

REDUCTION OF ACTIVITY NOISE IN THE CLASSROOM

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Introduction The noise generated by the children themselves is a problem in classrooms and a documented impediment to learning (Hygge, Boman & Enmarker, in press). Therefore it is of interest to find out whether there are efficient ways to reduce unnecessary shouting, chatter and talk in the classroom. One simple way to try that out is to repeatedly instruct the children to be silent and to give them feedback about how well they succeed.

Methods Children in the first grade (7-8 years, 23 students) were given five weeks with two SoundEars (a wall-panel depicting an ear, turning yellow at 65 dBA and red at 70 dBA). The ears were placed 2.5 m up on the walls at the back of the classroom and at the middle of the wall to the adjoining corridor. Both ears were clearly visible to the students, although the students at the front of the classroom had to turn their heads more than 90° to see one of the ears. During the first week (pre covered) the SoundEars were covered, during the second week (pre uncovered) the children saw the ears but were given no explicit instructions to be silent. During the third week they were asked at the start of the school day to be quiet (general silence), and during the fourth week the instructions to be quiet were given at the start of each lesson (directed silence). During the fifth week the ears were covered again (post covered).

The SoundEars were equipped with a counter and a timer to record the number of times and the accumulated time the yellow and red circuits were activated. The counters were read and reset daily before and after lunch, and before and after lessons when only a part of the class was scheduled. For the measurement periods hourly means were calculated across the two ears, which only marginally differed from each other in recordings.

From time to time during the experiment, the children also filled out questionnaires rating their annoyance and other reactions to the classroom noise. These forms were simplified to suit children aged 7-8 years, e.g. ratings of annoyance, irritation, and sadness were made on visual analogue scales with happy and sad faces inserted.

Results Figures 1 and 2 show how often and for how long the 65 and 70 dBA levels were exceeded when the whole class was assembled. As can be seen there is a marked reduction in sound levels during the directed silent periods, a reduction that is not wholly lost during the fifth week when the SoundEars were covered again and no instructions were given about being silent. There was a strong and significant pair wise correlation between all the four noise measures in all of the 114 measurement periods in the study (all $r_s > .79$, $p_s < .000$, night values, divided class, and empty classroom included). For the 38 measurement periods forming the basis for Figures 1 and 2, there was also strong and significant correlations (all $r_s > .58$, $p_s < .000$), with the exception of the relationship between frequency/hour yellow and seconds/hour red ($r_s = .19$, $p_s > .1$). This lack of relationship probably reflects the increase for frequency/hour yellow during the general silence period, in contrast to the steady decrease for seconds/hour red.

For the rating scales there was a large variation between students and there were no significant relationship between the sound level measures and the childrens' ratings of their noise reactions during the same time periods. Pairwise correlations between ratings of annoyance, sadness and

irritation ranged from .32 to .64 and were non-significant across the seven points in time when ratings were taken.

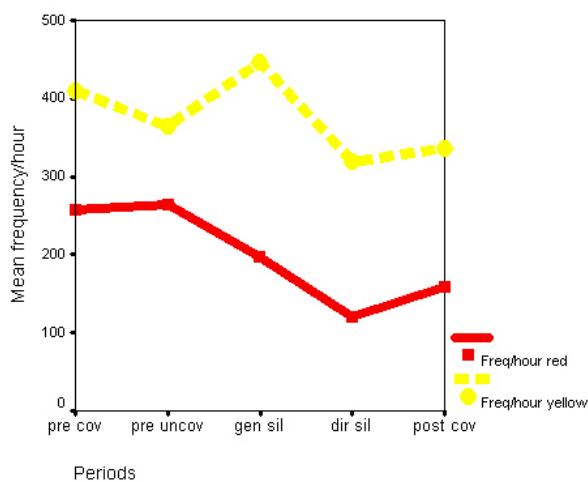


Figure 1. Frequencies per hour of > 65 dBA (yellow) and > 70 dBA (red)

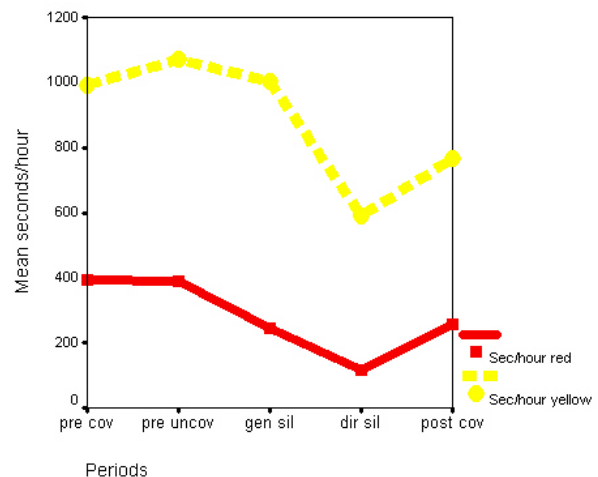


Figure 2. Seconds per hour > 65 dBA (yellow) and > 70 dBA (red)

The pairwise correlations on group basis between annoyance, sadness and irritation on one hand, and the four measures of noise in Figures 1 and 2 on the other hand, ranged from around - .40 to + .30 for most pairs, with the exception of a negative correlation of -.64 between rated sadness and mean sec/hour for the red noise measure. All these pairwise correlations were non-significant. The negative correlations indicate a more negative rating to *low* sound levels, which is contrary to what is expected. These findings strongly question the validity and reliability of the annoyance ratings made by the children.

Discussion This small experiment shows that it is possible to reduce the noise that the children produce themselves in their classroom. The general instruction to be quiet given at the start of the school day and the directed instructions at the beginning of each lesson together resulted in pronounced decrements in noise levels. During the periods with general or directed instructions to be silent, the children had continuous feedback about how well they performed. They had the opportunity to look at the SoundEars. During the follow up period, when the SoundEars were covered again, the low noise level from the directed silence period was not kept in its whole, but the levels were still below those from the general silence period. It is of course beyond the scope of the present study to say how stable and for how long the reduction in noise level will last if there is no feedback and there is no further instructions to be quiet.

The attempt to use rating scales for the children to assess how much they were affected by the noise was not successful. Whether our method or procedure was too clumsy to tap valid and consistent experiences in the children or whether children at the age of 7-8 years are not able to consistently do such ratings, we do not know.

Keywords Children, classroom noise, activity noise

References

Hygge, S., Boman, E., & Enmarker, I. (in press). Hygge, S., Boman, E., & Enmarker, I. The effects of road traffic noise and meaningful irrelevant speech on different memory systems. *Scandinavian Journal of Psychology*.