CONCEPTUAL BLENDING UNRAVELS COVARIATION

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Covariation is a form of reasoning that deals with creating new conceptual objects and mathematical meaning (Thompson & Carlson, 2017): when a person co-varies two varying quantities, she mentally forms a new object resulting from the two initial magnitudes. Hence the input knowledge at stake leads to the formation of a new object of knowledge. This cognitive process has many features in common with the mechanism of conceptual blending (Fauconnier & Turner, 2002): blending processes between different mental spaces of knowledge are a way in which people make sense of new information.

In this communication, we shed light on the connection between the cognitive processes of blending and covariational reasoning. We specifically describe how the conceptual blending framework can help in revealing and grasping forms of covariational reasoning. This seems to be an uncharted territory that could enlighten the unexpected forms of covariation emerging in students' reasoning, mainly when the input spaces of knowledge are mediated by several representations of the phenomenon under investigation.

The analyzed data consist of two episodes from two different teaching experiments conducted in a 10^{th} and 11^{th} grade in a scientific-oriented school in Italy. The tasks were specifically designed to enhance covariational reasoning: they were focused on the modelling of real phenomena (the motion of a ball rolling along an inclined plane and the temperature-humidity relationship) and involved the use of various technological supports. Commenting on these episodes, we will show how the blending of the information provided by the involved artefacts and representations reveals and sustains both first- and second-order forms of covariation (Bagossi, 2022) and enables us to grasp the complexity of the analysed phenomenon better.

References

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