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English Speech Rhythm. By Elizabeth Couper-Kuhlen. Amsterdam: John Benjamins Publishing Company, 1993. 346 pp. $75.00

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Elizabeth Couper-Kuhlen's *English Speech Rhythm: Form and Function in Everyday Verbal Interaction* is a publication of her post-doctoral thesis completed in 1991 at the University of Zurich. It is an interesting, ambitious, and provocative, albeit methodologically flawed, analysis of rhythm in English conversational speech.

In the author's own words, the intended contributions of the work are:

> (i) to propose a perceptually realistic method of identifying and verifying isochrony in connected speech; (ii) to advocate and assemble proof for a rhythm-based metric of turn-taking in everyday conversation; (iii) to further an understanding of prosodic contextualization and in particular of rhythm as a context-independent and, at the same time, context-dependent cue to the design and interpretation of speakers' meanings. (p. 2)

The ideas offered in the book are often plausible and are based on extensive and creative, but largely descriptive, analyses of conversational speech. Perceptual judgments of rhythmicity constitute the primary data base, but measures of their reliability are lacking as are inferential statistical analyses of acoustic measurements. These omissions make it difficult to assess the value of the proposed method for identifying isochrony. In turn, this precludes agreeing that "proof" has been offered for a rhythmical account of turn-taking. Even so, the findings make an interesting case that rhythms in conversational exchanges exist and are used in the regulation and interpretation of turn transitions.

The book begins with three introductory chapters. The main purposes of the first chapter are to provide a survey of the literature addressing the question whether English has an isochronous rhythm and to speculate that future investigation of the "P center" will reveal the isochrony that listeners to English claim to hear but that acoustic measurement has failed to confirm.

First named in the archival literature by Morton, Marcus, and Frankish (1976; see also Marcus, 1975), the P center ("perceptual center") construct was invoked to capture an observation that sequences of phonetically different syllables (digits in the earliest work) having evenly-timed onsets of acoustic energy do not sound isochronous to listeners. To sound isochronously timed, syllables with durationally longer onsets and, to a

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lesser extent, durationally longer rimes must be initiated earlier than syllables with shorter onsets or rimes. A descriptive account of the findings is that each syllable has a psychological "moment of occurrence" (Morton et al., 1976, p. 408) that is determined to a large extent by the duration of its syllable onset and to a lesser extent by the duration of its rime. The longer each component, the later in the syllable is the P center and so the earlier it must be initiated relative to a predecessor syllable to sound isochronously timed with it.

Couper-Kuhlen proposes that conversational speech heard as isochronous will be found to have evenly timed P centers. She cannot go on to test that proposal, however, because no satisfactory method has been worked out to locate the P center in a syllable or word. But the proposal does motivate the method Couper-Kuhlen goes on to use to assess the rhythmicity of conversational English, namely a perceptual method in which sequences are identified as isochronous if listeners agree that they are.

My own judgment about the P center is that it will not do the job that Couper-Kuhlen sets out for it. A major source of acoustic anisochrony in spoken English is the different numbers of unstressed syllables between stressed ones. Although Couper-Kuhlen is right that we do not know how, if at all, those syllables affect the P centers of stressed syllables (the intervals between which are supposed to be isochronous in a "stress-timed" language such as English), we do know enough to guess that they will not exert a strong effect. If a stressed syllable's P center is affected only by phonetic properties of the syllable itself (a suggested "null hypothesis" by Morton et al., 1976), then the most that following unstressed syllables can do is to move the stressed syllable's P center *earlier* in the syllable, because of the shortening effect that the unstressed syllables exert on the stressed syllable's rime (e.g., Lindblom and Rapp, 1973; Fowler, 1981). This is the wrong direction of movement for achieving isochrony across intervals with different numbers of syllables. Alternatively if the null hypothesis is wrong, and the extra duration of an interstress interval added by unstressed syllables affects the P center in the way that extra duration in the rime does, then we might predict a weak—because effects of the rime are weak—shift in the P center to a point later in the syllable. Although that is a shift in the required direction, it will not be enough to achieve isochrony, because, for example, in Marcus' data, the duration of the rime shifts the P center by only 25% of the duration of the rime.

The perceptual method that Couper-Kuhlen uses to identify isochronous sequences is described in Chapter 2 as it is applied to a two-minute excerpt from a radio talk program. First two judges worked independently and then together to mark the prominent syllables as they listened to the excerpt. Next, the judges independently and then together marked isochronous sequences between prominent syllables. Any disagreements that the judges could not resolve were then taken to a third judge who served as arbitrator. Only sequences on which consensus was reached were considered isochronous. Finally, acoustic measures of intervals between sequences were taken to compare with the perceptual judgments and to be used in a further search for isochrony to be described below.

Some of the findings using this method were that: (1) much, but not all of the fragment was judged isochronous; (2) because sequences judged isochronous often differed in their numbers of syllables between prominences, Couper-Kuhlen concurs with

predecessors that compression of multi-syllabic intervals must occur;[1] (3) interestingly for the later development of her analysis, chains of isochronous intervals frequently spanned turn transitions between speakers.

Acoustic measures of isochronous versus nonisochronous sequences confirmed that, modally, duration differences between successive isochronous intervals were shorter than those between successive nonisochronous sequences. However, there were nonisochronous sequences with small duration differences between adjacent intervals and isochronous sequences with large ones. Couper-Kuhlen suggests that rhythms of speech are dynamic auditory gestalts and that, when different gestalt principles work together to make successive intervals between prominences cohere, perception of isochrony is promoted. However, when the principles are in conflict, isochrony may not be heard even if temporal discrepancies across intervals are small. Moreover, given sufficient context to establish a beat, the gestalt principle of "good continuation" may be applied to sequences containing long pauses, so that listeners will hear pauses as containing one or more "silent beats" that maintain the rhythm for them. In fact, Couper-Kuhlen suggests that, if good continuation is applied to some of the sequences identified by judges as nonisochronous, then even more rhythmicity is found than in the perceptual analysis alone.

Couper-Kuhlen's methodology is careful and generally conservative. However, we are not given information on how successful it is. We do not know, for example, the extent of the initial agreement between the two judges of isochrony. My confidence in the perceptual method would be considerably greater were the judges, say, in agreement on 90% of interstress intervals than if they were in agreement on 30%. Moreover, opportunities for statistical analysis of acoustic measures of the sequences are not taken. So, for example, we do not know whether intervals heard as isochronous show reliably smaller departures from isochrony as measured acoustically than intervals heard as nonisochronous. A bar graph shows that differences are numerically as they should be, but a measure of reliability would be reassuring.

The foregoing weaknesses in methodology raise questions about the success of the perceptual judgment method in finding intervals that listeners might actually *use*, as much of the rest of the book suggests they could, for example, to regulate turn taking in conversation, to discover trouble spots in a communicative exchange and so on. These uses of rhythm are only feasible if listeners agree, on-line—not after arbitration—on the rhythm, if any, of the conversation.

In addition, I have difficulty making sense of Couper-Kuhlen's final augmentation of her perceptual method by applying gestalt principles to find rhythmic structure that the judges had missed. The argument was made early on that, until P centers are identifiable in acoustic signals, rhythms are most reliably identified perceptually. Yet here, the author is finding rhythms that the judges did not pick up. At first I thought she might be implying that there is more rhythm in the production of speech than listeners necessarily

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[1] Whereas this may be the case, it need not be, given that isochronous intervals are determined by perceptual judgment.

pick up. However, that interpretation does not work because gestalt principles are principles of *perceptual* organization, not of production. Accordingly, the analysis seems to imply that, if only the judges had used such gestalt principles as good continuation, they would have heard more isochrony than they did.

A third introductory chapter provides a brief summary and critical analysis of metrical phonological approaches (for example, Liberman and Prince, 1977; Selkirk, 1980) to the characterization of speech rhythms. Couper-Kuhlen finds them inadequate to capture the rhythmic structures in conversational exchanges. Remarkably, however, the first two of three flaws she identifies with the approaches relate to her mistaken understanding that "the metrical models developed thus far...appeal to morphosyntactic rather than phonological or prosodic categories in the creation of metrical structure" (p. 84). Whereas categories were morphosyntactic in Liberman and Prince's original formulation of the theory, a very early modification to the theory (see, for example, Selkirk, 1980) was to substitute prosodic units.

In any case, Couper-Kuhlen uses neither prosodic nor morphosyntactic *units* to describe conversational sequences. She adopts the "grid" rather than "tree" notation for describing rhythmic structure, which focuses on "heads" of prosodic domains, not their edges (cf. Beckman and Edwards, 1992). Applying metrical grid structures with prosodic levels corresponding to syllabic, foot, phonological phrasal, intonational phrasal and utterance domains to the two-minute radio talk program excerpt, Couper-Kuhlen finds that rhythms can be found at any prosodic level, but occur most commonly at the three intermediate ones. Perhaps not surprisingly, given her method for identifying isochronous sequences, she reports also that rhythms need not begin or end at the beginning or ending of a prosodic domain. A third conclusion relates to sequences in which judges had agreed that there were two mutually incompatible rhythmical analyses of a sequence. Couper-Kuhlen treats these incompatible rhythms both as real and concludes that such occurrences are "detrimental to clear rhythmic perception" (p. 100). I would judge, however, that the incompatible rhythms cannot both be real, and that such an outcome reveals that the perceptual method for finding isochronous sequences can lead to error. Listeners can only use rhythms of speech to guide their conversational behavior if talkers speak rhythmically. But a talker cannot simultaneously produce incompatible rhythms; accordingly, at least one analysis of the two incompatible ones must be wrong.

Chapters 4 to 8 provide the heart of Couper-Kuhlen's analysis. She begins by noting that turn-taking in conversation generally takes place with considerable temporal precision. That is, the unmarked transition between talkers is one in which there is no overlap in their speech and no noticeable pause. Generally, there is a transition interval of .2 seconds or less.

A remarkable finding across several conversational excerpts is obtained by looking at just those cases in which the transition interval is between 0 and 0.2 seconds. In these cases, the duration of the transition interval can be predicted by the number of weak syllables in the first talker's speech following the final strong syllable. The more weak syllables the shorter the transition interval. Characteristically, Couper-Kuhlen provides a table of the relevant cases, but no statistical analysis of the data. However, a regression analysis on the data (her Table IV-6) supports her conclusion. The analysis shows that, with a measure of speech tempo partialed out, the correlation between the transition interval and the number

of weak syllables following the ending talker's final strong syllable is -.52 ($F(2,23) = 8.65$, $p<.01$). This analysis does suggest that there can be rhythmical cohesion across a change in speaker.

There are, of course, other transitions, identified as marked, in which speech overlaps at the transition point or in which pauses intervene. Couper-Kuhlen argues that, even so, the speech may be perceived as rhythmical across the transition. For example, given a pause at the transition, it may be either incorporated into a rhythmic interval that also includes some speech or it may be perceived as one or more "silent beats" in an ongoing isochronous speech chain. The presence of a perceptible pause between the speech of two talkers may be meaningful, signalling embarrassment on the part of a new speaker, or confusion or disagreement. In contrast, incorporated pauses simply preserve the ongoing rhythm and so are part of a fluent exchange. In favor of this interpretation, she argues, is her finding that 10 linguist listeners as well as the original judges found pauses more salient when the final analysis of the speech, augmented by use of good continuation to find silent beats, had identified a pause as including silent beats rather than as being incorporated. This difference in salience held even for pairs of pauses of the same duration. However, there may be an alternative interpretation. For two pauses of a given duration to be treated differently in the analysis—as incorporated or as containing silent beats—the speech surrounding the pauses must have been of different tempos: slower for incorporated pauses than for unincorporated ones. It may be the case that silences of a given duration are less likely to be heard as a pause in the context of slower than of faster speech rather than that pauses consisting of silent beats are more salient because they are communicatively meaningful. That criticism aside, however, Couper-Kuhlen does offer evidence in favor of the idea that some of the time transitions between turns are rhythmically cohesive. This in turn implies that participants in conversations are sensitive to speech rhythms and use rhythm to guide the timing of turn taking.

In Chapter 5, Couper-Kuhlen considers and rejects three answers to a question she poses—why there is so much rhythmic behavior at turn transitions—before proposing her own answer. She extrapolates from Lenneberg's (1967) idea that there is a basic 6 Hz physiological rhythm underlying syllable production a hypothesis that rhythms at turn transitions might have a physiological basis. She rejects this hypothesis on grounds that the rhythms she observes at turn transitions occur at multiple levels, most with slower cycle times than 6 Hz. Another idea (Jaffe and Feldstein, 1970; Matarazzo and Wiens, 1967) is that rhythmic cohesion across turn transitions may reflect a sort of mutual entrainment of talkers one to the other. She rejects this idea on grounds that rhythmic cohesion should then be found to increase over time as talkers equilibrate to one another's personal rhythms; however, her data provide counter-examples. Finally, she agrees, but only in part, with Erickson and Schultz (1982) that rhythm may serve a "contextualizing function". That is, for Erickson and Schultz, talkers and listeners move and speak rhythmically, and these rhythms keep the speakers' "on track" (1982, p. 71). Failure to achieve a conjoint rhythm at all constitutes "serious interactional trouble". Lesser "stumbles" in a rhythm are associated with feelings of discomfort on the part of participants. Although Couper-Kuhlen appears to accept much of the substance of this view, she does not accept the analyses offered in support of it. Erickson and Schultz include movements of the speakers' bodies as well as their speech in their rhythmic analysis, and Couper-Kuhlen finds their markings of move-

ments ad hoc. In addition, she suspects that they mix different levels or time scales of rhythms, because the rhythmic beat they identify is even faster than Lenneberg's 6 Hz rhythm.

Couper-Kuhlen continues to restrict her own analysis to speech rhythms, but now expands its application to include 10 chats obtained from British and American families. She focuses on her earlier finding that many, but not all turn transitions are rhythmically cohesive. Transitions can differ in the extent to which they are determined, and Couper-Kuhlen hypothesizes that the more determined the activity or speaker after the turn shift, the more likely the turn transition is to be rhythmically cohesive. Transitions can be determined or not along two dimensions: The next speaker can be determined (e.g., because the first talker in some way designates the next talker) or not, and the general content of the next talker's utterance may be highly constrained or not.

Having identified turns of all four kinds (that is, with talker determinacy crossed with determination of content) in her data set, she looks for differences in the frequency with which turn transitions are rhythmically cohesive in the four cells. Quantitative findings are not supplied; however, Couper-Kuhlen reports not finding differences to support her hypothesis. This failure provides the impetus for a new hypothesis explored in Chapters 6 and 7 that, whereas transitions being tight (determined) or loose (undetermined) does not affect the likelihood that a turn is rhythmically cohesive, determinacy of the transition might provide a context in which the presence or absence of rhythmic cohesion can be interpreted by participants in a conversation.

Chapter 6 focuses on turn transitions in which the content of an utterance across a turn transition is not highly constrained. Couper-Kuhlen proposes that, in these exchanges, rhythm can serve a "contextualizing" function in which participants draw inferences based on the preservation or not of an ongoing rhythm about the interpretation of the conversational event, including such background information perhaps as loss of face by, embarrassment of, or confusion on the part of a speaker, the intentions behind a particular utterance and more.

The first part of the chapter includes a series of sample exchanges in which rhythm is or is not preserved across some turn transitions. One example consists of a discussion of "nonsmokers" who continue to smoke. In the course of the discussion, one participant offers lemon to the others, perhaps for tea. Despite the topic interruption, the speaker's stressed words are perceived as rhythmically cohesive with the surrounding talk. Couper-Kuhlen speculates that such rhythmic cohesion occurs to minimize the disruption caused by the temporary topic shift. Complementarily, therefore, disruption of a rhythm during introduction of a new topic may signify a successful attempt to establish a separate conversational "floor" apart from an ongoing exchange. Couper-Kuhlen provides evidence for this as well.

Although I do not find these interpretations implausible, they are post hoc and circular. The only evidence offered that a talker introducing a new topic is or is not attempting to minimize disruption is rhythmic cohesion or its absence. An alternative interpretation might be that, whatever the reasons are why speech is sometimes rhythmically cohesive across turn transitions, it has nothing to do with the presence or absence of shifts in topic. A more convincing demonstration of an important role of rhythmical cohesion in minimizing the disrupting effects of topic shift might be to examine transcripts

with rhythmicity judgments omitted and look for independent evidence of a talker's desire to maintain one floor or to establish a second. Then that evidence might be used to predict which topic shifts will be found to be rhythmically cohesive and which not.

A second domain to which Couper-Kuhlen applies a rhythm analysis is that of "turn-taking rules." She reviews Sacks, Schegloff and Jefferson's (1974) proposal that cyclical rules of turn taking apply roughly as follows: 1) the current speaker may designate a next speaker; or if not, 2) a next speaker may self-select; or if not, 3) the original speaker may jump in again. Couper-Kuhlen asks how a participant in a conversation can know when rule 2 has failed to apply. A plausible answer is that participants know, because a sufficient amount of time has gone by for a new speaker to jump in if so inclined. Couper-Kuhlen suggests that "sufficient time" can be given a precise definition in rhythmical terms. Given that the unmarked case at turn transitions is for a new speaker to come in on the first beat following the former speaker's last one, the existence of a silent beat in a turn transition signifies that rule 2 has not applied. In the same way, one can know that rule 3 has not applied if two silent beats occur.

As in the earlier analysis, these proposals are corroborated by example rather than by, say, frequency counts of transitions with one or more silent beats in which either the original or a new talker speaks across the break. However, it does seem as if Couper-Kuhlen's analysis makes some testable predictions. One is that, if there is just one silent beat after an original speaker gives evidence of ending a turn, the next speaker should always be the original speaker (because the silent beat indicates that rule 2 has not applied and, if rule 3 were not to apply, there would be at least two silent beats). A second is that when there are two or more silent beats, the original speaker may continue across the break, but not inevitably as should be the case when there is just one silent beat (because the rules cycle and if, on a new cycle, rules 1 or 2 apply, then a new speaker will begin a turn). These predictions should be testable in Couper-Kuhlen's corpus, but they are not tested in the book.

The seventh chapter examines turn transitions, such as occur in exchanges of greetings, questions and answers, or assertions that elicit agreement or not, in which the content of a new speaker's utterance is constrained by the first part of the exchange. Couper-Kuhlen finds that the expected and unmarked case here is rhythmical cohesion. In general, cohesion implies that the new speaker's response is as expected, although there are exceptions to this in the data. Anticipations or delays of a beat across a transition may be a sign of one kind or another of interactional trouble. For example, if a speaker makes an assertion to which he or she expects agreement, and the new speaker does not agree, the disagreeing response (a "dispreferred" response) may be delayed. Listeners can detect the interactional trouble, by detecting the delay.

However, some cases occur in the data in which dispreferred responses are rhythmically cohesive across a turn transition. Couper-Kuhlen interprets this as evidence of an effort on the new speaker's part to maintain harmony despite the disagreement, another plausible, but circular, interpretation. Again, a better analysis might be one in which independent evidence for harmony maintenance efforts or the opposite could be found in the transcripts and could be used to predict the presence or absence of rhythmic cohesion.

In the final chapter, Couper-Kuhlen looks closely at two kinds of exchanges—questions and answers, and repairs—to explore reasons behind specific rhythmic patterns.

Her conclusion based on her exploration is that different patterns provide information, not necessarily about the objective nature of the exchange, but rather about the interpretation speakers ascribe to it.

Looking at questions and answers, Couper-Kuhlen finds that, when an answer does not occur on a next beat, but rather is delayed, the utterance following the delay is often "I don't know". An obvious reason for the delay, therefore, is that the speaker is searching for an answer and ultimately finds none. However, not all delays are followed by "I don't know", and not all, plausibly, reflect a search for an answer. Couper-Kuhlen uses examples to suggest that, in these cases, delay may reflect embarrassment as when an unemployed person is asked "Whereabouts in Bolton do you work?". However, independent evidence suggested instances in which embarrassment was present, but in which an answerer's response was not delayed. Couper-Kuhlen concludes: "addressees may *choose not to display* their embarrassment" (p. 272, italics in the original). That is, if the interpretation they wish other participants in the exchange to put on their answer includes the information that they are not embarrassed, their response will be rhythmically cohesive with the question. However, at least in the absence of relative frequencies with which embarrassment, judged on evidence other than timing data, is or is not associated with delay, Couper-Kuhlen's interpretation is difficult to distinguish from one that embarrassment does not affect the timing of answers to questions one way or the other.

The same interpretive difficulties accompany Couper-Kuhlen's analysis of repairs. She reports, for example, that the different "moves" in a repair (for example, repair elicitation by a hearer and the speaker's following repair) show different rhythmic patterning. Repair elicitation often is not rhythmically cohesive with the utterance; rather, it is delayed. One interpretation of this is that the speaker saves face if he or she notices the need for a repair and self-corrects. Next speakers delay eliciting a repair to give the previous speaker a chance to self-correct. Some support for this is obtained by an observation that, when a repair is elicited because the listener did not hear the speaker, the repair elicitation (often "pardon?") is not delayed. Given that speakers will not be inclined to repeat themselves unless they are given information by the listener that their first utterance was inaudible, the repair elicitor has no reason to delay in this case.

This interpretation is challenged, however, by rhythmically integrated repair elicitations when mishearings are not involved. Couper-Kuhlen infers from these cases that it is not the objective fact of mishearing or not that dictates rhythmic integration or not, but rather the gloss that the repair elicitors wish to put on the repair elicitation. If they wish to make the tacit point that the repair is required through an unfortunate circumstance (such as mishearing) that is no one's fault, the repair elicitation is rhythmically cohesive with the previous speech.

I have trouble with this analysis in two ways. First is the problem—raised several times earlier—of circularity. An interpretation that it is the participant's gloss of an exchange not the objective nature of the exchange that gives rise to a particular rhythmic pattern and that the pattern, in turn, cues, is unfalsifiable in the absence of independent evidence for the participant's gloss. The second source of trouble is the relation between the first idea that listeners generally delay repair elicitation to give the speaker a chance to self-correct and the second one that rhythmic cohesion smooths over the discomfort of a repair. Perhaps both ideas are correct, but if so, there remains only one temporal pattern—an

accelerated timing of repair initiation—that does not help the speaker save face. And, in fact, earlier in the chapter, even that outcome during a repair is given a face-saving interpretation. ("The faster pace not only provides them with a means for contextualizing their talk as doing something different from prior (and subsequent) talk. It also tags this activity as one designed to attend to the urgency of the matter and to the necessity of re-establishing face as quickly as possible." p. 279) In short, it may be the case that, being aware that repairs can cause discomfort, Couper-Kuhlen is inclined to interpret every manner of timing the repair elicitation and response in terms of face-saving behavior.

Concluding remarks

In my judgment, Couper-Kuhlen's book is well worth reading for the important and highly plausible views it offers that rhythm occurs in conversation and that its patterning can provide information to participants in the conversation. More than that, the book offers a wealth of ideas on the kinds of information that rhythmic patterning can provide. However, I do not think that readers should take the findings offered in the book as established, both because, in my view, the perceptual method for determining rhythmic patterning needs improvement and also because the interpretations offered for the patternings that are obtained generally are post hoc and unverifiable. Even so, the material in the book can serve interested researchers as a resource. They can take important ideas and interpretations that the book offers and subject them to more rigorous test than Couper-Kuhlen provides.

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