"Yoko Ono" or "Ono Yoko"?: A Game-theoretic Answer to the Question

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1. Introduction

There are two ways of saying a Japanese name in English with respect to the relative order between the given name and the family name, i.e. the order of given name and family name and that of family name and given name. It is clear that the coexistence of the two ways of saying a Japanese name will lead to a confusion in that when you hear a name comprised of two parts, you cannot tell which part is the family name and which part is the given name for sure. So it is desirable that either one way should be adopted as the standard one. The question is which one should be chosen. Obviously, it must be not so easy to decide on either order, for if it were, one order would be exclusively used now, whichever it is. Indeed, both orders have their respective proponents. The representative opinion of people advocating the order of given name and family name is something like the following. In English communication scenes in not only English speaking countries but the world in general, people's names are usually said in the order of given name and family name; in other words, the order is a convention, which we had better follow. On the other hand, proponents of the order of family name and given name typically insist that for a person, her name is important part of her identity, so the original form of her name should be kept no matter of what language is to be used. That is, in the case of Japanese people, the original order of family name and given name for their names in Japanese should be used even in saying their names in English.

Both positions have a point of their own. Thus, there is no way to decide on which order is correct in the absolute sense with the current state of affairs surrounding the issue under consideration, which is why the two orders are both in use and there is no consensus among the Japanese people as to which order should be used when saying Japanese names in English.

However, it is clear that the use of both orders is confusing in that given a name, you cannot tell whether the first part is the given name and the second part is the family, or vice versa. So it is desirable to decide on the standard order to be used for saying Japanese names in English. The question is, again, which order should be designated as the standard one. As seen above, both camps supporting the respective options have an equally reasonable point of their own; one insists that the order of given name and family name is a convention for saying names in general in English, while the other protests that the name of a person is essential part of her unique identity; thus, changing it in form, in this case, the relative order between the family name and the given name, will mean disrespecting her identity, so the correct order for the name of a Japanese person

is that of family name and given name in whatever language is being used. As they are, one cannot be judged over the other, as can be witnessed by the fact that both orders have been in use without one of them having been weeded out, which indicates that neither position has a knockout argument against the other.

The indeterminacy about which order is to be designated as the standard is natural considering that the arguments for the respective orders have been made on separate criteria: *conformity to custom* for the order of given name and family name and *preservation of identity* for the order of family name and given name. When two or more ways of doing something are compared with one another for their superiority, the superiority can be determined only with respect to some criterion or some set of criteria. That is, the order of given name and family name is superior to the opposite order with respect to the criterion of conformity to custom, while the order of family name and given name is superior to the other order with regards to the criterion of preservation of identity. When one way is superior with respect to a criterion and the other is superior with regards to another criterion, you cannot tell which way is superior overall. Thus, in order to determine the overall superiority between the two orders, we must propose a new criterion with respect to which the two orders will be compared for the superiority and which is reasonable to assume for the use of names in language communication. For such a criterion, I propose *accuracy of information transmission*, which is, in the current case, rendered as the accurate identification of the given name and the family name. It is reasonable to suggest that (the use of) any form of communication, linguistic or not, should be something such that it respects accuracy of information transmission as much as possible; otherwise, you would fall off a wall with Humpty Dumpty to say, "When *I* use a word, it means just what I choose it to mean—neither more nor less" (Caroll, 1999, p.213). With such use of words, or linguistic expressions, there is no way of expecting information to be transmitted accurately. Although the use, or coexistence of both orders for a (Japanese) name is not so chaotic a transmission of information as Humpty Dumpty's use of words, or linguistic expressions, it is certainly the case that the less ambiguity the interpretation of a name has, the higher the probability that the name is successfully transmitted will be.

Granted that *accuracy of information transmission* is so fundamental a condition to be expected of any (linguistic) communicational act, in this case, specifically, the conveyance of a name, in contrast to subjective conditions like *conformity to custom* and *preservation of identity*, I propose that the two orders should be compared for one's superiority over the other with respect to accuracy of information transmission; that is, the order that is advantageous for the purpose of accurate transmission of information should be adopted over the other. In the following, I will present an analysis in terms of game theory to demonstrate that the order of given name and family name is the "rational" choice for the goal of securing better chances of names being transmitted correctly, or the correct identification of the given and the family names.

2. Game-theoretic Analysis

2.1. Definition of Saying Names in English

Besides uttering names orally in either order, the order of given name and family name, as in "Yoko Ono" or the opposite order, as in "Ono Yoko", also included in saying names in English are writing names in English alphabet in the following ways:

- Writing names with the first letter of both the given name and family name being a capital letter and the rest being lower-case letters in either order, as in *Yoko Ono* and *Ono Yoko*
- Writing both the given name and the family name all in capital letters in either order, as in *YOKO ONO* and *ONO YOKO*
- Writing both the given name and the family name all in lowercase letters in either order, as in *yoko* ono and *ono yoko*

However, excluded from saying names in English is a way of writing names in English with the first letter of the given name being in a capital letter, the rest of the given name in lowercase letters, and the family name all in capital letters in either order, as in *Yoko ONO* and *ONO Yoko*, for whichever order is used, it is clear which is the given name and which is the family name.

2.2. Game Theory

Game theory is a study of decisions made interactively by intelligent rational agents as to their actions, or strategies to attain some goal. In this paper, unfortunately, I can hardly do justice to the readers who are uninitiated in game theory to give an adequate exposition of the theory, but I can only hope the reader will pick up bits and pieces of game theory to understand and appreciate the gist of game theory as we go through a game-theoretic analysis of the situation at issue. For the introduction to game theory, see e.g. Muto (2001) and Osborne (2004) among others, which I personally have found good and accessible.

Saying names can be regarded as a game in which a name is conveyed from the sayer to the hearer. It is assumed that both the sayer and the hearer prefer for the name to be transmitted correctly, i.e. for the given name and the family name to be identified correctly, to otherwise and as such the sayer and the hearer are expected to take "strategies" to optimize the chances for correct transmission of names. Henceforth, the sayer and the hearer will be referred to as the *sender* and the *receiver*, respectively in consideration that the game in question is considered a kind of "signaling game" in which a sender "signals" some information, in this case, what the name is, to a receiver.

For a game-theoretic analysis of which order is rational for better chances of accurate information transmission, a word is in order about the assessment of the situation of saying names and (mis-)understanding them and the abbreviations of terms to be adopted here.

2.3. Facts of the Situation of "saying names"

Following are facts about the situations of names being conveyed in English.

(1) i.   The order of given name and family name (henceforth, G-F) and that of family name and given name (henceforth, F-G) coexist.

    ii. Sender doesn't know how the name she sent will be decoded by Receiver, as G-F or F-G.

    iii. Receiver doesn't know how the name was encoded by Sender, as G-F or F-G.

2.4. Types of Sender and Receiver

There are three types of Sender as in the following:

(2) Three types of Sender
- S_{G-F}: The type of senders who always encode a name in the order of G-F
- S_{F-G}: The type of senders who always encode a name in the order of F-G
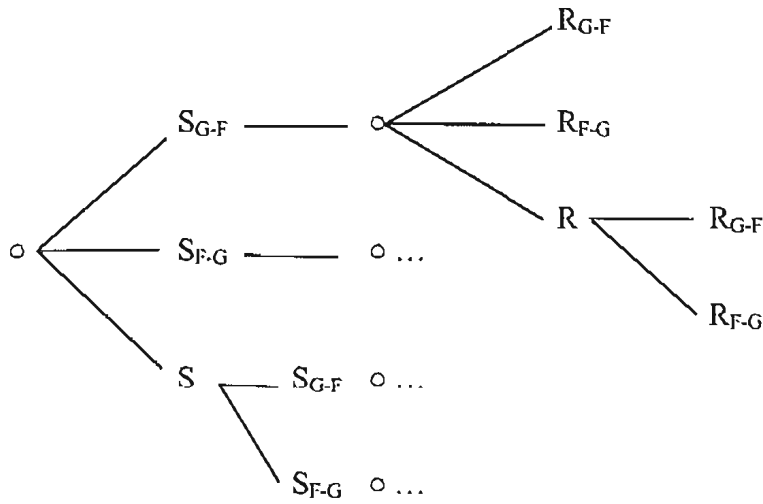- S: The type of senders who use either order probabilistically

Likewise, there are three types of Receiver as in the following:

(3) Three types of Receiver
- R_{G-F}: The type of receivers who always decode a name in the order of G-F
- R_{F-G}: The type of receivers who always decode a name in the order of F-G
- R: The type of receivers who use either order probabilistically

As the types of Sender and Receiver have been set, now it is possible to present a diagram showing all the possible matchups among the types of senders and those of receivers in the situation of transmitting names.

(4) Combinations of the Senders and the Receivers in communicating names

$$
\begin{array}{l}
\circ \big< \\
\quad S_{G\text{-}F} \longrightarrow \circ \big< \begin{array}{l} R_{G\text{-}F} \\ R_{F\text{-}G} \\ R \big< \begin{array}{l} R_{G\text{-}F} \\ R_{F\text{-}G} \end{array} \end{array} \\
\quad S_{F\text{-}G} \longrightarrow \circ \ldots \\
\quad S \big< \begin{array}{l} S_{G\text{-}F} \quad \circ \ldots \\ S_{F\text{-}G} \quad \circ \ldots \end{array}
\end{array}
$$

Probably, a word is in order about the above diagram. A circle, $\circ$ stands for a point where there are more than one possible case; for example, the left-most circle indicates the point where the sender sends a name, in which there are three possible types of the sender: $S_{G\text{-}F}$, $S_{F\text{-}G}$ and S. The sender of type S will decide to be of type $S_{G\text{-}F}$ sometimes and of type $S_{F\text{-}G}$ other times. The sender of any type matches up with the three types of the receiver with their respective probabilities. The receiver of type R decides to be of type $R_{G\text{-}F}$ sometimes and $R_{F\text{-}G}$ other times.

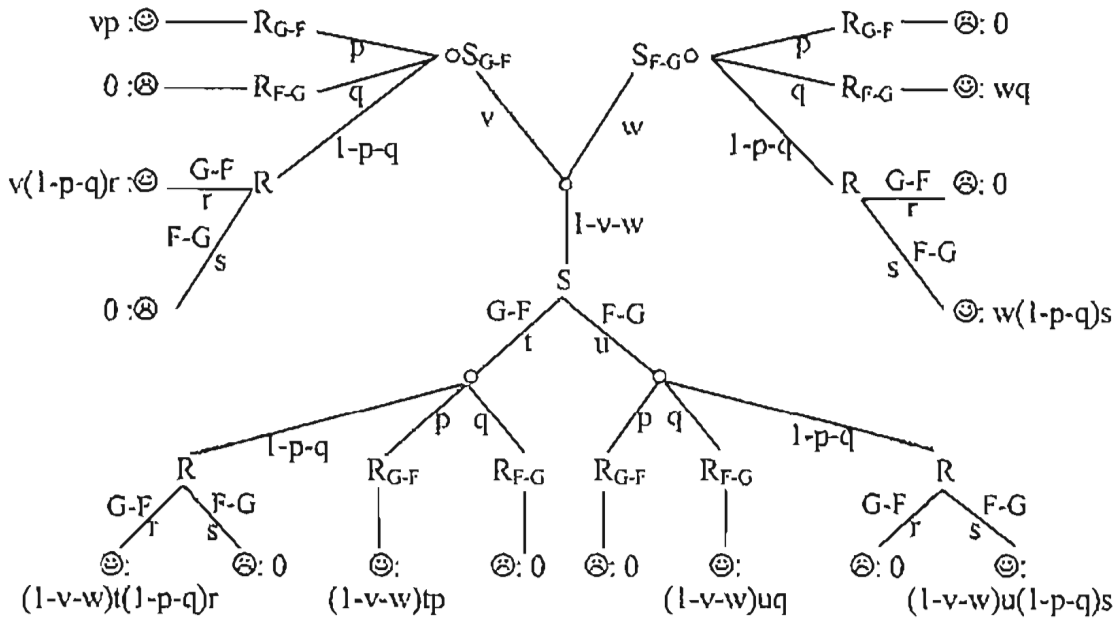2.5. Game-theoretic Modeling of the Situation

For a game-theoretic analysis of which order will be more preferable to the other, G-F or F-G, the situation of saying names in English, first, needs to be modeled in terms of game theory. The basic components of a game are (i) a set of players, (ii) for each player, a set of actions, and (iii) for each player, preferences over the set of outcomes. For the current situation, the players are the sender and the receiver, specifically, the sender of type S and the receiver of type R. The senders of types $S_{G\text{-}F}$ and $S_{F\text{-}G}$ and the receivers of types $R_{G\text{-}F}$ and $R_{F\text{-}G}$ do not make a decision as to which order is to be used; therefore, they are excluded from the players of the game. The actions for the sender and the receiver are to choose between the orders of G-F and F-G for encoding and decoding a name, respectively. The types of the outcomes of the decisions are twofold; that is, that a name is transmitted as intended and that it is not transmitted as intended. A name is transmitted as intended when it is both encoded and decoded as G-F or both as F-G, while it is not transmitted as intended when it is encoded as G-F but decoded F-G or vice versa.In(4), the outcome of an interaction between the sender of some type and the receiver of some type is represented as a sequence composed of at least one of the following nodes: $\circ$, $S_{G\text{-}F}$, $S_{F\text{-}G}$, S, $R_{G\text{-}F}$, $R_{F\text{-}G}$, Rsuch that it starts with the left-most $\circ$, the nodes are connected by a line, and the last node is not followed

by a line. For example, a sequence, $(\circ, S_{G\text{-}F}, \circ, R_{G\text{-}F})$ is an outcome in (4), modeling the case where the speaker of type $S_{G\text{-}F}$ meets the receiver of type $R_{G\text{-}F}$.Outcomes in this sense are also called *terminal histories*. Given that the accuracy of information transmission has now been proposed as the criterion to judge the two modes of saying names in English, it is reasonable to suppose for both the sender and the receiver to prefer an outcome where a name is transmitted as intended to one where a name is not transmitted as intended. The preferences are here represented as *payoff*, or *utility* values, or more specifically the values of a *payoff*, or *utility* function, u such that for an outcome, or terminal history h resulting in a successful transmission, $u(h) = 1$ and for an outcome, or terminal history h' resulting in an unsuccessfultransmission, $u(h') = 0$. In this setting, both the sender and the receiver are expected to take actions, or adopt strategiessuch that the outcomes will have the utility value of 1. However, the outcomes are not determined uniquely by their strategies partly because some coursesof events occur probabilistically. That is, whichever order the sender takes, G-F or F-G, it is only probabilistically determined which type of the receiver the sender encounters, the receiver does not know which order the sender has taken for sure, G-F or F-G, and furthermore, both the sender of type S and the receiver of type R take their actions probabilistically[1]. As a consequence, the outcomes of their strategies will not be determined uniquely, but only as probability distributions over the possible outcomes and then, the utility values relevant here will be the expected values of a utility function over the outcomes.

For an illustration of how the situation can be modeled game-theoretically, let me introduce the extensive form of the game reflecting the (mixed) strategies of the sender and the receiver, which is in fact a fully unfolded version of (4) and furthermore, is annotated with the actions the sender and the receiver take and the probabilities of the alternatives at each turning point; G-F and F-G on some lines are the actions the sender and the receiver can take, and the lowercase letters on some lines denote the probabilities of the cases the lines represent.

(5)   Extensive form of the game

$vp : \smiley$ —— $R_{G\text{-}F}$

$0 : \frownie$ —— $R_{F\text{-}G}$

$\quad p$

$\quad q$

$\circ S_{G\text{-}F}$

$S_{F\text{-}G} \circ$

$R_{G\text{-}F}$ —— $\frownie : 0$

q $R_{F\text{-}G}$ —— $\smiley : wq$

p

$1\text{-}p\text{-}q$

v

w

$1\text{-}p\text{-}q$

$v(1\text{-}p\text{-}q)r : \smiley$ $\dfrac{G\text{-}F}{r}$ R

$F\text{-}G$

s

$0 : \frownie$

$1\text{-}v\text{-}w$

R $\dfrac{G\text{-}F}{r}$ $\frownie : 0$

$F\text{-}G$

s

$\smiley : w(1\text{-}p\text{-}q)s$

S

$G\text{-}F$

t

$F\text{-}G$

u

R

$1\text{-}p\text{-}q$

p q

$R_{G\text{-}F}$ $R_{F\text{-}G}$

$R_{G\text{-}F}$ $R_{F\text{-}G}$

p q

$1\text{-}p\text{-}q$

R

$G\text{-}F$ $\dfrac{}{r}$ $F\text{-}G$ s

$\smiley :$ $\frownie : 0$

$\smiley :$ $\frownie : 0$

$\frownie : 0$ $\smiley :$

$G\text{-}F$ $\dfrac{}{r}$ $F\text{-}G$ s

$\frownie : 0$ $\smiley :$

$(1\text{-}v\text{-}w)t(1\text{-}p\text{-}q)r$ $(1\text{-}v\text{-}w)tp$ $(1\text{-}v\text{-}w)uq$ $(1\text{-}v\text{-}w)u(1\text{-}p\text{-}q)s$

In diagram (5), each terminal history starts with the central circle and ends with a smiling face, $\smiley$ or a frowning face, $\frownie$; one with a smiling face is a terminal history, or case where a name is conveyed as intended with the given name and the family name identified correctly, having the utility value of 1, while one with a frowning face is a case where a name is transmitted incorrectly, having the utility value of 0. As can be seen in the diagram, a strategy by the sender does not result in a unique outcome; for instance, even if the sender decides to take a pure strategy such that she adopts the order of G-F with the probability of 1, the strategy results in more than one outcome because the type of the receiver is only determined probabilistically. Neither does a receiver's strategy. The reason, this time, is that the receiver does not know what type of the sender she is dealing with, which can be determined only probabilistically again. Then, how can the utility of the sender's strategy be represented? We can use the notion of *expected value*, specifically, *expected utility value*. The expected utility value of a set of outcomes with a probability distribution over the set is the sum of the product of the probability and the utility value for each outcome, which is expressed as in the following:

(6) Definition (Expected utility value of a set of outcomes with a probability distribution on the set)

Suppose there is a list of outcome $(a_1, ..., a_n)$, the list of the probabilities of the respective outcomes is $(p_1, ..., p_n)$, and u is the utility function for the outcomes, then the expected utility is defined to be: $\sum_{i=1}^{n} p_i u(a_i)$.

In diagram (5), the expected utility value of each outcome, or terminal history is given next to or beneath its smiling or frowning face. Since the expected utility of an outcome is the product of the probability with which the outcome occurs and the utility value of the outcome, the value is equal to the probability for an outcome of a successful transmission of a name because the utility value is 1, while it is 0 for an outcome of an unsuccessful transmission of a name because the utility value is 0. Then, the end result of the sender's (mixed) strategy and the receiver's one, i.e. their expected utility value is the summation of the expected utility value of each outcome, which is:

(7) Expected utility value of the sender's and the receiver's (mixed) strategies

$$vp + v(1-p-q)r + wq + w(1-p-q)s + (1-v-w)t(1-p-q)r + (1-v-w)tp + (1-v-w)uq + (1-v-w)u(1-p-q)s$$

By means of the expected utility value for the sender and the receiver defined above, we can now paraphrase in concrete terms, the question of what is a rational strategy for the sender and the receiver to optimize the chances of successful transmission of names said in English. That is, considering the meaning of the expected utility value, it is obvious that the best, or rational strategies for the sender and the receiver are ones such that they maximize the expected utility value. In the following, it will be shown that with a reasonable premise about the current state of saying Japanese names in English, the expected utility value will be maximum when $t = 1$, $u = 0$, $r = 1$, and $s = 0$. With t and u being the probabilities for the sender, S to choose G-F and F-G, respectively, and r and s being the probabilities for the receiver, R to choose G-F and F-G, respectively, the above result means that the strategy for both the speaker and the receiver to take the action of G-F results in the highest expected utility value, i.e. the best chances for a name to be transmitted correctly. In that sense, the order of G-F is considered to be the rational choice for saying Japanese names in English. The proposition to be proved is the following:

(8) Proposition:

The expected utility value of the sender's and the receiver's (mixed) strategies, i.e.

$vp + v(1-p-q)r + wq + w(1-p-q)s + (1-v-w)t(1-p-q)r + (1-v-w)tp + (1-v-w)uq$
$+ (1-v-w)u(1-p-q)s$

is maximum when $t = 1$, $u = 0$, $r = 1$, and $s = 0$, on the condition that $v > w$ and $p > q$.

Note that the proposition has a condition, i.e. *on the condition that $v > w$ and $p > q$*. This condition is merely a fact about saying names in English in the world. As v and w are the probabilities for the sender to be of type $S_{G\text{-}F}$ and $S_{F\text{-}G}$, respectively and p and q are the probabilities for the receiver to be of $R_{G\text{-}F}$ and $R_{F\text{-}G}$, respectively, '$v > w$ *and* $p > q$' simply means that more people adopt the order of G-F when saying (and understanding) names in English than that of F-G, which is indisputably true of the current state of affairs in the wolrd.[2] With the condition vindicated, let us proceed with the proof of the proposition.

(9) Proof of proposition (8)

Among the terms constituting the expected utility value, i.e. vp, $v(1-p-q)r$, wq, $w(1-p-q)s$, $(1-v-w)t(1-p-q)r$, $(1-v-w)tp$, and $(1-v-w)uq$, the terms containing t or u, over which the sender, S has control over, or r or s, over which the receiver, R has control over, are $(1-v-w)tp$, $(1-v-w)uq$, $v(1-p-q)r$, $w(1-p-q)s$, $(1-v-w)t(1-p-q)r$, and $(1-v-w)u(1-p-q)s$. Therefore, of the expected utility value as a whole, the value of only the following term:

$(1-v-w)tp + (1-v-w)uq + v(1-p-q)r + w(1-p-q)s + (1-v-w)t(1-p-q)r + (1-v-w)u(1-p-q)s$ ...(i)

is subject to the variations of the values of t, u, r, or s. First, let us take a term composed of the first and the second terms of (i), i.e.

$(1-v-w)tp + (1-v-w)uq$ ...(ii)

As $p > q$, term (ii) as a whole will be maximum when $t = 1$ and $u = 0$. Next let us take a term composed of the third and the fourth terms of (i), i.e.

$v(1-p-q)r + w(1-p-q)s$ ...(iii).

As $v > w$, term (iii) as a whole will be maximum when $r = 1$ and $s = 0$. Finally, let us take a term composed of the fifth and the sixth terms of (i), i.e.

$(1-v-w)t(1-p-q)r + (1-v-w)u(1-p-q)s$ ...(iv).

Term (iv) will be maximum when $t = 1$, $u = 0$, $r = 1$, and $s = 0$, or alternatively, $t = 0$, $u = 1$, $r = 0$, and $s = 1$. So the question is which alternative should be chosen. Our objective is to find the strategy that makes the expected utility as a whole maximum. Since term (i) as a whole will be maximum when $t = 1$, $u = 0$, $r = 1$, and $s = 0$, the strategy that $t = 1$, $u = 0$, $r = 1$, and $s = 0$ is to make the expected utility value as a whole maximum as well. Q.E.D.

Proposition (8) in effect says that it serves best for better chances of correct transmission of names in English, for both the sender, S and the receiver, R to choose the order of G-F; in other words, on the current criterion of correct information transmission, the order of G-F is to be judged over that of F-G.

3. Conclusion

To break the stalemate between the positions arguing for the respective orders in saying Japanese names in English, I proposed for the judgment, a novel criterion which is objective, and furthermore, is to be satisfied by any communication act, linguistic or not, i.e. accuracy of information transmission. For an assessment of the two orders against the criterion, I modeled the situation of saying names in English in terms of game theory and demonstrated that the order of given name and family name is more advantageous with respective to the proposed criterion than the other order; in other words, the order of G-F is the rational choice for better chances of a Japanese name being correctly transmitted, i.e. the given name and the family name being correctly identified. Despite the above result, people are still free to use whichever order they prefer when they say Japanese names in English. Nonetheless, I hope that the current analysis has shed or will shed new light on the current issue, serving as new information for people to base their decisions on.

Notes

The original motivation for me to work on the current topic came from the strangeness I felt when I saw that the order of family name and given name is adopted for Japanese names in every junior high school English textbook that is approved by Japanese Ministry of Education and Science and is currently on the market in Japan. I just wanted to demonstrate that the order of given name and family name, which is much more widely used by not only English speaking people but also Japanese people when they say their names in English, is motivated on an objective ground, i.e. for the sake of accuracy of information transmission, which should be respected by any communication means, linguistic or not. In fact, in the presentations, I touched upon the situation of the textbooks and speculated on the reason for the textbooks' "out-of-touchness" from the reality as well. However, the discussion of this paper is restricted to a game-theoretic analysis that the order of given name and family name is the rational choice for the object of securing better chances of correct information transmission, partly because of space limitations.

By the way, the order of family name and given name that is used for my author name on the title page seems to be against the thesis to be presented in this paper; namely, the order of given name and family name is "rational" in saying names in English. Indeed, I would normally write my name as *Katsuhiko Yabushita* in English documents, as I have done and will do so. But, the

thing is that I had to follow the style for names, which is specified by the style sheet of the journal. However, fortunately or unfortunately, the way of writing Japanese names in the above way is not inconsistent with, or strictly speaking, is exempted from the thesis, as will become clear in section 2.1.

Last, but not least, I would like to express my gratitude to the volume editor, Professor Yuko Sugiura for patiently keeping reminding me of the current project. Without her encouragement, I would be still working on this paper.

[1] The assumption that both the sender and the receiver take their actions probabilistically, which are called *mixed strategies* instead of *pure strategies* where the players choose their actions deterministically, is immaterial to the current discussion. That is because a pure strategy is considered to be a special case of a mixed strategy where one of the available actions is chosen at the probability of 1. In fact, as will be demonstrated, the rational strategies for both the sender and the receiver will turn out to be choosing the order of G-F with the probability of 1, which is equivalent to the pure strategy of choosing the order deterministically.

[2] I have talked on the current issue in classes and conference presentations whose audiences were mostly Japanese, at least five times. Always I asked the audiences which order they used or would use, G-F or F-G when they said their names in English. Always almost all the Japanese people (, for instance, 67 out of 70 on one occasion) said that they would use the order of G-F. Always the clear minorities were mostly people in English education, which, I think, is ironic.

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