Normal Speech Errors and How They Happen: I. From Idea to Word

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3.1 What is Normal? (and Why Don’t We Say “Abnormal”?)

In clinical psychology, for abilities that can be measured, *normal* means roughly, “not unexpectedly different from average.” But this isn’t what we mean when we use the term outside the clinic; what we do mean, although we don’t want to admit it, is “approximately like us”—whoever “us” happens to be. A long and disturbing history of abusing people who were “not us” (“us” being whoever was in power in that particular time and place) lies behind the modern push to get rid of words like *abnormal*, a history that goes much deeper and wider than we can talk about here. (Look up *eugenics* if you would like to explore one aspect of it.) Let’s assume we mean adult speakers who are using their native language and who rarely or never get noticed by the people around them as having a problem with speaking, hearing, reading, or writing that language. Being a normal speaker might be defined as being able to communicate what you mean and to understand what the people around you mean, at the rate and level of sophistication that brings you satisfaction in your personal and professional life. We’ll talk more about who should be called a non-normal speaker or hearer in section 3.1.2.

So is it “normal” to make speech errors? Let’s put it this way: All of us who are reasonably successful in speaking or signing, understanding spoken or signed language, writing, and reading nevertheless make errors in doing these things, because they are complicated processes with many component parts. Unless your setting requires near-perfect speech all the time (e.g., if you happen to be President of the United States), a modest number of speech errors won’t attract unwanted attention or otherwise interfere with your life. If you do have to be near-perfect for part of the
time—for example, if you are a teacher, a preacher, or a lawyer—then being able to understand speech errors, when they happen, may be useful, at least as consolation.

Studying speech errors has been a major way to look at how our brains create and understand meaningful language. In this chapter, we'll look at the kinds of speech errors that normal speakers make, and see, starting here and continuing throughout this book, that people who would not be considered "normal" speakers or hearers make errors that are very similar to those that normal speakers make. We'll start by building a model of speech production and perception that explains how speech errors occur, not just in normal speakers, but in learners and people with language disorders. For now, we'll assume that we know what it means for something to be an error; in the exercises for this chapter, after you've seen a good many examples, you'll be asked to come up with your own definition for what a speech error is.

3.1.1 Normal speech errors

First, we'll look at two kinds of production errors, and then at three kinds of perception errors.

The most common kind of speech error is a slip of the tongue: when we say something we didn't mean to, scrambling the order of the sounds or words or putting in a wrong word. Psycholinguists love to collect these errors because they give us all sorts of hints about the swift and mysterious process of making sentences. After all, whatever is inside our heads must be the kind of gadget that would fail in these documented ways, and not in ways that don't happen (for example, accidentally saying words backward). Here are some errors from my own collection that we'll analyze in this chapter and the next.

I'll move this over here until I can get things put awayed.

The problem is to find off [find ~ bite off] a piece you can chew.

I lost my track of thought [train of thought ~? got off the track]

Where'd I bring it when I put it in? [Where'd I put it when I brought it in?]

It's not tack deductible [tax deductible]

Psycholinguists also test their ideas about how sentences are made in the laboratory by asking volunteers to say tongue twisters or to do other
speech tasks that are likely to provoke speech errors. We can get a great
deal of information about sentence production by studying both natural
and provoked speech errors.

Several other kinds of speech problems or errors are also normal, so
we shouldn’t fret about them (unless we make too many of them).

**Tip-of-the-tongue state:** This is the itchy mental state you are in
when you can’t find a word—especially a name—that you know and
want, and can at best only come out with approximations to it. What’s
fascinating about these approximations is how close they can be to the
word you want, and how the ways in which they are close to it vary from
one attempt to the next. Looking at them gives us ideas about **lexical
retrieval**—how we activate a content word when we need it. Here’s a
search sequence I went through recently: Bhatnagar . . ., Baharav . . ., Bhu-
vana! What I was looking for was Bhuvana (BHOO-vuh-nuh), the given
name of a woman friend and colleague of mine from India. The two other
words are names of colleagues whom I hadn’t seen for several years
(although they are family names, not given names); Bhatnagar is also from
India, though he’s a man, and Baharav is a woman from Israel. All three
names are stressed on the first syllable, and you can see lots of other simi-
larities in both the sounds and the spellings.

The semantics of my intended message—my colleague’s name—
seemed to activate words that are related to the one I needed both in
meaning (they were names, specifically names of colleagues), and in sound.
(Searches for names always stay in the “names” category, have you noticed?)
The only way to explain the arousal of names with similar sounds, as you’ll
see when we get into the later stages of sentence production in Chapter 4,
is to propose that my memory for the name I was hunting for was acti-
vated enough to activate its phonological and semantic neighbors (the
other two names). Yet, for some reason, it wasn’t activated enough to get
the information about the sounds in the word above the threshold that
I needed to actually say the name I wanted just at the moment that I wanted
to say it.

The next two kinds of errors aren’t one-time problems. They happen
when someone has apparently misperceived a phrase or a word, and then
stored it with this incorrect information. Eventually, they may figure out
that they must have made an error in perception (or storage), or they may
never catch on; in that case, we only find out about their perception error
when we notice it in their speaking or writing.

**Monodegreeen:** misanalysis of a phrase that you have heard frequently,
typically from a song. This error type gets its name from a report of hear-
ing . . . *and lady Mondegreen* for the phrase . . . *and laid him on the green.*
mondegreens.asp, the word is traced to a column by Sylvia Wright in 1954.). Probably the most famous recent example is *Excuse me while I kiss this guy* for the phrase *Excuse me while I kiss the sky*, from Jimi Hendrix’ song *Purple Haze* (http://www.urbandictionary.com). You can see that mondegreens seem to be formed when the correct phrase originally occurred along with competing sounds (music, multiple voices), and when it contains very unfamiliar words or improbable combinations of words (have you ever kissed a sky?). This is the perfect setup for top-down processing, based on expectations, to overrule or fill in for bottom-up processing of the intended words (the terms “top-down” and “bottom-up” processing were introduced in Chapter 2, section 2.5). We know that these errors were stored in people’s memories because the people who confess to having made them tell us so.

**MALAPROPISM**: fusing or confusing two words that have similar sounds and using one of them where the other is appropriate. (The two words may also share a morpheme, like the -ize in the first example below.) Many famous examples are made up, including the ones spoken by the character Mrs. Malaprop in Sheridan’s play *The Rivals*, but there are plenty of real ones, like these published by Arnold Zwicky (1980) in his useful book *Mistakes*:

*I hereby jeopardize [deputize] you to handle my duties.*

*The policemen threw an accordion [cord] around the crowd*

As Zwicky says (p. 15), “It is important that the people who uttered these real-life examples often repeated their peculiar locutions and, when challenged, maintained that the word they used was the word they meant (usually indicating that they didn’t see what the fuss was about).” So, according to Zwicky, these errors were also stored in memory, rather than being one-time events. And from the point of view of the speaker, they weren’t even errors.

Here again, we can suspect that top-down processing interacted with the sounds that were heard back at the time when the needed word was originally (mis)learned, because it looks like the people who made these mistakes have substituted a similar-sounding word that they already knew for a less familiar one. The only psycholinguistic difference between a mondegreen and a malapropism is that a mondegreen is a embedded in the (mis)memorized lyrics of a particular song, but a malapropism is a word in a person’s vocabulary (psycholinguists call this their **MENTAL LEXICON**), and might be used in any phrase where the correct word should go: *He was jeopardized to handle the job, She was blocked by the police accordion.*
Our last kind of error is different: these are one-time events, like slips of the tongue, only they happen in perception rather than in production.

**Slip of the Ear:** misanalyzing a word or a phrase as you hear it. A collection of slips of the ear detected in conversations and reported by Sara Garnes and Zinny Bond (1975) includes mishearing *bridge cable* as *bridge table*, *recite* as *recycle*, and *I'm getting married* as *I'm getting buried*. We know about slips of the ear only if they are our own errors, or if they cause a misunderstanding in a conversation and the speakers eventually figure out that one of them has misanalyzed what the other has said.

If you track conversations that you overhear (hiding behind a newspaper in a busy coffee shop is a good way to eavesdrop), you will probably pick up a few more of these among the conversational backtrackings and corrections that happen around you.

Many monodies and malapropisms probably begin as slips of the ear that were never detected and got firmly lodged in a person's memory. There's a fine source of examples of malapropisms that look as if they might have started as slips of the ear in the librarian's weekly online humor post of questions that have been addressed to them by library customers. It's called *Funny You Should Ask*, sponsored by Gale Virtual Reference Library. (We can't be completely sure that these errors came from slips of the questioner's ear; the error also could have been created by something that happened to the words as they were being stored in the questioner's mental lexicon, or when they were retrieved from the person's mental lexicon at the moment that they were talking to the librarian.)

Some examples from *Funny You Should Ask* in 2008 and 2009 are:

**I need to know who painted the sixteenth chapel.**
(From a student beginning a unit on the Renaissance; presumably, the teacher had assigned him or her to find out who painted interior of the Sistine Chapel.)

**Where is your gynecology department? I need to look up my family tree.**

**Do you have the "Genesis Book of World Records?"**

**Do you have any books on ESPN?**
(From a 10-year-old wanting a book about extra sensory perception.)

**Do you have "Little Richard's Almanac"?** [Poor Richard's Almanac]

**I can't find that Web site again—did you Barney Google it?**
(A senior patron asking for Web assistance; Barney Google is an old-time comic strip character.)
Take a minute to look at the similarities between what each person asked the librarian and the word(s) he or she should have said; what part of each error is correct? You'll want to come back and consider the connections between errors and targets, because these connections give us valuable clues about the interconnected networks of information in our brains.

These three closely related types of errors are fun to think about because they give us hints about more aspects of language processing. Mondegreens are evidence for the fact that people mostly learn what new words mean from hearing speakers use them in context (as opposed to reading them or having them defined) because, as we've just seen, when the context is not helpful, it's easy to get words completely wrong. Malapropisms can arise from mishearing or from misreading, or from an error in storing what we have heard or read in our memory. Thinking through how they arise helps us to figure out what the steps in learning a word must be. Slips of the ear give us a real-time look at how we manage to find understandable words in the stream of sounds that pours into our ears as others talk.

So mondegreens, malapropisms, and slips of the ear all provide vivid evidence for how top-down processing (based on what we already know) interacts with bottom-up processing (based on what we are taking in at the moment—in these cases, what we hear at the moment of a first encounter with a word or phrase). And as you'll see, the interaction of top-down language processing and bottom-up processing in language comprehension will be one of our recurring themes, from Chapter 5 to the end of the book.

3.1.2 Who is a “normal” speaker, and who is not?

What researchers and clinicians mean when they call someone a “normal” speaker of a language is something like this: an adult speaker/reader with no detectable foreign accent and no detectable language comprehension or production problems other than occasional slips of the tongue. (A more accurate but clumsier term is ”normal speaker/hearer.”) A person who is a similarly fluent user of a signed language is a normal signer. It used to be that “normal” also implied “monolingual,” but world migration patterns have made us aware of how many people are bilingual to varying degrees. Psycholinguistic researchers usually specify that the participants in their studies are monolingual unless bilingual speakers are the focus of the study, but classroom and clinical studies of the dominant language of a country may not have much information about what other languages their study participants speak, and how well they speak them.

Who is not a “normal speaker/hearer”? The answer depends on why the question is asked, and so do the ways of referring to the people in the
answer, but here are the main groups of people who would not be considered to meet the clinical definition of "normal speaker."

**First language learners**

A child who is becoming a speaker or of at least one language within the statistically normal developmental time range is currently referred to as a "typically developing" child, because it will take many years before she is a normal speaker in the sense of being able to process language as skillfully as an adult. A child who is learning a signed language as a first language is a "typically developing signer" if she is meeting the typical developmental milestones. She may or may not also be a typically developing speaker: If she has more than a mild hearing loss and/or doesn't have much opportunity to learn a spoken language, her spoken language development is likely to be delayed. Deaf children with cochlear implants are currently under intense study, but very early implants (before the age of 1 year) generally result in spoken language development within a clinically normal timeline.

**Second (or later) language learners**

Someone who is learning a second (or third or fourth) language and who is a typically developing or normal adult speaker of a first language would be considered a normal second language learner, but again, it will take many years before she is a normal speaker of the second language in the sense of being able to speak and write it as skillfully as an adult native speaker of that language. Even people who are very skilled but not native speakers of a second (or later) language turn out to be slightly slower than native speakers at demanding tasks in the psycholinguistics laboratory. (In the real world, as we have already noted, people who are not bilingual from the beginning of speech need a little more time than native monolinguals for reading difficult material and understanding speech in noisy surroundings.)

**People with developmental disorders, dyslexia, or brain damage**

People who are not developing or learning normally, people with developmental language disorders, including dyslexia, are not fully language-normal speakers. People who have suffered brain damage, whether as infants, young children, teenagers, or adults, are also not "language-normal," but if their language disorder is very specific, or their brain damage is limited to a very small volume, they may be normal in every other measurable way. However, as clinicians know, children who have dyslexia very often also
have attention deficit disorders, and in general, language and nonlanguage problems may compound each other in many ways. For this reason, people who have developmental cognitive/emotional disorders are also excluded from the "language-normal" group.

**People with late-onset hearing loss**

People who lose their hearing as adults, whether gradually or suddenly, are by definition no longer normal speaker/hearers. People who are losing their hearing must use more top-down processing in understanding spoken language, and they may also use more of the bottom-up visual information from lipreading (see Chapter 2, Exercise 2.6). People who have had a severe hearing loss as young adults, after many years of being unable to hear themselves and others speak, usually start to show abnormal patterns in the pitch and loudness of their voice.

**3.2 Language Production: Describing the Basic Processes**

Being a normal adult language user is the result of years of practice in comprehension and speaking (and reading and writing, for people in a large part of the world). When we try to figure out how to help improve the language of people who have a language disorder, or a cognitive disorder that produces language problems, or how to improve the language of computers and robots, we can draw on a rich understanding of how language-normal people use language and learn to use it. So, to start with, how do language-normal people speak? A lot happens when you talk, starting from having something that you want to express and ending with reasonably appropriate words coming out of your mouth about four-tenths of a second later. We're a long way from knowing all of what goes on, but the first steps toward working out the process were taken many years ago, as researchers tried to create a model of language production, that is, a rough description of a biological mechanism that could produce both correct speech and also the kinds of speech errors that we've talked about. (Many of the same processes are involved in signing and in writing, so we will focus on producing speech.)

It helps to divide the process of speaking into five rather different kinds of processes or levels; we'll base our description on one of the standard ways of doing this (from Bock & Levelt, 1994), although we'll be more explicit about a few of the steps. It's important to understand that
there are a number of very similar, reasonable models. All of these speech production models are approximations to reality, and this version is not better than the others—it's just more explicit at some points. That will help you in making a mental picture of the process of sentence production, but it doesn't mean that the more explicit version is more accurate. On the contrary, the other models are deliberately vague for a good reason, which is that there's too much that we still don't know. So just consider this as the first-pass version; if language production modeling becomes important in your life, you'll undoubtedly use better ones.

The first level of production, then, is the **Message Level**: the processes concerned with choosing what, of all that's currently in your mind, you are going to try to put into words. The second is called the **Functional Level**: the processes of finding (arousing) the words you need to convey your chosen meaning, and getting the nouns and pronouns linked to the roles that the people and things played in the event you're talking about. The other three levels, which we'll talk about in Chapter 4, fill in the details: getting the phrases set up and getting the words into the right phrases in the right order (**Positional Level**), then getting the sounds of the words in the right order (**Phonological Encoding Level**), and finally, actually pronouncing them (**Speech Gesture Level**). Figure 3.1 gives you a schematic diagram of these five levels.

In this chapter, we'll focus on the first two kinds of processes, which involve choosing what to put into words, finding the needed words, and getting them linked to their roles in events. Put together, these levels will help us to imagine the thing in our head that gives us the power of speech.

Organizing these processes into levels and sublevels does not mean that each level is isolated from the others. As we said in Chapter 2, the assembly line metaphor is not a good approximation to what goes on in the brain. It's just that we can't describe everything at once, so we start by talking in terms of levels or steps.

### 3.3 Choosing What to Put Into Words and What to Focus On: The Message Level

We said that the Message Level is where our brains choose what we'll put into words: what our story will be. It's a conceptual level; that is, everything in it could happen without language (although the way it works is affected by your language, as we'll see later). You can think about this Message Level activity as having three parts: picking your story's angle, activat-
Figure 3.1. Levels of processing discussed in Chapters 3 and 4.

Imagine the concepts of the people and things you’ll need to mention, and
organizing what happened into event structures (the basic chunks of who
did what to whom). At the end of Message Level processing, your brain has
gotten a clause-sized chunk of this conceptual information organized well
enough for actual language processing to begin. Let’s look at an example
to get a clearer idea of what this means.

Imagine an ordinary real-world scene, say a family—perhaps your
own—interacting at a zoo, that something dramatic happened, and that
you are starting to tell about it. Let’s say that the story is about how your
uncle handled a situation where your brother got too close to the lions.
What parts of this complex event are you going to put into words? You
have to organize the multiple simultaneous things that you might talk
about. You have to decide which ones you need to tell your story and
which ones are irrelevant, how detailed you want the story to be, how
emotional you want to be, and whose point of view or emotions you want
to convey. You usually make Message Level choices like this subcon-
sciously, but one way you might become aware of those choices is if you
first E-mail the story to a friend of your uncle’s (with your quick-thinking
uncle who distracted the lions as a hero and your brother as a total idiot),
and then decide you had better also tell the story to your mother (who
doesn’t really need to know how close your brother was to getting mauled).
That means you’ll have to change a lot of details; even though you’re
telling about the same event, you’re not telling exactly the same story (see
Exercise 3.5). You’ll recognize this process of organizing the Message
Level of production as being part of what linguists call pragmatics (see
Chapter 1, section 1.8).

The concepts of people and things that get activated will depend a lot
on how detailed your visualization of the scene is—you may or may not
activate details like the color of your brother’s jacket or the size of the
lion’s teeth; if some of those details are too fussy or too scary for the angle
that you chose, you’ll have to inhibit them, and if your story angle calls
for more vividness, you may have to wait a few tenths of a second so that
more of the details can come to mind—that is, can reach threshold levels
of arousal. Remember that the Message Level is prelinguistic processing:
we’re not talking about the words yet, just the concepts. But these con-
cepts are the basis for finding your words, which will start to happen at
the next processing level, the Functional Level.

The third aspect of Message Level processing is organizing the concept
of the event into what we can call the EVENT STRUCTURE. What ideas will
you pack into each clause, and what details of the action will you give?
You might prepare to say, My uncle distracted the lions, or My uncle got
closer to the lions and started jumping up and down, and probably
dozens of other things that would build up your listener’s mental picture
of what happened. The event structure will be your basis for activating the
appropriate verbs, and choosing the words that tell your hearer whether
the action those verbs describe is stopping, starting, or continuing.

People with traumatic brain injury and right hemisphere strokes some-
times have problems with pragmatics. Using the ideas we’ve developed so
far, we can describe part of their problems as trouble with organizing the
Message Level of production in order to stay relevant and/or to find a
diplomatic way to tell a story. People with aphasia don’t have problems
choosing an appropriate point of view, but they may have pragmatic prob-
lems for a different reason: they get badly tangled up because they can’t
find the syntax that they need to tell the story in a pragmatically appro-
 priate way. (We’ll look at a real example like this in the exercises for this
chapter.) Young children often don’t have the pragmatic skills to organize
their messages in a way that another person can understand, as you know
if you’ve listened to a kid retell a story or explain what happened on the
playground. And normal speakers who get excited and plunge into the
middle of a story may find themselves in pragmatic trouble, too, confusing
our listeners or saying things we really shouldn’t have mentioned.
3.4 The Functional Level, Part 1: Lemmas

3.4.1 What is a lemma, and why does our model need them?

Deciding to tell the zoo story with your uncle as a hero and your brother as an idiot means that activation will flow not only to their identities and word meanings like LION and CAGE, but to adjective meanings like SMART, BRAVE, QUICK, and STUPID, and to verbs of movement that were aroused by the event structure, and to adverbial meanings like CLOSER. Why am I suddenly using small capital letters here? Because the Message Level sends activation only to the MEANINGS of these words; that’s the part of word retrieval that happens at the Functional Level. The retrieval of the sounds comes later. So I need a way to show you when we’re only talking about a word’s meaning, and not its sounds; that’s what using the SMALL CAPS will mean. It’s going to be helpful here and later to have a technical term for this concept “the meaning of a word, without its sounds”: it’s called the word’s LEMMA.

If lemmas are, basically, word meanings, why do we need this obscure-sounding technical term for them? Why not just say “meanings”? One important reason is that the ideas of “meaning” and “concept” overlap a lot in the way we usually talk about language, so it would be confusing use those two words to mean two different things in our model. But a production model has to have some way to distinguish the prelinguistic level of concepts from the linguistic level of meanings, and also a way of distinguishing the level of word meanings from the level of word sounds.

Why do we have to distinguish prelinguistic “concepts” from linguistic “meanings”? We’ll run into quite a number of reasons, but here’s a good one to start from: A single concept can often be expressed by many different words and combinations of words. This is especially easy to see when you’re talking about a person. So suppose you are telling a story about one of your linguistics professors, Prof. Barbara Fox. What your hearer needs is to be able to figure out is how the person you’re talking about is connected to your story. If they know (or know of) the person, you can use her name, but if they don’t know the person, a name might not be very useful. So depending on whom you’re talking to and what happened in your story, you might want to refer to Prof. Fox as, This woman who was buying a case of organic cat food or The prof I had for semantics last term. And once you’ve introduced her in the story, if it’s about her, you’ll mostly refer to her with pronouns (So I asked her . . .) or shorter expressions (The woman with the cat food). All of these different expressions
are ways of referring to the same person, who is just one concept in your
mind. And each expression, by itself and outside of the context of your
story, has a different meaning—after all, the meaning of the word her or
of the phrase this woman who was buying a case of organic cat food
isn't BARBARA FOX; it just happens to refer to Barbara Fox in the context of
your story. Ditto for the phrase the prof I had for semantics last term.

A note about pronouns: We'll say right now that be, him, and his all
have the same lemma, and also that she, her, and hers share a lemma, and
so on with the case forms of other pronouns: I, me, my, and mine share
the first person singular lemma, and we, us, our, and ours share the first
person plural lemma. You'll see why in the next chapter when we look at
mistakes that involve switching pronouns.

(Why do we need so many ways of referring to the people in our sto-
ries? Well, using pronouns and shortened expressions correctly makes a
story sound more coherent, which in turn makes it easier to understand,
at least for people (not for computers, however). If you keep using longer
referring expressions (This woman who was buying a case of organic
cat food), your listener may think that you're talking about someone
new each time. When children, second-language learners, or people with
aphasia can't use the language well enough to shift from longer to shorter
referring expressions appropriately, it gets harder to follow their stories
about what's happening in their lives. But for people who are trying to get
computers to work as if they understand language, these natural ways of
switching among different ways of referring to the same person [or thing]
are an enormous headache.)

Agreed, now, that we need a term to separate a concept from the words
used in referring to it. Why not just say we have "concepts" at the Message
Level, and "words" when we get to linguistic levels of production, then?
Why do we need this term "lemma" for the word's meaning? Because we're
reasonably sure that finding a word in production has two separate steps:
first, finding the lemma and second, going from the lemma to the sound.

What's the evidence for this? Here's some: Remember that, for people
in the tip-of-the-tongue state (section 3.1.1), the meaning they need is ac-
tivated, but the word form that they want hasn't gotten above the thresh-
hold required for speaking. And if you suggest a word to them, they can say
whether the word you've suggested is the one they had in mind or not—
they don't accept just any word that has roughly the same meaning as the
one they were looking for. So it seems that what is aroused in their minds
—what they are holding onto as they search for the word's form—is not
only the concept, but the concept plus something more specific. In our
model, this thing that they are holding onto is the word's lemma.

In our production model, a word's lemma is, more fully, its meaning
plus the information that your mind needs to use it in making sentences
(for example, for a verb, whether it's irregular, or whether it can have a direct object). This meaning-plus-grammatical-information is like what you'd find in a dictionary if you looked up a word, but the word's lemma in your mind is not the same thing as its definition in a dictionary. Why not? Because a definition is made of other words. So if we said that a word's lemma is its definition, that would lead to two problems. First, what's in a dictionary never captures all the nuances of what a word means, especially if its meaning contains a lot of direct sensory information, like red or butter. But a lemma is the meaning itself, as your mind has constructed it by reading and hearing the word, plus memories of the real world contexts that you've heard it used in, which may include visual memories, motor memories, taste memories, and so on (think back to Jenny learning about candles in Chapter 2). Those sensory and motor memories go beyond words.

Second, if we tried to define a word's lemma as made of other words, then we'd have to ask what those other words were made of, and we'd be in an endless loop. Not a good idea.

As we go on through this chapter, you'll get a better sense of how breaking up finding a word (or a phrase) into these three steps of concept (at the Message Level), lemma (at the Functional Level), and phonological form (at the Positional Level and the Phonological Form Level, which we'll discuss in Chapter 4) makes it easier to talk about a lot of things that happen when speakers make choices or errors.

3.4.2 Activating the wrong lemma

Let's look at some everyday speech errors.

1. My dissertation is too short—long. (corrected by the speaker)
2. . . . be's going downtown . . . (target: he's going uptown)
3. . . . before the place closes . . . (target: before the place opens)
4. Look at the lady with the dachshund (target: Volkswagen)
5. . . . be is a good magician (target: musician) (Fay & Cutler)
6. Do you wash your Tupperware by hand or do you put it in the refrigerator? (target: dishwasher)
7. . . . you have too many irons in the smoke. (target: you have too many irons in the fire)
8. *I really liked the original* Pink Panda. (target: *Pink Panther*; while discussing the movie *Kung Fu Panda*)

Examples 1-4 and 7 were collected and published by the late Prof. Vicki Fromkin of the UCLA Linguistics Department; Example 5 is from the collection of Fay and Cutler; and the others are from my collection.

Sometimes we catch an error as soon as it happens, as the speaker did in Example 3. Sometimes we don’t catch it, but the people who are listening to us do, and sometimes nobody at all notices; yet, if the conversation was taped and you listened to it later, the error would be glaringly obvious. People with aphasia make similar mistakes, but much more often; we all make them more often when we are tired, or trying to do several things at the same time. (Should we call this “abnormal” behavior? Better to use it as a way of understanding that there isn’t a clear boundary between normal and abnormal language errors.)

In the first three examples above, the speaker said the opposite of what she or he had intended. (For Examples 2 and 3, there’s nothing in what’s written to indicate that there was an error, but Prof. Fromkin realized from the context that the speaker had said the opposite of what he or she meant.) In these three cases, activation probably spread from the needed concept to its opposite, because words and their opposites are closely linked in our minds. (The best evidence for this is that if you ask people to say the next word that comes into their mind after you have said a word to them, and the word you say is one that has an opposite, they are very likely to say it.) And for opposites that are commonly produced in the same phrase, like night and day or up and down, our minds have plenty of opportunities to build direct connections between their lemmas, as well as the connections that already exist between the concepts.

How do concepts get connected so closely that activation can spread from one to another? And, besides opposites, which concepts get connected closely enough to make substitution errors likely? To answer that, we need to look at how we learn to group concepts into categories.

### 3.4.3 Relations between concepts

Children in middle-class families in mainstream Western society—and in many other cultures as well, although not in all of them—are taught names of things and people quite as deliberately as they are taught the basic words of politeness: to say doggie, milk, and Grandma as well as please and thank you. Not long after we teach the names of some kinds of
things—and even before, in a few important cases—we teach the names of a few categories, in contexts like these: Don’t jump on the furniture! Don’t play with your food! What’s for dessert? Let’s go see the animals; Here’s some bread for the birdies; Don’t squash the bugs! What color is it? Pick up your toys! Put on your clothes! There are also plenty of categories that don’t have an everyday name (that is, a name that we consider suitable for young children to learn): Do you want something to drink? Look at all the cars and trucks! And trains and boats and planes! Pick up your crayons and markers and pens and pencils!

So being a member of a semantic category has nothing to do with whether our everyday language has a name for that category. What does create a category? Looking at the three examples (beverages, vehicles, and—what would you call them—drawing utensils?) in the last paragraph, the answer is easy: At least for these examples, it is what we do with the items in the category that defines them as belonging together, or what those items do in our lives. So a category seems to be a set of things that we use or interact with in a particular way, and our history of real or imagined interaction with those things must be what forms the category in our minds.

Category names, if we have them (and use them to teach, nag, or coax children), tell us how we can expect something to behave and how we are entitled to behave toward it: Will it bite? Are we supposed to take care of it, and if so, does that mean we feed it or that we polish it (or, as the wry army joke goes, salute it or paint it)? It’s amazing to watch young children trying to figure out what to do with an item that might be in two categories that are to be treated very differently, like the small wooden horse in Figure 3.2: Is it to pat or to climb on?

Or for a child who already knows the story of the Gingerbread Man and now sees his first gingerbread man like the one in Figure 3.3 being taken out of the bakery bag: Is it going to run away when Mommy lets go of it? (Seeing the worried look on my 2-year-old’s face and not wanting him to think we were cannibals, I immediately switched from calling it a gingerbread man to calling it a gingerbread man cookie.)

There is a lot of neat research on such semantic categories, how children learn them, how they differ across languages and cultures, and how they have unclear and somewhat flexible boundaries (people are more likely to agree that a chair is furniture than that a mattress on the floor is; and furthermore, if someone is sitting on the mattress, they are relatively more likely to call it furniture than if no one is there). But the importance of the idea of semantic category for this book is seeing how semantic categories are at work in our brains as we speak and listen to one another, bearing in mind that each of us has had our categories formed by slightly
Figure 3.2. Is it to pat? to climb on? Fifteen-month-old puzzled by merry-go-round horse.

Figure 3.3. Gingerbread man. Image adapted from Shutterstock®. All rights reserved.
different experiences, and that most things belong to several different kinds of categories, with and without category names (an aquarium inhabitant may be, simultaneously, a fish, a pet, a beautiful object, a vertebrate, something to keep the cat away from, and an expensive hobby).

3.4.4 Many are called, but few are chosen: Associative categories organize the pandemonium in our brains

3.4.4.1 Semantic categories and speech errors

So far, we’ve established that during the early part of time that we are formulating the message we want to say (maybe 100 or 200 milliseconds before the first word of the sentence emerges), the concepts that become active activate their lemmas, and they also activate some of concepts that are related to them. But we’ve only talked about errors arising from arousing opposites (antonyms), and antonymy is just one kind of relationship among concepts. What kinds of errors seem to come from arousing unintended members of the sorts of categories we discussed in section 3.2.1? When people with aphasia try to name objects in pictures, they make lots of errors involving using the label of a different object in the same category, for example, calling a table a desk; we’ll discuss those in Chapter 6.

Let’s look at normal speakers’ Examples 4, 5, and 6 again:

4. Look at the lady with the dachshund (target: Volkswagen)

5. . . . be is a good magician (target: musician) (Fay & Cutler)

6. Do you wash your Tupperware by hand or do you put it in the refrigerator? (target: dishwasher)

The category that dachshund and Volkswagen both belong to seems to be “things from Germany.” You can figure out the shared categories for other two substitutions yourself—there are several of them. It’s worth noting, by the way, that other factors may have been involved in these two cases. Magician and musician are a lot alike in both phonology (their sounds) and morphology (how they are put together from smaller meaningful parts), and we’ll see in Chapter 4 how this would add to the activation of the unintended word magician. The refrigerator/dishwasher example was spoken by a friend helping me to deal with the dishes after
we had eaten dinner; my dishwasher and my refrigerator are next to each
other, so what she was looking at was arousing both words. And the small
plastic containers she was talking about are usually used for storing food
in the refrigerator.

What do category substitution errors like these add to our understand-
ing of the process of arousing the words we need for saying something?
We already knew that a message we want to convey typically involves the
concepts of one or more people or things and something about how they
act (the place closes) or how they are connected to each other (the lady
has a Volkswagen) or about properties they have (long, good). And we
knew that these concepts arouse the meanings—the lemmas—of one or
more words that the speaker could use to convey them. What category
substitution errors confirm for us is that concepts in the message indeed
arouse other concepts that are members of some category that they both
belong to, categories the speaker has created during a lifetime of firsthand
and secondhand experiences (things from Germany, people whose skilled
performances you enjoy watching, kitchen appliances). The “collateral
lemmas” aroused by these other concepts may be activated enough, as we
said in section 3.4.2, to compete with the lemmas for the words the
speaker really wants. Sometimes that competition gets resolved in favor of
one of the wrong words, and we get substitution errors.

When we analyze substitution errors, we often see other factors that
probably contributed to the success of the wrong word, like the real-world
link between small plastic food containers and refrigerators; this supports
the idea that a lemma can be activated from several different sources. The
most dramatic examples of this are Freudian slips, like substituting the
name of your ex for the name of your current sweetie, as we talked about
in the Introduction (section 0.3). How does our model of language pro-
duction explain the way that the name of a person who is on your mind
sneaks into a sentence that’s supposed to be about someone else?

Well, if a person is “on your mind,” that is a way of saying that their
identity is activated pretty close to the threshold of consciousness most of
the time, even when your current message has nothing to do with them.
That background level of activation of their identity is enough to activate
the lemmas you’d need for talking about them (including not just names,
but titles like mother) at the Functional Level, and those lemmas will com-
pete with the lemmas for referring to the people you consciously intended
to talk about. When will this competition tip in favor of a name or title of
the person who’s on your mind? Often, it’s when the person you really
want to talk about is in some semantic category that the person who is
haunting your subconscious also belongs to.
How far does activation spread?

Activation spread among concepts while normal speakers are producing a sentence seems to be limited: it almost always stays within category boundaries. When it doesn't, the semantic links are still tight, as in this example: She mentioned that she had lived in Hebrew for seven years (target: Israel; LM). So there isn't a free-for-all competition among all the lemmas in our heads when we talk; it's only a struggle among close neighbors. This is also true for many aphasic speakers, but there are occasional exceptions among people with mild aphasias, and many dramatic exceptions for people with severe aphasias, often making it impossible to guess what they might have been trying to say. A moderately aphasic friend of mine said, of a family member who was planning to visit, "What about his delicious cats?" and then rephrased it as, "What about his cat deliciousness?" It turned out, after some guessing by the person he was speaking to, that he had meant to ask "What about his cat allergy?"

The model of language production that we are using explains errors of choosing a word that's related semantically to the one you really wanted as happening when something goes wrong during the production step in which activation spreads from concepts (at the Message Level) to lemmas (at the Functional Level). If you are a normal fluent speaker of the language you are using, activation will flow from the concepts in your message (like "lion" or "your uncle" or "distracting") to the lemmas LION or UNCLE or DISTRACT, which are very strongly connected to them. But activation will also spread from a concept like "lion" or "uncle" to related concepts like "tiger" or "aunt," and from there to your mental store of word meanings, so many lemmas that are related to the ones you really want also get activated.

Word substitution errors can happen this way for both normal speakers and those who have language problems or who are still language learners. (And we don't have to wait for speech errors to show that this kind of collateral lemma activation really happens. In Chapter 5, we'll sample more than 30 years laboratory experiments that explore it.) It's actually a good thing that this collateral activation of related concepts and lemmas happens, because if you can't find the exact word you want, you may be able to slip in a sufficiently close substitute without a hitch. Also, having several related lemmas activated often gives us the ability to patch up pragmatic errors before they happen—for example, if you suddenly realize that referring to someone who is very senior to you by her given name (Barbara) or a nickname (Foxy) is not appropriate because she has suddenly appeared within earshot, you can switch fluently to a politer form (Professor Fox).
This example also reminds us why it's useful to separate concepts from lemmas: it lets us say that the concept of this one person's identity is linked to all of the lemmas BARBARA, FOXY, and PROFESSOR FOX. That seems to be a sensible way to talk about people and their names.

3.4.5 Compromises don't work: Blend errors

Sometimes parts of two words or phrases seem to have tried to get out at the same time and gotten mixed together:

7. ...you have too many irons in the smoke.
   (target: you have too many irons in the fire)

8. I really liked the original Pink Panda.
   (target: Pink Panther; commenting on an ad for the remake of the movie The Pink Panther while waiting for the movie of Kung Fu Panda to begin)

9. I lost my track of thought.
   (target: train of thought; blended with track, aroused for use in something like I lost track of what I was saying.)

10. The problem is to find off a piece you can chew.
    (find blended with bite off)

11. Oh, help all you want
    (help yourself blended with take all you want)

12. car dealsman
    (target: car dealer or car salesman)

13. momentaneous
    (target: momentary/instantaneous)

Examples 7, 12, and 13 are from Fromkin; the others are from my collection. The subconscious struggle between two lemmas is even clearer in blends than it is in substitution errors, because we can see that both of them were strong enough to call up their phonological forms at the same time. A wonderful thing about these errors is how beautifully they are formed: for example, the wrong nouns (smoke, panda, track) slip right in where the target nouns (fire, panther, train) should have gone. How do
lemmas find the place in the sentence where they belong? How does the language production mechanism churning away in our brains almost always get words into the right order so that they mean what we intended to say? An essential step—probably the first one—in that process must be the one we’ll turn to next: getting lemmas linked with the semantic functions that correspond to the roles in our message—AGENT, UNDERGOER, THEME, RECIPIENT, LOCATION, and so on (see Chapter 1, section 7). Just to recall some of the other semantic roles introduced in that section that we’ll need for our analyses, here they are again: MODIFIERS of nouns (ADJECTIVES, numbers, POSSESSIVES), SENTENCE ADDRESSEE (Mom, where are my sneakers?), PREPOSITIONS (under the bed), OBJECTS OF PREPOSITIONS (under the bed), and ADVERBS (Frankly, I don’t care; He’s really sweet; It’s full enough; Do it now).

3.5 The Functional Level, Part 2: Semantic Functions

Why do we call the level where lemmas are activated the Functional Level? What is “functional” about activating the lemmas of needed words? Nothing, really. The name comes from another kind of information represented at the Functional Level: the semantic function or role of each word.

Semantic function

At the Message Level, your desire to tell a story didn’t just activate concepts of people and things; if it did, the story you actually produced would just be a list of nouns, with nothing happening. The story you wanted to tell also activated EVENT STRUCTURES—what your REFERENTS (the people and things that you are talking about) did or what happened to them. The event structures are, basically, your concepts of who did what to whom in your story.

How does that information get into the sentence you produce? Each event structure has to arouse an appropriate verb lemma (TEASED, FRIGHTENED, DISTRACTED . . . ). Verb lemmas, like noun lemmas, are their meaning plus the grammatical information needed to use them, and that includes the semantic roles or SEMANTIC FUNCTIONS that the nouns around them will play. In the sentence My uncle distracted the lions, illustrated in Figure 3.4, your uncle is the Agent and the lions are the Undergoers; in My brother was frightened, your brother is the Undergoer. These semantic role terms and several others were introduced in Chapter 1, section 1.7, if you want to look back there for a review.
Figure 3.4. The Message Level sets up the Functional Level in our model. At the Message Level (in the shaded cloud), the real world events and referents activate their concepts; concepts are grouped into event structures, and activate other concepts as well. Concepts that were activated above threshold at Message Level activate their lemmas at the Functional Level (the boxes). The semantic roles that are part of the activated verb's lemma are attached as tags to lemmas of the participants in the event, according to their roles in the event structure. Lemmas don't have any order, so I've used a random order here.
At the Functional Level, the lemmas referring to the people, animals, and things in each event structure of your story get linked to the proper semantic functions of that event's verb lemma. This is a key step in making sure that your story will convey which person—if any—is the Agent of each verb, who is the Undergoer, what location is the source, what location is the goal, and so on.

What kind of thing is it in our heads that (usually) puts words in the right order to mean what we intend? In this section, we'll only discuss the steps involved in communicating information about actions, which is what has been studied most; feelings and sensations have different event structures, and they are probably slightly different.

We've seen how neat the blend and substitution errors are at putting words into grammatically appropriate slots. (Later we'll talk about errors that are not quite so neat. They do exist, so we have to explain them, too.) But when we mix up lists of numbers or of numbers and letters that don't spell anything (a telephone number, a license plate number), we are quite likely to get the numbers or letters in all sorts of wrong orders. So whatever we do in putting sentences together is not much like what we do in remembering a list of numbers. (Experiments on memory for sentences show this, too; see Chapter 5, section 5.2.4.)

As we've just said, language encodes our understanding of the events that are happening around us by somehow linking each thing that we talk about with a semantic function like Agent or Recipient or Undergoer—or, if no other semantic function fits, with Theme. Psycholinguists don't know how this linking works, so we duck by saying that during the construction of a sentence, each lemma is temporarily "tagged" with its semantic role. This idea of semantic role tagging is useful even though we don't know how to explain it in terms of how the brain does it. If we say that the lemma **Jon** is tagged as Agent, **Susie** as Recipient, and **cake** as Theme (and **morning** could be called temporal Location) in the sentences here, then we have a way to talk about, for example, the link between the cake and its creator in all of these sentences regardless of their syntax or whether the baker and the recipient are explicitly mentioned:

*Jon baked the birthday cake for Susie this morning.*

*Susie loved the cake Jon baked for her this morning.*

*The cake was baked this morning by Jon.*

Activating lemmas and tagging each with its semantic function are two of the three main processes that create the Functional Level of sentence production. Sometimes, we don't even need a real lemma to refer to
the agent of a sentence in English; there's no referring expression to say who the Agent is in *Bake a cake last night?* and no need for one, either, because you can only say that to the person whom you are guessing did the baking. Many other languages can leave out Agents even in formal speech, and some of them can leave out Themes, too, if they are unimportant, or if hearers can perfectly well figure out what was eaten, taken, seen, or whatever.

Clinical descriptions and tests show us that people with aphasia are usually clear on these semantic functions, even when they can't express them by putting words together in the right order. And children are very tuned into who-did-what-to-whom long before they can talk; as you'll see in Chapter 7, one of the first things children learning English understand about grammar, while they themselves are still only able to say one word at a time, is the meaning difference between *The dog pushes the baby* and *The baby pushes the dog*.

Here is a speech error that swaps semantic roles, from the Fromkin collection:

*The Grand Canyon went to my sister.* (Goal interchanged with Agent)

We'll talk more about this error in Chapter 4, as we'll need to introduce new concepts to understand how it might have happened in our model of speech production.

### 3.6 Summary of Language Production So Far

#### 3.6.1 From ideas to lemmas and semantic roles

The first step in speaking is choosing what you're going to put into words. Usually, we do this without thinking about it, but if it's difficult for any reason, we may become conscious of parts of the process of trying to figure out how to say what we mean. The information that gets organized at this first step of language production, which we've called the MESSAGE LEVEL, is all concepts—it's not words yet. Setting up the Message Level means activating the concepts of our REFERENTS (whom and what to mention), and deciding who is the hero (or what is the topic) of our story. At the Message Level, we also decide (usually unconsciously) what sort of words we should use for referring—formal or informal, fully spelled out or abbreviated, or just a pronoun, or even no referring expression at all—and we
organize the things that are happening into event structures, usually built around verb concepts.

Activation flows from the concepts at the Message Level to two kinds of information at the Functional Level, lemmas and semantic roles. The concepts for the referents activate the noun or pronoun lemmas (the meanings of the words without the sounds). At the same time, the event structure for the actions that the referents are involved in will activate two kinds of things: the verb lemmas that will describe the action, and the semantic roles that the referents will get tagged with. But the lemmas don't have any order; in fact, in our model, lemmas don't ever have an order—they just have tags that eventually will get them to their destinations, like checked luggage (we hope). The order that words come out in is created at the Positional Level, and we'll work on how that happens in Chapter 4. What we've done in this chapter is a little like the early part of preparing to stage a puppet show: at the Message Level, you've got the plot outline, and at the Functional Level, you've chosen the roles—a king, a queen, a villain, a wizard—and what they are going to do. However, you don't yet know exactly what they will look like or the precise order that they will appear in; that will be the next step.

3.6.2 Managing traffic without a cop, a play without a director

Speaking is different from putting on a scene in a very important way: Inside your head, there is no director. (We can't say that your mind is the director, because we're trying to explain how the mind itself works. If you explain the mind by putting another mind inside it, you'd have to explain how that inner mind worked, and so on . . .). This "choosing" that we've been describing doesn't happen because someone takes a concept out of a box; it happens, subconsciously, because some concepts are aroused by something we see, hear, and/or remember. In turn, activation automatically spreads from these concepts to some of the lemmas for the words that can be used to communicate information to someone. Again, the spread of activation is automatic. No one is responsible for it (although you may be concentrating on your language enough to be able to catch an error that has happened inside your head before you actually say it aloud). The concept of the person who can be called Professor Barbara Fox will activate all the possible lemmas for referring to her—and it will also activate the lemmas for some of your other professors, although not as strongly. And, when it is activated, the lemma BARBARA will activate concepts of
some other people named Barbara, which in turn will link to the lemmas for the family names of these other Barbaras.

It's relative strength of activation that matters. Mistakes at the Functional Level can happen when two lemmas are activated to just about the same extent, so that we get blend errors like I lost my track of thought or car dealsman from trying to say both of them at once. They also happen when something else on your mind or happening around you adds to the activation of a concept or a lemma that isn't the one your conscious mind would have wanted, tipping the balance of activation in favor of the lemma for the wrong word, like REFRIGERATOR instead of DISHWASHER, PANDA instead of PANTHER, or DACHSHUND instead of VOLKSWAGEN.

3.7 Applying Our Model to an Aphasic Speech Production Problem

Shirley Kleinman, who told the story of her Broca's aphasia in Shirley Says: Living with Aphasia (online at http://www.spot.colorado.edu/~menn/docs/Shirley4.pdf), was trying, in an experimental test that I gave her, to describe what was going on in the picture shown in Figure 3.5).

![Figure 3.5. Baseball hits baby.](image-url)
Like most people with moderate Broca’s aphasia, Shirley had lost the ability to make passive-voice sentences. What she said was *The baby—no (sigh)—the ball hit the baby*. We can use the ideas we’ve developed in this chapter to describe what happened here, based on what she started to say and how she revised it. First of all, the description she settles on is correct, so the picture must have activated the right concepts and event structure at the Message Level: a ball, a small child (baby), and a hitting event. The ball in this event hits the baby, and Shirley’s not confused about that, either, even though people hit balls at least as often as balls hit people. Less important information—how the girls are reacting to the event—doesn’t distract Shirley from focusing on the main event at the Message Level.

This information at the Message Level aroused two appropriate lemmas (BALL, HIT) at the Functional Level; we know that for sure because those two lemmas were then able to activate their phonological forms at the Positional Level. We’ll talk about that process in Chapter 4. In the case of BABY, which doesn’t seem to be the best possible word for a child who looks like he can walk, it’s possible that the concept at the Message Level sent activation to the lemmas of more complicated referring expressions (like LITTLE KID), and/or a more precise but lower frequency word (like TODDLER), as well as to the lemma of the not-quite-accurate word BABY. But Shirley produced the word *baby*; why? Well, BABY is easier to activate than TODDLER because it’s much more frequent.

Why does higher frequency make a word easier to activate? We can’t give the full story yet, but here’s the main part of it: As you’ll remember from Chapter 2, frequent words have a high resting level of activation. (Now we can say that more precisely: The lemmas of frequent words have a high resting level of activation.) That means that it doesn’t take as much new activation to get those lemmas up to the threshold for sending activation on to their phonological forms. The lemma BABY would have gotten less activation from the picture than the lemma TODDLER, because the concept of a baby isn’t a great match to the picture, but that small amount of input activation could get BABY up to threshold so it could activate its phonological form; the less frequent lemma TODDLER would have needed a lot more input to reach threshold.

The event structure at the Message Level also sent activation—and clearly, enough activation—so that the ball could be tagged as the inanimate Cause of the hitting event (we don’t usually call inanimate causes Agents) and the baby could be tagged as the Undergoer.

And why did Shirley have a false start and a self-correction? We’ll get the answer to that in Chapter 4, section 4.1.1.
Exercises for Chapter 3

3.1. Now that you’ve seen a lot of examples of speech errors, how would you define “speech error”? (I have deliberately not put a definition of speech error in the Glossary.)

3.2. Look back at the errors in the queries to librarians in section 3.1.1. Work out the details of how one of these errors might have occurred, in terms of spreading activation from the phonetic and syntactic information that was coming in when the customer heard his or her assignment, combined with expectations based on the words and the real-world information that the customer probably already had before they heard the teacher say the new name or book title. Consider how the sounds heard, the syntax, the semantics, and the pragmatics would activate stored information. What practical recommendations would you give to teachers and students (of any age) to reduce the chance that errors like these would happen, especially in a second-language setting?

3.3. Reading, like hearing, is also a mix of top-down and bottom-up processing, and we make errors of misreading when too little information comes from the letters, for whatever reason. Work out some of the similarities and differences between the processes that must be involved in understanding written words compared to those involved in understanding spoken language.

3.4. In an official written communication from a leader of an organization, the phrase “bottoms-up process” occurred not once but twice. (For non-native English readers and non-drinkers: “Bottoms up!” is a common alcoholic-beverage-drinking expression, used as a toast like, “To your health!” or “Cheers!”) The context made it clear that his meaning was “a process originating in the membership of the organization, rather than in the leadership”—in other words, a bottom-up process.
After you finish chuckling at the implication that the author of this communiqué may have been drinking too many toasts, decide what kind of language production error this is, or whether you can’t classify it, and why. Regardless of whether you can classify it, you can give a pretty full story of how it arose, in terms of spreading activation. Try doing that, step-by-step.

3.5. Pragmatics: Compose an E-mail telling a story, like the zoo event in section 3.2.1, to one person who would enjoy hearing the story in an exciting way and then telling the same story to person a who would be upset by the details, without lying to either person. After you’ve done this in as natural a way as possible, list the pragmatic differences between the two versions. If you using this book in a class, it would be best to work in pairs to do this, so that each person can analyze the other person’s choices of messages, event structures, and words.

3.6. Analyzing a blend error: Explain the steps in creating the utterance Did someone fly off the deep end?, presumably a blend of Did someone fly off the handle? and Did someone jump off the deep end?

3.7. If you know a signed language, read some of the literature on “slips of the hand” errors, and then consider the possibilities that Sign might offer for monodegrees and the other types of errors that we have discussed in this chapter.

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