

## **On the empirical data ascertainment of argumentative competencies and styles of pupils in secondary school**

Although argumentation has a high priority in educational standards, there is still a rather small number of empirical studies on argumentative competency of pupils. The reasons for this deficiency are neither the lack of interest nor the missing data base, but a number of theoretical problems, which inhibit an extensive collection of empirical data. The aim of the paper is to present a five-dimensional model for the categorization of argumentative data based on a review of the current empirical research literature, which solves or at least limits the theoretical problems. On the basis of this model a cohort study in the secondary school level is presented and examined for its didactic relevance for argumentative competencies. Its results show several significant differences in the argumentative behavior of the pupils of the 8th and 10th grade. In addition, a variety of argumentative styles within the experimental sample can be distinguished by means of a factor analysis, which provides more detailed insights into the argumentative behavior of the tested population.

The scientific literature on linguistic argumentation analysis can be roughly divided into two different areas. Older studies, which are addressed as models of argumentational theory, examine the logical connection between the propositions of an argumentation and thus focus on the argumentative microstructure. Their aim is to examine and classify the internal structure of argumentative texts and conversations. Beside the classical model of the Aristotelian syllogism the most popular approach is the argumentation scheme of Toulmin (1958), which attempts to model the structures of everyday-world reasoning, and in particular distinguish between claim, data and warrant. Based on the ideas of Toulmin, a number of different works have been published in which, with different emphasis, attempts are made to describe and to model the structural relationships between the different propositions of argumentative texts and conversations. The problem of all models of argumentational theory is the verbal vagueness and fragmentariness of everyday argumentations, which almost never have the degree of explicitness required for the application in the models. In particular, the warrant of Toulmin's theory is usually not explicitly expressed in language, but remains latent as a conventionalized implication (see Kienpointner 1992). Although models of argumentational theory seem to be well-suited to the categorization of everyday argumentations and thus to the empirical examination of argumentative behavior, they are opposed to an exhaustive and disjunctive classification and characterisation and thus impede a comprehensive empirical investigation.

On the other hand, there are models, addressed as conversational analytic, which are typical for the younger research tradition. They focus the discursive and dialogical character of argumentative texts and conversations and try to examine argumentation as a more holistic phenomenon. Thus the problem of structural vagueness of everyday argumentation plays a much lesser role as the approaches weaken the logical context in favour of the discourse-structural aspects of the argument. Recently, a number of empirically-based conversational analytic works on the argumentative competence of pupils have been published with the purpose to analyse the argumentative behaviour of the subjects in a holistic perspective (e.g. Grundler 2011; Krelle 2014). Those surveys establish sophisticated the-

oretical models, which, although much more appropriate to the complexity of actual argumentative discussions than the reduced models of argumentational theory, nevertheless face two fundamental problems: Firstly, the empirical implementation of the models requires an extensive amount of time and effort, impeding the transfer of the method to a larger scale of probands. Secondly, the models focus on many aspects typical not only for argumentative, but also for other patterns of conversation, while on the other hand constitutive aspects of argumentative conversations, namely the conclusion from the truth-value of a proposition to the truth-value of another one, remain excluded. Thus the models elaborate important aspects of school-related conversational situations, but treat features constitutive for argumentative conversations only peripherally.

The analytical model presented in this article intends to elaborate basic concepts of argumentation theory approaches in order to enable a reliable data collection and thus to be used in the context of conversation analytic models. The starting point is Toulmin's analysis model with its basic tripartite structure of claim, data and warrant. However, on the side of the claim the presented model is supplemented by an explicit counter-claim, which takes account of the fact that argumentation is usually used only if a potential counter-thesis is present in the discourse. The existence of such a counter-claim constitutes the boundary between argumentation and reasoning.

In contrast to Toulmin, the relationship between data and claim is not described as causal, but only as a correlation, which can be differently strong and can have different signs. This characteristic takes account of the fact that in everyday argumentation it is sometimes uncertain whether the relationship between data and claim is causal, conditional, final or concessive. The assumption of correlation between data and claim is therefore a minimum requirement. At the same time, it allows connections of varying strength, which also proves to be beneficial, since everyday argumentations rarely require strict causality, even if the linguistic surface seems to indicate it (e.g. by using causal conjunctions as "because" or "therefore"). Finally, correlations can be positive, but also negative, so that the data can be related to the claim not only in a proving but also in a disproving way.

The requirement of the mere correlative relationship between data and claim can also solve the problem of the missing warrant in everyday argumentation, since three possible warrants can be distinguished exhaustively, if the relationship between two propositions is interpreted as argumentative:

- 1) A deductive warrant is assumed if the data correlation the argument is based on is stated as given.
- 2) An inductive warrant is assumed if the data correlation the argument is based on is evolved from examples.
- 3) An analogizing warrant is assumed if the data correlation the argument is based on is interpolated from parallel data correlations.

In the classification of claim and data, a distinction is made whether or not the propositions are presented as given facts or as merely desirable. Those two types of assertions are addressed as epistemic and deontic. In addition, on the data side of the model hypothetical assertions are added, of which the truth value is not asserted, but considered to be possible.

Given those assumptions, each argumentative step can be categorized using five independent dimensions:

- 1) Characterization of claim and counter-claim (epistemic / deontic)
- 2) Characterization of the data (epistemic / deontic / hypothetical)
- 3) Characterization of the warrant (deductive / inductive / analogizing)
- 4) Argumentational reference (to claim / to counter-claim)
- 5) Argumentational attitude (proving / disproving)

The analyzation model is modular in the sense that the characteristics of argumentative texts and conversations can be represented in five independent dimensions. For example, indirect or e-contrario argumentations can be categorized without requiring a separate category as in other argumentation models (e.g. Kienpointner 1992, p. 306). Their specific characteristic results from the combination of a disproving reference of the data to the counter-claim.

For the didactic context, however, it is crucial that the properties of the different dimensions do not occur independently in everyday argumentations, but rather form certain characteristic clusters, which allow conclusions to be drawn about the argumentative behavior of pupils of different grades. This is illustrated in a pilot study on the basis of 471 oral argumentative contributions of 135 pupils in the 8th (N = 84) resp. 10th grade (N = 51) of two Berlin secondary schools. For example, the proportion of deductive deductions increases significantly from the 8th to the 10th grade, while there are no significant differences between classes of the same age. Also the proportion of indirect argumentation is significantly higher in the 8th than in the 10th class, underlining that not only individual features, but entire characteristic clusters show characteristic class-level effects. A similar effect is the correlative link between disproving argumentational attitude, hypothetical data and inductive warrant, which is comparatively frequent within the 8th grade, but practically irrelevant in the 10th grade.

In order to examine the closer correlations between the different argumentative dimensions, a factor analysis is presented in the article, distinguishing between three different groups of argumentative behavior on the basis of the data. Combined with class-level effects and theoretical considerations, four basic argumentative styles and a subtype can be deduced, which are addressed as epistemic induction, epistemic deduction, deontic deduction, and inductive refutation, the latter with the subtype of inductive-hypothetical refutation. The data suggests that the incidence of epistemic inductions decreases during the development of argumentative competencies in favour of epistemic deductions, and that the inductive-hypothetical refutation is more typical for younger than for older pupils.

Although the results of the study are preliminary and require confirmation within surveys on a larger data sample, they demonstrate the practicability and didactic relevance of the presented analytical model, which is thus recommended as an easy-to-use supplement of conversational analytic models.

## **References**

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