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## Low outdoor temperatures and its association with noise exposure in the preschool.

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It is assumed that employees in preschools are exposed to the highest noise levels while indoors. More outdoor working hours is therefore preferable in order to reduce noise exposure and experienced stress. An important factor for working outside with children is temperature. Low outdoor temperatures may lead to more indoor working hours, thus higher noise exposure. The hypothesis of this study was that lower outdoor temperatures will have a negative impact on the indoor noise exposure and stress levels of the employees. The study included 89 employees at 17 preschools in the northern part of Sweden during the six coldest months of the year. Noise exposure was measured during all work hours for one week at each preschool.

Noise levels were recorded with stationary recordings (dining rooms and play halls) and personal carried noise dosimeters. Stress was evaluated by use of the Stress-Energy questionnaire and by analyses of cortisol from saliva samples. Temperature data was collected each day at 10 am and 3 pm from a weather database at Umea University.

A significant, but weak correlation ( $r = -0.160$ ,  $P = 0.027$ ) was observed for lower outdoor temperature at 3 pm and increased equivalent sound levels in the play halls. ANOVA analyses revealed that employees with an outdoor temperature colder than  $-10^{\circ}\text{C}$  at 10 am rated their experienced stress at 11 am significantly higher compared to employees having an outdoor temperatures warmer than  $-10^{\circ}\text{C}$  ( $F(3,81) = 3.18$ ,  $P = .028$ ). No group differences were observed regarding cortisol levels.

The results indicate that outdoor temperature may have an impact on the working environment regarding increased exposure noise levels and experienced stress. It is likely that the temperature needed to have an impact on changes in planned outdoor activities to indoor activities is below  $-10^{\circ}\text{C}$ . A weakness of this study is the low number of days with a temperature colder than  $-10^{\circ}\text{C}$ .