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A B S T R A C T S



Annotating Argument Schemes with the Periodic Table of Arguments

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The *Periodic Table of Arguments* (PTA) is a recently developed method of describing and classifying the various types of argument [7, 8]. The PTA unifies the traditional dialectical accounts of argument schemes and fallacies and the rhetorical accounts of logical, ethotic, and pathetic means of persuasion into an encompassing theoretical framework. The classification of the types of argument takes place on the basis of three independent partial characteristics: first-order / second-order arguments; subject / predicate arguments; combinations of statements of value / policy / fact. These partial characteristics are then superpositioned so as to provide a full description of the type of argument. The present version of the theoretical framework of the PTA distinguishes between 36 main types of argument.

Given the formal nature of the description of argument types in the PTA, it lends itself well for formal linguistic and computational research into argumentative discourse. Being a factorial typology of argument schemes, it is also a promising starting point for carrying out empirical research into the occurrence of different types of argument in large corpora of argumentative discourse. In order to test these intuitions, Visser et al. [6] have recently used the PTA as a basis for the annotation of the various argument types in the existing US2016 corpus of televised candidates' debates and associated Reddit commentary during the lead-up to the 2016 US presidential elections (the US2016 corpus is introduced in [5], and it is publicly available at corpora.aifdb.org/US2016). The 98,000-word corpus comprises annotations of argumentative and discursive structure on the basis of *Inference An-*

choring Theory [4].

Visser et al. [6] report on the extension of a 17,000-word sub-corpus of US2016 with the classification of the types of the existing annotated arguments. The factorial typology of the PTA allowed the complex task of argument scheme classification to be broken down into three independent much simpler partial sub-tasks: 1) distinguishing first-order from second-order arguments, 2) subject from predicate arguments, and 3) classifying statements as either evaluative, policy-proposing, or factual. The resulting inter-annotator agreement – varying between Cohen’s κ ’s [1] of 0.658 and 0.851 for the constitutive sub-tasks of the annotation – falls within the range of substantial to almost perfect [2], which is considerably higher than those previously obtained for argument scheme classification (see, e.g., [3]). This leads the authors to conclude that the annotated “corpus opens up new avenues in automatic scheme identification by providing the means to break down the objective into simpler classification tasks”.

However, Visser et al. [6] also report on some difficulties in applying the theoretical framework of the PTA to the often less than perfectly well-formed discourse encountered in the annotated election debates. In particular, they remark that there is a “[n]otably low [...] proportion of second-order arguments [and] [c]onversely, there is a high number of default inference classifications” – where the ‘default inference’ means that the inferential relation could not be successfully classified. In addition, an anonymous reviewer noted that “the number of instances used for computing the [inter-annotator agreement] is not overwhelming. Esp. in the situation where relatively few schemes cover the vast majority of the data, a larger proportion would be more informative.”

Our aim in the present paper is to address those difficulties by providing an extended and more refined version of the annotation guidelines for the benefit of future PTA-based annotations of corpora of argumentative discourse. To this end we systematically re-examine the relation between the starting points of the PTA approach to argument classification and the PTA-based annotation guidelines on

the basis of an error-analysis of the instances where the annotators did not agree on the appropriate classification.

This means that first of all, for each of the three partial characteristics of arguments that constitute the theoretical framework of the PTA, we describe how they are operationalised in the annotation guidelines. An innovation is that we propose to group the three sets of instructions into two. We do so by combining the first two partial characteristics (first-order / second-order arguments; subject / predicate arguments) into what we call ‘argument form’, thereby establishing a correspondence with the most recent visualisation of the PTA (see [8]). The resulting description of the four different argument forms is reflected in the division of the table in four different ‘quadrants’. At the same time, we propose to keep the third characteristic (combinations of statements of policy / value / fact) as a distinct one, related to what we call the ‘argument substance’: the types of statements expressed in the premise and the conclusion of the argument.

Regarding the operationalisation of the three partial characteristics in the annotation guidelines, we provide a decision tree with a limited number of heuristic questions that enables the annotator to find the argument form (i.e., the first two partial characteristics) of the concrete argument under scrutiny in one go. And concerning the third partial characteristic that is constitutive of the theoretical framework of the PTA, the argument substance, we extend the instructions regarding the distinction between statements of fact and statements of value.

We then relate these refinements and extensions of the annotation guidelines to the criticisms and obstacles mentioned above by pointing out how they address the issues of the low number of second-order arguments and the high number of ‘default inference’ classifications. We believe that the first issue is addressed by having provided annotation guidelines that include improved instructions for recognising second-order subject arguments and the second issue by having provided a clear decision tree for the combination of the first two partial characteristics of arguments as well as more refined instructions with respect to the third partial characteristic.

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