PSY 254: Precept 2

Methods in developmental science

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Catch up & reminders

Last precept: How to read a scientific article

(ask after class or email if you would like a copy of the slides)

MCQs: should be submitted *before* precept each week, correct answer should be indicated

Textbook readings: suggested to be completed before the corresponding lecture

Research participation: Sign-ups open next week

If you're new to this precept, fill out the intro survey (1min)

Types of (developmental) science

Deductive

Have a hypothesis…need some data!

Top down, confirmatory

Inductive

Have some data…need a hypothesis!

Bottom up, exploratory

Types of (developmental) science

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Deductive or Inductive?

Netflix analyzes your daily watching patterns to recommend new movies

A neuroscientist stimulates neurons in the amygdala of rats as they perform a learning task

A school district introduces anti-bullying posters in half its schools, counts bullying reports every quarter

The World Bank correlates GDP with other indices to figure out why some countries are poor

Kisilevsky et al. (2003)

Hypothesis: fetuses discriminate mother's voice vs. female stranger's voice

Participants: 60 term fetuses

IV: voice type (mother vs. female stranger)

DV(s): fetal body movement & HR

Results: increased HR for mother, decreased HR for stranger

Kisilevsky et al. (2003)

Internal validity

Increases control

Decreases confounds

External validity

Translates to the real world

Kisilevsky et al. (2003)

What decisions did the authors make to rule out other factors that could explain the results (i.e., confounds)?

METHOD

Participants

Sixty term fetuses (M = 38.4 weeks GA, SD = 1.1) of Chinese women receiving antenatal care at a hospital in southeast China were tested after the mothers-to-be provided informed verbal consent. All pregnancies were singleton and considered low risk. Testing was conducted on one occasion in a laboratory near the outpatient fetal assessment unit. Gender was not determined at time of testing.

Equipment

The 2-min speech stimuli were generated by tape-recording mothers reading an adult poem. Maternal speech was recorded and delivered using a Sanyo Cassette Recorder (Model M-1770K). A XingQui-ND2 SPL meter was used to measure sound intensity.

Continuous FHR was recorded in beats per minute (bpm) on a paper strip using a Sonicaid RS232 Cardiotocograph (Oxford Instruments). An FHR for each second was obtained by tracing over the recording using a digitizer connected to a Macintosh computer (for details, see Coleman, Kisilevsky, & Muir, 1993). Body movements were visualized using a Toshiba CAPASEE (Model SSA-220A) real-time ultrasound scanner and video-recorded on-line using a Sharp VC-RA58 Multi Lingual OSD VHS video recorder.

Procedure

During the 6-min procedure, mothers lay on a bed in a semirecumbent position. Fetuses were assigned to one of two voice conditions, each of which consisted of three 2-min periods: no stimulus, voice (mother or female stranger), and no stimulus. The same poem was played to the two groups of fetuses; there were 30 fetuses in each group. For the mother's-voice group, the voice was a tape recording of their own mother's voice. The voice of a female research team member was used for the first participant in the stranger's-voice condition, but for every other participant in this group, we played the tape recording that had been played to the previous fetus in the maternal group. The voice stimuli were delivered at an average of 95 dB SPL through a loudspeaker held approximately 10 cm above the maternal abdomen. FHR was recorded continuously, and body movements were video-recorded.

Same "age"

Only low-risk singleton pregnancies

Same location of testing

Same equipment used in all conditions

Same duration and order of presentation in both conditions

Same auditory stimuli used in both conditions

Same text (poem) used for both conditions

Same loudness and distance of presentation

Kisilevsky et al. (2003)

Face Validity: how much intuitive sense does your task make to test this idea?

Convergent Validity: use similar tasks to see if they show the same pattern

Divergent Validity: use different tasks to see if they show the same pattern

Kisilevsky et al. (2003)

Which has higher face validity:
ACT/SAT or a Buzzfeed quiz?

Kisilevsky et al. (2003)

Face Validity: how much intuitive sense does your task make to test this idea?

Convergent Validity: use similar tasks to see if they show the same pattern

Divergent Validity: use different tasks to see if they show the same pattern

Kisilevsky et al. (2003)

Which has higher divergent validity: Taking the ACT and SAT or MCAT and LSAT?

Kisilevsky et al. (2003)

Face Validity: how much intuitive sense does your task make to test this idea?

Convergent Validity: use similar tasks to see if they show the same pattern

Divergent Validity: use different tasks to see if they show the same pattern

Kisilevsky et al. (2003)

Which has higher convergent validity: Taking the ACT and SAT or MCAT and LSAT?

Kisilevsky et al. (2003)

Did Kisilevsky's (2003) measures have high convergent validity, high divergent validity, or mixed?

ferences in fetal body movements. Hepper et al. (1993), who used only body movement measures of responding, also reported no differences in fetal behavior in response to the familiar voice of the mother and the novel voice of a stranger. These disparate findings attest to the need for multiple response measures in studies examining fetal perceptual abilities.

Our results also contrast with those from studies using short bursts of noise at 105 or 110 dB (e.g., Kisilevsky et al., 1989, 2000) or vibroacoustic stimulation (e.g., Kisilevsky, Fearon, & Muir, 1998), in which fetuses showed an immediate, brief body movement coupled with an increase in heart rate within 20 s of stimulus onset. In reviewing the literature on human fetal and newborn behavior, Joseph (2000) related these and other similar behaviors, such as heart rate changes to

Kisilevsky et al. (2003)

Limitations?

Alternative hypotheses?

Kisilevsky et al. (2003)

Kisilevsky et al. (2003)

Kisilevsky et al. (2003)

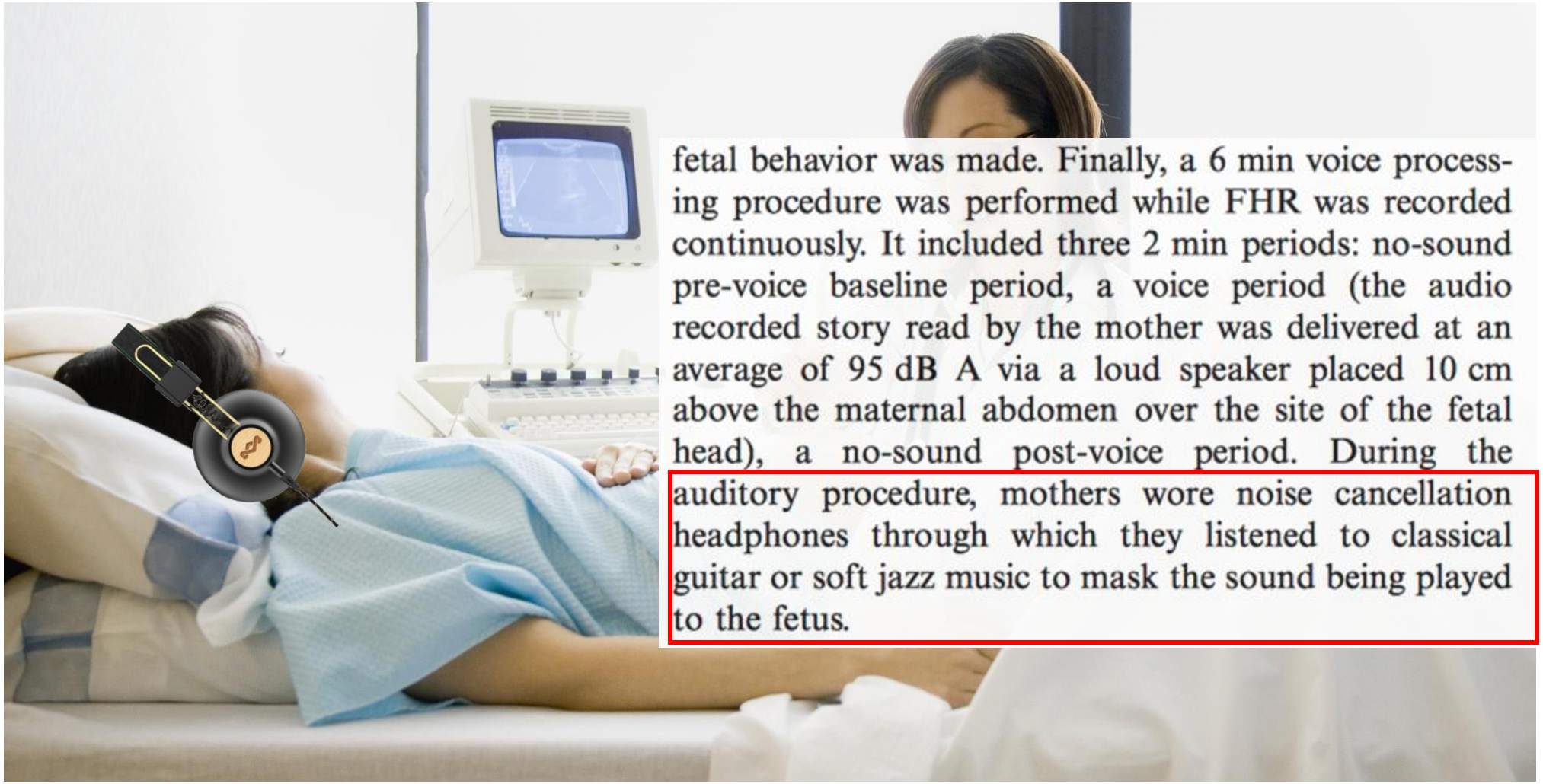
A whisper is about 30 **dB**, normal conversation is about 60 **dB**, and a motorcycle engine running is about **95 dB**.

Kisilevsky et al. (2003)

How can we fix this?

Kisilevsky et al. (2011)

Science (sometimes) corrects itself!



fetal behavior was made. Finally, a 6 min voice processing procedure was performed while FHR was recorded continuously. It included three 2 min periods: no-sound pre-voice baseline period, a voice period (the audio recorded story read by the mother was delivered at an average of 95 dB A via a loud speaker placed 10 cm above the maternal abdomen over the site of the fetal head), a no-sound post-voice period. During the auditory procedure, mothers wore noise cancellation headphones through which they listened to classical guitar or soft jazz music to mask the sound being played to the fetus.

Preparation for next time

Homework:
Read the paper (Smith et al., 2011)

Submit one mock exam question (multiple choice) on Canvas before precept (indicate the correct answer)

Email me your baby photos if you're presenting next week

Office hours:
Wednesdays 10:30-11:30am in PSH 217
Email me (kcasey@princeton.edu) with questions or to schedule alternate meeting time

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