Mental and mathematical representations of music

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In musicological literature the concept of representation is quite widespread, even if in few cases it is completely analysed from a philosophical and psychological point of view [1]. We analyse here two different possible senses of the concept of musical representations: we distinguish between mental and mathematical representations of music [2]. Mental representations of music are the objects of the musical mind, the material of the musical cognition: they are *private representations* and they can be (meta)represented by public representations which are similar to the private mental representations [3]. On the other hand, mathematical representations of music are public representations which could be cognitively correlated with mental representations of music.

In many popular cognitive theories of music the mental representations of music are considered to be construed by the mind according with the musical flow [4], but in other models, like Generative Theory of Tonal Music [5] the mental representations of music are considered in the framework of a final-state theory. The computational approach to the musicology grounded on formal mathematical models uses written representations of music with a precise analytical function.

If mental representations of music are by definition a matter of cognitive psychology and philosophy, it can be argued that also mathematical representations of music have some cognitive correlates enabling the understanding of non-tonal music. Amongst the many typologies of mathematical representations of music we will analyse in details some examples about the so-called transformational analysis, which is a formalised subfield of computational musicology coming from the American Tradition [6]. The transformational paradigm in music also opens new questions about the cognitive and philosophical ramifications of algebraic approaches in music theory, analysis and composition, as we will discuss at the end of our talk by presenting some relationships between this approach in musicology and a category-oriented version of Piaget's genetic epistemology [7].

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