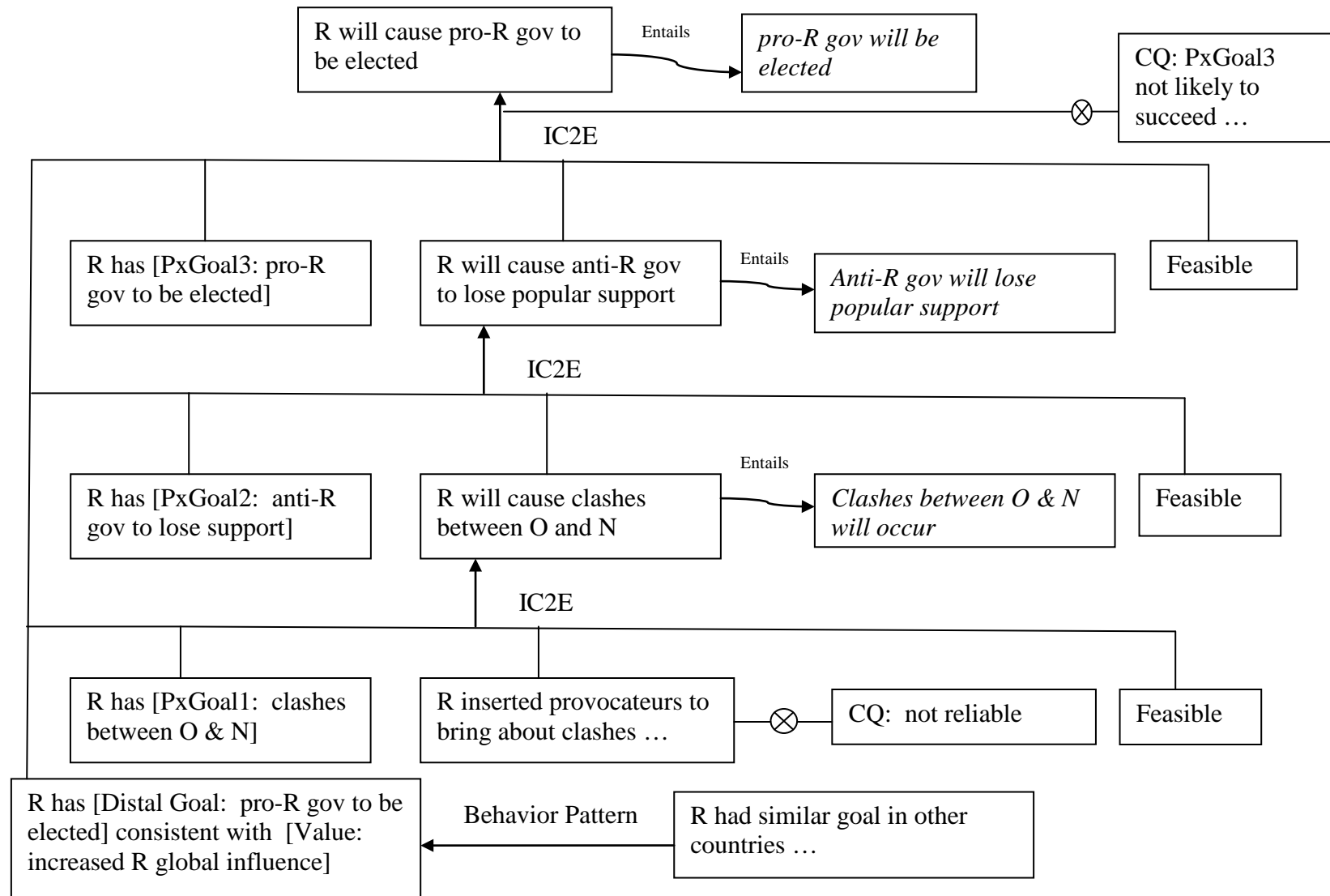← Behavior Pattern — R had similar goal in other countries …

Figure 2. Screen shot of AVIZE. Evidence panel is on left. For illustration, all the evidence snippets were extracted from (Weinberger 2016). It is assumed that in actual use, text in the evidence panel will have been selected manually or automatically from multiple, possibly conflicting sources. Argument scheme definitions are on right. Clicking on scheme name causes scheme template to appear in diagramming workspace to be filled in by user.
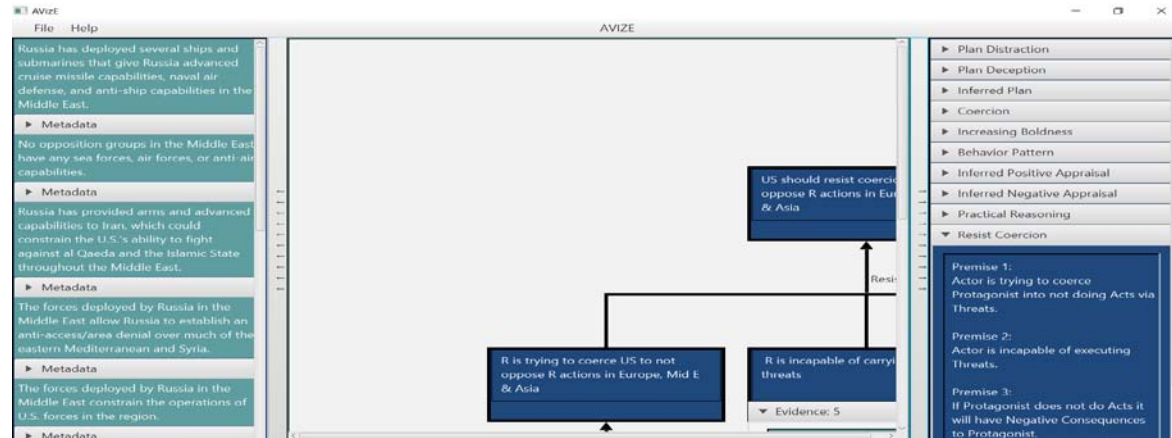

Figure 3. Screen shot of AVIZE with argument diagram in center and side panels minimized. Argument that U.S. should resist R coercion to not oppose R's global expansion has been constructed using two argument schemes from the right hand panel. Relevant evidence has been dragged from the evidence panel and attached to the premises.