

# Reasoning discursive actions implemented by young children during a classification task

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## Research topic and theoretical framework

By analyzing the processes of classification in mathematics (and sciences), Ouvrier-Bufferet (2006) demonstrated that this activity is not just about sorting objects, but about understanding their properties and how they interact with one another, up to the point of determining definitions or rules. Although this activity is complex, it appears to be accessible to young children. Indeed, during early childhood, classification activities are common and are carried out with objects that are not directly associated with mathematics. The purpose of this project is to investigate the reasoning involved in such activities, which are familiar and accessible to children; so, that they can later reinvest in a more specific mathematical context. Therefore, in this study, we want to characterize children's reasoning during a classification task.

For this study, we rely on the mathematical reasoning (MR) model proposed by Jeannotte (2015; Jeannotte & Kieran, 2017). This model defines structural and procedural aspects of MR which help to identify and analyze children's discursive actions in a detailed way. In this poster, we focus on the structural aspect of children's reasoning. In particular, the structural aspect of MR comprises three different elementary steps: deductive (infers a claim from data and warrant); inductive (infers a warrant from data and a claim about the data); and abductive (infer data and/or a warrant from the claim alone). Those different steps are combined to form different MR chains.

## Method

We individually met during 20 to 30 minutes with seven children and presented them with a guided activity designed for children between the ages of three and five. The sessions were videotaped for analysis. Here, we focus on one specific activity in which the children were asked to organize items in a grocery store. During the activity, the interviewer asked the children to explain their thought processes and the reasons behind their grouping decisions. Our objective was to observe and describe the structures of the children's reasoning using Jeannotte's (2015) MR model, in a context where the children were not explicitly asked to classify mathematical objects.

## Results and Discussion

We will illustrate the analysis of a short excerpt presented in the center of the figure below (Figure 1). This excerpt is the beginning of the activity that we did with Aria. In this local analysis of the actions (Figure 1), we can identify that the three types of steps are undertaken by Aria in this brief time frame. The deductive step in green was made by the researcher. When we zoom out and analyze the chains of the reasoning steps (the whole Figure 1), as suggested by Knipping (2008), we observe a

child leveraging the researcher's suggestion to engage in an analogical reasoning (Jeannotte, 2015) which is a combination of different steps. Indeed, Aria used the suggestion from the researcher to adjust her own group. She retraced her collection and constructed a satisfying warrant (inductive step). She, then, modified her collection (abductive step) and finally completed it (deductive steps).

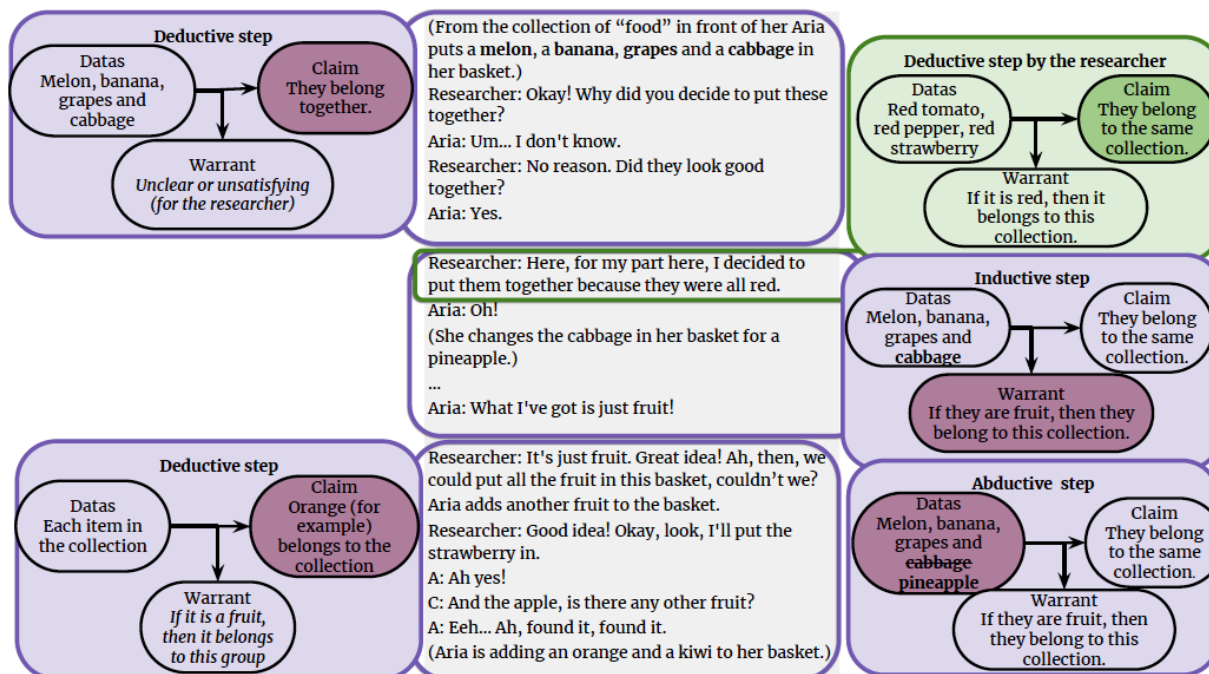


Figure 1: Analysis of an excerpt in terms of reasoning steps made by Aria

This short example shows how rich this child's reasoning activity can be in terms of structure. It's worth noting that not all of the observed children demonstrated this level of reasoning; the majority continued with deductive steps and the completion of the red group proposed by the researcher. In our future analysis, we are looking not only to identify the MR structures and how those structures interact but also how MR processes lead to a better understanding of the child's potential mathematical activity.

## References

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