Towards acceptable quality machine translation without post-editing for municipal websites:
An evaluation of Japanese controlled language rules

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Outline

- Background
- Objective and scope
- CL rules
- Evaluation
- Results and discussions
- Future plans

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Background

- Social background
    - Need for frequent updates of municipal information
    - MT use in Japanese municipalities
    - Limited budget and resources for post-editing
- Technical background
    - Difficulties in Ja-En MT
    - Controlled Authoring

Outline

- Background
- **Objective and Scope**
- CL rules
- Evaluation
- Results and Discussions
- Future Plans

Objective and Scope

- Controlled Authoring
  - Document templates, glossary management, grammar and style checkers, controlled language (CL) rules, etc.
    - Bernth and Gdaniec, 2001; O'Brien and Roturier, 2007.
    - Nagao et al., 1984; Shirai, 1998; Ogura et al, 2010.
- Three types of 'MT users'
  - Municipalities
  - Authors
  - Readers
- Evaluation of each CL rule (Hartley et al., 2012)
  - MT quality (Target text readers)
  - Readability (Source text readers)
  - Feasibility assessment (Source text authors)

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CL rules

- CL rules must:
    1. Help to raise the quality of MT output
    2. Not degrade the quality of source texts
    3. Be easy for humans to implement
- Formulation of CL rules in this study
    - Writing guidelines from technical writing books and documents
    - A total of 22 rules

CL rules

a. Try to write sentences of no more than 70 characters. In no case use more than 100 characters.

b. Do not interrupt a sentence with a bulleted list.

c. Do not use parentheses to embed a sentence or long expression in a surrounding sentence.

d. Ensure the relationship between the subject and the predicate is clear.

e. Ensure the relationship between the modifier and the modified is clear.

f. Use the particle が only to mean 'but'.

g. Do not use the preposition ため to mean 'because'.

h. To express 'from', use the particle から. Use particle より only in comparisons.

i. Avoid using multiple negative forms in a sentence.

j. Use れる/られる only for the passive voice, and not to express the potential mood or honorifics.

CL rules

k. Avoid using words that can be interpreted in multiple ways. Use words with a narrowly defined meaning.

l. Avoid using the colloquial expression になります (become).

m. Avoid using the expression という (as/like).

n. Avoid using the expressions ような, こと and もの (such as).

o. Do not double-up on words with the same meaning in a single sentence.

p. Avoid using the expression 思われる (seems to be) and 考えられる (be considered).

q. Avoid using the verb 行う (do) with Sahen nouns.

r. Avoid the single use of the formしたり (do … and).

s. When listing items, make sure they are syntactically parallel.

t. Use words from a general Japanese-English dictionary.

u. Avoid using compound Sahen nouns.

v. Ensure there are no typos or missing characters.

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Experimental framework

Japanese

Original text
ex) 燃えるゴミ**になります**。

Experimental framework

Japanese

Original text
ex) 燃えるゴミ**になります**。

↓ **Rewrite**
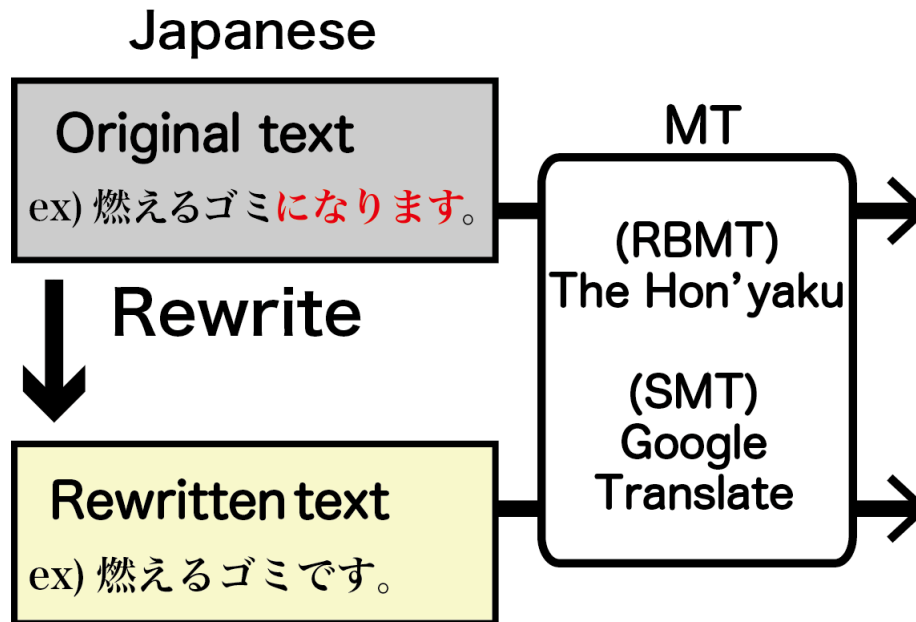
Experimental framework
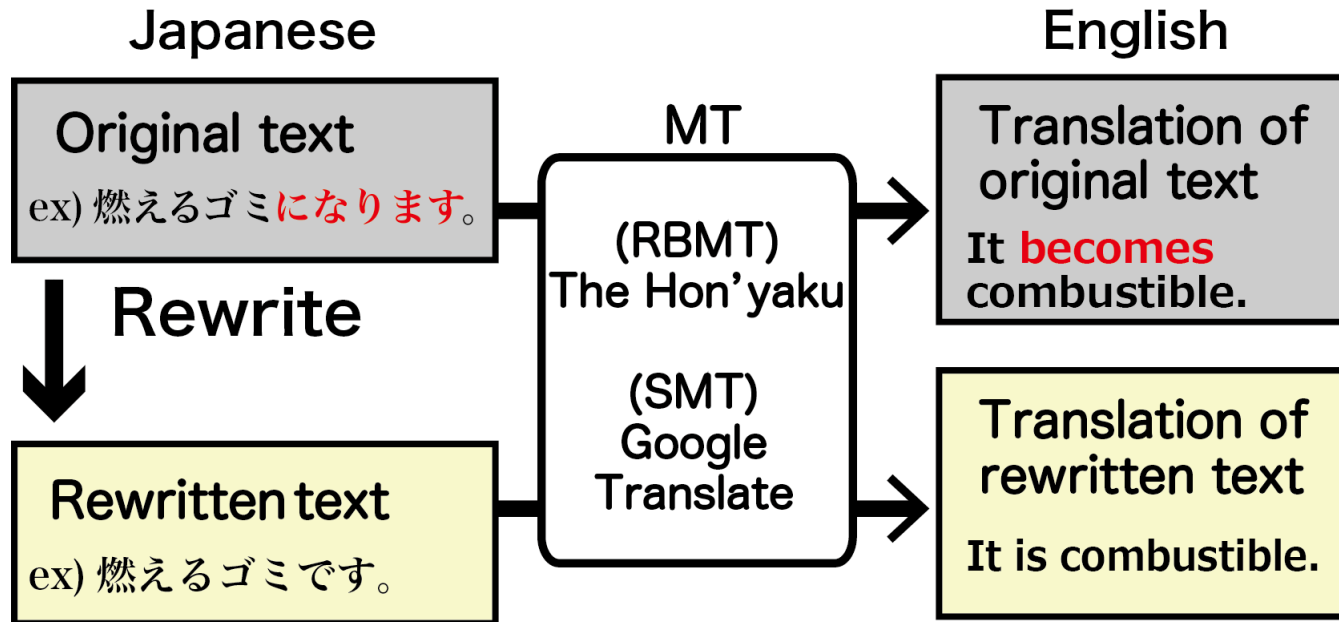
Japanese

Original text
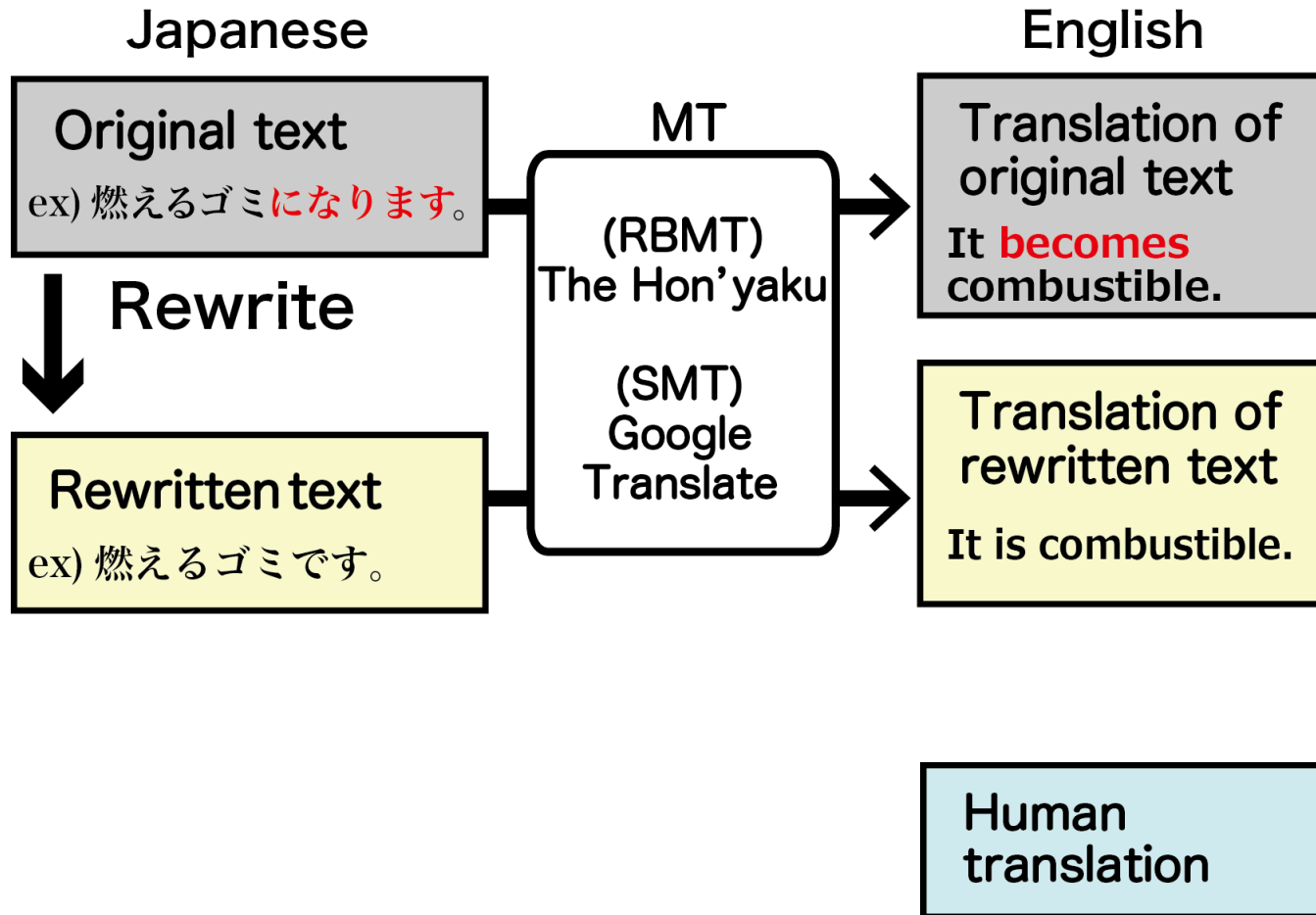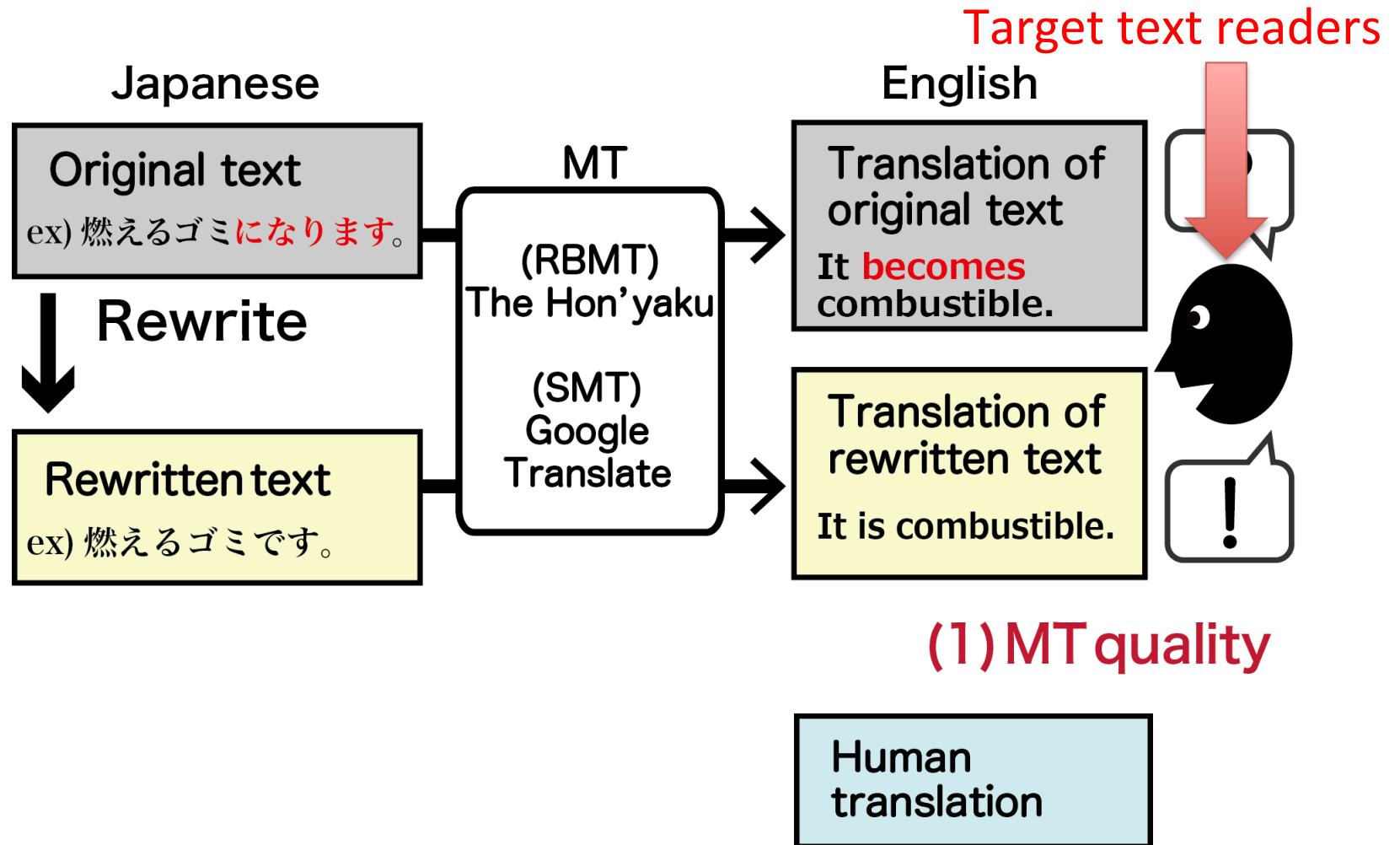ex) 燃えるゴミになります。

↓ Rewrite

Rewritten text
ex) 燃えるゴミです。

Experimental framework

Japanese

Original text
ex) 燃えるゴミ**になります**。

Rewrite

Rewritten text
ex) 燃えるゴミです。

MT

(RBMT)
The Hon'yaku

(SMT)
Google
Translate

Experimental framework

Japanese

English

Original text	MT	Translation of original text
ex) 燃えるゴミになります。	(RBMT) The Hon'yaku	It becomes combustible.

Rewrite

(SMT) Google Translate

Rewritten text	Translation of rewritten text
ex) 燃えるゴミです。	It is combustible.

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Experimental framework
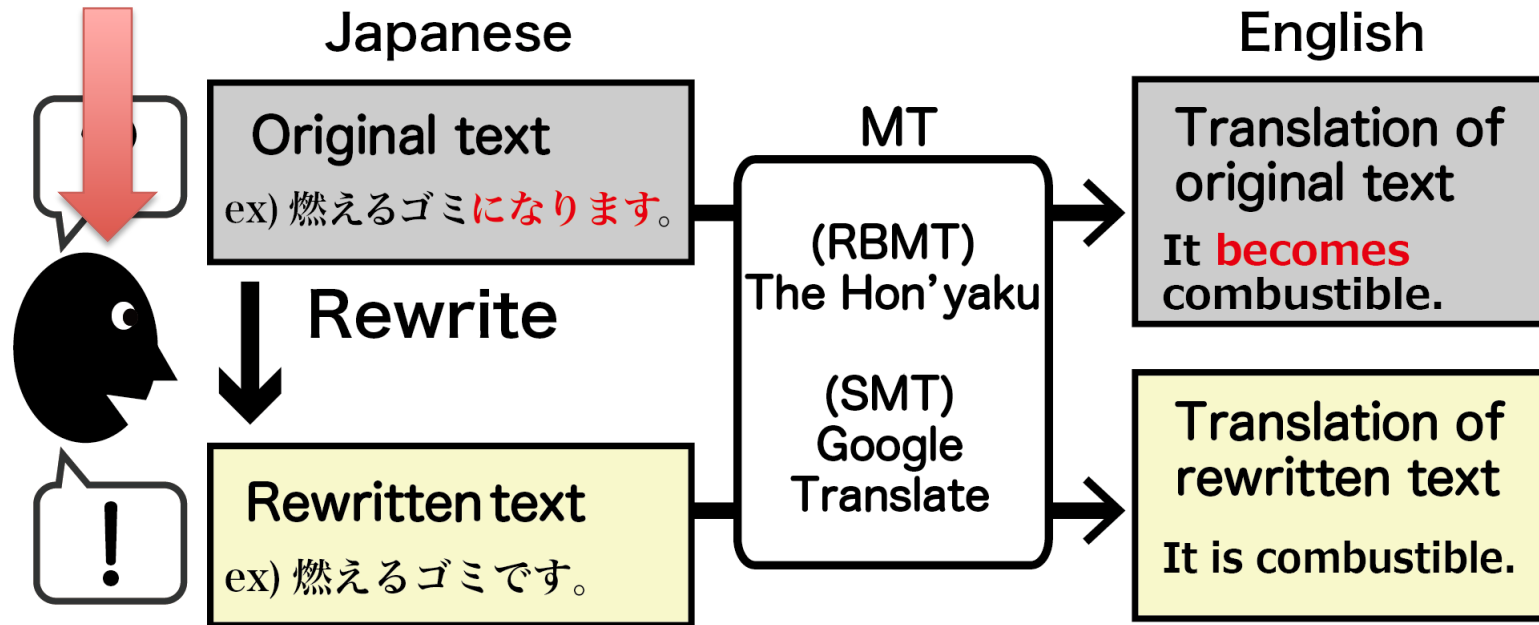
Experimental framework

Experimental framework

Experimental framework
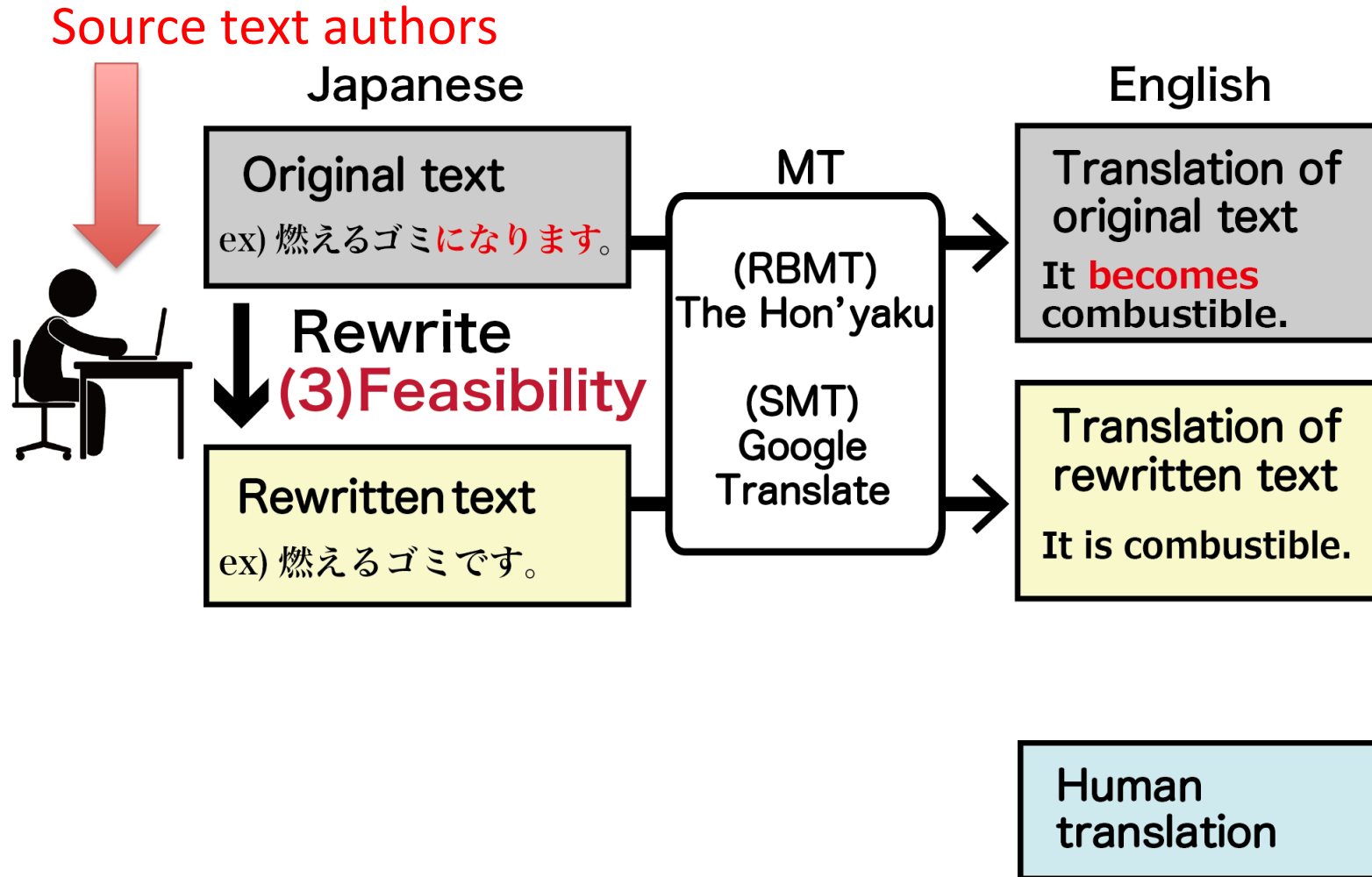
(1) MT quality evaluation

- Usefulness
  - Understandability
  - Correctness
- Two-step evaluation method
  1. How much they understood and how much effort was required
  2. How close the meaning of human translation was to their understanding of MT output
- 16 adult English speakers

  (eight native and eight non-native)

Step 1

This is a machine-translation.
Please read the sentence, and indicate how much you understood and how much effort was required.

It was played live by a year or two of the music department. Production from the program, the students are all made to the announcement.

- ○ I understood fully what this sentence is saying, after reading it once.
- ○ I understood fully what this sentence is saying, after reading it more than once.
- ○ I understood partially what this sentence is saying, after reading it more than once.
- ○ I have no idea what this sentence is saying even after reading it more than once.

(Next)

Step 2

A performance was made by the 1st and 2nd graders of the music class. Everything from the program to the directing and announcements were made by the students.

○ Exactly the same meaning
○ Mostly the same meaning
○ Partly the same meaning
○ Completely different meaning

(Next)

If you have trouble remembering your understanding from the machine-translated sentence, you can refer to the following translation presented in the previous page. Please, however, avoid direct comparison between the two texts; focus on the difference in your understanding between the two.

It was played live by a year or two of the music department. Production from the program, the students are all made to the announcement.

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Step 1

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Please read the sentence, and indicate how much you understood and how much effort was required.

It was played live by a year or two of the music department. Production from the program, the students are all made to the announcement.

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○ I have no idea what this sentence is saying even after reading it more than once.

(Next)

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Step 2

This is a human translation.
Please read the sentence, and indicate how much you understood and how much effort was required.

A performance was made by the 1st and 2nd graders of the music class. Everything from the program to the directing and announcements were made by the students.

○ I understood fully what this sentence is saying, after reading it once.
○ I understood fully what this sentence is saying, after reading it more than once.
○ I understood partially what this sentence is saying, after reading it more than once.
○ I have no idea what this sentence is saying even after reading it more than once.

(Next)

24
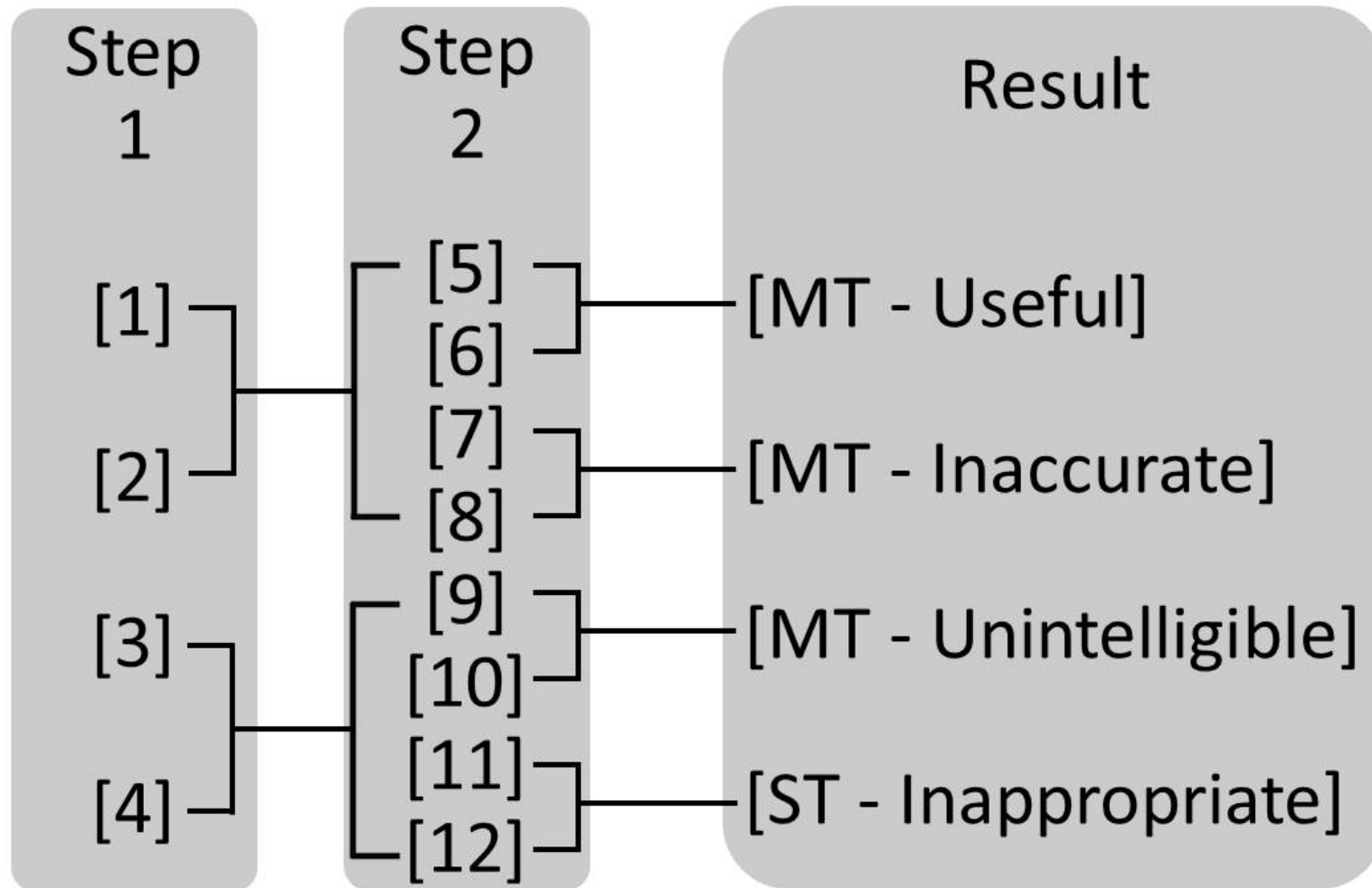
(2) Japanese readability evaluation

- Readability on a four-point scale

- Method
  - Present both BJ and AJ
  - Ask judges to evaluate each sentence

- 10 Japanese native-speaker university students

Q.1

A	各機関は、定期的又は随時に通信訓練を実施し、発災時に備えるよう努力する。
B	各機関は、定期的又は随時に通信訓練を実施し、災害発生時に備えるよう努力する。

Aの読みやすさについて、4つの選択肢の中から最もあてはまると思うものを1つ選んでください。

⊙ 読みやすい
⊙ どちらかといえば読みやすい
⊙ どちらかといえば読みにくい
⊙ 読みにくい

Bの読みやすさについて、4つの選択肢の中から最もあてはまると思うものを1つ選んでください。

⊙ 読みやすい
⊙ どちらかといえば読みやすい
⊙ どちらかといえば読みにくい
⊙ 読みにくい

(次へ)

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(3) Feasibility assessment

- Assessment of difficulty in rewriting sentences in accordance with CL rules for third person
- Rewriting 120 sentences in three hours
- Two native Japanese speakers

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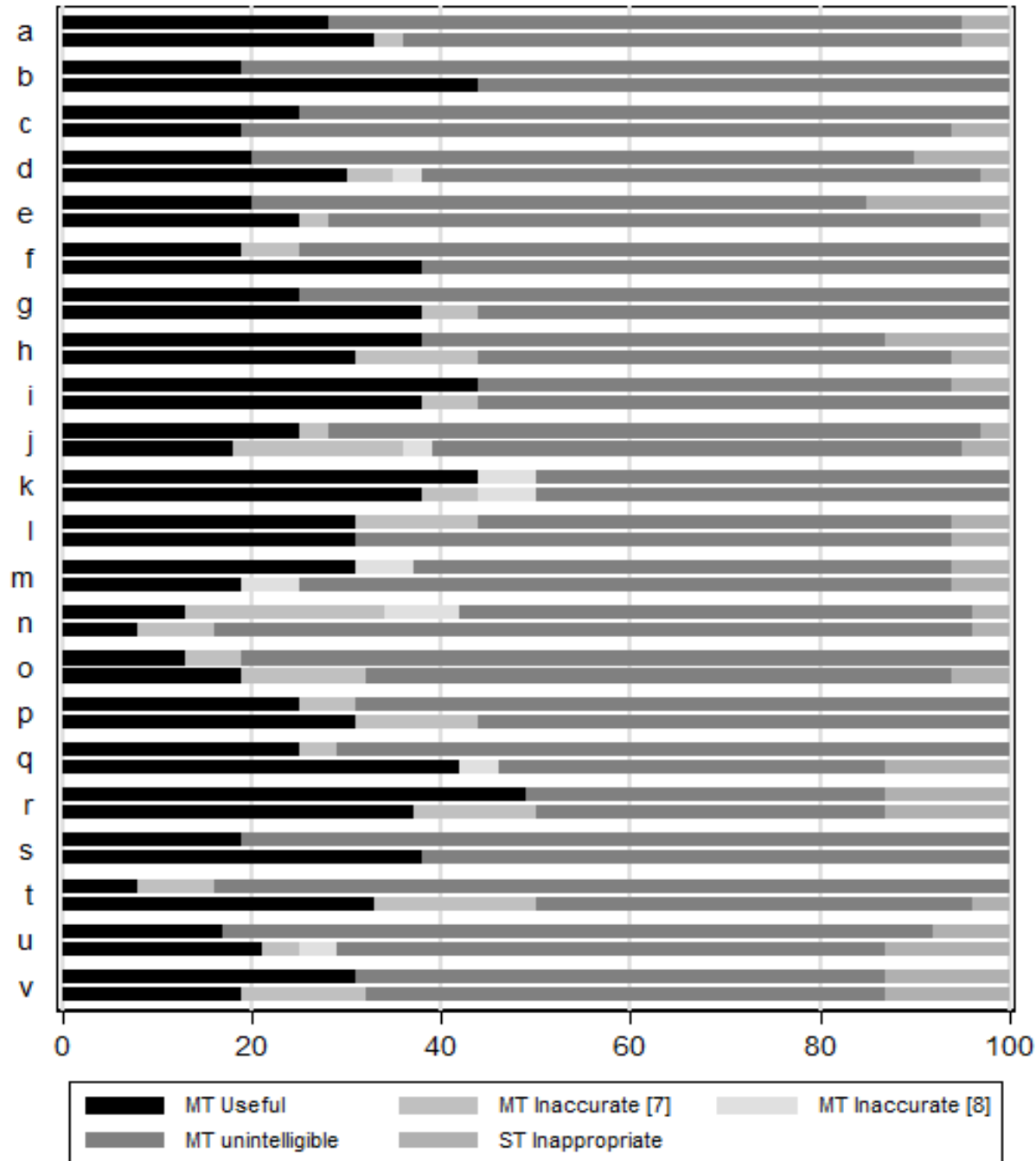- **Results and discussions**
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Overall results (MT quality)
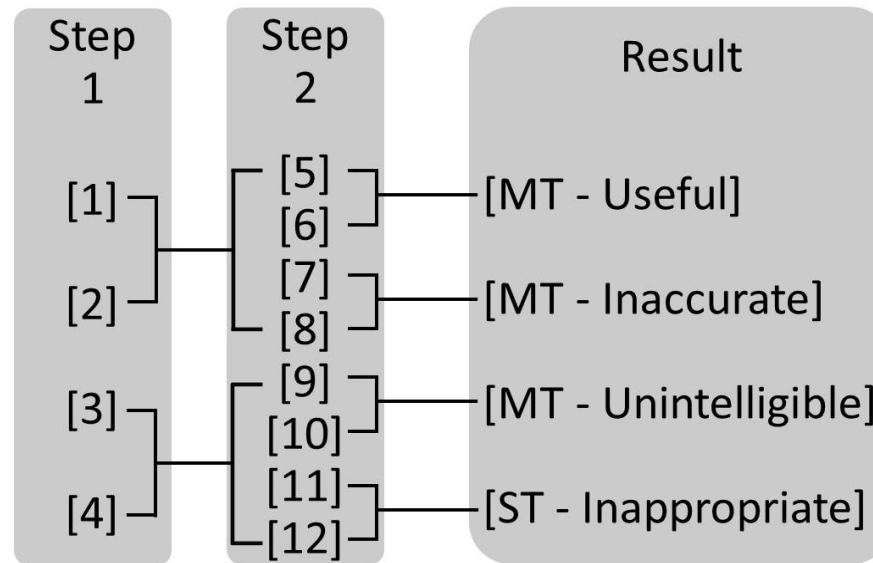
MT-Useful cases: less than 30% even when CL rules applied

MT	Before applying CL rules	After applying CL rules
The Hon'yaku	118 (24.6%)	137 (28.5%)
Google Translate	113 (23.5%)	133 (27.7%)

Usefulness of The Hon'yaku output
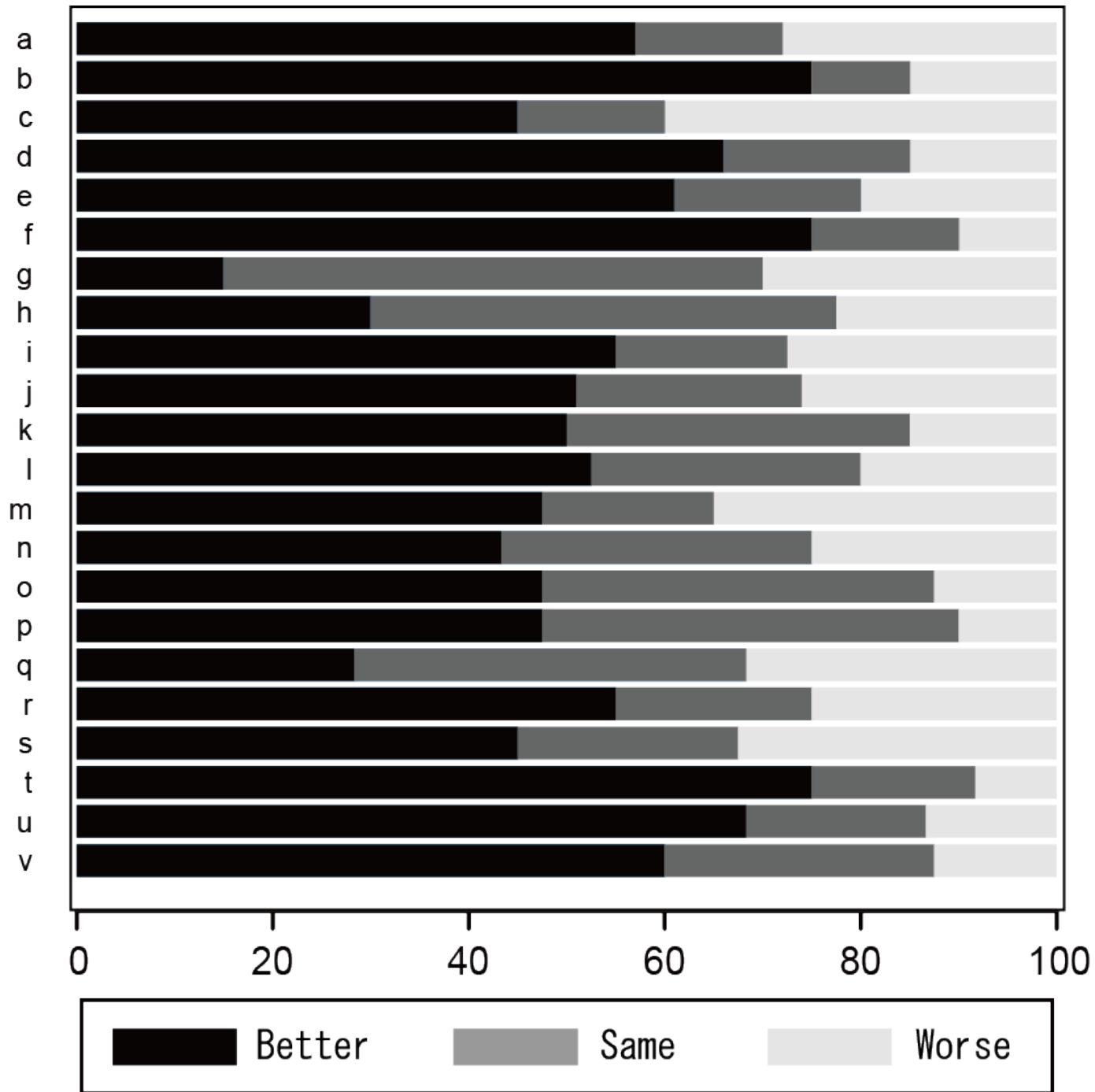
 [MT–Useful]
improvement: 12 / 22 rules

(b,f,q,s: without causing an increase in [MT–Inaccurate])

Usefulness of Google Translate output
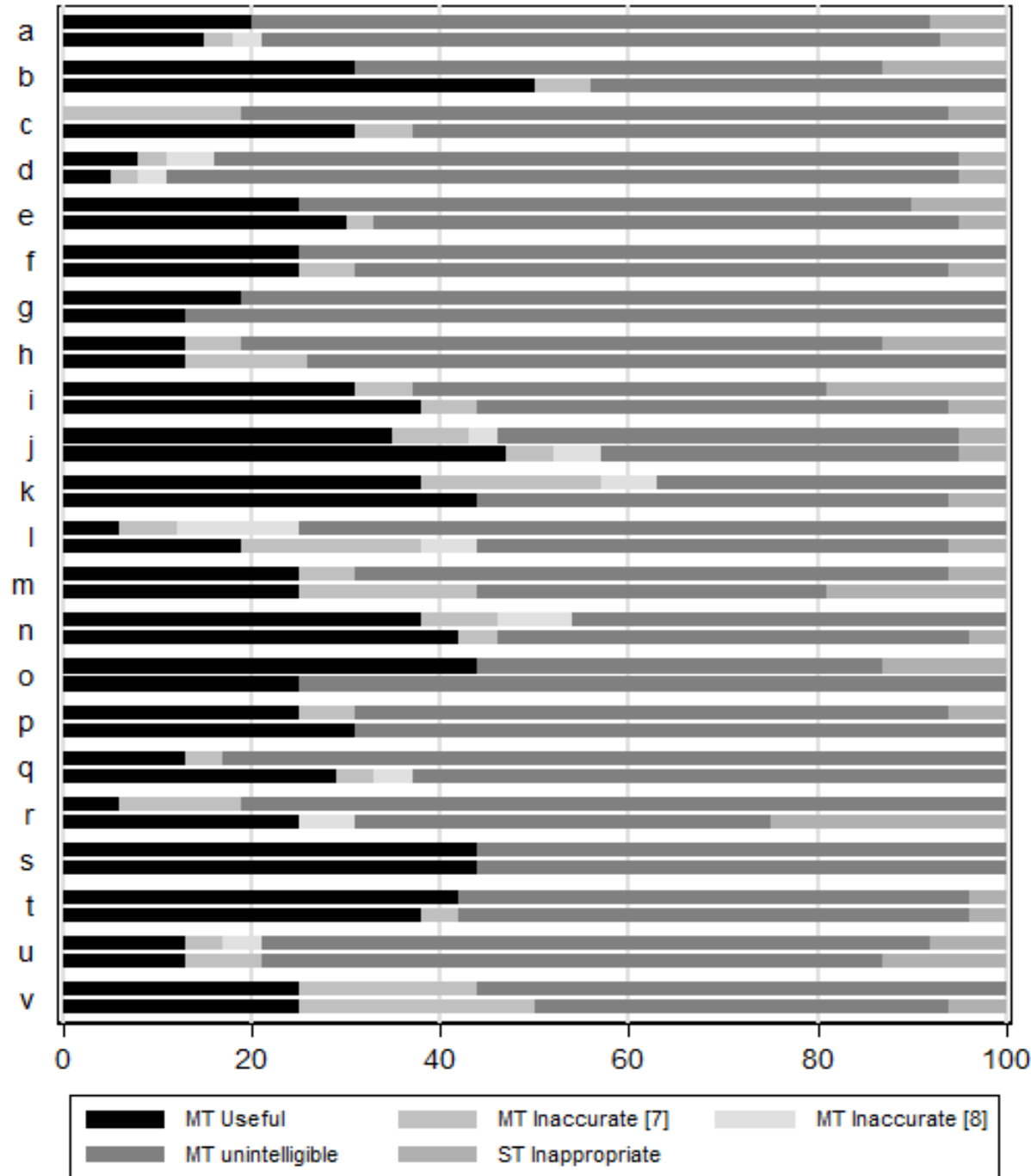
[MT–Useful] improvement: 11 / 22 rules

(c,i,j,k,n,p,r: without causing an increase in [MT–Inaccurate])

Changes in Japanese readability

Most of the CL rules improved or at least retained the quality of the source text

(b, f and t: 'Better' by about 80%)

Results (Feasibility assessment)

- CL violation was successfully amended
  - 111 (92%) for Rewriter A
  - 103 (86%) for Rewriter B
- The success rate varied depending on the CL rules
  - 100%: *a*, *b*, *h*, *i*, *l*, *m*, *p*, *q*, and *t*
  - 90-99%: *j*, *n*, and *u*
  - Less than 80%: *d* and *s*
- *c*, *e*, *f*, *g*, *k*, *o*, *r*, and *v*
  - one of the rewriters amended all sentences successfully, but the other rewriter succeeded less than 80%

Discussions

- The effectiveness of CL rules is affected by the MT system that is used

- The feasibility assessment gives us insight into the application of CL rules

- Our methodology is helpful for assessing the usefulness of machine-translated texts in real-life situations

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Future plans

- CL rules
  - Formulation
  - Refinement
  - Adjustment
- Authoring environment
  - Document template
  - CL checker (Mitamura et al., 2003; Nyberg et al., 2003)
  - Terminology manager
  - MT system
  - Post-editing
  - User feedback mechanism

Authoring tool (prototype)

Document template (with DITA)

Original text input (+ Pre-edit)

*タイトル

20文字以内 → 20文字以内

Title

20文字以内

トピックの簡単な説明

住民登録の手続きについて説明を行います。 →

Short Description

Make describes procedures for resident registration.

説明を行い：「サ変名詞」＋「を行う」はなるべく「〜する」に置き換えてください。

CL checker (detection & suggestion)

MT outputs (+ Post-edit)

Authoring tool (prototype)

Document template
(with DITA)

Original text input (+ Pre-edit)

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住民登録の手続きについて説明します。

→

Short Description

It describes procedures for resident registration.

MT outputs (+ Post-edit)

CL checker (detection & suggestion)

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Thank you very much for your kind attention.

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