Tracking the what and why of speakers' choices: Prosodic boundaries and the length of constituents

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The rational speaker hypothesis (Clifton, Carlson, & Frazier, 2002) claims that speakers are self-consistent, employing intonation in a manner consistent with their intended message. Preceding a constituent by a prosodic boundary that is not required by the grammar often signals that this constituent is not part of the immediately preceding phrase. However, speakers tend to place prosodic boundaries before and after long constituents. The question is whether prosodic boundaries will have a larger influence on listeners' choice of an analysis when they flank short constituents than when they flank long ones. The results of two listening experiments indicate that they do, suggesting that listeners attend not just to properties of the input signal, but also to the reasons why speakers produce those properties.

Speakers apparently do not tailor their utterances to make them maximally easy for listeners to comprehend. Instead, speakers seem to choose structures on the basis of their own needs, delaying the articulation of phrases that take a long time to plan (Arnold, Wasow, Losongco, & Ginstrom, 2000; Wasow, 1997) and uttering already-planned phrases as soon as possible, without regard for structural ambiguities (Ferreira, 1996; Ferreira & Dell, 2000). But although speakers may not try to accommodate the needs of listeners, listeners may have to pay close attention to the behavior of speakers in order to determine which aspects of an utterance are informative with respect to the speaker's intentions.

In the present experiments, we investigate whether one aspect of a spoken sentence, the presence of an intonational phrase (IPh) boundary, becomes less informative to the listener under conditions in which more than one reason for the boundary exists.¹ The way adjacent words are spoken depends on many factors, including their phonological length and the syntactic structure they occur in. Whether there is a prosodic boundary separating the words and, if so, whether it is an intermediate phrase (ip)

or an IPh boundary in the ToBI analysis system (Beckman & Ayers, 1993; Pierrehumbert, 1980), will depend, in part, on whether the two words occur in the same syntactic phrase (Nespor & Vogel, 1986; Selkirk, 1984; Truckenbrodt, 1995), as well as on the length of the constituents (Gee & Grosjean, 1983; Watson & Gibson, 2001, 2004). Listeners' interpretations of sentences with ambiguous syntactic constituency are influenced by the presence and placement of prosodic boundaries (see, among others, Carlson, Clifton, & Frazier, 2001; Price, Ostendorf, Shattuck-Hufnagel, & Fong, 1991). Furthermore, listeners' judgments of the prosodic appropriateness of prosodic boundaries are affected by the lengths of the phrases they precede (Frazier, Clifton, & Carlson, 2004), and speakers are more likely to place a prosodic boundary before a long phrase than before a short one (Fodor, 1998; Watson & Gibson, 2004).

We examined how the listener deals with the alternative possible reasons for an IPh boundary in the context of the rational speaker hypothesis (Clifton, Carlson, & Frazier, 2002). According to this hypothesis, listeners interpret intonation by assuming that speakers do not make prosodic choices without some reason (and are, therefore, rational). In particular, if a speaker intends a larger syntactic boundary before X than before Y in the sequence X . . . Y, the speaker cannot then place a larger prosodic boundary before Y than before X for no reason. If constituent Y is long, though, the speaker might place a large boundary before Y in order to produce the sentence fluently. In this case, a rational speaker might intend a larger syntactic boundary

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at X but place the larger prosodic boundary at Y. The present question is whether listeners adjust. Do they discount prosodic boundaries flanking long constituents because they can be justified by the length of the constituents?

Our view of the syntax–prosody mapping relies on the assumption that listeners and speakers may obey the grammatical constraints on prosody in more than one way. In other words, an emphatic rendition of a sentence may include more prosodic boundaries and larger boundaries (e.g., full IPh boundaries) than does a less emphatic or more understated rendition of the same sentence. What is necessary is for the speaker to be self-consistent in the implementation of prosody within an utterance and for prosodic choices to be consistent with the speaker's own syntactic and semantic intentions. Of course, this assumes that the syntax–prosody mapping constraints do not dictate the absolute size of prosodic breaks.

We claim that the use of prosodic boundaries in processing is governed by the value of a prosodic choice within the global pattern of choices that the speaker has made. A contrasting view is that what matters is purely local information that a prosodic boundary (perhaps of a particular size) has appeared in a particular position. Marcus and Hindle (1990) have provided a clear statement of such a view, suggesting that an intonational phrase boundary unconditionally closes the syntactic phrase it follows.

The sentences in (1) and (2) are syntactically ambiguous. Depending on how they are pronounced, they can have the structure indicated in (1a) and (2a) or the structure in (1b) and (2b) (see Lehiste, 1973, for evidence that this structure is sensitive to intonational phrasing).

- 1a. (Pat) or (Jay and Lee) convinced the bank president to extend the mortgage.
- 1b. (Pat or Jay) and (Lee) convinced the bank president to extend the mortgage.
- 2a. (Patricia Jones) or (Jacqueline Frazier and Letitia Connolly) convinced the bank president to extend the mortgage.
- 2b. (Patricia Jones or Jacqueline Frazier) and (Letitia Connolly) convinced the bank president to extend the mortgage.

Experiments 1A and 1B were auditory questionnaire experiments in which undergraduates listened to sentences like those in (1) and (2). Each sentence had a short form, as in (1), and a long form, as in (2). Each form was pronounced with either an early prosodic boundary after the first name, favoring the (a) structure, or a late prosodic boundary after the second name, favoring the (b) forms. After each sentence, the listeners chose between visually presented paraphrases of the sentence by pulling a response key under the selected paraphrase.

If the position of a prosodic boundary influences which syntactic analysis is assigned, more interpretations reflecting an “(X) or (Y and Z)” analysis should occur with early boundaries than with late boundaries, whereas relatively more interpretations reflecting an “(X or Y) and (Z)” analysis should occur with late boundaries. The main point of the experiments, though, was to ascertain whether listeners treat a prosodic boundary as more informative about

the syntax when it flanks short constituents than when it flanks longer constituents. If this is so, the difference between the early- and late-break prosodic conditions in how they are interpreted (and perhaps, how quickly) should be larger for the short condition than for the long condition.

EXPERIMENT 1A

Method

Materials. A phonologically trained linguist recorded four versions of each of 16 sentences like those in (1) and (2). All items appear in Appendix A. Two versions contained short (1- and 2-syllable) proper names as the subject noun phrase conjuncts, as in (1); two versions contained longer proper names (similar to the short names, insofar as possible). The short subject noun phrases averaged 5.25 syllables in length, whereas the long phrases averaged 17.5 syllables. Orthogonally, two versions (the [a] versions) contained IPh boundaries after the first and third of the conjoined nouns, whereas the (b) versions contained IPh boundaries after the second and third of the conjoined nouns. Sample pitch tracks of (1a) and (1b) (from Experiment 1B, which also represents the prosody used in Experiment 1A) appear in Figure 1. ToBI analysis indicated that all of the conjoined nouns were marked with H* or L+H* accents of moderate prominence and the IPh ended with L–H% continuation rises (Beckman & Ayers, 1993).²

The resulting 64 utterances were divided into four counter-balanced lists. Each list contained 4 utterances in each of the conditions in (1) and (2), and each sentence occurred in each condition in one list. Each list also contained 76 other utterances of various structures, some ambiguous and some unambiguous, recorded by the same speaker. Two alternative paraphrases of each utterance were written for the participants to choose between. Item 1 in Appendix A illustrates the form taken by the paraphrases. The alternatives conveyed the intended interpretations, using parentheses that divided the nouns into phrases, as well as an explicit statement of the number of people who would be involved (which differed between the [a] and the [b] interpretations).

Participants and Procedure. Forty-eight University of Massachusetts undergraduates were tested in individual half-hour sessions. A session began with the instructions that the participant would listen to sentences, some ambiguous and some unambiguous, and indicate his or her initial, intuitive understanding of each one by choosing between two visually presented paraphrases that would appear after each sentence.

After hearing and responding to the items in a seven-item practice list, each participant heard all the utterances in one list in an individually randomized order. Twelve participants heard each list. A PC played the digitized utterances at a comfortable listening level over Radio Shack Optimus 7 speakers in an acoustic chamber. The participants pulled a response lever when they had understood each utterance, and then the alternative paraphrases were displayed on opposite sides of a video monitor in front of them. The participants pulled the response trigger underneath the paraphrase that most closely matched their initial understanding of the utterance. The participants' choice of paraphrase and the time taken to make the choice were recorded.

Results

Table 1 presents the mean percentages of early break interpretations (choices of the paraphrase corresponding to 1a, which indicated that either the first person or the second and third people would perform the specified action, as opposed to precisely two people performing it) and the reaction times to pull the response trigger. The reaction times showed that responses to longer items were

Figure 1. Sample F_0 pitchtracks of two utterances used in Experiment 1B, with ToBI labeling. Top panel: Early boundary (1a). Bottom panel: Late boundary (1b).

slower [4,330 vs. 3,826 msec; $F_1(1,47) = 10.09, p < .01$; $F_2(1,15) = 6.90, p < .05$]. This could be a simple length effect, since longer items had longer answers, or it could reflect confusion about the interpretation. In addition, the interaction between phrase length and boundary position was significant [$F_1(1,47) = 4.91, p < .05$; $F_2(1,15) = 8.17, p < .05$]. Responses were particularly fast for short items with an early boundary. This is the condition that showed the most extreme percentage of choices of one reading and may have simply been the least ambiguous and most easily understood utterance.

Table 1
Mean Percentages of Early Breaks (“One or Two” Rather Than “Just Two”) Interpretations and Mean Reaction Times (RTs, in Milliseconds) in Experiments 1A and 1B

Condition	Experiment 1A		Experiment 1B	
	Early Break	RT	Early Break	RT
Short, early break (1a)	81.7	3,490	71.3	4,274
Short, late break (1b)	20.3	4,162	19.2	4,122
Long, early break (2a)	73.4	4,328	63.5	4,750
Long, late break (2b)	30.2	4,331	29.6	4,662

The percentage of early break choices clearly reflected the predicted interaction: The effect of early break versus late break prosody was greater for short names (a difference of 61.5%) than for long names (a difference of 43.2%) [$F_1(1,47) = 8.02, p < .01$; $F_2(1,15) = 10.42, p < .01$]. Overall, the main effect of early versus late break position was also highly significant [$F_1(1,47) = 149.11, p < .001$; $F_2(1,15) = 386.9, p < .001$], replicating Lehiste’s (1973) effects. The main effect of length was nonsignificant ($F < 1$).

EXPERIMENT 1B

Method

Experiment 1B was a replication of Experiment 1A, except that long definite descriptions were used, instead of long proper names, to establish the generality of the effect, as in *The plantation owner or the tenant farmer and the new caretaker convinced the bank president to extend the mortgage*. Several of the short name items also differed between experiments. All the items appear in Appendix A. The short conjoined noun phrases averaged 6.3 syllables in length, whereas the long noun phrases averaged 17.7 syllables.

Forty-eight University of Massachusetts undergraduates were tested in procedures that were essentially the same as those in Experiment 1A, except that the 16 experimental utterances in a list were combined with 82 other utterances of various structures.

Results

The data appear in Table 1. The results closely replicate those in Experiment 1A. The critical interaction in percentage of early break choices was significant [$F_1(1,47) = 9.87, p < .01$; $F_2(1,15) = 10.51, p < .01$]; the 52% effect of prosody for short names was greater than the 34% difference for long descriptions. The main effect of early versus late break position was also highly significant [$F_1(1,47) = 104.21, p < .001$; $F_2(1,15) = 132.3, p < .001$]. The reaction times showed only that responses to longer items were slower (4,706 vs. 4,198 msec). Responses to short, early boundary sentences were not particularly fast, unlike in Experiment 1A.

Discussion

The results support the hypothesis that prosodic breaks affect syntactic analyses but are taken to be less informative when they flank long constituents than when they flank shorter constituents. This suggests that listeners are sensitive to the reasons for a prosodic break. When the constituents are short, the presence of a boundary is often taken to reflect the intended structure of a sentence, since constituent length does not justify the break. When the constituents are long, either constituent length or sentence structure might be responsible for the prosodic break. Listeners' responses indicate that they understand when a boundary has multiple justifications. This, in turn, provides evidence that listeners pay attention both to what speakers do and to the reasons that they do it.

EXPERIMENT 2

In the second experiment, we used a very different set of materials to ask essentially the same question as that posed in Experiment 1. In this auditory questionnaire, the participants heard sentences like those in (3) and (4).

- 3a. Susie learned that Bill telephoned last night.
- 3b. (Susie learned that Bill telephoned) (last night.)
- 4a. Susie learned that Bill telephoned last night after the general meeting.
- 4b. (Susie learned that Bill telephoned) (last night after the general meeting.)

Each sentence contained a final adverb phrase that could modify either the matrix verb (*learn* in the example) or the complement verb (*telephone*). This phrase was either short (3) or long (4) and was either contained in the same IPH as the rest of the sentence (3a and 4a) or separated by an IPH boundary (3b and 4b; marked by parentheses). Previous research (Carlson et al., 2001; Price et al., 1991) has shown that this boundary promotes *high* (matrix) attachment (in the absence of an equally large boundary after *learned*). We asked whether the boundary's effect would be diminished when the adverb phrase was long, with the boundary being less informative about the syntax when the length of the following phrase provided another reason for it.

Method

Materials. Sixteen sentences (see Appendix B) like those in (3) and (4) were recorded in four versions each by the same speaker

as that in Experiment 1. The short adverb phrases contained an average of 2.25 syllables, whereas the long adverb phrases averaged 11.5 syllables. Each sentence either was pronounced as a single IPH or contained a single IPH boundary before the adverb phrase. No additional prosodic boundaries above the word level appeared inside the adverbials. Sample pitch tracks for (4a and 4b) appear in Figure 2. The resulting 64 sentences were divided into four counterbalanced lists, with four instances of each sentence version in a list, so that each sentence was tested equally often in each version across the entire experiment. The 16 sentences in each list were combined with another 100 sentences of various constructions.

Participants and Procedure. Sixty University of Massachusetts undergraduates were tested in an auditory questionnaire task. The procedure was essentially the same as that in Experiment 1, except that the participants were explicitly instructed to judge what they intuitively thought the speaker was trying to convey by how she pronounced the sentences. Fifteen participants were assigned to each of the four counterbalancing lists. They heard the list in an individually randomized order following a short practice list. Each sentence was followed by a visually presented two-choice question that disambiguated the sentence toward matrix versus embedded verb modification (e.g., *What happened last night? Susie learned something/Bill telephoned*). The participant was to pull a lever under the answer that corresponded to his or her understanding of the speaker's intention.

Results

Table 2 presents the mean percentages of matrix (high) modification choices. The critical result was an interaction between presence versus absence of an IPH boundary before the adverb phrase and length of the adverb phrase [$F_1(1,59) = 5.82, p < .05$; $F_2(1,15) = 7.22, p < .05$]. Matrix modification interpretations were substantially enhanced by the presence of an IPH boundary for short adverb phrases (39% vs. 24%), but not for long ones (28% in both cases). This also resulted in a significant main effect of boundary presence [$F_1(1,59) = 5.05, p < .05$; $F_2(1,15) = 8.41, p < .05$]. The main effect of length was not significant ($p > .20$).

Discussion

As in Experiment 1, a long phrase following an IPH boundary decreased the effect of the boundary. The listeners appeared to discount the syntactic implications of the boundary when it could be justified by the length of the following constituent.

Although the effects found in the present two experiments seem robust, we note that they have not always appeared when we have attempted to find them. In Carlson et al. (2001), Experiment 5, a manipulation of the length of adverb phrases in sentences rather similar to those in Experiment 2 failed to significantly affect interpretations. However, the size of the length manipulation in Carlson et al. (2.72 vs. 6.17 syllables for the short vs. long adverb phrases) was smaller than that in the present Experiment 2 (2.25 vs. 11.5 syllables), perhaps not sufficient to trigger the effect.

In addition, an unpublished previous experiment in which the materials in Experiment 2 were used with the judgment task in Experiment 1 (in which the participants were told to report their intuitive understanding of what they heard, rather than reporting what they thought the

Figure 2. Sample F_0 pitchtracks of two utterances used in Experiment 2, with ToBI labeling. Top panel: No boundary (4a). Bottom panel: Late boundary (4b).

speaker was trying to convey) yielded results that were generally similar to those found in Experiment 2. The mean size of the effect of prosody was 7.6% for short adverb phrases versus -0.7% for long phrases (in comparison with effect sizes of 15.1% vs. 0.1% in Experiment 2), but the difference between these two effect sizes was not statistically significant even with 72 participants [$F_1(1,71) = 1.80, p = .18$; $F_2(1,14) = 3.27, p = .09$]. We used instructions to make explicit judgments of prosody in Experiment 2, with the intention of attempting to magnify the effect. It is possible that the instructions succeeded in magnifying the data reported here; however, several other prosodic experiments included in Experiment 2 and the

earlier version with different instructions yielded very similar effects in both experiments, so this is not certain. We suggest that the failure to reach significance in the earlier version may represent a Type II statistical error.

CONCLUSIONS

Listeners do not interpret prosodic breaks in a context-independent fashion. Elsewhere, we have shown that the interpretation of a prosodic break is not a simple function of its phonological size but depends on the existence and size of prosodic breaks earlier in the sentence (Carlson et al., 2001; Clifton et al., 2002). The present data show that the length of constituents also influences how a prosodic boundary is interpreted. That, in turn, suggests that listeners can be sensitive to the demands placed on speakers and take these demands into account in determining speakers' intentions, in line with the rational speaker hypothesis laid out by Clifton et al.

We conclude by acknowledging that the rational speaker hypothesis, as currently formulated, leaves some critical questions unanswered. One unanswered question involves when listeners make use of prosodic information. If pro-

Table 2
Mean Percentages of Matrix Verb Modification in Experiment 2

Condition	Percentage
Short, no IPh boundary	24.4
Short, IPh boundary	39.5
Long, no IPh boundary	28.3
Long, IPh boundary	28.4

Note—IPh, intonational phrase.

sodic boundaries are used immediately in processing (e.g., to project a likely syntactic boundary), it may be that the effect of a long phrase following the prosodic boundary (to devalue the interpretive effect of the boundary) is a delayed effect, reflecting a revision that occurs only when the listener is well into the long phrase. Alternatively, it may be that the listener can project the length of an upcoming phrase from its beginning (Grosjean, 1983). Or it may be that the effects of prosodic boundaries are generally delayed. In fact, there is little evidence about when prosodic boundary effects occur during on-line comprehension (see Kjellaard & Speer, 1999, for suggestive evidence of their on-line nature; see also Dahan, Tanenhaus, & Chambers, 2002, and Weber, Grice, & Crocker, 2006, for on-line evidence that pitch accent placement can affect information structure and sentence interpretation).

A second unanswered question concerns whether listeners prefer to interpret a prosodic event as reflecting communicative intent or utterance length. In Experiment 1, the position of a prosodic boundary had a substantial effect on interpretation even with long phrases. In Experiment 2, the effect of a prosodic boundary on interpretation disappeared when the boundary preceded a long phrase (although in Carlson et al., 2001, it did not disappear when the boundary preceded a less extreme long phrase). It is even possible that a prosodic boundary induced by a long phrase may still be interpreted as conveying communicative intent. Hirose (2003) has reported results suggesting that this occurs during reading. She found that the phonological length of proper name subjects affected how Japanese readers resolved a syntactic ambiguity and suggested that this occurred because the long proper names encouraged the readers to insert an implicit phonological boundary (a major phrase boundary) that then biased interpretation.

The present data do not permit us to state how quickly phrase length is used to interpret the occurrence of a prosodic boundary, nor do they permit final statements about just how sensitive listeners are to phrase length. Nonetheless, they do buttress our earlier claims that the effect of a prosodic event depends in intricate ways on the context in which the prosodic event occurs.

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NOTES

1. As has been pointed out by Amy Schafer, the absence of an expected prosodic boundary may also be informative (as was noted in Schafer, Carlson, Clifton, & Frazier, 2000).
2. We consider the difference between ip and IPh prosodic boundaries to be a categorical distinction and the L-H% tune (plus lengthening and a pause) to be diagnostic of an IPh. With these assumptions, all of our sentences contained IPh boundaries as specified and no other boundaries of that size.

APPENDIX A

Materials Used in Experiment 1, With Questions for Item 1

Alternative forms are separated by /. Initial long and short items were used in Experiment 1A; second versions of the items were used in Experiment 1B.

1. a. Patricia Jones or Jacqueline Frazier and Letitia Connolly convinced the bank president to extend the mortgage.
- b. Pat or Jay and Lee convinced the bank president to extend the mortgage.
- a'. The plantation owner or the tenant farmer and the new caretaker convinced the bank president to extend the mortgage.
- b'. Pat or Jake and Lee convinced the bank president to extend the mortgage.

Who convinced the bank president?

a. Patricia Jones, or (Jacqueline Frazier + Letitia Connolly) (one or two people)	(Patricia Jones or Jacqueline Frazier) + Letitia Connolly (two people)
b. Pat, or (Jay + Lee) (one or two people)	(Pat or Jay) + Lee (two people)
a'. The plantation owner, or (the tenant farmer + the new caretaker) (one or two people)	(The plantation owner or the tenant farmer) + the new caretaker (two people)
b'. Pat, or (Jake + Lee) (one or two people)	(Pat or Jake) + Lee (two people)
2. Ezekial Smith or Jennifer Bolton and Jackson Plane / Ez or Paige and Jim / The realtor or the current owner and a chatty neighbor / Ethan or Paige and Jim / talked so candidly that prospective buyers lost interest.
 3. Elizabeth Cantrell or Catherine Ferry and Victoria Lakoff / Liz or Kay and Vicky / The actress or the crazy agent and the dour executive / Liz or Kayla and Vicky / must have called a cab to go to the Four Seasons.
 4. Joseph Baltimore or Zacharia Leonard and Nathaniel Foley / Joe or Zack and Nate / The sleazy salesman or the shady supervisor and a groveling underling / Joey or Brandon and Nate / tried to sell Dan a used car.
 5. Rebecca Ralston or Christina Ashby and Gloria Montague / Becky or Kris and Gail / The beautiful dancer or the talented singer and the impresario / Becky or Crystal and Gail / apparently spent a lot of time in this club.
 6. Carlton Highsmith or Nicholas Cantrell and Derrington Falstrom / Carl or Nick and Dan / The skilled golfer or the new trainer and the young millionaire / Kevin or Mike and Dennis / persuaded some friends to golf in the rain.
 7. Jedediah Rayner or Dominick LaFrance and Franklin Coughlin / Jed or Dom and Frank / The handsome surgeon or the other doctor and the surgical nurse / Zach or Rob and Frank / must be off preparing for a difficult operation.
 8. Benjamin Masterson or Adrian Stoney and Jeremy Pacht / Dave or Bill and Trent / The grumpy waiter or the friendly bartender and the new head cook / Dave or Bill and Trent / usually sit in that booth in the back.
 9. Melissa Macintosh or Elizabeth Falmer and Louisa Stuart / Mel or Liz and Lou / The town clerk or the town planner and the mayor's assistant / Celia or Lauren and Olive / should inform the planning board about the new regulations.
 10. Dorothy Thayer or Margaret Bulleran and Samantha Reedy / Dot or Meg and Sam / The idealistic architect or the radical student and the progressive developer / Tina or Meg and Nicole / were planning to protest the sewer extension.
 11. Timothy Slattery or Theodore Button and Anthony Baltimore / Tim or Ted and Tony / The kind gardener or the gruff stable boy and the ditsy maid / Jeff or Austin and Tony / had reportedly seen the heiress before she disappeared.
 12. Cynthia Margolis or Antonia Crawford and Jennifer Stevens / Sue or Ann and Jean / The graceful blond girl or her tall shy friend and Gina's mother / Susie or Ann and Gina / admired Bill's new cell phone.
 13. Frederick Sessions or Alexander Furness and Roberto Mangun / Fred or Al and Bert / The stern policeman or the amiable detective and the streaker / Ryan or Todd and Burt / were in the first police car when it pulled away.

APPENDIX A (Continued)

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14. Dominick Portsmouth or Jonathan Fellows and Samuel Franks / Dom or Juan and Sam / The old contractor or the new contractor and the electrician / Tyler or Juan and Sam / tipped off the papers about the building's code violations.
 15. Jessica Proust or Angelika Steinbeck and Jennifer Liversedge / Jess or Ann and Jenn / The cell biologist or the crazy chemist and the evolutionary biologist / Brooke or Sarah and Jenny / proposed the last wacky theory.
 16. Brittany Ashby or Deborah Malthus and Louisa Stevenson / Brit or Deb and Louise / The taxi driver or the city bus driver and the limo driver / Doug or Ray and Lou / will be expected in court.
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APPENDIX B

Materials Used in Experiment 2, With Alternatives Separated by “/”

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1. Susie learned that Bill telephoned last night / late last night after the general meeting.
 2. Sally discovered Pat telephoned on Friday / in the early hours on a Friday morning.
 3. Emmon reported Sam arrived Saturday / very early on Saturday morning.
 4. Brian concluded Tim had arrived this morning / sometime around seven o'clock this morning.
 5. Tom discovered Bill got sick today / during the long pancake breakfast today.
 6. Ann learned Patty was ill today / in the middle of the day during a break.
 7. Sally began to expect Sam would leave in June / midway through the month of September.
 8. Lucy predicted Mark would give up last fall / sometime during the second semester.
 9. Melinda maintained the Chairman lied today / today during the important press conference.
 10. Martin maintained the CEO evaded the issue yesterday / the day of the preliminary Senate investigation.
 11. Patricia found out Laurence disappeared today / on the day of the strike over the new contract.
 12. Alicia found out Terence left Sunday / very early sometime during Sunday morning.
 13. Rodney complained the bookkeeper cheated last year / way back in the year of the external audit.
 14. Linda complained the boss was mean today / from very early in the morning until six at night.
 15. Carolyn complained the babysitter was cranky last night / the night of the youngest child's birthday party.
 16. Jason concluded Tom went skiing last week / the week of the basketball team's big win.
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