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RESEARCH ARTICLE

Figures and figure supplements

Tactile sensory channels over-ruled by frequency decoding system that utilizes spike pattern regardless of receptor type

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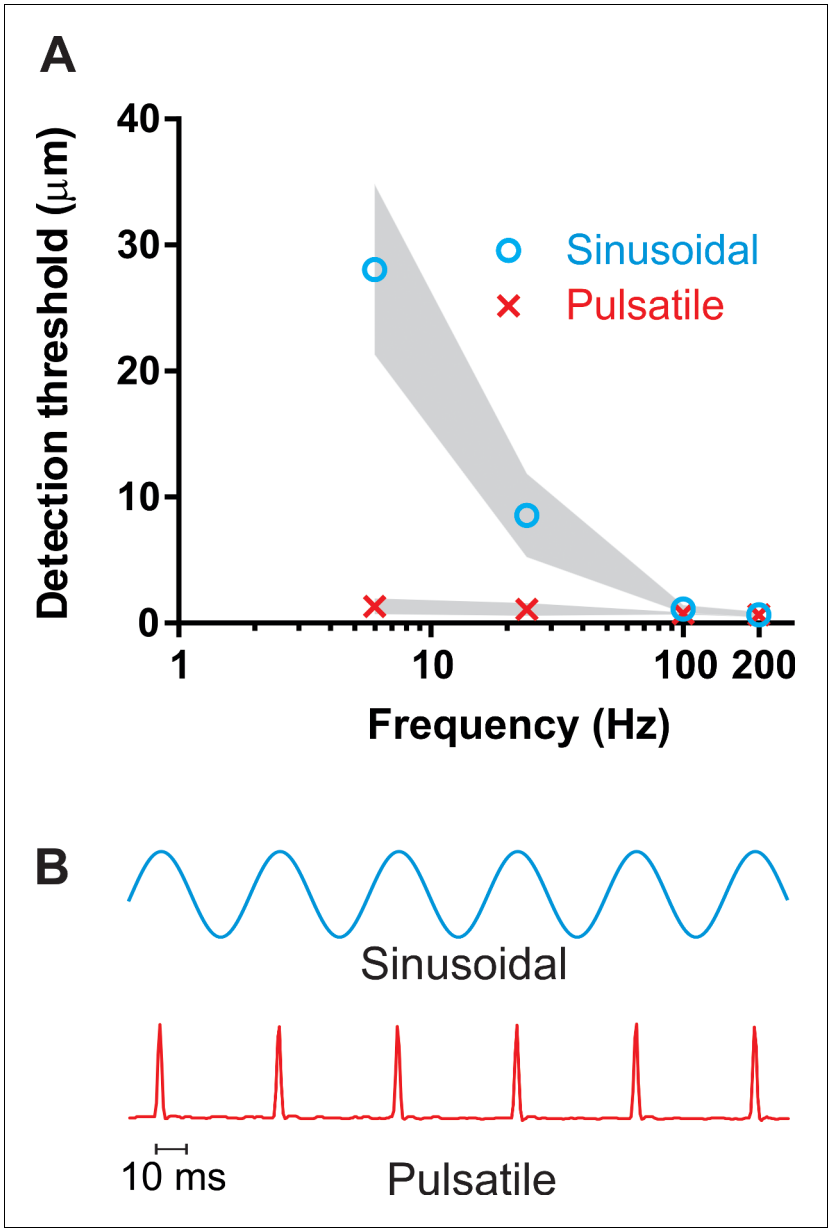

Figure 1. Detection thresholds. (**A**) Vibrotactile detection thresholds on the finger across frequency ranges for sinusoidal and pulsatile stimuli (n = 12). Shaded area represent ± 95% confidence intervals. (**B**) An example of the sinusoidal and pulsatile waveforms.

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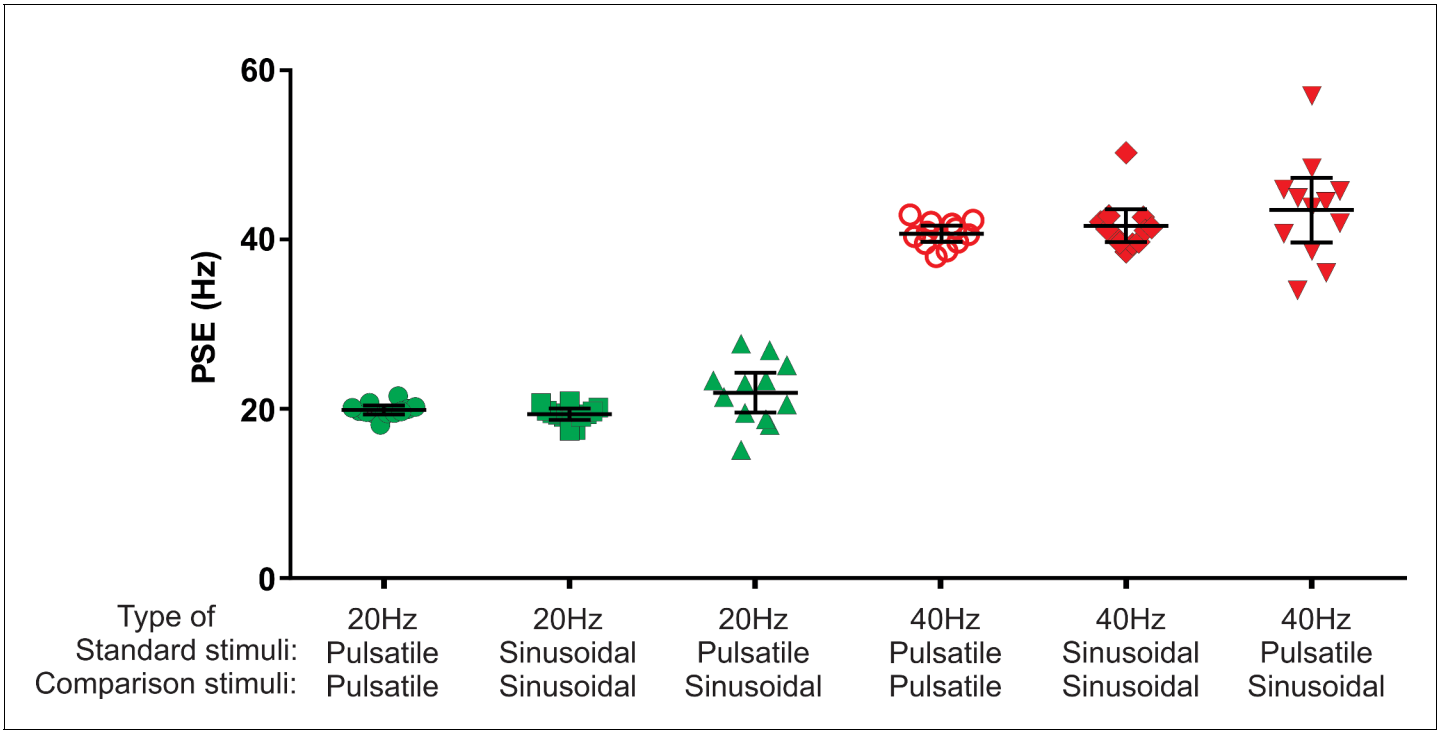

Figure 2. Point of subjective equality (PSE) obtained using two interval forced choice paradigm. The test stimulus was either sinusoidal or pulsatile presented at 20 Hz and 40 Hz. The test stimulus was compared with a range of comparison frequencies: 10, 14, 18, 22, 26, 30 Hz with 20 Hz test stimulus; and 25, 31, 37, 43, 49, 55 Hz with 40 Hz test stimulus. Black horizontal lines represent mean ± 95% confidence intervals (n = 12).

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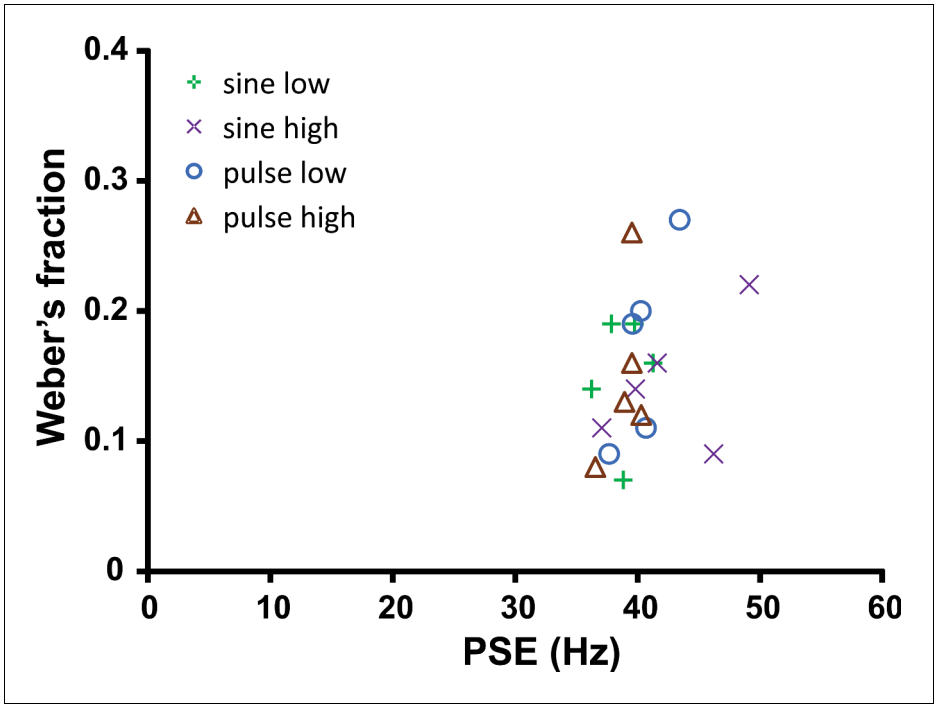

Figure 2—figure supplement 1. Insensitivity of frequency rating to changes in stimulus amplitude. Results are shown for five subjects (n = 5), who conducted the same experimental protocol illustrated in ***Figures 2*** and ***3*** at 40 Hz, but with two different amplitudes (randomly interleaved) for the comparison frequencies. For the sinusoidal comparisons, the standard was 60 μm, and the comparisons were 40 μm (sine low) and 90 μm (sine high). For the pulsatile comparisons, the standard was 6 μm, and the comparisons were 3 μm (pulse low) and 10 μm (pulse high). Mean values for PSE and Weber fraction for each condition with 95% CI were:

40 Hz comparisons	PSE	Weber Fraction
sine low	38.8 (37.1 - 40.5) Hz	0.15 (0.11 - 0.19)
sine high	42.8 (38.5 – 47.0) Hz	0.14 (0.10 - 0.19)
pulse low	40.3 (38.5 - 42.2) Hz	0.17 (0.11 - 0.24)
pulse high	39.0 (37.7 - 40.3) Hz	0.15 (0.09 - 0.21)

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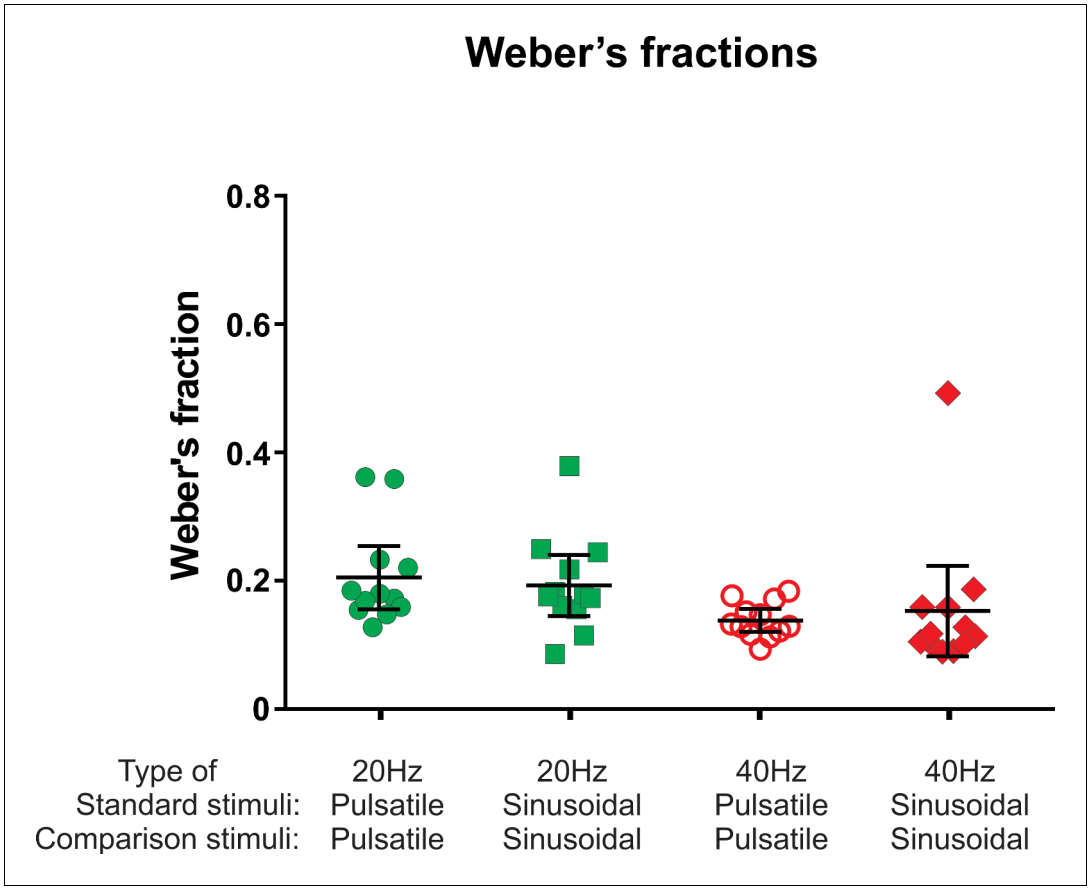

Figure 3. The Weber's fraction of just noticeable difference in frequency. For details refer to legend of ***Figure 2***.
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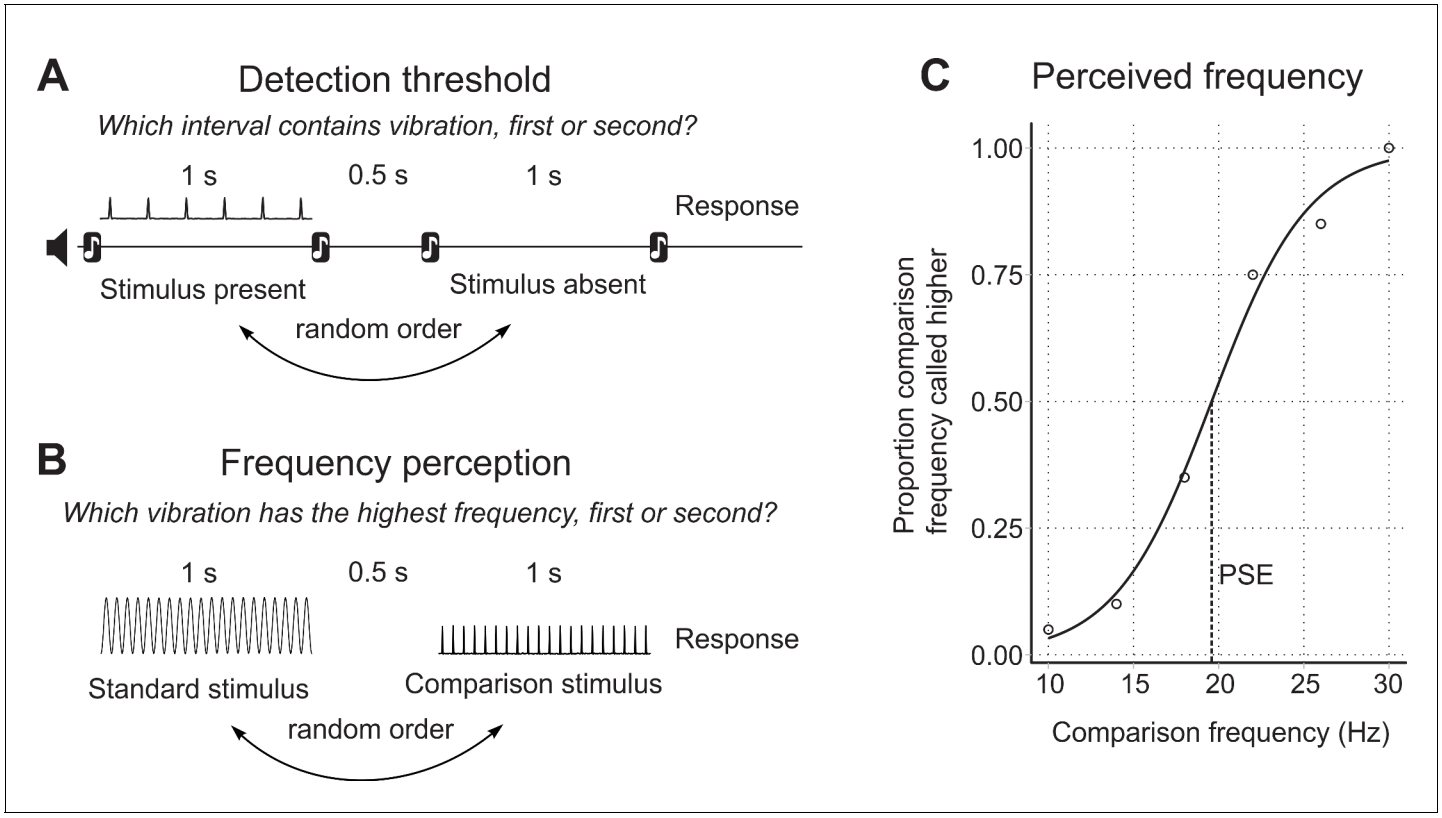

Figure 4. Experimental protocols. (**A**) Structure of the detection threshold task. (**B**) Structure of the frequency perception task. (**C**) Point of subjective equality (PSE) determined on the psychometric curve.

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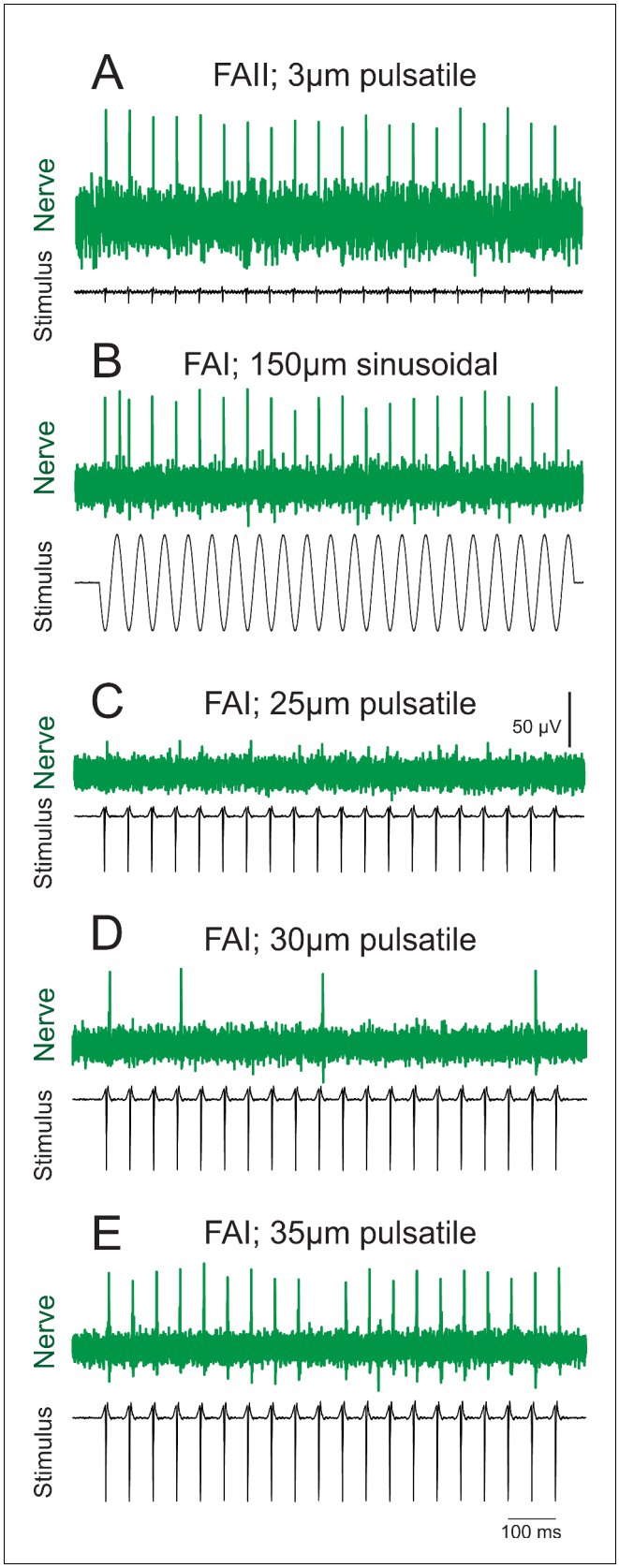

Figure 5. Afferent responses with 20 Hz stimuli. (**A**) FAII afferent response to pulsatile stimuli 3 µm in amplitude. (**B**) FAI afferent response to sinusoidal stimuli 150 µm in amplitude. (**C–D**) The same FAI afferent as in B, response

Figure 5 continued on next page

Figure 5 continued

to pulsatile stimuli at various amplitudes: no response with 25 µm (subthreshold) stimulus; sporadic firing at 30 µm; and entrainment at 35 µm. Note that firing pattern in A, B and E is identical regardless of stimulus or afferent type.
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