

The Game Sounds the Same: Change Deafness, Divided Attention, and Sports Expertise

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Abstract

Speech carries both semantic information and the acoustic or indexical characteristics of the voice. In a change deafness manipulation using radio broadcasts of sporting events, we show that change deafness to a switch in talker increases when listeners are asked to monitor both lexical and indexical information for change. We held semantic content constant and demonstrated a change deafness rate of over 80% when participants listened to the home team broadcast of a American Football and Hockey games that switched midway to the away team broadcast with a different announcer. In Exp. 2 participants were asked to monitor either the indexical characteristics (*listen for a change in announcer*) or both the indexical and semantic components (*listen for a change in announcer or a goal scored*). Monitoring both components led to significantly greater change deafness even though both groups were alerted to the possibility of a change in announcer. In Exp.3, we changed both the indexical and the semantic components when the broadcast switched from a hockey game to a basketball game. We found a negative correlation between sports expertise and change deafness. The results are discussed in terms of the nature of perceptual representation and the influence of expertise and evolution on attention allocation.

Exp. 1: Change Deafness in American Football

We presented experts and novices with excerpts of the home team broadcast of two sportscasters announcing an American football game on the radio. During a penalty announcement by the referee, we switched to the away team broadcast which featured two different sportscasters announcing the continuation of the same game for another 30 s.

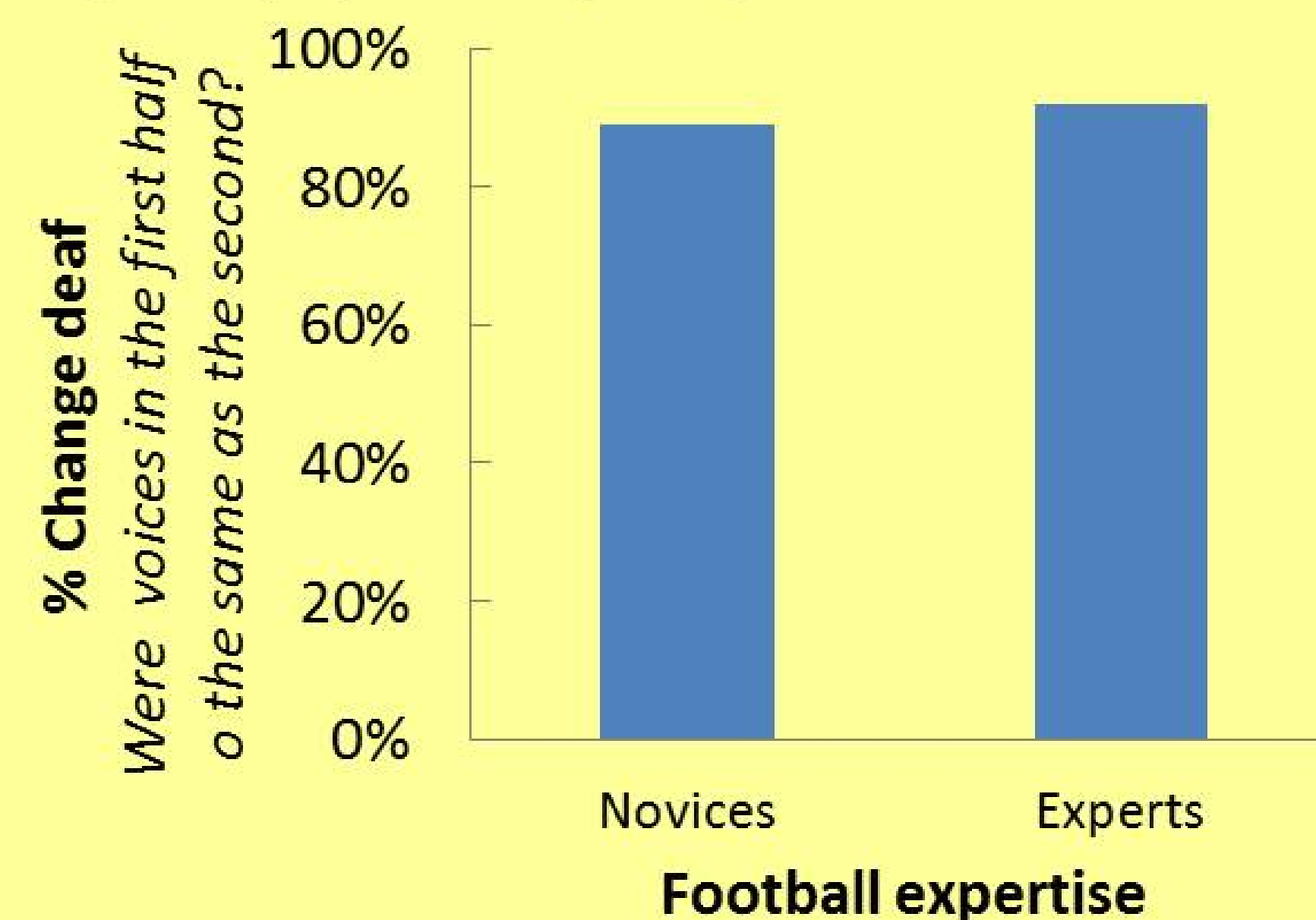
Change Deafness Questions

1. Did you notice anything unusual about the radio broadcast?
2. Was the first half of the radio broadcast the same as the second half of the radio broadcast?
3. Were the voices in the first half of the radio broadcast the same voice as the second half of the broadcast?



Expertise Measures

- Football rules "quiz"
- How often do you watch or listen to football games?
- How would you rate your ability to follow and understand a radio broadcast of a football game?
- Have you ever played on an organized football team?



Exp.2: Dual Task Change Deafness in Hockey

We presented experts and novices with a radio broadcast of a hockey game. Halfway through the one minute clip, the announcer changed. In a between subjects design we examined the effects of directed attention to a single change versus directed attention to two possible changes.

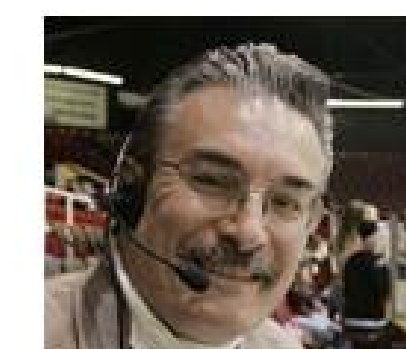


Instructions by group

Group 1: Just listen.

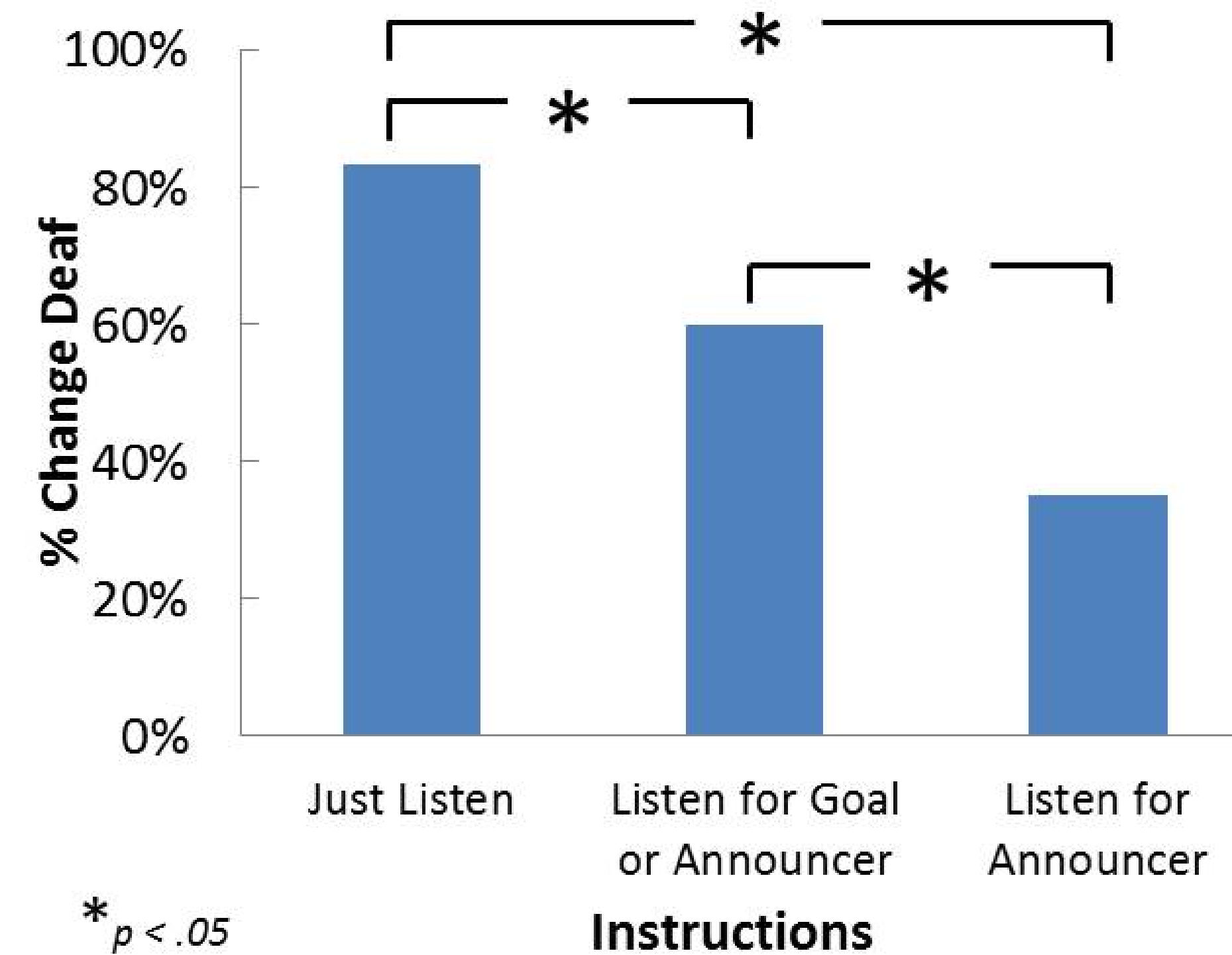
Group 2: Listen for a change in announcer.

Group 3: Listen for a change in announcer OR a goal scored



Expertise Questions

- Hockey rules "quiz"
- How often do you watch or listen to hockey games?
- How would you rate your ability to follow and understand a radio broadcast of a hockey game?
- Have you ever played on an organized hockey team?

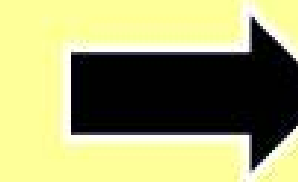


Exp. 3: Switch from Hockey to Basketball

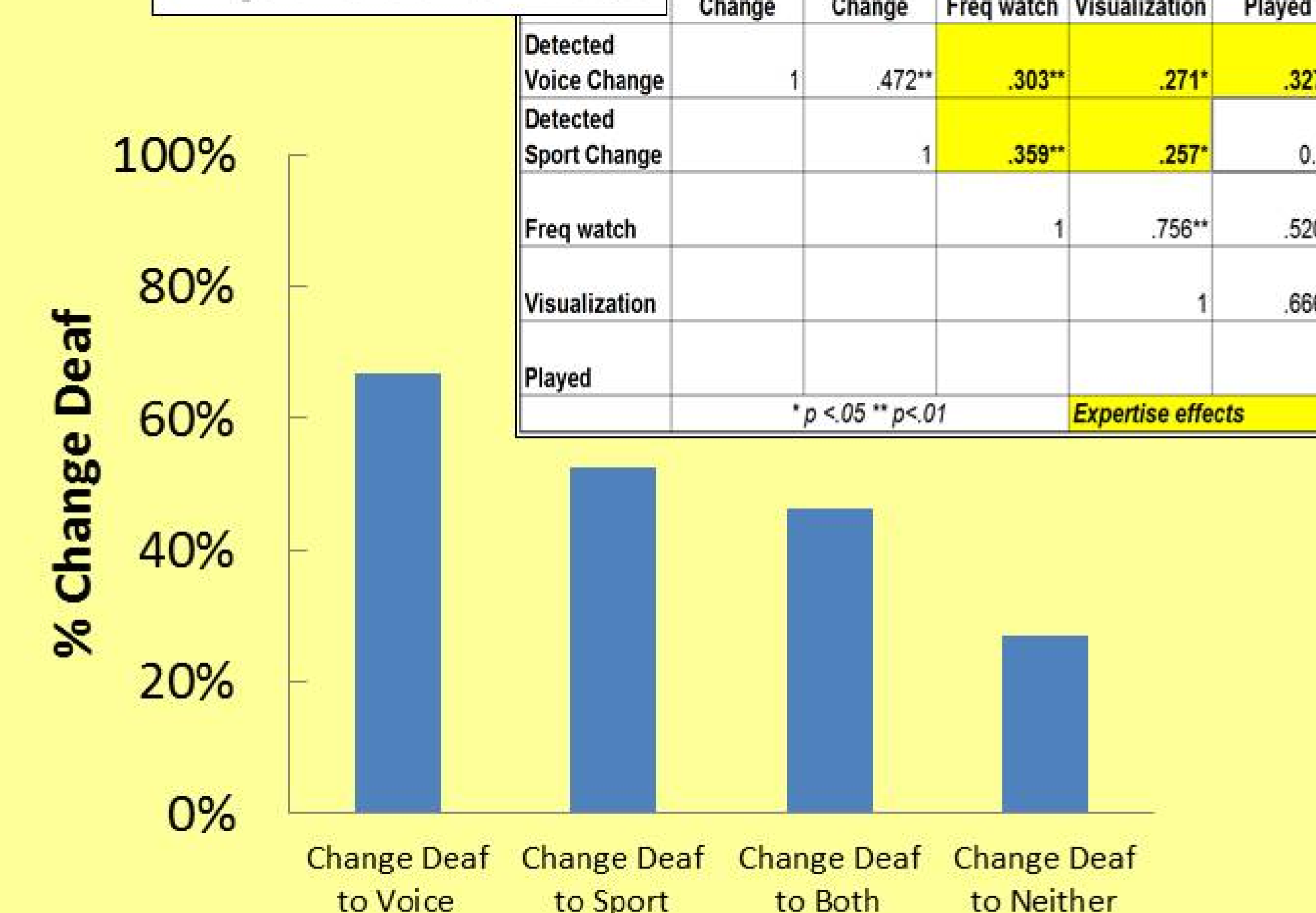
We presented experts and novices with a radio broadcast of a hockey game. Halfway through the one minute clip, the broadcast change to a basketball game with a different announcer.

Change Deafness Questions

1. Did you notice anything unusual about the radio broadcast?
2. Was the first half of the radio broadcast the same as the second half of the radio broadcast?
3. Were the voices in the first half of the radio broadcast the same voice as the second half of the broadcast?
4. Was the sport being broadcast in the first half the same as the sport in the second half?



Expertise effects



	Detected Voice Change	Detected Sport Change	Freq watch	Visualization	Played
Detected Voice Change	1	.472**	.303**	.271*	.327**
Detected Sport Change		1	.359**	.257*	0.21
Freq watch			1	.756**	.520**
Visualization				1	.686**
Played					1

* p < .05 ** p < .01

Expertise effects

Discussion

Listeners exhibit high rates of change deafness for a change in announcer during a radio broadcast of a sporting event. Over 80% of our listeners who were not cued to the possibility of a change failed to detect the announcer change. When alerted to the possibility of a change, the rate of change deafness dropped to 35%. However, if listeners were alerted to the potential for a change but also asked to listen for changes in both the semantic and indexical characteristics of the speech signal, change deafness increased to 65%. In Experiment 3 we made a semantic change in the signal from a hockey game to a basketball game and found that those with greater sports expertise were more likely to detect the change.

Previous work has shown that detecting changes in the indexical characteristics of the speaker can impair processing the lexical aspects of the speech (Vitevitch, 2003). Similarly, work showing that change deafness is greater in a familiar versus an unfamiliar language shows that attending to semantic information can impair detection of changes in the indexical characteristics of the speaker (Neuhoff et al., 2014).

However, both of these previous change deafness findings occurred under conditions where listeners were not expecting a change in speaker. In the current study, Experiment 2 shows that attending to semantic information can reduce the detection of changes in the indexical information even when listeners are alerted to the possibility of a change. The simultaneous focus of attention on both dimensions of the speech signal incurs a cost in detecting change in one of those dimensions even if the change is expected.