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Cognitive accessibility predicts word order of couples' names in English and Japanese

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Abstract: We investigate the order in which speakers produce the proper names of couples they know personally in English and Japanese, two languages with markedly different constituent word orders. Results demonstrate that speakers of both languages tend to produce the name of the person they feel closer to before the name of the other member of the couple ($N = 180$). In this way, speakers' unique personal histories give rise to a remarkably systematic linguistic generalization in both English and Japanese. Insofar as closeness serves as an index of *cognitive accessibility*, the current work demonstrates that systematicity emerges from a domain-general property of memory.

Keywords: accessibility, binomials, Japanese, English, word order

1 Introduction

Our understanding of what it means to learn and use language has undergone a shift over the past several decades. While the dominant view in linguistics had been that key aspects related to the formal expression of language are not learned but are instead “acquired” via the toggling of parameter settings on universal principles (Chomsky 1981; Baker 2005), today there is a growing recognition that language is learned in the same way that other skills are learned: on the basis of the input together with domain-general cognitive factors. This newer, *usage-based* perspective predicts that differences in input should lead to differences in linguistic competence, a fact which has long been studied by educators, and which has recently been the focus of work in linguistics. Other papers in this volume and elsewhere report evidence that there is a remarkable degree of variation in language ability even among L1 (i. e., native) speakers (Dąbrowska 2014, Dąbrowska 2018; Perry et al. 2016; Treffers-Daller and Silva-Corvalán 2016; Smith and McMurray 2018). Other work, in the

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sociolinguistics tradition, has documented subtle linguistic differences that correlate with speakers' region, race, class, gender, or age (Alim et al. 2016; Eckert 2017; Geeraerts et al. 2010; Labov 1972; Tagliamonte and D'Arcy 2009). There is compelling evidence that speakers use these linguistic cues to indicate identification with a group (Eckert 1989; Eckert and Labov 2017), while listeners use these cues to infer membership in a group and stereotypical properties associated with the group (Kinzler and DeJesus 2012; Kinzler et al. 2007; Purnell et al. 1999; Rickford and King 2016). Thus, in studies of both skill learning and sociolinguistics, individual differences are reflected in systematic *differences* in language use. The usage-based approach predicts, in fact, that languages and dialects can vary in myriad ways, and the variation across languages is in many ways quite striking (Croft 2001; Haspelmath 2007; Evans and Levinson 2009).

The present work investigates the effects of individual experiences in a different way. We highlight a way in which speakers' unique personal histories give rise to a remarkably *systematic* linguistic pattern in both English and Japanese. According to usage-based constructionist approaches to language, cross-linguistic systematicity is not determined by any constraints that are specific to syntax; instead generalizations across languages arise on the basis of constraints on human memory and categorization or on the basis of the function of languages as efficient conventional systems of communication (e. g., Bates and MacWhinney 1989; Bybee 1985, Bybee 2010; Eggins 2004; Givón 1983; Goldberg 2019; Haiman 1985; Halliday 1978; Hudson 1984; Langacker 1987; Lakoff 1987; van Valin and LaPolla 1997).

Here we focus on the implications of one particular functional factor: there is a cognitive cost to holding an entity in working memory while another task is performed (Gonthier et al. 2016; Barrouillet et al. 2007; Cohen et al. 2008). In the case of language, this leads listeners to interpret language incrementally rather than delaying comprehension until more of the input has been witnessed (Frazier and Rayner 1982; Rayner and Clifton 2009). When a delay in interpretation is required, comprehenders attempt to minimize its length. For example, listeners aim to interpret the role of an initial question word (*wh*-word) as quickly as possible, rather than holding it in mind until the end of the sentence before assigning an interpretation (Boland et al. 1995; Kamide et al. 2003). Very generally, there is a tendency to position semantically related elements closer together in the string both in morphology and in syntax (Bybee 1985; Hawkins 1994, Hawkins 2004). This tendency to minimize the distance between semantic dependents has recently been confirmed and quantified across dozens of languages (Futrell et al. 2015; Hawkins 1994, Hawkins 2004; Gildea and Temperley 2010; Gibson et al. 2019; Liu 2008; Namboodiripad 2017; Liu (to appear)).

From the speaker's perspective, the cost of holding an entity in working memory while another task is performed has been argued to lead to a tendency to position more cognitively *accessible* elements earlier in the string (Ferreira and Dell 2000; MacDonald 2013; Tanaka et al. 2011). We define *cognitive accessibility* as follows:

Cognitive Accessibility (degree of): the speed and accuracy with which concepts are “brought to mind”; that is, the speed and accuracy with which concepts are retrieved from memory so that they are available to consciousness and linguistic processing.

For this special issue on individual differences, we provide support for the idea that more cognitively accessible entities are expressed early, while demonstrating that speakers' unique individual histories determine which entities are most cognitively accessible. In particular, we investigate the order in which speakers produce the proper names of couples they know personally (e. g., *Ken and Hana* vs. *Hana and Ken*). These “proper name binomials” are ideally suited for detecting an effect of unique personal histories because they afford speakers maximal flexibility. That is, there is no fixed conventional ordering for specific names of couples since, except in the case of celebrity couples (*Bonnie and Clyde*), there are no language-wide conventions for how the names of particular couples should be ordered. Moreover, as conjunctions, either order of names is licensed and is in principle acceptable. In addition, either order results in the same semantic interpretation: *Ken and Hana* can just as accurately be referred to as *Hana and Ken*.

We hypothesize that when asked to name familiar couples, speakers tend to produce the name of the person they feel closer to before the name of the other member of the couple. Feelings of closeness are clearly dependent on individual experiences. We interpret closeness as an index of cognitive accessibility on the assumption that, in a neutral discourse context, individuals we are closer to are relatively more easily “brought to mind” than individuals we are less close to. The functional advantage of ordering more cognitively accessible names first stems from the efficiency factor already mentioned: it is more demanding to hold accessible units in working memory while less accessible units are retrieved and produced first.

Names of familiar couples are well-suited as an index of cognitive accessibility as potentially distinct from the accessibility of the word labels (lexical accessibility) because the name of a familiar person selects a representation of that person: We might know several people named *Ken*, but when we talk about *Ken and Hana* we have a particular person named ‘Ken’ in mind who may not

bear any resemblance nor relation to the other Kens we might know. Previous work has identified certain indexes of accessibility that are controlled for in the present work. These include the fact that animate entities are more accessible than inanimate entities (MacDonald et al. 1993; Ferreira 1994; Christianson and Ferreira 2005) and concepts that have already been mentioned or primed are more accessible (Ariel 1988; Givón 1983). Animacy of reference and discourse-givenness themselves tend to be correlated because people – and animate entities more generally – are the most common topics of interest, which increases the likelihood that they will be mentioned or primed. Animate and given referents, as they are more accessible, tend to be named earlier in the string, commonly in active or passive subject position in English (Bock 1982, Bock 1987; Levelt 1989; Bock and Levelt 1994; MacDonald et al. 1993; Bock and Warren 1985; Carroll 1958; Tomlin 1995; Downing and Noonan 1995). That is, the vast majority of languages tend to conventionally position the agent or causer of an event and/or the discourse-given topic before other complements (Ferreira and Yoshita 2003; Haspelmath et al. 2005; Prat-Sala and Branigan 2000). The current focus on binomial names controls for animacy and discourse-givenness in order to investigate speakers' choices when those choices are not subject to language-wide conventions.

To summarize, we formulate the hypothesis and explanation summarized below:

Hypothesis: In proper-name binomials of familiar couples, the member of the couple that the speaker feels closer to will tend to be expressed first, in both English and Japanese.

Explanation *Ceteris paribus*, more cognitively accessible words are named earlier because doing so minimizes cognitive demands on the speaker (e.g., Ferreira and Dell 2000; MacDonald 2013).

The present case presents an ideal case of “other things being equal”, in that language-wide conventions are not determinant, leaving speakers flexibility to select either word order. In the current study, we chose to test this claim in both English and Japanese because these two languages are renowned for their strikingly different constituent orders. Not only does English employ SVO order and Japanese SOV order, but English speakers prefer to position shorter post-verbal constituents before longer ones as in (1a) (Arnold 2003; Gries 1999; Stallings and MacDonald 2011; Wasow 2002), while Japanese speakers prefer to order longer non-subject constituents before shorter ones as in (2a) (Dryer 2000;

Hawkins 1994, Hawkins 2004; Gibson 1998; Chang 2009; Hakuta 1981; Yamashita and Chang 2001):

- 1a. “Explain to me the resistance that you ran into when you’re out there trying to promote her candidacy” (COCA) >
- 1b. Explain the resistance that you ran into when you’re out there trying to promote her candidacy to me.
- 2a. “Masako-wa [sinbun-de syookai-sarete-ita otoko-ni] [okasi-o] todoketa.”
Masako-topic [newspaper-in introduced man-dat] [cake-acc] delivered. [Masako delivered the cake to the man (who was) introduced in the newspaper.] (Yamashita and Chang 2001: B52) >
- 2b. Masako-wa [okasi-o] [sinbun-de syookai-sarete-ita otoko-ni] todoketa.
Masako-topic [cake-acc] [newspaper-in introduced man-dat] delivered [Masako delivered the cake to the man (who was) introduced in the newspaper.]

In fact, the English shorter-first has been found to hold in other VO languages as well, while the Japanese longer-first preference has been documented for OV languages beyond Japanese (Hawkins (1994, 2004); Gildea and Temperley (2010); Faghiri and Samvelian (2014); see Liu (2008) for evidence from 15 languages; and Futrell et al. (2015) for evidence from 37 languages).¹ This well-documented difference in constituent ordering motivated us to test our hypothesis in both English and Japanese.

2 Previous work on binomials

Previous investigations into the ordering of English binomials have offered a wide range of often quite specific predictors of word order, but have only rarely invoked accessibility explicitly. For instance, Cooper and Ross (1975) suggested 19 factors which included the first element of a binomial being more “Here, Now, Adult, Male, Positive, singular, Living, Friendly, Solid, Agentive, Powerful, at Home, and Patriotic” (1975: 67). This classic study led to a number of refinements. For example, Benor and Levy (2006) quantified a model that included 20

¹ There is some evidence that the tendency in OV languages is weaker than the corresponding tendency in VO languages (Liu To appear), which may suggest an interaction between a preference to position dependent constituents close to their head and an independent preference for accessibility-early, as documented here.

constraints related to aspects of lexical semantics, phonetics, and frequency. Morgan and Levy (2016) reduced this list to the following seven factors (in order of effect size): iconic sequencing (e. g., early before later), perceptual markedness (which encompassed the majority of factors proposed by Cooper and Ross), formal markedness, power, final stress, length, and frequency. These weighted constraints produced a model that predicted the preferred order in a large corpus of natural speech with 77% accuracy. While these studies tested many factors, including those that are related to accessibility, there was limited mention or attempt to directly measure accessibility. Onishi et al. (2008), a rare study that did explicitly evoke accessibility as a key factor in English binomial order, introduced yet another predictor: more prototypical members of categories tended to be produced before less-prototypical members.²

Lohmann and Takada (2014) provide an important precedent for the current work, as they compared results from corpus analyses of binomial expressions in English and Japanese texts. This study included a number of potential predictors including power (including male and “importance” for inanimates), iconicity (early before later), frequency, discourse-givenness, length (in syllables or mora), and conceptual accessibility. Conceptual accessibility was included as an umbrella category that included animacy, concreteness, prototypicality, basic level, proximal and self before other. In this work, which likely included many conventional or “frozen” binomials since it was based on corpus data, significant effects were found in both languages for length, power, iconicity, discourse-givenness and accessibility but not frequency of words. This work explicitly omitted conjoined proper names from their analyses.

Importantly, Morgan and Levy (2016) demonstrated that experience with specific binomial expressions strongly influences the way familiar binomials are expressed. Specifically, they found that the frequency of familiar binomials negatively correlated with reading time. In a separate forced-choice task, participants were asked if they preferred the familiar order or the reverse order of the binomials. Results indicated that the higher the frequency, the more likely participants were to choose the familiar order over the reverse order. Thus,

² Polinsky (1997: 414) touches on binomial expressions in the verb-final language, Tsez, a language of the Nakh-Daghestanian family spoken in the NE Caucasus of Russia. She observes that entities which have higher “conventional value” in a culture tend to be produced first, e. g., *enij-no kid-no* (“mother and daughter”) rather than # *kid-no enij-no* (“daughter and mother”). This generalization, that entities considered to be more important are mentioned first in binomials can be recast in terms of accessibility: the entity considered to be more important tends to be easier to recall, i. e., more accessible.

in order to determine whether particular factors beyond conventionality are operative, it is important to avoid conventional binomial expressions.

Like the current study, Wright et al. (2005) considered the ordering of “Name and Name” phrases. Critically, however, that study differed from the current one in that the experimenters provided names without referents. That is, nothing about the task required participants to imagine particular individuals. The study found a bias to order male before female names and shorter before longer names, two factors that have been proposed for English binomials generally, but which are not necessarily the best indexes of cognitive accessibility, the key factor of interest in the current work.

A precedent for considering “psychological closeness” to be relevant to binomial order comes from Iliev and Smirnova (2016). This work hypothesized that “psychological closeness of the speaker to one of the poles in the word pair” should predict order with the closer entity positioned earlier (2014: 210). Unlike the current study, all proper names were excluded from their analyses. In one study, websites about cars, politics, religion were analyzed. Results demonstrated that sites sponsored by Honda, for example, were more likely to mention *Honda* before its competitors; liberal leaning websites were more likely to mention *liberal* before *conservative*, and to a lesser extent, websites about Islam showed a tendency to mention *Muslim* before *Christian*. A second study focused on gender and results were more equivocal. The authors hypothesized that male authors should be more likely to order male terms before female, while female authors might show the reverse tendency. Notably, however, male terms were ordered before female terms 93% of the time by male authors and 90% of the time by female authors. The strong skewing toward male-first, also found in previous work, may have at least partially been driven by the fact that many phrases are conventionally frozen in English with a male-first order (e. g., *men and women*; *husband and wife*). A final study was experimental rather than based on corpus data; it elicited various binomials from participants by asking for the top two colleges in Chicago, the two main political parties in the US, the traditional two genders and so on. Participants showed a tendency to name their university first (Northwestern, 67%), and liberal students were more likely to name *Democrat* before *Republican* than conservative students were. Finally, echoing their and others' corpus work, an overwhelming majority of respondents produced male before female terms when naming genders (91%).

To summarize, the current investigation into how English and Japanese speakers order the names of familiar couples satisfies several desiderata that allow us to extend previous work on binomial ordering. In particular, we investigate whether individuals' personal histories determine the order in which they

express binomials in a way that goes beyond the group-level preferences revealed by the corpus data in Iliev and Smirnova (2016). If speakers do not take feelings of closeness into account or if they only treat closeness as a relatively minor factor, it would provide evidence that speakers generally discount their own unique histories when selecting among formal options available to them. In this case, individuals may only respect language-wide or group-level normative conventions in binomial ordering (which have been amply demonstrated to exist in previous work). The choice of using names of familiar couples without providing a rich discourse context enables us to control for discourse-giveness, while keeping the generation of names similar to what occurs in natural production. Animacy is also controlled for since both names refer to animates. By considering personal names that are known to participants, the current work is able to index cognitive accessibility with a single factor: closeness. Finally, the ordering of names of familiar couples critically avoids the effect of language-wide conventions on ordering which are known to have a potent influence (Morgan and Levy 2016). Possibly relevant factors of length and gender are included in (preregistered) analyses.

A final important precedent for the current study comes from Hegarty et al. (2011), who primarily focused on the role of gender stereotypes in the ordering of binomial names in English in a series of surveys. In a clever design, they also investigated the role of closeness. They recruited 17 participants with long term heterosexual partners and asked them to collect all of the Christmas cards they received; the participants then sorted the cards into piles according to whether the sender(s) were closer to their partner, themselves, or to both equally. The results demonstrated that the senders tended to name the addressee they were closer to first, regardless of the gender of that addressee. The current work extends this finding by directly asking the speaker about the level of closeness after the names have been produced. We also collect a much broader range of names, which allows us to consider effects of length as well as gender and closeness (all Christmas cards were addressed to one of 17 couples). Most importantly, we compare English with Japanese in order to address possible systematic differences in the word order of names produced. In particular, we will determine whether either or both languages tend to order more cognitively accessible names earlier. If both languages pattern alike and order the name of the person the speaker feels closer to before the name of the other member of the couple, it will demonstrate a way in which speakers' unique personal histories give rise to a systematic linguistic pattern in two languages which in other ways display strikingly different word order preferences.

3 Method

3.1 Preregistration

Prior to data collection, we preregistered the experiment on AsPredicted.org (<https://aspredicted.org/2dz8y.pdf>). There we stipulated the number of participants we would test in each language based on a pilot study (Tachihara et al. 2019) and the method of coding responses and the main analyses, which was based on prior work (Benor and Levy 2006; Morgan and Levy 2016).

3.2 Participants

90 native speakers of English living in the US and 90 native speakers of Japanese living in Japan were recruited on Amazon Mechanical Turk and moderately compensated for their time.

3.3 Procedure

Participants first answered questions about their gender and native language. They were then asked to name 3 important couples in their lives. They entered the name of each member of the couple in blank boxes. In the Japanese survey, participants were also asked to provide the phonetic spelling for each name. The rest of the survey provided, for each couple named, the two names in random order. Participants were asked which member of the couple they felt closer to, whether or not they were related to either member, and the gender of each member of the couple. The order of the couples was also randomized for each participant. The entire survey lasted approximately 5 minutes.

3.4 Response coding and model development

To analyze the data, we followed the model of ordering preference for binomial expression introduced by Levy and colleagues (Benor and Levy 2006; Morgan and Levy 2016). The model predicted the likelihood that the ordering preference for a given pair was consistent with various planned fixed effects. First, the outcome variable for each pair was coded in an arbitrary way: specifically, whether or not the names were ordered alphabetically. In the English data the English alphabet

was used and for the Japanese data, the Japanese alphabet was used. To be clear, we were not testing whether or not there was a preference for alphabetical order. Rather, we used alphabetical order as a basis to create a binary code that allowed us to annotate the ordering of any couples' names the participants provided. An arbitrary coding was necessary because most names were unique and because ordering could not be coded by accuracy.

Then, for each response, each fixed effect was assigned 1 if the factor predicted the alphabetical order and 0 if it predicted a non-alphabetical order. For example, if the participant indicated that they were closer to Hana than Ken, closeness would receive a 1 because both alphabetical order and closeness predicted the same order, *Hana and Ken*. If they indicated that they were closer to Ken than Hana, then closeness received a 0 because the alphabetical order (*Hana and Ken*) reverses the closeness preference (*Ken and Hana*).

To see if the length of names affected ordering, we counted the number of syllables in each name for English, and for Japanese, the number of morae, a more appropriate measure of length in that language (Otake et al. 1993). We then calculated the difference in the number of syllables/morae between each pair of names. We assigned this number a positive score when alphabetical order and ordering based on longer-before-short matched (the longer name was earlier in the alphabet) and a negative score when they did not.

4 Results

Before presenting the results of the linear mixed model, we present in Table 1 the percentages of responses in the pooled data for each factor by language.

Not all responses were relevant for every factor. In particular, same-gender couple names are not relevant to a Male bias, and names of the same length cannot provide evidence for a length-based bias.

All statistical tests were preregistered unless otherwise described as “exploratory.” There was a significant effect of closeness-first and male-first in both languages, and no effect of length, in multilevel models with closeness, gender, and length as fixed effects, random intercepts for subjects, and order as the outcome using the lmerTest library (R Development Core Team 2008). Specifically, the model revealed, for English, the effect of closeness ($\beta = -0.50$, $t = -8.89$, $p < 0.0001$) and gender ($\beta = -0.19$, $t = -3.35$, $p < 0.0001$); a numerical trend toward shorter before longer order was not significant ($\beta = -0.04$, $t = -1.38$, $p = 0.17$). The Japanese data also revealed an effect of closeness ($\beta = -0.35$, $t = -6.03$, $p < 0.0001$) and gender ($\beta = -0.16$, $t = -2.25$,

$p = 0.02$), and no effect of length ($\beta = 0.04$, $t = 1.18$, $p = 0.24$). Consideration of the intercept (β) for each factor reveals that closeness was more than twice as strong a predictor of order as gender, in each language (Figure 1).

Table 1: % of responses for each fixed effect for English and Japanese. Percentages rounded to the closest integer.

		English	Japanese
Closeness	closer person is 1st	73%	65%
	closer person is 2nd	27%	35%
Gender	Male – Female	56%	45%
	Female-Male	40%	39%
	Male-Male	3%	7%
	Female-Female	1%	9%
	Other	0%	0%
Length	Long-Short	28%	31%
	Short-Long	33%	24%
	Same	39%	45%
Participant Gender	Male	66%	40%
	Female	44%	59%
	Other	0%	1%

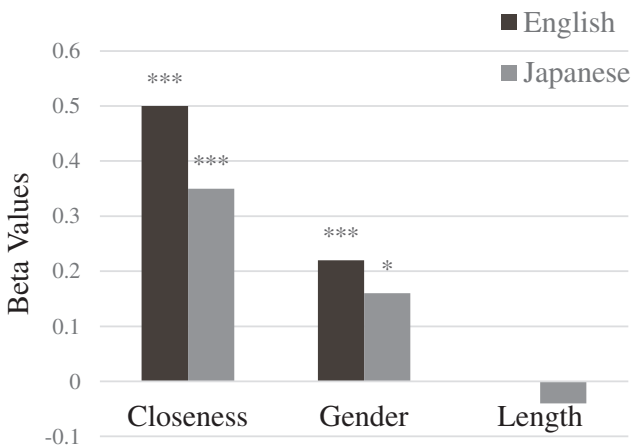


Figure 1: Beta values for each of the fixed effects in English (black) and Japanese (grey).

These results are consistent with an independent pilot study that had been run with 60 other participants (Tachihara et al. 2019). That study produced the same

results in terms of significance, except that the effect of gender was not significant in English.

We analyzed the subgroup of pairs of names in which the participant was not related to either of the members in order to see if the same effects remained evident (exploratory). The same mixed model used for the preregistered analysis was rerun on this subset of the data, and the significant results were identical to that found in the whole group.³

In order to better quantify the importance of each effect, we compared a model without each effect to the full model, using a leave-one-out method. Closeness significantly improved the model in both languages (English, $\chi^2 = 77.94$, $p < 0.0001$; Japanese, $\chi^2 = 34.33$, $p < 0.0001$), as did gender (English, $\chi^2 = 14.26$, $p = 0.0002$; Japanese, $\chi^2 = 7.39$, $p = 0.03$). Length did not improve either model (English, $\chi^2 = 2.23$, $p = 0.14$; Japanese, $\chi^2 = 1.41$, $p = 0.25$).

We combined the data to look for a possible interaction of closeness and language. We found this interaction was marginal, suggesting that closeness may be stronger in English than Japanese. This was found with a model that predicted order with gender and length as independent fixed effects, closeness and language as interacting fixed effects, and random intercepts for subject. Closeness was significant ($\beta = -0.50$, $t = -9.19$, $p < 0.0001$) and an interaction of closeness and language was marginal ($\beta = 0.15$, $t = 1.88$, $p = 0.06$).

To see if gender or length had different effects in the two languages, we used an (exploratory) maximal multilevel model to predict order with closeness, gender, and length, as fixed effects, each with a possible interaction with language; subject intercepts were included as a random factor. For gender, as expected from analyses above, there was a significant main effect ($\beta = -0.19$, $t = -3.40$, $p = 0.0007$), but no interaction with language ($\beta = 0.04$, $t = 0.41$, $p = 0.68$). There was no main effect of length ($\beta = -0.04$, $t = -1.35$, $p = 0.18$), but we found a marginal interaction of length and language ($\beta = -0.08$, $t = 1.78$, $p = 0.08$). The interaction of closeness and language was again marginal ($\beta = 0.15$, $t = 1.94$, $p = 0.05$).

Participant gender correlated strongly with which member of the couple the participant felt closer to. That is, male participants were likely to indicate that they were closer to the male member of the couple and the female participants

³ That is, for English, closeness was a significant predictor and so was gender, but length was not (closeness, $\beta = -0.47$, $t = -7.84$, $p < 0.0001$; gender, $\beta = -0.18$, $t = -2.97$, $p = 0.003$; length $\beta = -0.05$, $t = -1.58$, $p = 0.12$). Likewise, for Japanese, closeness and gender were significant predictors, but length was not (closeness, $\beta = -0.38$, $t = -6.27$, $p < 0.0001$; gender, $\beta = -0.16$, $t = -2.18$, $p = 0.03$; length $\beta = 0.04$, $t = 1.09$, $p = 0.28$).

were likely to indicate that they were closer to the female member of the couple. In an exploratory analysis, we confirmed this quantitatively with a linear regression ($\beta = 0.58$, $t = 27.12$, $p < 0.0001$). In order to unconfound participant gender from closeness, we considered the subgroups of responses in which: males indicated they were closer to females, females indicated they were closer to males, both members of the couple were of the same gender, and one case in which the participant chose “other” as their gender. We ran the same main mixed effects model for these cases in which closeness was not confounded by participant gender. This analysis confirms that closeness remains a significant predictor of ordering, even when participant gender is controlled for (closeness, $\beta = -0.21$, $t = -3.08$, $p = 0.002$; gender, $\beta = -0.21$, $t = -2.68$, $p = 0.008$; length, $\beta = -0.04$, $t = 0.93$, $p = 0.35$).

Individual variation in the tendency to express the closer member of the couple first is captured in Figure 2, which indicates, for each participant, whether they selected the person they felt closer to in 0, 1, 2 or all three of the couples named. Notably, only 7.22% (13) participants failed to name the person they reported being closer to first on any trial.

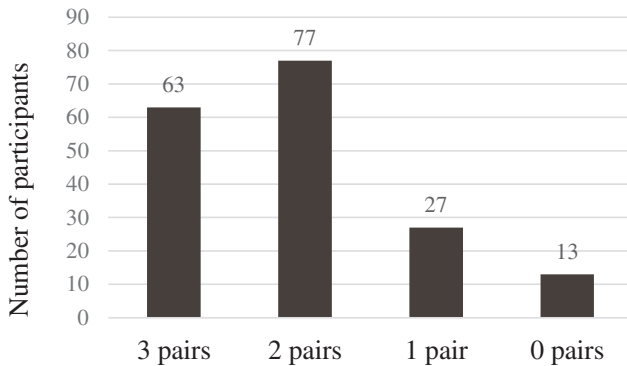


Figure 2: Histogram of the number of participants (out of 180) who expressed the person they felt closer to first, in 0, 1, 2 or all 3 pairs of names.

5 Discussion

The ordering of the names of familiar couples is strongly predicted by which member of the couple the speaker feels closer to. If we take personal closeness as an index of cognitive accessibility, the results demonstrate that cognitive accessibility is the strongest predictor of name ordering in both English and

Japanese, operating in the same direction in both languages: more cognitively accessible names tended to be produced first. A much smaller male-first bias was also found in both languages, consistent with previous work (Cooper and Ross 1975; Lohmann and Takada 2014, including prior work on non-referential proper names (Wright et al. 2005). The current work did not find evidence that the male-first bias was stronger in either language, although in a pilot study with fewer participants, the male-first bias was only evident in Japanese (Tachihara et al. 2019).

Length was not a significant factor in either English or Japanese when considered independently. However, the possibility of detecting an influence of length was affected by the fact that a high proportion of couples' names were equal in number of syllables or morae (39% in English and 45% in Japanese). When the data was combined, we found that English speakers were somewhat more likely to produce shorter names first than Japanese speakers were (see Table 1). The marginal interaction echoes a non-significant trend found in pilot data (Tachihara et al. 2019); in that work, when names were not equal in length, the ratio of shorter-first in English was roughly 4:3, while in Japanese, the ratio of *longer* names first was roughly 3:2. Iliiev and Smirnova (2016) *had* found evidence of a shorter-first first binomials in both English and Japanese, but at the same time, they had found the preference for shorter-first to be 3x as large in English as Japanese. Thus, there is suggestive support for the idea that shorter-first may be a factor in English but not Japanese.

There was a strong tendency for male participants to report being closer to the male member of the couples they named, and for female participants to report being closer to the female member of each couple. This raised the possibility that congruent gender rather than closeness was the causal factor in the ordering of names in the current experiment. To address this, we considered the subset of responses that were unconfounded by participant gender, and found that closeness still predicted ordering of couples' names. Moreover, recall that prior work on binomial ordering had found virtually no evidence for a tendency to order the person with the same gender as the speaker or author first, and instead had found a strong male-first bias in the absence of personal familiarity with the couple (Lohmann and Takada 2014; Wright et al. 2005).

6 Conclusion

This study began with a tiny puzzle. We overheard someone say that, *Laura and Mike were coming, but Mike and Laura couldn't make it*, and the intended listener

didn't seem to need any clarification. By pulling on this thread to clarify which factors influence the order of names of familiar couples, we found that both English and Japanese speakers are most strongly influenced by their own idiosyncratic personal histories in determining the word order of familiar couple binomials. Speakers tend to name the member of the couple they feel closer to first. Since feelings of closeness are a reasonable proxy for conceptual accessibility, we essentially find that the idiosyncratic behavior of individual speakers is largely predictable by the very same general factor in both languages. The current study demonstrates that, *ceteris paribus*, speakers of both English and Japanese prefer to produce more cognitively accessible units earlier.

Because usage-based constructionist approach treats our knowledge of language as a type of knowledge, it is well-positioned to capitalize on decades of research in cognitive psychology that can help illuminate how language is learned, organized, and used. The current contribution is modest, as we have only considered a small construction in a limited way, in only two languages. But the study reveals a great deal of systematicity across English and Japanese, despite the fact that the two languages use markedly different constituent orders. We recognize that there are many situations in which all things are not equal: differences in animacy and discourse-givenness were controlled for in the current experiment, and a weaker effect of male-first was also in evidence. Nonetheless, if your name is *Hana* and your partner's name is *Ken*, it is likely that your friends call you *Hana and Ken*, and his friends call you *Ken and Hana*.

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