

What goes into the rest of the methods section?

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### Different potential parts

- Materials
- Apparatus (aka Equipment)
- Stimuli
- Design
- Procedure
- Coding (aka Measures)
- Analysis
  
- No study has all of these, and only the procedure is consistently a necessity...

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### Materials, Stimuli & Apparatus

- Apparatus:
  - Testing booth if for humans, test cage if for animals
  - Generally, things that are bought off a shelf are not described or are only briefly described; only things made for/by the researcher
- Materials:
  - Surveys, clinical tests
  - Generally, things that are easily available are simply cited, and only relevant details described; new tests are described in more complete detail
- Stimuli:
  - Including how/why they were chosen, recorded, presented

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## Apparatus example 1

"The experiment was conducted in a three-sided test booth constructed of pegboard, with panels of 4 by 6 ft on three sides and open at the back. This made it possible for an observer to look through one of the existing holes to monitor the infant's headturns. Except for a small section for viewing the infant, the remainder of the pegboard was backed with white cardboard to guard against the possibility that the infant might respond to movements behind the panel. The test booth had a red light and a loudspeaker mounted at eye level on each of the side panels, and a green light mounted on the center panel. A white curtain suspended around the top of the booth shielded the infant's view of the rest of the room. A MacintoshCentris 650 computer and response box were located behind the center panel, out of view of the infant. The response box, which was connected to the computer, was equipped with a series of buttons that started and stopped the flashing center and side lights, recorded the direction and duration of headturns, and terminated a trial when the infant looked away for more than 2 s. Information about the direction and duration of headturns and the total trial duration were stored in a data file on the computer."

Houston, D. M. & Jusczyk, P. W. (2000) The role of talker-specific information in word segmentation by infants. *JEP:HPP*, 26(5), 1570-1582. From draft version.

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## Apparatus example 2

"A Sony TRV-7000 Digital8 camcorder was attached to a Sony KLW-9000 LCD presentation display (a 56-in. screen). A second camcorder was mounted above this display to record infant looking times. A large white plywood barrier surrounded the front of the display and camera in order to minimize looks to non-essential sections of the testing apparatus. In this way, the infant or toddler was prevented from seeing anything except the screen and the lens of the camera."

Seidl, A., Hollich, G. & Jusczyk, P.W. (2003). Early understanding of subject and object wh-questions. *Infancy*, 4(3), 423-436.

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## Materials example

- "The stimuli were 2,938 monosyllabic words. These words involved a wide range of frequencies: from 0 to 69,971 counts per million, according to the Kucera and Francis' (1967) objective frequency norms, and from 1 to 62,218 per million, according to the CELEX (Dutch Center for Lexical Information, 1995) norms. The words ranged from two to eight letters in length. . . ."

Balota, Piotti, & Cortese (2001) Subjective frequency estimates for 2,938 monosyllabic words. *Memory & Cognition*, 29(4), 639-647

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## Stimuli example 1

“Stimuli consisted of six colored shapes (turquoise square, blue cross, yellow circle, pink diamond, green triangle, and red octagon) presented one at a time in a continuous stream, with no break or delay between shapes. Each shape was presented for 1 s and loomed from 4 to 24 cm in height (2.4 - 14.6°).”

Kirkham, N.Z., Slemmer, J.A. & Johnson, S.P. (2002). Visual statistical learning in infancy: Evidence for a domain general learning mechanism. *Cognition*, 83, B35-42.

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## Stimuli example 1

“Two groups of twenty CVC nonsense words were selected as stimuli. These items are listed in Appendix A. The two sets were matched for positional phoneme probabilities. That is, each phoneme that occurs syllable initially in one set occurs syllable initially the same number of times in the others set. This same matching was done for the vowel and the final consonant. However, matching on biphones (sequences of two phonemes) was not possible while maintaining other constraints. The average neighborhood values of both sets, via both methods of calculation, are shown in Table 1.

[describes methods of calculation here]

An additional 40 real words were selected as foils. These items were all neighbors of the nonsense items. Approximately one-third of the words differed from a nonsense syllable in their first consonant, one-third in their vowel, and one-third in their final consonant.

All items were recorded by a female native speaker of English (RSN), using a Shure SM81 microphone and a Mackie 1202 VLZ mixer/amplifier. They were recorded at a 44.1 kHz sampling rate, with 16 bits quantization, and stored on computer disk.”

Newman, R.S., Sawusch, J.R., & Luce, P.A. (Accepted). Do post-onset segments define a lexical neighborhood? To appear in *Mem. & Cog.*

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## Procedure & Design

- Generally, the procedure is described from the point of view of the participant
  - What they experienced or were told to do, in that order
    - Instructions
    - What a trial was like (what happened in it)
    - What different types of trials they were
    - How many trials there were (overall & in each block)
    - How long each trial was, & how long the experiment was
    - How they responded
    - Block order or condition order
    - How they were debriefed
  - How assigned to groups, if not in subject section

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## Procedure & Design

- Some things are invisible to the participant, but still must be described (either in this section, or in coding or analysis)
  - What types of measures were taken from the participant's data
  - Rationale for these measures
  - Things subjects were explicitly not told (to avoid bias)

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## Procedure & Design

- Design
  - Groups, factors, levels - statistical setup
  - Between vs. within vs. single-subject
  - Often only included as a separate section when design is atypical or complicated; otherwise, information is included as part of procedure

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## Procedure example 1

"A total of 45 subjects were randomly assigned to 5 groups. Four of the groups were presented with 27 min of Korean, presented binaurally through earphones. The control group was tested without prior exposure to Korean. A soundproof chamber was used for testing subjects. After listening to the recorded passage, each subject was presented was 24 sentences, repeated twice. A 5 sec pause separated the two versions of the sentences. Subjects were permitted 15 sec to respond, in writing, and were warned five sec prior to the next trial with a brief 1000 Hz tone, also presented binaurally. The subjects determined which version sounded 'more natural.' The dependent measure was the number of sentences in which the sentence with the pause separating the larger units was identified as 'more natural.'"

Pilon, R. (1981). Segmentation of speech in a foreign language. *Journal of Psycholinguistic research*, 10(2), 113-122.

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## Procedure example 2

- “Upon arrival at the lab, parents and their infants were escorted to a playroom. There, the experimenter explained the study and gave the parent a consent form. The infant and parent were then led to a testing room, where the infant was seated in the center of their parent’s lap and the parent was directed not to interact with the infant during the experiment. During the experiment, the parent wore a visor with a long piece of felt hanging from the front. This blocked the parent’s view of the screen and prevented the parent from influencing the child to look in any particular direction. The parent and child were seated 46 in. from the screen. The entire experiment took 2 min and 16 sec.”

Seidl, A., Hollich, G. & Jusczyk, P.W. (2003). Early understanding of subject and object wh-questions. *Infancy*, 4(3), 423-436.

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## Procedure example 3

- “The infant sat on a caregiver’s lap in the center of the test booth. There was an initial practice phase to familiarize the infants with the task; during this phase, the infants heard one of two musical passages on alternating trials until they accumulated at least 25 s. of listening time to each passage. Listening time was assessed by the amount of time the infant spent looking at the “source” of the sound (the flashing light).
- The test phase began immediately after the listening criteria for the practice phase was reached. During this test phase, the infants heard three repetitions of each of four different names. The twelve trials were blocked in groups of four so that each name occurred once in a given block, although the order of the four names within each block was randomized....

Newman (in press) The cocktail party effect in infants revisited: Listening to one’s name in noise. To appear in *Developmental Psych.*

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## Procedure example 3, cont.

- Both familiarization and test trials began by blinking the light in the center of the front panel. Once the infant had oriented in that direction, the light was turned off and one of the two red lights began to flash. Once the infant had oriented towards that light, the stimulus for that trial began to play from the loudspeaker on the same side. The stimulus continued to play until its completion, or until the infant had looked away for 2 consecutive seconds, whichever came first. Any time the infant spent looking away (whether it was 2 seconds or less) was not included when measuring total listening time. The red light continued to flash for the duration of the entire trial. Information about the direction and duration of headturns and the total trial duration were stored in a data file on the computer.
- The experimenter behind the center panel pressed a button on the response box whenever the infant looked at or away from the flashing light. Both the experimenter and the caregiver listened to masking music over Peltor aviation headphones so that they could not influence the infant’s behavior or the coding of that behavior.”

Newman (in press) The cocktail party effect in infants revisited: Listening to one’s name in noise. To appear in *Developmental Psych.*

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## Design example 1

“The present study employed a yoked-control experimental design. Infants were assigned to either the maternal-voice or the novel-voice condition. During the familiarization phase, half of the infants in the maternal-voice condition were assigned to hear *cup* and *dog*. The remaining maternal-voice infants heard *bike* and *feet*. During the test phase, each of these infants heard all four of his or her mother’s recordings of the six-sentence test passages containing the words *cup*, *dog*, *bike*, or *feet*. Infants heard both the passages containing the familiarized words and those containing the unfamiliarized words during the test phase; listening times were compared for these two types of passages. Each infant in the novel-voice condition was matched with an infant in the maternal-voice condition, and heard the same recordings as that infant [see Figure 1 for design schematic].”

Barker, BA & Newman, RS (2004) Listen to your mother! The role of talker familiarity in infant streaming. *Cognition*, 94(2) B45-53.

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## Design example 2

“The experimental design was a between-within factorial with an external control. There were two factors between with two levels each and one within factor with three levels. The dependent measure was the identification of the “more natural” linguistic unit in a forced-choice task. The first factor was the grammatical structure of Korean. Level 1 represented grammatically organized words (i.e., sentences), while level 2 involved random word lists. The second factor was the vocabulary used in the exposure period. Level 1 involved exposure to the same words as used in the test sentences, while level 2 reflected the use of different words. The data were submitted to an analysis of variance.”

Pison, R. (1981). Segmentation of speech in a foreign language. *Journal of Psycholinguistic research*, 10(2), 113-122.

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## Design example 3

“This experiment employed a 2x2 factorial design, with side of presentation of motherese (left vs. right) and training order (motherese first vs. motherese last) as between-subject variables. The dependent measure was the number of trials, out of 15, in which the infant’s head-turn was in the direction required to produce motherese. Twelve subjects were assigned randomly to each of the four groups, with the constraint that the distribution of male and female subjects was balanced throughout the groups.”

Fernald, A. (1985). Four-month-old infants prefer to listen to motherese. *Infant Beh. & Devel.*, 8, 181-195.

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## Coding & Analysis

- Coding:
  - How measurements were done
    - What was measured
    - What was summed/averaged
  - Reliability of coding
  - Issues surrounding observer bias (how avoided, etc.)
- Analysis
  - Generally only needed if analysis was itself a complicated or especially important aspect
  - Sometimes includes same information as would otherwise be in design (statistical information) or in coding

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## Coding example

- “For each subject, durations of looking time to the left or the right were coded off line, frame-by-frame, and without sound to minimize the possibility of bias. The first author coded all the data. The second author coded ten percent of the data. Inter-coder reliability was .96 or better (this is the percent of agreement between coders.)”

Seidl, A., Hollich, G. & Jusczyk, P.W. (2003). Early understanding of subject and object wh-questions. *Infancy*, 4(3), 423-436.

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## Analysis example 1

“The two main dependent variables, attentional responsiveness (as measured by looking time) and affective responsiveness (as measured by the cumulative score of the ratings on the questions referring to interaction, interest, and emotional state) were analyzed separately in repeated measures mixed ANOVAs with 2 x 4 (age by order) between-group variables and 2 x 2 x 2 (sex of talker by talk type by day) within-group variables. . . .”

Wenker, J.F. & McLeod, P.J. (1989). Infant preference for both male and female infant-directed talk: A developmental study of attentional and affective responsiveness. *Can. J. Psychol.*, 43(2), 230-246.

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## Analysis example 2

"The recordings from each child were digitized at a sampling rate of 44.1 kHz, with 16-bit quantization, and stored on computer disk. The first 10 content words spoken by each child that occurred without background noise in both the infant-directed and adult-directed speech were selected for further analysis. The fundamental frequency, amplitude, and duration of each word was measured using the Cool Edit 96 computer program by Syntrillium. Amplitude and duration measures were taken across the entire target word; fundamental frequency was measured over the largest voiced section of the word. Reliability was measured by having two observers separately analyze the speech from each of the first 12 subjects. For the duration measure, the correlation between the two observers was  $r = .935$ . For the fundamental frequency, the correlation was  $r = .757$ , and the correlation was  $r = .978$  for the amplitude measure. These correlations suggest that measurements are quite consistent across observers, although the measures of fundamental frequency were more variable. For these twelve subjects, the average of the two coders' measures was used in the later data analysis.

From these calculations, we determined four measures for each child in each condition: average fundamental frequency, standard deviation of fundamental frequency, amplitude standard deviation, and average amplitude. Each measure was compared across conditions (infant-directed vs. adult-directed) using a within-subjects t-test."

Wepelman, T. L., Bostow, A., Schiffer, R., Elbert-Perez, E. & Newman, R. S. (2003). Children's use of the prosodic characteristics of infant-directed speech. *Language and Communication*, 23(1), 63-80.

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