

# A grammar of strategic behavior in agenda setting processes

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## **Abstract**

Agenda setting fulfills the role of a gatekeeping process in the public policy process. Actors behave strategically in this process to either have their topic on the agenda or prevent topics from reaching the agenda. Most of the current research on strategic behavior is qualitatively oriented and describes a rich picture. This makes it difficult to identify the uniqueness and distinctive character of the different forms. To overcome this problem, this paper proposes an attribute grammar of strategic behavior. This grammar identifies different interpretations of strategic behavior, increasing the chance of interpreting the behavior correctly and reacting appropriately. Further research should focus on improving the grammar with additional forms of strategic behavior and expanding the grammar into a grammar of strategic discourse.

**Keywords:** attribute grammar, formal grammar, strategic behavior, agenda setting, public policy, formalization.

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# 1. Introduction

The first step in a public policy process is agenda setting, the step in which an agenda is constructed (Kingdon, 1995). The construction of the agenda is the first and an important step in the process, since it determines which topics will be discussed and which ones neglected. Agenda setting fulfills a gatekeeping function. When topics are unable to reach the agenda, a change in policy will be unlikely (Birkland, 2007; Capella, 2016). The actors participating in this public policy process have their own interests which could determine which topics they want to discuss or want to prevent from being discussed. In other words, they will act strategically with the aim of influencing the agenda. Strategic behavior is defined in this study as behavior that complies with the following conditions: intentional, self-serving, camouflaged (Ten Heuvelhof, 2016) and aimed at shaping perceptions (Schelling, 1960).

This study is based on the description of forms of strategic behavior by Ten Heuvelhof (2016) and Cobb & Ross (1997). Strategic behaviors that comply with the definition are used as a foundation for this study. More information about this selection process can be found in Dijkhuizen (2018).

In order to understand, observe and describe this strategic behavior in an agenda setting context, this paper proposes an attribute grammar that formalizes this strategic behavior. In contrast to most of current literature, which gives a rich picture of forms of strategic behavior, this grammar can be used to systematically describe strategic behavior. The use of this grammar could foster the research on strategic behavior in a similar fashion as the ADICO-framework did for the analysis and design of institutions (Crawford & Ostrom, 1995). Chapter 2 lists seven dimensions, used to describe the forms of strategic behavior. Chapter 3 explains the theory and construction of the attribute grammar, based on these dimensions. Chapter 4 elaborates on the added value of the grammar. Chapter 5 discusses the limitations of the grammar and chapter 6 gives the main conclusions and recommendations.

## 2. Dimensions of strategic behavior

In order to be able to describe strategic behavior, the essential elements of strategic behavior have to be identified. These elements can help to describe the uniqueness and distinctiveness of the different forms of behavior. Therefore, a classification has been constructed based on a discussion with experts in an iterative process (de Bruijn, Nikolic, & Bots, 2017). The classification consists of the following elements:

- The strategic actor
- The action
- The influenced actor
- What element of perception is influenced
- Nature of relation between actors
- Legitimize or delegitimize
- Object

*The strategic actor* describes the actor (or group of actors) that behaves strategically. *The action* is based on the forms of behavior, in which two different actions can be identified:

communication or transaction. *The influenced actor* describes the actor (or group of actors) that is influenced. This actor can be a proponent, an opponent or a third actor. The third actor is used in a broad sense: this can be any other actor, group of actors or even the general public. *The element of perception* relates to the representation of perceptions of Bots, van Twist, & van Duin (1999). The three elements of a perception that are used in this dimension are facts, causality and values. *The nature of relation between actors* is relevant to describe strategic behavior, since some forms occur in cooperative relations, others in conflictual relations. Some forms could also occur in both. *Legitimize or delegitimize* describes whether the strategy is aimed at legitimizing or delegitimizing an object. When proponents want a topic on the agenda, the aim will be legitimizing. Proponents who want to prevent a topic from reaching the agenda will try to delegitimize. *The object* describes the target, which is legitimized or delegitimized, of the strategic behavior. There are five different objects: the strategic actor, the influenced actor, a third actor, a problem or a policy. These objects correspond to the three streams of Kingdon (1995).

### 3. An attribute grammar of strategic behavior

Using the dimensions of chapter 2, an attribute grammar of strategic behavior can be constructed. Paragraph 3.1 will first explain the theory behind attribute grammars. Paragraph 3.2 then formalizes strategic behavior by means of an attribute grammar.

#### 3.1 Theory of an attribute grammar

The attribute grammar was introduced in 1968 by Donald Knuth in order to be able to specify the meaning of languages. This technique made it possible to add conditions and attributes to a formal grammar, i.e. to incorporate semantics (Knuth, 1968).

An attribute grammar AG consists of three different elements: a context-free grammar (which is a formal grammar), attributes and semantic rules. The context-free grammar provides the basis, the syntax of the attribute grammar. Combined with attributes and semantic rules, that provide the semantics of the grammar, the following generic attribute grammar can be constructed:  $AG = (G, A, R)$ .

A context free grammar G could be described as follows:

$$G = (N, T, P, D)$$

With:

- N as set of nonterminal symbols (symbols that could be expressed in one or more other symbols)
- T as set of terminal symbols (fundamental symbols, cannot be expressed in other symbols, indicated with underlining)
- P as set of productions (i.e. statements on transformations of nonterminals into terminals)
- $D \in N$  (D is an element in set N) as starting point (Paakki, 1995; Slonneger & Kurtz, 1995).

Formal grammars are commonly expressed in the Backus-Naur Form (Backus et al., 1960). The following conventions on the syntax of the Backus-Naur Form are relevant for this study:

- ::= - A connection symbol, the left hand element could be written as the (collection of) right hand element(s).
- <> - This symbol explains that everything between these brackets is one variable.
- | - This symbol means “or”.
- + - The preceding variable can occur one or more times.
- \* - The preceding variable can occur zero or more times.

Besides these specific conventions, one other convention is relevant for this study, namely the syntax for describing a set. A set of  $a$  and  $b$  will be described as  $(a,b)$ .

The concept of a context-free grammar and this definition will be explained by a transportation-related example. Assume that there are two options to go home, by car or by train, and two different routes, via The Hague or Rotterdam. Using the elements of a context-free grammar and the conventions of the Backus-Naur Form, the following context-free grammar can be constructed:

$G = (N,T,P,H)$

$H ::= M C$

$M ::= < \underline{\text{train}} > \mid < \underline{\text{car}} >$

$C ::= < \underline{\text{The Hague}} > \mid < \underline{\text{Rotterdam}} >$

With:

$H$  = Option to come home (nonterminal and starting point)

$M$  = Modality (nonterminal)

$C$  = City in between (nonterminal)

This grammar generates four different options: by train via The Hague, by train via Rotterdam, by car via The Hague and by car via Rotterdam. The fact that this grammar is context-free means that both modalities are possible with both cities to travel through. When a restriction is in place (i.e. a semantic rule), such as the fact that you can only travel via Rotterdam if the travelling is done by train, than a context-free grammar is insufficient to express this situation. Then the situation has to be expressed in an attribute grammar.

Consider the same example, with the addition that travelling via Rotterdam is only possible by train. This would result in the following attribute grammar:

$AG = (G, A, R)$  with  $G = (N,T,P,H)$

$H ::= M C$

$M ::= < \underline{\text{train}} > \mid < \underline{\text{car}} >$

$C ::=$  **Condition: if  $M = \text{train}$**   
            $< \underline{\text{The Hague}} > \mid < \underline{\text{Rotterdam}} >$

**Else:**

$< \underline{\text{The Hague}} >$

With:

H = Option to come home

M = Modality

C = City in between

This grammar only generates three options: by train via The Hague, by train via Rotterdam and by car via The Hague due to the addition of a semantic rule. Attributes can be added when multiple occurrences of a nonterminal result in different transformations. When you can only travel by car once, attributes are added to the modality ( $M_1$  and  $M_2$ ). This addition enables a check for the choice of travelling the first time, which could influence the options the second time (when the car is used the first time, the only option the second time will be the train).

### 3.2 Construction of an attribute grammar of strategic behavior

According to the definition of an attribute grammar, it consists of a context-free grammar, attributes and semantic rules:  $AG = (G, A, R)$ . First the context-free grammar will be described and then the semantics will be added.

The context free grammar of strategic behavior will describe every possible form of behavior within the scope of this research. Instead of strategic behavior, the highest level in this grammar will be a strategic discourse. This strategic discourse can consist of one or more forms of strategic behavior. Strategic behavior in this grammar consists of four elements: a strategic actor, the actual behavior, the influenced actor and the goal.

The behavior can be divided in two categories: communications and transactions. Transactions can be compared with position rules (creating positions and describing these positions) and boundary rules (exit and entry rules for these positions) as defined by Ostrom (2011). Two instances of transactions have been described in this study based on Cobb & Ross (1997): the establishment of a committee (i.e. assign new committee, related to position rules) and co-optation of applicant member in a committee (i.e. add to existing committee, related to boundary rules). Communication can be divided in two categories, true and false communication. It is important to notice that in this case true and false are not absolute: truth is related to the perception of the strategic actor. When he does not know that his communication is false, it does not qualify as strategic behavior, as it is not intentional. Communication can use four different types of statements. Statements with facts, causal relations and values are related to the perception of the influenced actors, but there is a fourth type: deontic statements. Deontic statements could contain the concepts of obligation, permission and prohibition (Hilpinen, 1968). Furthermore, the behavior could be combined with one or more behavior modifiers, words that add extra information to the behavior. Behavior modifiers could be repeatedly, vaguely, anticipatorily, symbolically and unfoundedly. The deontic statements and statements with facts, causal relations and values could also be combined with one or more modifiers. These modifiers are personal, impersonal, secret, new, old, fundamental, vague, similar, alternative, associating, blaming, dominating, proposed, ethical, unethical, institutional, partial, enlarged, heard and adapted. These modifiers are derived from forms of strategic behavior as described in Ten Heuvelhof (2016) and Cobb & Ross (1997)

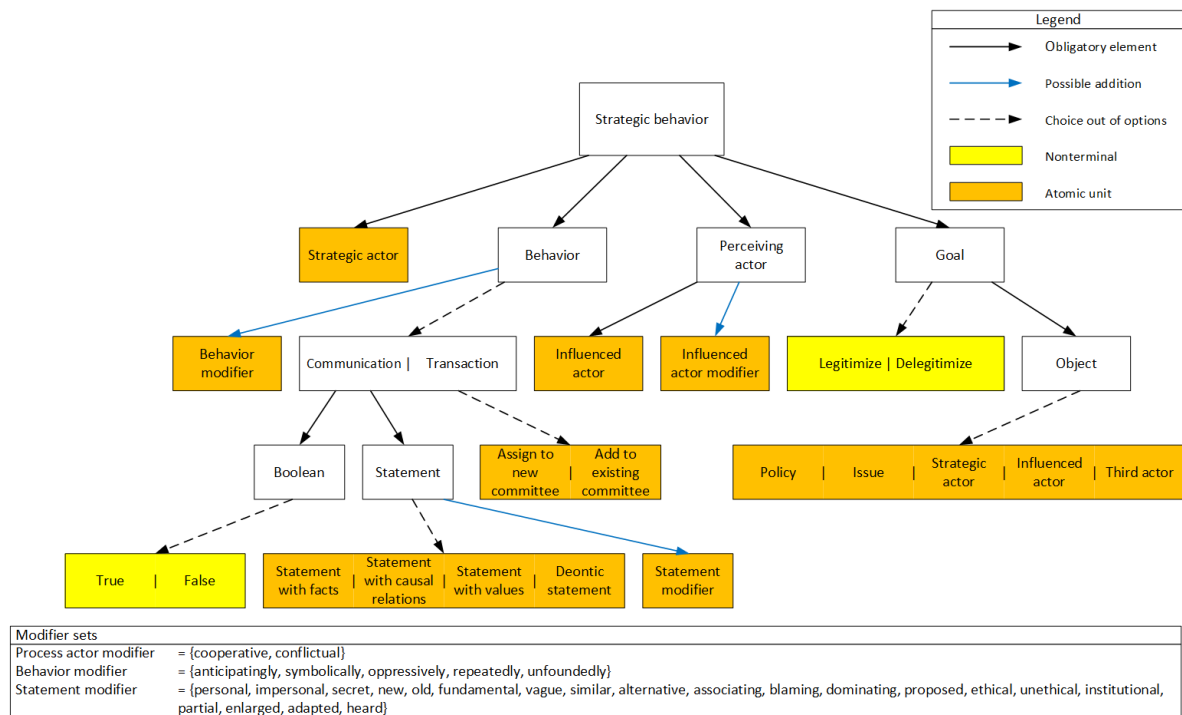


Figure 1: Detailed decomposition tree of strategic behavior

The influenced actor is the actor that is influenced by the strategic behavior. He could also be part of the goal of the behavior. However, this is not necessarily the case. The nature of the relation between the strategic and influenced actor could be added to the influenced actor as influenced actor modifier, to indicate details on their relation. Some strategic behaviors are aimed at cooperative actors, other at conflictual actors and some forms of behavior are indifferent for the position of the actor involved.

The goal of the strategic behavior has two directions, legitimize or delegitimize, and five objects: the strategic actor, the influenced actor, an external actor, an issue or a policy (corresponding to the three streams in the theory of Kingdon (1995)). Every form of strategic behavior is aimed at one or more of these five objects.

The decomposition of strategic behavior is visualized in figure XXX. Black arrows point towards obligatory elements, blue arrows towards optional elements and dotted arrows towards a choice: from every block, only one of the options is used to replace the higher level variable. The yellow boxes indicate the lowest level variables, the terminals in this grammar, which cannot be replaced by something else. The orange boxes indicate atomic units: these units cannot be decomposed and are replaced with one specific terminal. The strategic actor and influenced actor can be replaced with specific actors (or software agents), the modifiers by one of the words in the sets of modifiers, the policy and issue by a specific policy and issue, the committees by specific committees and the statements with a specific statement. This figure should be read from left to right, from the top down.

Going through the different elements of strategic behavior from left to right will generate a sentence that describes a specific form of strategic behavior.

Based on the description in this paragraph and the decomposition tree in figure 8, the context-free grammar  $G = (N, T, P, SD)$  is constructed, with the following production lines:

- $\langle SD \rangle ::= \langle SB \rangle +$
- $\langle SB \rangle ::= (\langle A1 \rangle, B, \langle PA \rangle, G)$
- $G ::= \langle \text{legitimize} \rangle O+ \mid \langle \text{delegitimize} \rangle O+$
- $O ::= \langle TA \rangle \mid \langle \text{issue} \rangle \mid \langle \text{policy} \rangle$
- $B ::= C \langle BM \rangle^* \mid T \langle BM \rangle^*$
- $T ::= \langle \text{assign to new committee} \rangle \mid \langle \text{add to existing committee} \rangle$
- $C ::= \langle \text{makes a} \rangle \langle \text{Boolean} \rangle S$
- $\langle \text{Boolean} \rangle ::= \langle \text{true} \rangle \mid \langle \text{false} \rangle$
- $S ::= \langle \text{statement with} \langle SM \rangle^* \text{facts} \rangle \mid \langle \text{statement with} \langle SM \rangle^* \text{causal relations} \rangle \mid \langle \text{statement with} \langle SM \rangle^* \text{values} \rangle \mid \langle SM \rangle^* \langle \text{deontic statement} \rangle$
- $\langle PA \rangle ::= \langle AM \rangle \langle A2 \rangle$
- $\langle TA \rangle ::= \langle A1 \rangle \mid \langle A2 \rangle \mid \langle A3 \rangle$
- $\langle SM \rangle ::= \langle \text{personal} \rangle \mid \langle \text{impersonal} \rangle \mid \langle \text{secret} \rangle \mid \langle \text{new} \rangle \mid \langle \text{old} \rangle \mid \langle \text{fundamental} \rangle \mid \langle \text{vague} \rangle \mid \langle \text{similar} \rangle \mid \langle \text{alternative} \rangle \mid \langle \text{associating} \rangle \mid \langle \text{blaming} \rangle \mid \langle \text{dominating} \rangle \mid \langle \text{proposed} \rangle \mid \langle \text{ethical} \rangle \mid \langle \text{unethical} \rangle \mid \langle \text{institutional} \rangle \mid \langle \text{partial} \rangle \mid \langle \text{enlarged} \rangle \mid \langle \text{adapted} \rangle \mid \langle \text{heard} \rangle$
- $\langle AM \rangle ::= \langle \text{cooperative} \rangle \mid \langle \text{conflictual} \rangle \mid \langle \text{any} \rangle$
- $\langle BM \rangle ::= \langle \text{repeatedly} \rangle \mid \langle \text{vaguely} \rangle \mid \langle \text{anticipatingly} \rangle \mid \langle \text{symbolically} \rangle \mid \langle \text{unfoundedly} \rangle$

With:

- SD = Strategic discourse
- SB = Strategic behavior
- G = Goal
- O = Object
- B = Behavior
- PA = Perceiving actor
- T = Transaction
- C = Communication
- S = Statement
- TA = Target actor
- SM = Statement modifier
- AM = Actor modifier
- BM = Behavior modifier

Then the semantic rules are added, which are aimed at preventing the occurrence of impossible combinations of elements. The grammar should only generate sentences that are internally consistent and logically make sense. Therefore, (groups of) combinations are tested on consistency and common sense. For instance, since the combination of delegitimizing the influenced actor (as goal) and cooperative as nature of relation is very unlikely, every form of strategic behavior with that combination is excluded.

The conditions in table 6 only suffice when the variables in the grammar with + (one or more appearances of the preceding variable) and \* (zero or more appearances of the preceding variable) occur with a maximum of one time. When these variables occur more than once, many new combinations are generated. This causes an increase in complexity and therefore an expanded list of conditions. This limitation also makes the use of attributes superfluous, since only one instance of a nonterminal will occur.

Table 1: List of constraints added to the attribute grammar

Constraints	Explanation
Transaction → Delegitimize and aimed at influenced actor, policy or issue	Transactions (add to existing or assign to new committee) are used to either damage an actor by letting him participate in the process, or constructing conclusions that benefit the strategic actor
G = delegitimize → O cannot be strategic actor	A strategic actor will not execute behavior that delegitimizes himself
Boolean = true → SM cannot be adapted/heard	Adapted and heard relate to fraud and false rumors, which are impossible combinations with a true statement.
Boolean = false → SM cannot be partial/enlarged	Partial and enlarged relate to change of scope or change of time. These statements are true, they only shape the argument in their advantage.
Object ≠! policy → SM cannot be proposed	Proposed can only be used in combination with policy, since proposed relates to proposals, options for policy.
Add to existing committee → Delegitimize influenced actor; Influenced actor → conflictual; BM → symbolically/oppressively	This act contaminates the influenced actor with the current policy, since he is being involved in making it. Since he is delegitized, he can only be conflictual. The modifier can only be oppressively or symbolically, due to the nature of the act.
Object = influenced actor and aim = delegitimize → influenced actor = conflictual; Object = influenced actor and aim = legitimize → influenced actor = cooperative; Else → influenced actor = any	The influenced actor is only delegitized if the nature of their relation is conflictual and only legitimized if their relation is cooperative. Otherwise the relation between the actors can be of any kind.
Object = issue/policy → SM cannot be personal	When an issue or policy is targeted, this cannot be done with a statement that is related to a person.
Object = strategic actor/ influenced actor/ third actor → SM cannot be impersonal	When an actor is targeted, it cannot be done with a statement that is unrelated to a person.
S = statement with values → SM cannot be adapted	Adapted is related to fraud and it is impossible to fraud with values.
SM = secret → BM cannot be vaguely, unfoundedly, symbolically	When secrets are used, it is not in the interest of the strategic actor to do this vaguely or symbolically, since it reduces its power, and unfoundedly is impossible, since these secrets are the foundation.
B = Communication and G = delegitimize and O = strategic actor/ influenced actor/ third actor → BM cannot be symbolically	A delegitimizing statement aimed at an actor cannot be made symbolically, since the definition of symbolically is that it stands for something else, which cannot be the case when the statement is made at this actor.

In order to clarify how such the attribute grammar works with the added conditions, one example will be elaborated. The complete attribute grammar can be found in appendix XXX. The transformation begins with SD and following the production lines of the attribute grammar, the different nonterminals are transformed into atomic units and terminals:

1. SD
2. SB
3. A1 B PA G
4. A1 B PA legitimize O
5. A1 B PA legitimize TA
6. A1 C BM PA legitimize TA  
(G = legitimize, B can only be C)
7. A1 makes a Boolean S BM PA legitimize TA
8. A1 makes a false S BM PA legitimize TA
9. A1 makes a false statement with SM values BM PA legitimize TA
10. A1 makes a false statement with SM values BM AM A2 legitimize TA
11. A1 makes a false statement with SM values BM AM A2 legitimize A1
12. A1 makes a false statement with personal values BM AM A2 legitimize A1  
(O = TA, SM cannot be impersonal. S = statement with values, SM cannot be adapted. Boolean = false, SM cannot be partial or enlarged)
13. A1 makes a false statement with personal values BM any A2 legitimize A1  
(A2 is not the object, therefore AM = any)
14. A1 makes a false statement with personal values anticipatingly any A2 legitimize A1  
(B = C, BM cannot be oppressively)
15. A strategic actor makes a false statement with personal values anticipatingly to any influenced actor to legitimize himself  
(This is the result after the rewrite-procedure.)

## 4. Added value of grammar

Analyzing statements with the use of the grammar leads to different interpretations of the behavior. Which interpretation is correct depends on the context and observers have to provide arguments for the correct interpretation.

The added value of the grammar can be summarized in the following remarks:

- A statement does not have to reflect the perception of the strategic actor. The statement can also be chosen based on the intended goal.
- A statement can be aimed at a different, more indirect goal than the goal expressed in the statement.
- The behavior and statement modifiers indicate intentions which might not be thought about. *Anticipatingly* (as behavior modifier) for instance indicates priming as a strategy, while *alternative* (as statement modifier) indicates framing and spinning.
- The application of the grammar forces to use multiple angles and consider multiple interpretations in a systematic manner. This increases the chance of a right observation.

These remarks show that the grammar reveals alternative interpretations of the behavior, which possibly reveal different intentions. These interpretations and intentions influence the appropriate response to such behaviors. For instance, when strategic actors make a true statement (according to their perception), which appears to be false, it might be a good strategy to convince them of the incorrectness of their statement. However, when strategic actors know that the statement is false, they cannot be convinced with arguments. Then it might be a better strategy to focus on the actors that the strategic actors try to influence with their statement.

To illustrate the added value of the grammar, a statement from a Tanzanian woman about her experiences with the Water User Committee will be used as an example (more information about the context can be found in Kemerink, Ahlers, & van der Zaag (2009)). The statement is as follows:

*“We don’t get water if we don’t sleep with the chairman”* (Kemerink, 2017)

It is clear that the behavior is a form of communication with an unethical causal relation. The aim of the statement could be to legitimize the problem, or delegitimize the chairman. When the aim is to legitimize the problem, the statement is probably true, since the intention is to generate attention for the problem. When the aim is to delegitimize the chairman, it is unknown whether this statement is true or false, but both options have to be considered. Using the context of the situation, the upcoming elections of the water user associations have to be taken into account. Then it becomes clear that this statement could be a way to delegitimize the current chairman, as an anticipating act for the upcoming elections. So besides the option that this statement could be true, there is also a possibility that these statements are only expressed in order to delegitimize the current chairman. This knowledge can be used to put the behavior of the strategic actor in perspective and could influence the way the facilitator should react to the strategic actor. The following three interpretations are identified by means of the grammar:

1. A strategic actor makes a true statement with an unethical causal relation to any influenced actor to legitimize the problem.
2. A strategic actor makes a true statement with an unethical causal relation (anticipatingly) to any influenced actor to delegitimize a third actor.
3. A strategic actor makes a false statement with an unethical causal relation (anticipatingly) to any influenced actor to delegitimize a third actor.

Looking at these interpretations, it becomes clear that the first interpretation might not be strategic, since there is no camouflage involved. When this interpretation appears to be the right one, the statement does not qualify as strategic behavior. However, the grammar gives three different interpretations of the behavior, which increases the chance of interpreting the behavior correctly and unveiling the intentions of the strategic actor.

## 5. Discussion

One of the problems in the research of strategic behavior is that it is subject to attribution: behavior is observed, but the observer adds the label of strategic behavior. Due to camouflage and hidden agendas strategic behavior cannot be directly perceived. The observer perceives

the behavior and provides arguments why the behavior must be strategic. This also means that behavior that fits the grammar does not necessarily qualify as strategic behavior, since strategic behavior must comply with the four conditions (intentional, self-serving, camouflaged and aimed at shaping perceptions). Furthermore, behavior that cannot be described by the grammar can still be strategic behavior. The grammar is based on forty five forms of strategic behavior, which is only a small sample of forms that can be perceived in reality. The grammar has to be expanded with more forms of behavior in order to increase its descriptive capacity and applicability. Nevertheless, the grammar provides a systematic manner for observing, describing and discussing strategic behavior.

## 6. Conclusion and recommendations

This paper proposes a formal grammar which is able to describe forms of strategic behavior in an agenda setting context. Seven dimensions for describing this behavior have been identified and these dimensions are used as a foundation for the attribute grammar. With the grammar multiple interpretations of behavior can be identified, increasing the chance of detecting strategic behavior and reacting appropriately.

This study recognized the fact that strategic behavior mostly adopts the form of a strategic discourse, combining forms of strategic behavior in order to achieve the goal. Although this notion is implemented in the grammar, the list of conditions is insufficient for checking for consistency in strategic discourses. This drawbacks create a simplified image of strategic behavior. Future work should study the concept of a strategic discourse to increase the understanding of a strategic discourse in a game theoretical sense. It could give insights in combinations of strategic behavior that amplify or weaken their effect. These insights will also improve the estimation of risk and utility as they are suggested in appendix Y, due to the added interaction effects.

Furthermore, the grammar of strategic behavior as constructed in this study could be expanded by analyzing other forms of strategic behavior that have not been used in this study. This could lead to additions and therefore improvement of the grammar.

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