

An Acoustic Analysis of English and Japanese Jokes:

Focusing on Intensity

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► Key Words

jokes
kobanashi
intensity
intonation
pause

▼要 旨

この小論はKadooka (2009, 2011b, 2012a, 2013)、角岡 (2011a, 2012b) に続けて、小咄の類を音響面から分析しようとする試みである。これまでの分析では音調と間を中心に据えていたが、今回は音圧の面から検証する。

聴覚上の印象では、小咄や落語のサゲ（おち）では「サゲの前で間を置いて、声を落としてほそっと語る」という特徴を先行研究で実証している。音調と間を音響分析した結果においては、この印象はほぼ客観的に裏付けられたと言える。この結果を音圧に当て嵌めると、「サゲでは、それまでの語りよりも音圧が小さい」という仮説が成立しそうである。

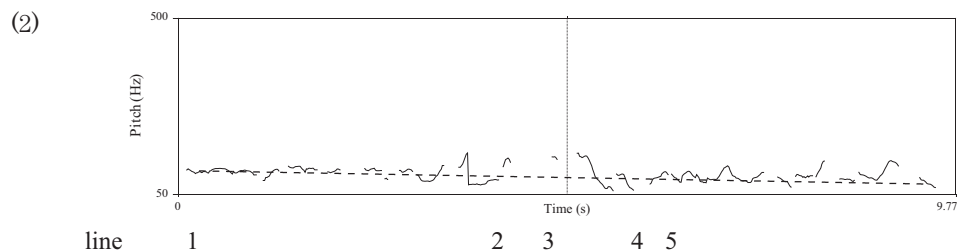
しかし今回、これまでの小咄類を対象として分析した限りではこの仮説を裏付ける結果は得られなかった。音圧に関して明確な傾向として検証できたのは、対話形式の英語ジョークで二人目の話者が第一話者より相当低い声で返事をしていたという事実のみであった。

1. Introduction

In a series of the acoustic analyses of English and Japanese jokes in Kadooka (2009, 2011a, b, 2012a, b, 2013), I suggested and defined the *Punch Line Paratone* as the phonetic and phonological complex of a combination of the pause, tempo and intonation. Below are the basic phonetic and phonological features of the Paratone described in Kadooka (2013: 22), modeled after Tench (1996):

- (1) 1. high in the beginning: high pitch on the onset syllable of the intonation unit
2. high baseline in the beginning: the lowest frequency (baseline) is also high
3. gradual lowering: gradual lowering of the baseline toward the end of the story
4. lowest fall in the final: the lowest fall of depth in the final intonation unit (IU)
5. slower tempo in the final: slowing down process in the final IU
6. longer pause before the final IU

These have been verified as true in general in the preceding papers listed above. The concept of Paratones are to signal both the beginning and the end of paragraphs in a discourse: to start with the high in the beginning, and to end in a low tone. Below is a table showing the pitch of the two speakers telling the joke (5) in section 2:



A dotted line suggests the gradual lowering from line 1 toward the end of line 5. In each line, deviations above and below the dotted line are observed. Line 1 ‘Do you know how many Irishmen does it take to change the light bulb?’ shows the smoothest lowering of the pitch through the line. In lines 3 and 5, many bumps of the frequency can be pointed out.

What is left behind, intentionally in a sense, is intensity. That is to say, it seems natural that in the punch line the volume of the speaker’s voice is lower compared with the preceding lines. This is the main hypothesis to be testified in the following sections. In the last section, the reasons will be testified why intensity has not been one of the main topics in the area of phonetics.

2. Acoustic Analysis of Intensity

The main phonetic feature to be testified in the following sections is intensity. We will have a brief look at the definition of *intensity* in Trask (1996: 181):

- (3) The amount of energy carried by a sound wave, measured in decibels. The perceptual correlate of intensity is loudness, but the relationship is far from linear.

The definition of *decibel*, then, goes on as follows (ibid, 201), in which the detail of why loudness is far from linear is told:

- (4) The standard scientific unit for expressing the intensity of a sound. Strictly, the decibel scale does not express the absolute intensity of a sound, but only the ratio between its intensity and some reference intensity. In practice, the reference intensity is usually taken to be 10^{-16} watts per square centimetre, the lowest intensity audible to an average human ear. The decibel scale is a logarithmic scale, reflecting the fact that the perceived intensity of a sound is roughly propositional to the logarithm of the physical intensity. If the reference intensity is R , then a sound of intensity S may be expressed on the decibel scale as follows:

$$\text{intensity in dB} = 10 \times \log (S/R)$$

This means that the ten times of the difference of sounds is expressed as that of 2 decibels. Hence it can be assumed that the difference of 1 decibel is significant to a certain degree. This is in contrast with the fact that the figures of pitch in Hz, pause in seconds, and tempo indicated by seconds per syllable, word or foot, are all expressed with absolute scale. That is to say, when the first sound is 400 Hz and the second one is 200 Hz, the former is one octave higher than the latter. The pause of 0.2 seconds is twice longer than the one lasting 0.1 seconds. When each syllable is uttered with the duration of 0.1 seconds, it is twice as fast as in the utterance with the duration of 0.2 seconds.

In the following sections, we will look at only the relative difference of intensity indicated by dBs.

3. English Dialogue-type Jokes

The jokes to be analyzed in this section are from a compact disc titled *Pretty Good Jokes* (A Prairie Home Companion, 2000). The host is Garrison Keillor, featuring Paula Poundstone and Roy Blount, Jr., recorded from 1996 through 1999. Among about 50 series of jokes, some of the *Light Bulbs* stories are subject to the analysis below. In this section, altogether ten jokes

are told between the beginning and ending songs. In these stories, the first question is fixed as “How many such-and-such people does it take to change the light bulb?” This question is followed by the answer “I don’t know” or “No, I don’t,” or an echo question “How many?” and then by the punch line. The punch lines make the audience laugh by the attribution of the person changing the light bulb: nationality, occupation, the company he or she belongs to. We will choose six jokes from this series.

The six jokes are such as follows:

(5) Irishmen

1. ‘Do you know how many Irishmen does it take to change the light bulb?’
2. ‘No, I don’t.’
3. ‘Fifteen.’
4. ‘Hum...’
5. ‘One’d hold the bulb, and the rest to drink whisky until the room spins.’

(6) Psychiatrist

1. ‘How many psychiatrists does it take to change the light bulb?’
2. ‘No, I’ve no idea.’
3. ‘One, but only if the light bulb really wants to change.’

(7) IBM

1. ‘How many IBM engineers does it take to change the burnt light bulb?’
2. ‘I don’t know.’
3. ‘Well, none...’
4. they really change the standards of darkness and upgrade the customers.’

(8) Narcissists

1. ‘How many narcissists does it take to change the light bulb?’
2. ‘Ah, how many?’
3. ‘One, ... he holds the bulb and the world revolves around him.’

(9) Grad student

1. ‘How many grad students does it take to change the light bulb?’
2. ‘I don’t know.’
3. ‘One, but it takes ten years.’

(10) Programmer

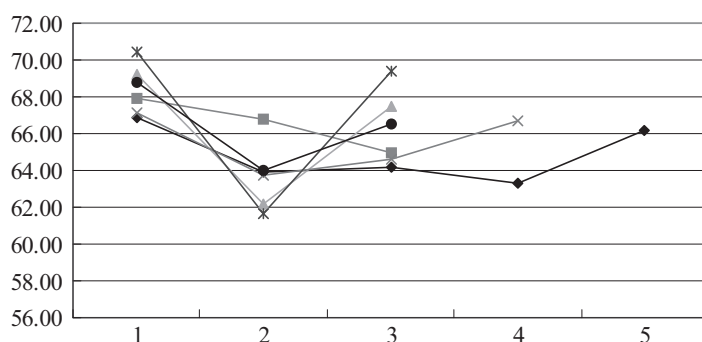
1. ‘How many programmers does it take to change a light bulb?’
2. ‘How many?’

3. ‘None,... that’s a hard work, probably.’

A table shows the figures of intensity in these six jokes:

(11)

	Irishman	Psychiatrist	IBM	Narcissists	grad student	programmer
1	66.85	67.87	69.25	67.16	70.47	68.80
2	63.92	66.80	62.21	63.78	61.64	63.96
3	64.16	64.96	67.51	64.59	69.35	66.55
4	63.31			66.67		
5	66.15					



In these six jokes, different speakers perform their roles. I distinguished at least five different voices: one female and four male. There seems to be only one shared role through all of these jokes: the second line, answering to the question “How many people does it take to change a light bulb?” is uttered by one speaker. The first speakers, or the questioner, are different from one story to another.

From a discourse analysis perspective, it is crucial that the first and the third lines are uttered by the same speaker. The first line is the question, and the third line is the punch line. *Irishmen* is exceptional to this observation in that there are five lines altogether, the fourth line being the response “Hum ...” by the second speaker. If this line would be omitted and the third and fifth lines are combined as “Fifteen; one’d hold the bulb, and ...,” this story would be similar to other three-line counterparts.

Another characteristic is that the last lines are almost always louder than the second-to-the-last line: the only exception is *Psychiatrist*, in which the punch line, i.e. line 3 is weaker than the second line, with the difference of 1.84 dB. The tendency that the punch line is the loudest in the whole story is in coordination with the weakness in line 2. The first speaker and questioner is the principal role, while the second speaker is the supporting role, only answering the question with “No, I don’t.” Thus, the typical three-line question - “No” answer - punch line structure shows the loud - weak - loud intensity pattern.

4. The Monologue-type Jokes

In this section, we will re-examine the English monologue-type jokes, once analyzed in Kadooka (2011b), to compare them with the dialogue-type in section 2. There were four jokes analyzed in Kadooka (2011b): *I don't know*, *Discipline*, *Piggy Bank*, and *One-way Street*. These were recorded by a British speaker in an English textbook for Japanese university and college students (Kadooka 2003). Since the recordings are intentional in the sense that for the students to comprehend the jokes line by line, the tempo is much slower, and the pauses between the lines are longer than in the natural situations. In this section, the tempo and the pauses in these jokes are reviewed in comparison with those in the last section. In addition, the declination of the fundamental frequencies is also verified.

The first story *I don't know* is the shortest of the four. It is a dialogue between a teacher and a student:

(12) Episode 1: *I don't know*. (7.15 seconds)

1. Teacher: Tell me three words most commonly used by students.
2. Student: I don't know.
3. Teacher: Correct.

The second one is a dialogue between a father and his friend.

(13) Episode 2. *Discipline* (23.24 seconds)

1. The father was explaining to his friend the difficulty of trying to discipline his son.
2. "When I was his age, my father sent me to my room for punishment.
3. But my son has his own TV, CD player and telephone."
4. "So what do you do?"
5. asked the friend.
6. "I send him to **my** room."

The next example is a dialogue between a mother and a daughter with a narration.

(14) Episode 3: *Piggy Bank* (30.11 seconds)

1. Mother decided that her daughter Judy, a nine-year old, was old enough to have her own bank account.
2. So she took Judy to the local bank.
3. Judy liked this idea very much.
4. "This is to be your account.
5. You must fill out the application yourself."
6. Judy did well until she came to the space marked, "Name of your former bank."

7. She thought for a while and wrote down,
8. “Piggy.”

The last episode is the longest one of the four. The whole story is told by narration, including the punch line written on a piece of paper; it is NOT told by a character.

(15) Episode 4: *One-way Street* (36.11 seconds)

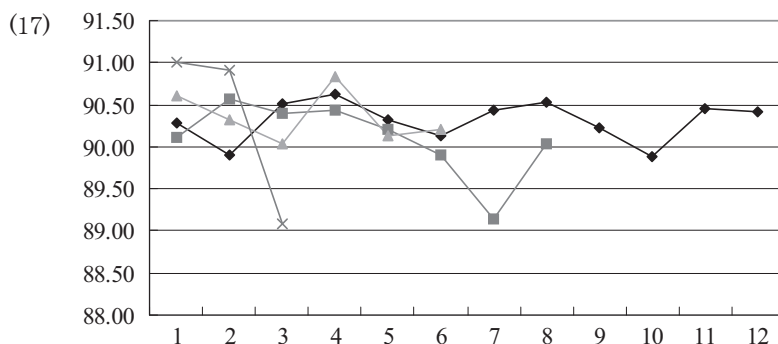
1. A Frenchman was visiting New York for the first time in his life.
2. He could not speak English at all.
3. One day he decided to go for a walk.
4. He was afraid of getting lost,
5. so he carefully looked at the street sign in front of his hotel
6. and wrote it down on a piece of paper.
7. He walked around for quite a long time.
8. Then he realized he was lost.
9. He saw a policeman
10. and showed the piece of paper.
11. It said
12. “ONE-WAY STREET.”

This is a table summarizing intensity in each joke:

(16)

line	one way street	piggy bank	discipline	I don't know
1	90.28	90.11	90.60	91.00
2	89.91	90.57	90.33	90.91
3	90.52	90.40	90.04	89.09
4	90.62	90.43	90.83	
5	90.32	90.20	90.13	
6	90.13	89.90	90.20	
7	90.43	89.14		
8	90.53	90.03		
9	90.22			
10	89.88			
11	90.46			
12	90.42			
average	90.31	90.10	90.36	90.33

The transition of the intensity in each story is as follows:



The patterns of the transition of intensity are totally different from those observed in the dialogue-type jokes in the last section. The typical three-line question - “No” answer - punch line structure shows the loud - weak - loud intensity pattern. Of the four jokes, the punch lines are louder than the average of each story in three: the exception is *One-way street*. Compared with the line before the punch line, the punch line is louder than the previous line in two: *Discipline* and *Piggy bank*. These varieties may be the result of the reflection of the style of telling: the whole narration *One-way street* shows a relatively flat transition of intensity, while in *I don't know* the punch line is told much weaker than the previous line, with a gap of nearly 2 dB.

To conclude, it would be adequate to assume that the lowering of intensity in the punch line is not always necessary. Rather, how the punch line is told, or whether it is told more or less loudly in other words, depends on who in what role tells the punch line.

5. Japanese *Kobanashi* stories

The subjects of the analyses in this section are taken from the Makura of a Rakugo stories (see Kadooka 2012 for the detail of Rakugo and Kobanashi stories). We will examine five Kobanashi stories below in this section. They are told as the Makura, i.e. shorter jokes told before the main story, of a horrible story *Gokoo*: 1. Duck and Scallion (*Kamo to negi*) 2. Oil Merchant (*Abura-ya*) 3. Plea for a Monster (*Bake-mon wo negae*) 4. Haunted Hole (*Yūrei no ana*) 5. Monsters' Party (*Poppen, poppen*).

(18) <Episode 1: Duck and Scallion (*Kamo to Negi*)>

Kamo ga koo kawa oyoide-tan-desu naa
 duck NOM thus river swim-PAST-POLITE PART (icle)
 hona kamo no oyoide-deru ushiro-kara negi ga koo nagarete-kite
 then GEN PROG back-from scallion flow-come
 ushiro e poon-to atat-ta
 toward suddenly-QUOT hit-PAST

Kamo ga hyot-to furimui-te,

swiftly turn

“Oo, kowa...”

oh horrible

When a duck is swimming in the river, a piece of scallion flows from the upper stream and strikes the duck. The duck said, “How horrible...”

(19) <Episode 2 : Oil Merchant (*Abura-ya*)>

1. Abura-ya no yane ni yo na yo na bake-neko ga deru to-iu uwasa ga
oil-merchant GEN roof on night-every monster-cat NOM haunt QUOT-say rumor
tat-te...
appear
2. Kinjo no renchuu ga sore o iron-na koto ii-masu node abura-ya no shujin ga
neighbor people it ACC various thing say-POLITE since master
ki-ni-shimashi-te yonaka ni
worry midnight in
3. oki-dashite jibun-toko no yane o mi-masu to iu to ma-yonaka ni oo-yane no teppen-e
wake-up self-place look-POLITE big-roof top-toward
4. sugoi kono neko ga
terrible this
5. gira-gira -to me o hikarashi-nagara oni-gawara ni koo te o kake-te
dazzling eye shine-going-on demon-tile paw put
6. gya - to nai-teru
squall scream
7. “Koitsu kai,
This-guy PART
8. kora, omae-no okage de obake-abura ya to ka iron-na koto i-ware-n ne ya.
hey, you owing-to haunted-oil PART tell-PASSIVE PART PART
9. Nande uchi ni de-yaga-n ne ya, kono neko.”
why our-house appear-DEROG
10. Ishi o tsukande abura-ya no shujin ga pa—t to nage-tsukeru to, neko ga hyot-to tai
stone grab forcefully throw-aim nimbly body
kawashi-te,
dodge
11. “Abura-ya no.”

Narration: Once, there was a rumor that a ghost cat haunted the roof of an oil merchant's store. The master of the store made up his mind to probe whether the rumor was true or false. At midnight, when he was patrolling, he found the cat and said:

Master: Owing to you, our oil is dubbed as haunted, and we have a lot of trouble.

Narration: Then the master threw a stone at the cat. The cat dodged it and said:

Cat: Dangerous!

(20) <Episode 3: Plea for a monster>

1. Otoko ni dama-sare te
a man DAT deceive-PAS and
2. uran-de shin-da onnaga
bear a grudge die woman NOM
3. ano-yo e it-te Enma-han no mae de
afterlife to went King of Hell GEN front in
4. “Watashi wa otoko ni dama-sare te
I TOP
5. sore ga kuwashi-ite shini-masihta.
it regrettable die-POLITE-PAST
6. Yuurei ni nat-te urami wo ii-ni mou-ikken shaba e modori-tai no de o-negai itashi-masu.”
ghost become resentment tell again this-world come-back-want please
7. Enma-daiou ga hyot-to miru-to, kore ga
Yama, the king of hell took-a-look-at this
8. “Haa, sute-rareru no-mo muri-nai” te na, nan-tomo-ien omoroi kao shitoru.
well leave-PAS NOM-also natural QUO PAR beyond-description funny face be
9. “Ano naa,,,,”
you listen
10. mukashi-kara yuurei to-iu no wa motto bijin ga, bijo ga naru mon-ya.
from old times such as more beauty bewaeuty become used-to-be
11. Omae mitai-na kao de sonnna-koto
you like such a thing
12. dekiru mon-ka,,, wa ha ha ha,,,“
can do isn't it ha, ha
13. Enma-han ga warau,
laugh
14. onna wa naku.
cry
15. Oni ga kinodoku-gatte, “Oi,
demon feel-sorry hey
16. omae, bakemon wo negae,
you monster ACC plea
17. bakemon wo negae,,,,”

(21) <Episode 4: A ghost's hole>

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- kicchiri sono ana wo umete-shomo-ta.
thoroughly that
14. Akegata-mae ni naru to yuurei ga modot-te-kite,
dawn come-back
15. doro doro doro, kie-komou to shita ga haire-mahen-ne ya naa.
(the manner of ghosts haunting) disappear tried but enter-NEG
16. Nan-ben yat-te mo hai-rare-hen.
many-times tried even enter-POSSIBLE-NEG
17. Dan-dan dan-dan higashi ga shiran-de kuru.
gradually the east brighten-become
18. “Aa, washi no inochi mo
ah I-GEN (my) life
19. kyou kagiri ja.”
today end PAR

Every midnight, a ghost appears from behind a grave. Some vigorous lads knew that, and thought, “There would never be such a silly thing.” Some others thought, “Well, if it really happens, then we could have a look at it.” They one night went to the graveyard and were watching the site. Surely, a ghost appeared from the grave and disappeared to somewhere. “It is certain that the ghost appeared from this hole,” they thought, and investigated the site. They found a hole. “The ghost appeared from this hole, we see. What if we packed this hole.” “That would be quite interesting. Let’s do that!” They packed stones into the hole and entirely closed the hole. Before dawn when the ghost came back to the site and tried to enter the hole, but it could not. It tried many times but could never go back into the hole. Gradually the dawn was coming. “Alas, my life is coming to an end...”

(22) <Episode 5: Monsters’ Party>

1. Bakemon yara, yuurei yara ga atsumat-te
monsters and ghosts NOM gather
2. bounenkai yat-ta chuu-na hanashi ga omasu.
year-end party held-PAST QUO story exist
3. Sake ga hodo-you mawat-te “Mina, gei wo nanka dase-ya,” chuu-n de,
sake favorably drunk everyone entertainment ACC something perform
4. kou kasa-kozou, kara-kasa no bakemon ga kyokugei wo kou yat-te-mitari
well umbrella-kid umbrella acrobatics perform
5. ee ... *well*
6. hitotsu-me kozou ga
one-eyed

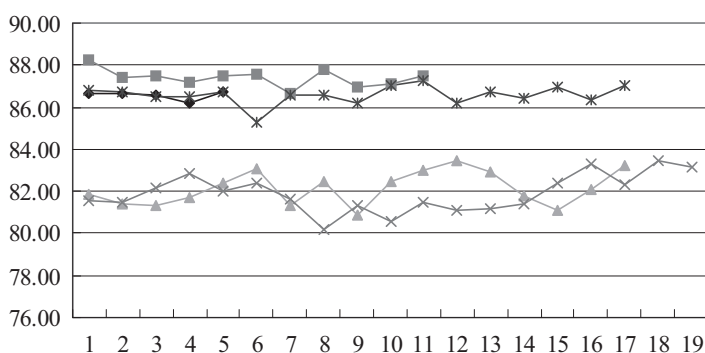
7. nanka kou odori wo odoru, oo-nyuudou ga chikara-waza wo miseru.
 something dance dance big-tonsured monster feat of strength show
8. Ironna koto wo yat-te-ru naka ni,
 various things among
9. kappa ga nan ni mo sen to non-doru.
 water sprite nothing do-NEG drink
10. "Omae mo nanka yare." "Washa nan ni mo gei nai ne ya."
 you something do-IMP I don't have
11. "Nan ka yara-n kai, omae kate, non-den-ne ya nai kai."
 something do-NEG PAR also drink
12. "Shaa-nai naa...
 no way
13. Dokka mugi-wara nai ka."
 somewhere wheat-straw
14. Mugi-wara wo mot-te ko-sashi-te shiri-no-ana he gut-to tsukkon-de
 bring come-CAUSA buttocks-GEN-hole toward firmly insert
15. "Dare ka, kore wo
 someone VOC this
16. hui-tari suu-tari shite kure."
 blow-and inhale do please
17. Suu, haa, suu, haa ... yaru-to, atama no sara ga "Poppen, poppen, poppen ..."
 (sounds of blowing and inhaling) head plate rattle

Once, there was a strange story: monsters and ghosts gathered to hold a year-end party. Everyone was drunk, and it was time for someone to perform entertainments. An umbrella goblin pulled off acrobatics, a one-eyed goblin dances, a monster with a huge bald head showed a feat of strength, and so on. Among them, a water sprite was only drinking without entertaining others. "Why don't you perform something?" "Sorry, I'm so talentless that I can't do anything particular." "Why are you so blunt? You're one of the members joining this party." "Well, I see ... Can I have a straw?" Then someone brought one, and the water sprite put it into his back passage and asked, "Please breathe through the straw." When someone did it, the plate on the head of the water sprite, rattled like a glass whistle.

(23)

	duck and scallion	oil merchant	plea for a monster	haunted hole	monsters' party
1	86.69	88.28	81.83	81.59	86.83
2	86.67	87.40	81.38	81.50	86.75
3	86.55	87.49	81.30	82.18	86.48
4	86.21	87.19	81.74	82.87	86.48
5	86.70	87.50	82.40	82.02	86.76
6		87.56	83.10	82.42	85.25
7		86.62	81.34	81.65	86.59
8		87.78	82.48	80.20	86.58
9		86.98	80.90	81.33	86.21
10		87.11	82.49	80.57	87.02
11		87.47	83.02	81.49	87.28
12			83.46	81.06	86.17
13			82.96	81.17	86.76
14			81.82	81.42	86.44
15			81.11	82.37	86.97
16			82.07	83.29	86.38
17			83.24	82.30	87.03
18				83.43	
19				83.13	
average	86.56	87.40	82.16	81.89	86.59

(24)



We will set up two kinds of criteria: one is to compare the intensity in the punch line with that of the average of all lines, and the other is to compare that with the previous line, i.e. the second to the last line. When we apply these two criteria to the five stories, we will have ten results. Of these ten, only one is different from the others: intensity of the punch line in Haunted Hole is smaller than the previous line (line 18). The difference is 0.30 dB.

As a conclusion, it would be possible to assume that the punch lines are told louder than the other lines in Japanese Kobanashi stories. The impression when I listened to the recordings is, however, slightly different from this assumption. In *Plea for a Monster*, for instance, the

punch line uttered by a goblin “Bakemon wo negae, bakemon wo negae” (Plea for a monster) must be less loud because this is turned to the woman who wanted to be a ghost, and it is preferable that the Yama would not hear that suggestion.

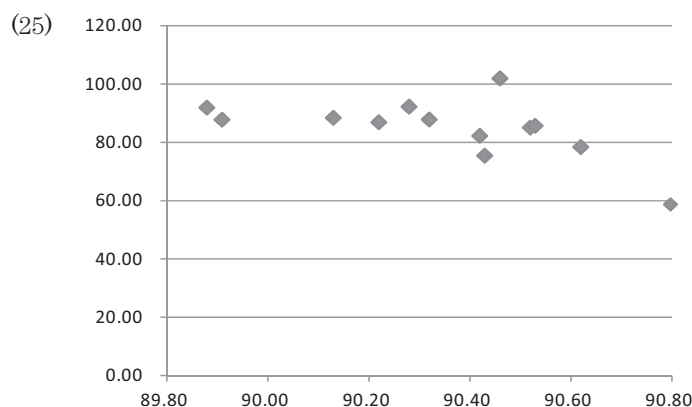
6. Conclusion

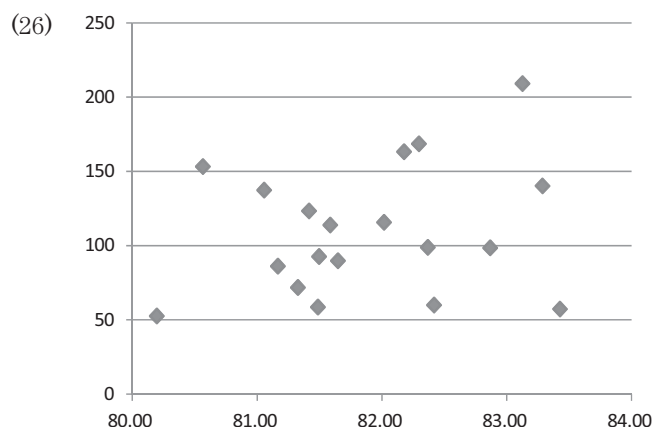
As a series of acoustic analyses of jokes, this paper has confirmed the performative effects of telling jokes in English and Japanese, focusing on intensity. The most probable finding in above sections would be that the answer to the question “How many people does it take to change the light bulb?” is almost always uttered weaker than the question and the punch line. Other assumptions, such as “the punch line is weaker than the average of the previous line” was not confirmed. This is not in accordance with the pause, tempo and pitch in the punch line and other parts of jokes.

This peculiarity of intensity may be one of the reasons why intensity has not been subject of acoustic analyses so far. There remains some possibility, however, that an obvious inclination observed in the dialogue-type joke show may be found in other types of discourse.

The second hypothesis concerning the difficulty of acoustic analyses of intensity is that the ‘interpretation’ of figures indicated in dBs is not straightforward in the sense that they are in a logarithmic scale. As pointed out in section 1, the differences of intensity are hard to compare directly. Hence the comparisons are to be done relatively—for example, ‘The first line is louder than the second line.’

Finally, we will have a brief look at the correlation of intensity and the pitch. Below are the figures showing the correlation in *One-way Street* (25) and *Haunted Hole* (26):





There seems to be some correlation in (25) in that the dots gather in a linear shape, but it is not the case in (26). The concentration in (25) may come from the monotonous tone of narration. The unevenness in (25) may reflect the effect of the story-telling as the Rakugo stories.

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