ABSTRACT
Contextual plasticity (CP, Kopco et al., 2007) is a form of spatial auditory plasticity observed in localization experiments in which distractor-target click pairs with a fixed distractor location (the context) are interleaved with target-alone trials. CP is observed as biases in localization of the target-alone clicks of up to 10° in the direction away from the distractor (which was not presented on these trials). This adaptation is on the time scale of seconds to minutes. Here we present and analyze the behavior of CP using 45° by 45° experimental models. The models are fitted to data in which distractor location (frontal vs. lateral, context distractor type (single click vs. multiple clicks), target location (near vs. far from distractor), and environment (anechoic vs. reverberant) are manipulated. The linear models describe the data as a combination of a fast onset adaptation followed by a slow drift in responses. The modeling results show that contextual plasticity depends on all the evaluated factors, and that the fast and slow components are affected differently by the factors. Thus, contextual plasticity is likely a result of a combination of multiple adaptive processes on different temporal scales.

METHODS
Stimulus and setup: Target-click presented from a random loudspeaker (Fig. 2). On most trials, a “distractor” click preceded the target. Distractor location – frontal or lateral to a subject. On no-distractor trials, the target was presented alone. Distractor type and distractor-target Stimulus Onset Asynchrony (SOA):
- Experiment 1 (Kopco et al., 2007): 1-click or 2-click, 25, 50, 100, 200, or 400 ms.
- Experiment 2 (Kopco et al., 2017): 1-click or 8-click (50 or 200 ms). Inter-click-interval in 8-click distractor: 100 ms.

Seven target loudspeakers and two distractor loudspeakers positioned in the subjects’ right or left frontal quadrant (see Fig. 1). Seven normal-hearing subjects in classroom (four in anechoic space).

Experimental procedure Each experiment in two different environments: reverberant classroom (CL, background noise of 40 dBA) or anechoic space (AN).
- Runs blocked by distractor location (frontal or lateral) and listener orientation (left or right quadrant). Four 1-hour sessions per experiment per subject.
- Each session had 4 runs of 168-trials (random order) in Experiment 1 (Exp 1) and 144 trials in Experiment 2 (Exp 2).

Data Analysis
Assumed left/right symmetry - data collapsed across orientation. Outliers lying 70° and more from the target were removed. For each combination of parameters, subject mean response on no-distractor trials was calculated (distractor trials were not considered).

RESULTS
In both Experiments and both rooms, Panel A, C, no-distractor responses are shifted:
- Frontally in lateral-distractor runs,
- Lateral in frontal-distractor runs.
In both rooms, click-distractor data shows large shifts for nearby sources. Black lines (Exp1) show average red lines (Exp 2) at left-hand side for frontal distractor.
- Red lines at right-hand side for lateral distractor.
- Similar shape of biases for frontal 3 targets (11, 22.5, 34°) in combination with frontal and lateral distractors (56, 67.5, 79°).
Bias grows over time (followed by subtracts)
- More for lateral distractor than frontal distractor data (Fig. 2, panels A, B).
- In the anechoic room, onset is similar for both experiments, but biases are higher for the last subsamples for Exp 2.
- In the classroom, onset is higher by the same value in Exp 2.
- 5-way RM ANOVA (Experiment, Room, Target, Subrun, Distractor) performed on difference (Responses to Target) data found:
  - Significant 4-way interaction of Experiment x Room x Target x Subrun x Distractor (F23,454, p=0.0285 **).
  - Significant 2-way interaction of Experiment x Target (F23,16,9, p=0.0012 ***).

CONCLUSIONS AND DISCUSSION
Increasing temporal resolution of CP data can be achieved by sacrificing spatial resolution. Temporal analysis can be simplified by looking at onset and late components from linear fit. Increasing temporal resolution of CP data can be achieved by sacrificing spatial resolution. In the classroom, onset is higher by the same value in Exp 2.

REFERENCES
- Experiment 2 (Kopco et al., 2017): 1-click or 8-click (50 or 200 ms). Inter-click-interval in 8-click distractor: 100 ms.

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