

# **The Loudness War & Hypercompression: Quantifying the perception of compression effects**

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The Loudness Wars have been fought for several decades on various fronts. The term generally indicates the efforts by the music industry to release records with a steadily increasing loudness to the market. Besides radio broadcasting, movies and television the audio recordings in popular music are one of the most contested fronts. First a few historical facts, then terms and conditions for the emerging Loudness Wars are clarified.

My research is mainly focused on digitally-produced popular music, and its post-processing (audio mastering). At this stage of production compressors and digital limiters are used to make the final product sound louder. Since the Audio-CD hit the market in 1982 and established digital audio as the main form of mainstream distribution the average RMS-Level of Audio-CDs has steadily increased. In many cases, the tendency towards "hypercompression" has led to a decrease in overall sound quality in the sense of a measurable loss of dynamic range or even audible musical clutter. Quantitative studies concerning the many aesthetic concerns of the usage of dynamic range compression and the implications of the phenomenon of the Loudness War are still quite rare.

Hypercompression harms the overall audio quality and lets the music sound squashed, reduces depth, texture and stereo width and lately decreases the emotional impact of music. The empirical study for my Master's thesis examines two main questions. First, if an increasing amount of compression applied has a negative influence on overall audio quality judgements and second, if increasing amounts of compression really decrease the perceived stereo width of a song. The listening test used a double-blind method (adapted MUSHRA) with self-mastered soundsamples which were rated by a pool of expert listeners in order to collect quantitative data. The aim was to quantize the perception of compression effects on a scientific basis and thereby contribute to de-escalation strategies for the ending of the Loudness Wars. The collected data shows, that increasing amounts of compression applied significantly reduce the overall audio quality judgements. Surprisingly I failed to find any significant evidence for a loss of perceived stereo width, though some tendencies towards an expected decrease, depending on the respective audio content, are shown. Due to the lack of scientific studies on this topic, the attempt to quantize the perception of "hypercompression" can be considered as pioneering, and act as a model for further work in this area.