

Colloquium April 27, 2026

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Title: “Keyboard Distance: An Analytical Tool for Bridging Transformational Theory and Embodied Performance in Piano Music”

Keywords: Transformation theory, Keyboard Distance, Embodied performance, instrumental space, piano

Abstract:

Lewin’s Transformational theory has long provided powerful models for understanding abstract pitch relations in music. However, as current scholarship increasingly recognizes the importance of embodied performance effort and practice, a significant gap remains in theorizing the physical interface of musical instruments. While De Souza (2017), Frederick (2024), and Momii (2020, 2024) have begun integrating the physicality of performance into analytical models, the unique spatial and ergonomic constraints of the piano keyboard have yet to be systematically formalized within transformational theory. Unlike string instruments such as violin, guitar, or shamisen—which feature open strings as Cartesian starting points—the piano lacks a single zero point; pianists instead navigate via a “center of gravity” (Duguay 2019), locating themselves through black-key gaps and registral estimation. This paper addresses this critical gap by introducing Keyboard Distance (KD), an analytical tool that quantifies gestural topography on the piano—the physical paths a performer’s hands travel. KD defines the space between adjacent white keys as one unit, with all other distances measured proportionally. Directional arrows model both lateral and vertical motion, accounting for the elevated position of black keys and the ergonomic demands they create. This paper thus adapts transformation models specifically to the piano’s topography. Case studies include Ravel’s “Scarbo” and Concerto in G, Corigliano’s Etude Fantasy, and Ligeti’s Désordre. This paper presents KD as a new transformation theory that accounts for piano playing and its physical dimensions. This approach not only expands the analytical toolkit available to music theorists but also creates new opportunities for dialogue between analysis and performance practice.