

## Evidence for Positional Faithfulness from a Language Game

**OVERVIEW:** We commonly observe that some phonological contrasts are preserved only in certain phonological positions and neutralized elsewhere (e.g. mid vowels surface only in initial syllables in Tamil: Beckman 1998). Two opposing theories compete to explain such positional neutralization patterns: positional faithfulness (Beckman 1998; Casali 1996) and positional markedness (Itô and Mester 2003; Zoll 1998). Positional faithfulness asserts that speakers prohibit changes in phonetically or psycholinguistically prominent positions ("Do not remove mid vowels in the input in word initial positions"). Positional markedness theory instead posits that speakers exert strong pressure against maintaining a contrast in non-prominent positions ("Do not have mid vowels in non-initial positions"). This paper provides evidence for the first view through an investigation of Japanese imperfect puns. We show that in making imperfect puns, speakers avoid disparities between corresponding segments in prominent positions (initial syllables and long vowels). We thus independently observe that speakers deploy the principle of positional faithfulness in verbal art. On the other hand, positional markedness cannot explain our results because positional markedness only evaluates the wellformedness of output forms, but does not evaluate the relation between two forms.

**BACKGROUND:** Japanese speakers traditionally create imperfect puns by combining two similar sounding words or phrases, as in *aizusan-no aisu* 'Ice cream from Aizu' or *okosama-o okosanaide* 'Don't wake up the child'. We can see in these examples that (i) paired words can contain non-identical pairs of sounds ([z] vs. [s] in the first example, and [m] vs. [n] in the second example), but that (ii) these mismatched sounds are nevertheless similar (Cutler & Otake 2004; Kawahara & Shinohara 2009). In other words, speakers attempt to maximize the similarity between the corresponding words in Japanese imperfect puns. Our experiments show that speakers particularly disfavor mismatches in word-initial positions and in long vowels. Their avoidance of disparities in psycholinguistically and phonetically prominent positions lends independent support for the principle of positional faithfulness.

**EXPERIMENT 1: INITIAL VS. MEDIAL POSITIONS:** The first experiment tested whether speakers avoid mismatches in initial positions. The stimuli were pairs of words that contain a pair of sounds that minimally differ in voicing ([t-d], [d-t], [k-g], [g-k], [s-z], [z-s]). To control for the syntactic and phonological distance between the punning constituents, the stimuli all had the same syntactic structure, [X-particle Y]. The punning constituents X and Y were all three syllables long. In one condition the mismatch occurred in the initial syllables (e.g. *zasetsu-ni zasetsu* 'I gave up making a left turn'), and in another condition, the mismatch occurred in the second syllables (*hisashi-ni hizashi* 'sunlight on the sun root'). Additional filler items were interwoven with the target questions. The participants rated both the funniness and the acceptability of each pun pair on a 1-to-4 scale for both questions. We used the two different ratings to separate perceptions of wellformedness from comedic value.

Figure 1 shows the results based on 26 speakers. The speakers rated puns with medial mismatches as better than puns with initial mismatches (2.87 vs. 3.01: by a within-subject *t*-test,  $t(25)=2.5$ ,  $p<.05$ ). In other words, speakers disfavor mismatches in initial syllables more than in medial syllables, just as in phonological input-output mapping where speakers avoid changing specifications more in initial syllables than in non-initial syllables (Beckman 1998; Casali 1996).

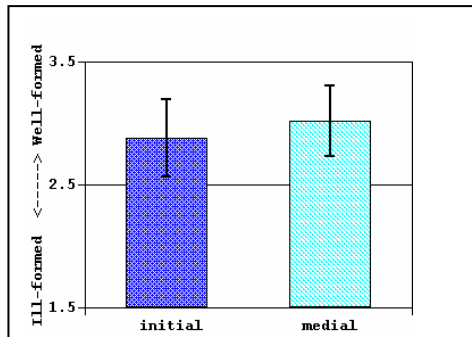


Figure 1: Wellformedness of two types of puns, those with initial mismatches and those with medial mismatches. The error bars represent 95% CIs across the speakers.

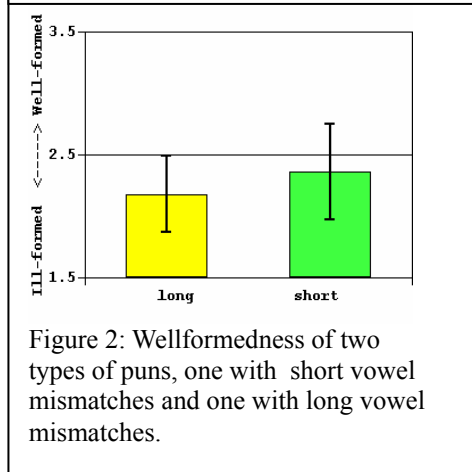


Figure 2: Wellformedness of two types of puns, one with short vowel mismatches and one with long vowel mismatches.

Formally, the avoidance of mismatches in initial syllables in puns can be captured as a result of a constraint that prohibits a mismatch between two surface forms (Benua 1997) that is specific to initial syllables (IDENT(voi)-SS- $\sigma$ 1: “SS for Surface-to-Surface”). On the other hand, the speakers could not have based their behavior on a principle of positional markedness, because positional markedness evaluates the wellformedness of one form only, but not the relation between two forms.

**EXPERIMENT 2: LONG VS. SHORT VOWELS:** In the second experiment we tested whether speakers disfavor a mismatch in long vowels more than in short vowels, because we observe in phonology that speakers avoid creating changes in long vowels, relative to short vowels (Steriade 1994). The design had three fully crossed factors: 10 vowel combinations ([a-i], [a-u], [a-e], [a-o], [i-u], [i-e], [i-o], [u-e], [u-o], [e-o])  $\times$  2 orders (e.g. [a-i] vs. [i-a])  $\times$  2 lengths (short vs. long). An example of a crucial pair was: *jookuu-no jookaa* ‘A joker in the sky’ vs. *rippu-ga rippa* ‘The lips are fine’. Additional 40 fillers were added. The procedure for wellformedness judgments was identical to that in Experiment 1.

The results of Experiment 2 are shown in Figure 2. Speakers judged mismatches in short vowels as more acceptable than mismatches in long vowels (2.14 vs. 2.32:  $t(15)=2.60, p<.05$ ). The results yet again show that speakers disfavor mismatches in long vowels (due to

FAITH-SS-Long Vowel), just like speakers avoid making changes in long vowels in phonology (FAITH-IO-Long Vowel).

**CONCLUSION:** This paper reports two experiments which show that speakers consistently disfavor mismatches—or changes—between two corresponding segments in puns in word-initial positions and long vowels. The avoidance of disparity in prominent positions suggests that speakers use the principle of positional faithfulness in verbal art. Positional markedness on the other hand cannot explain the results because it does not evaluate the relations between two forms.

**REFERENCES:** [1] Beckman, J. (1998) *Positional Faithfulness*. PhD dissertation, UMass, Amherst. [2] Benua, L. (1997) *Transderivational Identity*. PhD dissertation, UMass, Amherst. [3] Casali, R. (1996) *Resolving Hiatus*. PhD dissertation, UCLA. [4] Cutler, A., and Otake, T. (2002) Rhythmic categories in spoken-word recognition. *Journal of Memory and Language* 46: 296-322. [5] Itô, J., and Mester, A. (2003) *Japanese Morphophonemics: Markedness and Word Structure*. Cambridge: MIT Press. [6] Kawahara, S., and Shinohara, K. (2009) The role of psychoacoustic similarity in Japanese imperfect puns: A corpus study. *Journal of Linguistics* 45. [7] Steriade, D. (1994) Positional neutralization and the expression of contrast. Ms. UCLA.