Improving child development by monitoring noisy daycares

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During some of their most formative years, many children go to day care centers outside their homes. While there, they require a supportive, healthy environment that includes meaningful speech and conversation.

This hinges on the soundscape of the child care center.

In his presentation at the 183rd Meeting of the Acoustical Society of America, Kenton Hummel of the University of Nebraska–Lincoln described how soundscape research in day cares can improve child and provider outcomes and experiences. The presentation is titled "Applying unsupervised machine learning clustering techniques to early childcare soundscapes."

"Few studies have rigorously examined the indoor sound quality of child care centers," said Hummel. "The scarcity of research may deprive providers and engineers from providing the highest quality of care possible. This study aims to better understand the sound environment of child care centers to pave the way toward better child care."

The goal of the research is to understand the relationship between noise and people. High noise levels and long periods of loud fluctuating sound can negatively impact children and staff by increasing the effort it takes to communicate. In contrast, a low background noise level allows for meaningful speech, which is essential for language, brain, cognitive, and social/emotional development.

Hummel is a member of the UNL Soundscape Lab led by Erica Ryherd. Their team collaborated with experts in engineering, sensing, early child care, and health to monitor three day care centers for 48-hour periods. They also asked staff to evaluate the sound in their workplace. From there, they used machine learning to characterize the acoustic environment and determine what factors influence the child and provider experience.

"Recent work in offices, hospitals, and schools has utilized machine learning to understand their respective environments in a way that goes beyond typical acoustic analyses," said Hummel. "This work utilizes

similar machine learning techniques to build and expand on that work."

More information: Confernce: acousticalsociety.org/asa-meetings/