



Student Resource

Guide to Phonemic Analysis

If you are a linguist working on a language that hasn't been studied before, you need to determine which of the sounds distinguish meaning (i.e., are phonemes) and which do not (i.e., are allophones). When two sounds are allophones of a single phoneme, you then need to determine whether you can predict which one occurs where (this is usually possible), succinctly state the environments for each, and write a rule that clearly states the change. The steps below outline this process.

STEP 1: Read the instructions and identify the target sounds for the problem: ensure that you understand what you are being asked to do. Read every example, including its English translation. (It helps to familiarize yourself with all the data at the beginning, rather than proceeding directly to analysis.) If there are any phonetic symbols that you do not recognize, refer to the IPA chart online or in the back of the book.

STEP 2: Look for minimal pairs: Are there any minimal pairs or near-minimal pairs for the target sounds in the data? (Remember that the translations must be different for words to be minimal pairs, i.e., they must differentiate meaning.)

- **If YES:** The sounds in question are distinct *phonemes*.
- **If NO:** Continue to Step 3.

STEP 3: Check for free variation: If you thought you had minimal pairs, but the translations were identical, then the two target sounds are *allophones of a single phoneme in free variation*.

- If you have neither phonemes nor allophones in free variation, then continue to Step 4 to look for *complementary distribution*.

STEP 4: Create a list of environments: For each of the words in which the target sounds occur, list the preceding and following sounds. Let's assume the target sounds are [s] and [z]. Your lists should look like this (these environments are just made up; they are not tied to any particular data set):

<u> s </u>	<u> z </u>	
t ___ V	d ___ V	
t ___ #	d ___ #	
p ___ #	b ___ #	etc.

- The symbol V refers to "vowel" and C refers to "consonant." These can be used when it seems that any vowel or consonant can occur next to the sound.
- The symbol # is used to represent a word boundary. Thus, ___ # means the sound occurs before a word boundary, i.e., it is the last sound in the word or is in "word-final" position. Similarly, # ___ means the sound occurs after a word boundary, i.e., it is the first sound in the word ("word-initial").

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STEP 5: Analyze the environments: Look for commonalities within the groups of sounds that precede and follow each target sound (i.e., the symbols that you've listed to the left or the right of the underscore). The following points and questions can help you move towards an analysis:

- Look to see whether the target sounds occur in the same position or in different positions within words broadly: Are both word-initial, word-final, before a vowel, following a consonant, between vowels, etc.?
- If you don't find any patterns when looking at the broad level, look at the environments in more detail. For example, if both target sounds occur before consonants, look at which *specific* consonants follow each sound. You may need to rewrite your lists. For example, rather than writing #___C, you may need to write # ___ p (specifying the consonant that occurs in a given example) and # ___ t (specifying the consonant that occurs in another example) – make sure that you get every example when you do this.
- **Use your knowledge of phonetics and natural classes to guide your thinking.** Usually if there is complementary distribution, one target sound will be conditioned by a **natural class** of sounds. Check to see whether any of the groups of sounds that precede or follow either target sound form a natural class. If so, characterize that class using phonetic features (for example, voiceless stops).
- **Look for and expect natural phonological processes** (e.g., assimilation). A list of common phonological processes is provided in Textbox 3.6.
- Do any of the sounds that occur before one target sound also occur before the other? If so, then it is not the *preceding sound* that is causing the particular target sound to appear.
- Do any of the sounds that occur after one target sound also occur after the other? If so, then it is not the *following sound* that is causing the particular target sound to appear.
- If some preceding sounds *and* some following sounds are shared, the conditioning environment is probably the *surrounding* environment (e.g. both target sounds can have vowels before and after, but it might be that only one of the target sounds occurs *between* two vowels).
- Note that frequently your environments will list multiple sounds from the same natural class, e.g., all stops. The best analysis is one that treats these as a unified, phonetically defined group that can be described with one rule, rather than as a set of unrelated sounds that undergo rules separately. For example, it is easier to say “stops become fricatives between vowels” than “/p/ becomes [f] between vowels, /t/ becomes [s] between vowels,” etc., as if these are unrelated facts.

Once you have completed your analysis, you should write it up in prose to present to your instructor. See the related student resource, **Writing for Linguistics: Phonemic Analysis**, which demonstrates how to write up problems: (1) when the sounds are phonemes, (2) when the sounds are in free variation, and (3) when the sounds are in complementary distribution.