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Predictors of lexical availability in English as a second language

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Abstract

Lexical availability measures the degree of availability of a word given a semantic context or category. It has been widely used in the Spanish-speaking world in order to derive words for use in dictionaries and/or teaching materials, but has received very little attention in English. The aim of this research was to identify the predictors of lexical availability (LA) in English as a second language (L2). Participants were 60 advanced students of English, enrolled in a 5-year English Teaching Programme. The lexical availability index (LAI) was obtained for two semantic categories (Body Parts, Food and Drink). Then correlation and multiple regression analyses were conducted in order to assess the relation between LA and four factors: familiarity, age of acquisition (AoA), frequency, and imageability. The results showed that both AoA and familiarity correlated highly with LA in Body Parts, but only AoA was a strong predictor of LA. In Food and Drink, familiarity and frequency had a moderate correlation with LA and only frequency was a significant predictor. These results are mostly in line with previous data in Spanish L1 and L2, and are of relevance for the learning and teaching of vocabulary in English L2.

Keywords: lexical availability; English L2; age of acquisition; familiarity; frequency.

1. Introduction

Learning vocabulary is one of the most important aspects of second language acquisition. If students do not know sufficient vocabulary, they are unable to communicate their ideas or express themselves properly. Wilkins (1972) once wrote: "without grammar very little can be conveyed, without vocabulary nothing can be conveyed" (1972: 111). Since vocabulary learning is key to improving fluency, it is of great relevance to know what vocabulary second language learners should know and what characteristics this vocabulary should have.

In regular L2 courses, beginner students are normally exposed to new vocabulary from basic categories, for instance, Body Parts, or Food and Drink. The idea of organizing the lexicon into semantic categories seems very beneficial, and many examples can be found where this approach has been used (McCarthy & O'Dell, 2010; Oxenden & Latham-Koenig, 2009; Richards, Hull, & Proctor, 2012). However, there is not much information as to how the vocabulary included as part of each semantic category has been selected.

Research into vocabulary learning has taken different directions in the English and Spanish-speaking worlds, especially within the field of applied linguistics (see Jiménez Catalán, 2014; Šifrar Kalan, 2015). The Spanish linguistic experience for vocabulary research has encompassed the study of speakers' available lexicons, as opposed to word frequency, which is more common in English-speaking countries. It was only very recently that word frequency lists and other properties of Spanish words were made freely available on a comprehensive website (Duchon et al., 2013), or as supplementary materials of a publication (Alonso, Fernandez, & Díez, 2015; Guasch et al., 2012; Moreno-Martínez, Montoro, & Rodríguez-Rojo, 2014; Stadthagen-Gonzalez et al., 2017). Much more emphasis, however, has been put on the study of lexical availability (LA), which is based on associations where semantic categories are used as prompts for participants to elicit related words. For instance, given a semantic category such as Body Parts, participants produce words such as head, mouth, finger or hand, which are 'available' words for Body Parts. As stated above, in English, the preferred option has been the creation of frequency lists based on corpora, the elaboration of dictionaries containing frequency data, and the compilation of corpora for use in vocabulary research (e.g., Kučera & Francis, 1967; Zeno, 1995).

There are some problems with the use of frequency for selection of words in dictionaries and L2 study materials. Frequency measures are obtained from a variety of corpora that contain a language register which is often different from the one speakers actually use in day-to-day conversations. In fact, Brysbaert and New (2009) demonstrated that traditional word frequency lists (based on books, newspapers, and magazines) are inaccurate measures of word selection because they contain edited material, exaggerate lexical variation, and often include topics that are not of real importance to people. Unlike word frequency, LA is obtained directly from people based on what comes to mind as they think about a topic or semantic category. The clear distinction in the way data are obtained using LA and word fre-

quency suggests there is only a weak relationship between the two measures. In fact, this is exactly what has been found in Spanish L1 (Hernández-Muñoz, Izura, & Ellis, 2006) and Spanish L2 (Hernández-Muñoz, Izura, & Tomé, 2014). However, to our knowledge there are no studies to date looking at this phenomenon in English.

Previous studies have investigated LA in English L2, but their focus was different. For instance, Jiménez Catalán and Fitzpatrick (2014) looked at LA and frequency, but their focus was on determining EFL students' vocabulary profile and not on the direct relation between LA and frequency. A more recent study by Santos Díaz (2017) examined the semantic relations of words in Spanish L1, English L2, and French L2; however, it did not relate LA to other factors as in the current work.

The aim of the present study was to assess what factors, including word frequency, are associated with LA in English L2. If we can determine the factors that affect LA in English L2, we can identify the type of vocabulary students learn when they study English as a second language, as well as the vocabulary they are lacking. As defined by Hernández-Muñoz, Izura, and Ellis (2006: 730), lexical availability "measures the ease with which a word can be generated as a member of a given category". LA is obtained by having participants elicit as many words as they can, given a prompt or semantic category (e.g., Body Parts) for a time period of two minutes. A lexical availability index (LAI) is then calculated by taking into account the number of people who produce a given word from a specific semantic category, as well as the order in which the word was produced.

The predominant use of LA in the Spanish-speaking world has a long tradition starting with pioneering work by López Morales (1973) in Puerto Rico and followed by a number of projects in other countries, including Chile (Valencia, 1997). More recently LA has been fostered by the PanHispanic Project (Grupo de Investigación DispoLex, 2017), which aims to gather lexical data from individuals in different Spanish-speaking countries and regions in order to create lexical availability dictionaries and compare dialects at linguistic, ethnographic and cultural levels (e.g., Prado & Galloso, 2017). Some researchers, however, have also focused on the cognitive aspects of LA (Ferreira & Echeverría, 2010; Hernández-Muñoz, Izura, & Ellis, 2006) and more recently some have also investigated emotional factors affecting LA (Jiménez Catalán, 2017). In this line of research, LA is perceived not only as a linguistic variable that can provide information about the lexicon used by a community, but also as a factor that can draw on mental processes engaged during vocabulary use (Hernández-Muñoz, Izura, & Tomé, 2014).

Having this in mind, Hernández-Muñoz et al. (2006) decided to investigate the extent to which LA was associated with other linguistic and cognitive factors. They assessed LA in L1 from 117 native Spanish speakers, from both public and private schools in Spain. They looked at four basic semantic categories (Body Parts, Clothes, Furniture, and Animals) and investigated the effect of six factors (familiarity, typicality, imageability, age of acquisition (AoA), and

word frequency) on LA. The results showed that LA was strongly associated with typicality (how typical a word is within a category) and AoA (the age at which words are learned), moderately associated with familiarity (how familiar a word is) and imageability (the ease with which a mental image of a word is created), and weakly associated with word frequency (how frequently words are used).

In a subsequent study, Hernández-Muñoz et al. (2014) also studied LA in Spanish L2. This investigation presented two aims. Firstly, the researchers wanted to determine the extent to which the availability of a word from a specific semantic category is affected by the same cognitive factors when the word is learned as part of the L1 or the L2. Secondly, it aimed to determine whether there was any transfer from L1 to L2 in terms of vocabulary acquisition. The results revealed that AoA, cognateness and typicality were significant predictors of LA in L2. In addition, the researchers suggested that if individuals learn the L2 soon after childhood, there is a tendency that L1 and L2 AoA overlap. However, if the L2 is acquired later in life, there is some reliance on the L1 regarding grammar rules and vocabulary acquisition.

While LA has been investigated in Spanish L1 and L2, there have been very few studies dealing with LA in English L1 or L2, and none of them have looked into the cognitive factors that can explain LA in English L2. The present study investigated the cognitive factors of LA in English as a second language in order to identify which of these factors can explain LA. As mentioned earlier, studies of the cognitive factors of LA have provided important information concerning the nature of this variable; however, there is no research into what factors affect English L2 in speakers of Spanish L1. We selected four factors that could potentially affect or explain LA: familiarity, imageability, word frequency and age of acquisition (AoA).

Familiarity has been described as the frequency with which people keep in contact with a concept, and can influence processing times. For instance, more familiar words are named faster than less familiar items in Spanish (Cuetos, Ellis, & Alvarez, 1999). Another factor that can potentially predict LA is *imageability*, understood as how accessible the recalling of a mental representation of a concept is or how fast a word is able to evoke a mental image. Highly imageable words tend to be processed faster in a number of tasks, including lexical decision, cued recall, and free recall (Balota et al., 2004; Kennet, McGuire, Willis, & Shaie, 2000) and induce fewer naming errors in patients with phonological impairment (Hirsh & Ellis, 1994; Tree, Perfect, Hirsh, & Copstick, 2001). Another variable is *word frequency*, defined as how often a word is used in samples of spoken and/or written language. Word frequency has also been shown to influence language processing in English and more recently in Spanish (Alija & Cuetos, 2006). Another property is *age of acquisition* (AoA), which is defined as the age at which a word is acquired and has been found to affect naming in English (Monaghan & Ellis, 2002).

In the following study we gave advanced speakers of English L2 a lexical availability test, where they were asked to produce words from two semantic categories: Body Parts, and Food

and Drink. We then obtained the LAI of each word and used this index to examine which factors explained LA. We predicted that familiarity, AoA and frequency would significantly predict LA based on data from previous studies (Hernández-Muñoz et al., 2006, 2014). Also consistent with previous evidence, imageability should have just a moderate association with LA or no association at all.

2. Method and materials

2.1. Participants

The participants were a group of 60 fourth-year advanced English students (39 female, 21 male; mean age 21.8 years, SD 2.3). All 60 participants were English Pedagogy students from Universidad Católica de la Santísima Concepción (UCSC), Chile, with no evidence of any language disabilities. All the students had Spanish as their mother tongue and English as their second language. They had all learned English in the context of instruction and none of them were simultaneous bilinguals. They were required to pass a local examination in their third year, which mimics the First Certificate in English (FCE) (UCLES, 2016). Thus, they were classified as B2 or C1, according to the Common European Framework of Reference for language (Council of Europe, 2014).

2.2. Materials

A two-page LA test was created in Microsoft Word and contained two semantic categories (Body Parts, Food and Drink) obtained from the study by Ferreira and Echeverría (2014). Each category was presented at the top of a page, and the participants' responses were registered from top to bottom. After pre-processing the data, the 50 most available words from each category were used in the analyses. We obtained ratings for familiarity and imageability for these words from the MRC Psycholinguistic database (Coltheart, 1981). Word frequency ratings were extracted from the Hyperspace Analogue to Language (HAL) frequency norms corpus (Lund & Burgess, 1996), which consists of approximately 131 million words. AoA ratings were obtained from Kuperman, Stadthagen-Gonzalez, & Brysbaert (2012), which contains measurements for 30,000 English words. The mean, standard deviation, and range for LA, familiarity, imageability, frequency, and AoA of the 50 most available words are presented in Table 1.

2.3. Procedure

Participants were presented with the LA test in a computer room located in the Department of Language Sciences and Literature, UCSC. They were instructed to read each category (e.g., Body Parts) and, within a time frame of 2 minutes, type as many words as possible that they thought belonged to the category. In total, the application of the LA test

took around 8 minutes. The test was given in the morning during lesson time and by one of the researchers. The procedure was conducted in different sessions, as participants belonged to different teaching groups.

2.4. Data pre-processing

Following the application of the test, the data were pre-processed for analysis. We followed the standard procedure for data pre-processing as in other LA studies, so responses that were made up of more than one word were hyphenated and turned into a single entry (e.g., finger-nail). All nouns collected in regular plural form were changed to their singular form (e.g., eyes, eye), but irregular plurals were left unchanged (e.g., foot, feet). All capital letters were changed to lower-case, including proper names. Finally, words that did not belong to the category in question were also deleted. Then the LAI for each semantic category was calculated using Dispogen II (Echeverría, Urzúa, & Figueroa, 2005). After obtaining the LAI, compound expressions (e.g., fish-and-chips) were excluded from the 50 most available words in each category, and these 50 were then used for the analyses. See Appendix 1.

TABLE 1

Mean, standard deviation, and range of the 50 words for lexical availability index (LAI), frequency, age of Acquistion (AoA), imageability, and familiarity

PREDICTORS		BODY PARTS	FOOD AND DRINK
Lexical availability	Mean	.21	.15
	SD	.16	.09
	Range	.02 – .58	.05 – .33
Frequency	Mean	9.37	8.83
	SD	1.07	1.12
	Range	7.66 – 11.73	6.88 – 11.57
Age of acquisition	Mean	4.52	4.33
	SD	1.20	1.06
	Range	2.74 – 7.16	2.37 – 6.58
Imageability	Mean	5.92	6.10
	SD	2.4	1.9
	Range	5.30 – 6.38	5.69 – 6.44
Familiarity	Mean	5.64	5.79
	SD	2.8	2.7
	Range	4.86-6.12	5.29 – 6.41

2.5. Data analysis

Unlike previous studies (Hernández-Muñoz, Izura, & Ellis 2006; Hernández-Muñoz, Izura, & Tomé 2014), data analyses were carried out separately for each category. The reason is that some words might belong to more than one category and have a different LAI depending on the category, which might affect the degree of association between LAI and other variables in the analysis.

We first used correlation analyses in order to identify which variables were most strongly associated with LA, and whether the predictors (familiarity, imageability, word frequency, and AoA) also correlated between them. Then we ran multiple regression analyses to assess the effect of all four predictors combined and individually on LA. The analyses were conducted separately for each semantic category on R version 3.2.5. (R Core Team, 2016). In order to report significance, we used the lmerTest package version 2.0-32 (Kuznetsova, Brockhoff, & Christensen, 2016).

3. Results

Before running the analysis, we removed outliers ranging above and below 1.5 * Interquartile range (IQR) for each of the predictor variables and the outcome variable (LAI). The outlier detection procedure showed 2 outliers for AoA, 0 for frequency, 4 for imageability, 0 for familiarity and no outliers for LAI in Body Parts. As for Food and Drink, 2 outliers were detected for AoA, 1 for frequency, 1 for imageability, 1 for familiarity and no outliers for LAI. In total we removed 2.56% of the data from Body Parts and 2.56% from Food and Drink.

3.1. Body Parts

The correlation analyses showed that LA correlated highly with AoA and familiarity. There were also significant but moderate correlations between AoA and imageability, and familiarity and frequency (see Table 2).

TABLE 2

Correlation matrix of lexical availability, age of acquisition, familiarity, frequency, and imageability for Body Parts

	LEXICAL AVAILABILITY	AGE OF ACQUISITION	FAMILIARITY	FREQUENCY	IMAGEABILITY
Lexical availability	1				
Age of acquisition	-.64***	1			
Familiarity	.60***	-.60***	1		
Frequency	.26	-.17	.48**	1	
Imageability	.22	-.47**	.25	-.24	1

Note: $^{**}p < .05$; $^{***}p < .001$

Since two of the predictor variables above are intercorrelated, the interpretation of their individual correlations with LA needs to be cautious and assessed using a regression analysis. Hence, a multiple linear regression was also calculated to predict LA based on AoA, familiarity, frequency, and imageability. A significant regression equation was found, $F(4,33) = 9.42$, $p < .001$, $R^2 = .54$, which shows that all predictors combined accounted for 54% of the variance in lexical availability. Individually, the main significant predictor of LA was AoA, $b = -.47$, $t(33) = -3.55$, $p < 0.001$, which alone contributed with 47% of the variation in LAI. The second significant predictor was familiarity, $b = .01$, $t(33) = 2.65$, $p < .01$, but explained very little variance (only 1%), whereas frequency ($b = -.15$, $t(33) = - .09$, $p > .05$) and imageability ($b = -.01$, $t(33) = -1.24$, $p > .05$) were not significant predictors of LA.

3.2. Food and Drink

The correlation analysis showed that LA correlated moderately with familiarity and frequency, but did not correlate significantly with AoA and imageability. The other significant correlation between the list of factors was between familiarity and frequency (see Table 3).

TABLE 3
Correlation matrix of lexical availability, age of acquisition, familiarity, frequency, and imageability in Food and Drink

	LEXICAL AVAILABILITY	AGE OF ACQUISITION	FAMILIARITY	FREQUENCY	IMAGEABILITY
Lexical availability	1				
Age of acquisition	-.05	1			
Familiarity	.43**	-.15	1		
Frequency	.42*	-.14	.49**	1	
Imageability	.25	.-17	.32	.24	1

Note: **$p < .01$

Another multiple linear regression was calculated to predict LAI for Food and Drink based on frequency, AoA, familiarity, and imageability. The regression equation with all predicted variables was not significant, $F(4,34) = 2.10$, $p = .10$, $= .20$. Hence, we ran another model with only frequency and familiarity because these two variables correlated moderately with LA. The new model predicted LA significantly, $F(2,36) = 3.70$, $p = .03$, $= .17$, and accounted for 17% of the variance. Frequency was a significant predictor of LA, $b = .20$, $t(36) = 2.15$, $p < 0.04$, whereas familiarity was not, $b = .00$, $t(36) = .50$, $p > 0.05$. In order to decide which model best fitted the data, we compared both models, using the *anova* function in R, and found there were no significant differences between the two regarding data fitting ($p = .59$), so we decided to report model 2 (with only frequency and familiarity as predictors) because it was the most parsimonious.

4. Discussion

The present study aimed to assess the different cognitive factors that predict or are associated with LA in English L2 across two semantic categories (Body Parts, and Food and Drink), in order to better understand what type of vocabulary advanced EFL students actually use. The factors we selected included familiarity, imageability, AoA, and word frequency, as these are properties of words that have been found to affect word retrieval and can predict speed when classifying words into semantic categories (Hernández-Muñoz et al., 2006). Previous research has only looked at cognitive factors in Spanish L1 and L2, so this is the first time that the cognitive aspects of LA have been studied in English L2.

Native Spanish speakers, who were also advanced students of English, were asked to type as many words as they could from two semantic categories (Body Parts, Food and Drink). We used the first 50 most available words in each category and then performed correlations between all variables in each category followed by multiple regression analyses in order to determine which of the above factors best explained LA in English L2. The results for Body Parts showed that LA had a high positive correlation with familiarity and a strong negative correlation with AoA and no significant correlations were reported for LA and frequency or imageability. The regression analysis carried out revealed that both AoA and familiarity were significant predictors of LA. However, LA was responsible for 50% of the variance while familiarity only explained 1%. More specifically, for 1 unit change in AoA scores, we would expect a 0.5 unit change in LA and this association is negative, so the lower the AoA of a word the higher its LA. Frequency and imageability did not contribute to predicting LA. Regarding the Food and Drink category, LA showed significant moderate positive correlations with frequency and familiarity and no significant correlations with AoA or imageability. The regression model we ran with all four predictors was not significant, so we ran a new model with only the predictors that had moderate correlations with LA (frequency and familiarity). We found that the combined effect of both predictors significantly predicted LA, but none of the predictors explained significant unique variance, which means that familiarity and frequency shared most of the predicted power in explaining LA.

Our results largely fit our predictions that AoA, familiarity, and frequency would be a significant predictor of LA, whereas imageability would only show a moderate association with LA. The current findings are also mostly in line with previous findings in Spanish reported by Hernández-Muñoz et al. (2014), who found that AoA in Spanish L1 predicted LA in Spanish L2. In an earlier study, Hernández-Muñoz et al. (2006) had also found that AoA in Spanish was strongly associated with LA in the same language. In our study, we found a similar pattern for English when analysing the properties of words from the Body Parts category. Hernández-Muñoz et al. (2014) argue that when the L2 is learned after childhood, both the L1 and L2 AoA overlap because at least some words are learned early in both cases. However, the asso-

ciation between the two is not perfect because some terms are relevant only for children to be learned very early in life (e.g., nappy, dolly) and others are acquired early only in the case of adults (e.g., bill, accommodation). All in all, a strong relation between AoA and LA, although not perfect, was present in our data.

The presence of an AoA effect can have different interpretations. It can arise within the semantic system, with early acquired meanings being more available than later acquired ones, but it can also be manifest at a lexical level, affecting access to spoken words, or in the mapping between the semantic and phonological representations of words (Hernández-Muñoz et al., 2006). Unlike Hernández-Muñoz et al. (2006)'s results, the contribution of familiarity in the present study was only marginally significant. This implies that the words that are most available for L2 speakers are not necessarily the most familiar and available for native speakers. This suggests that L2 speakers have a unique representation of words, perhaps influenced by their L1.

As mentioned earlier, frequency was the only significant predictor of LA in Food and Drink, but its effect was small compared to AoA in Body Parts. This is in line with Hernández-Muñoz et al. (2006), who noticed that frequency measures might not be very well sampled out because they generally come from written texts. Support for this argument was raised by Brysbaert and New (2009), who found that classic word frequency measures do not really represent actual frequency.

From the four predictors we selected, imageability was the only one that was not associated with LA in any of the semantic categories. These results fit in well with Hernández-Muñoz et al. (2006), where imageability did not emerge as a significant predictor, either. They argue that the available lexicon does not depend on whether a word represents a concrete or abstract concept; alternatively, it may mean that imageability does not affect concept retrieval because the preceding items in a LA task provide a context, which might eliminate imageability effects.

In sum, the present study demonstrated that AoA and word frequency in English L1 can explain LA in English as a second language, but their level of association differs depending on the semantic category from which LA comes from. Future studies should explore other possible predictors of LA (e.g., typicality, semantic richness) across different semantic categories, in order to better understand the nature of LA as a variable that can help us understand the organisation of the mental lexicon in a second language.

5. Conclusions

We investigated the predictors of lexical availability in English L2 in order to understand the characteristics of the lexicon that Chilean EFL students have. We found that variables such as AoA and frequency in English L1 are associated with the available lexicon in English L2. Getting

to know the nature of the available lexicon of EFL students can give teachers an idea of what vocabulary they should teach, and incorporate this into lessons accordingly. The available words are those more easily accessible in the mental lexicon, so they represent the vocabulary that students actually know and are able to use in a conversation. Lexical availability studies help not only to measure the vocabulary that EFL students actually use, but also to compare it to that of native speakers, identifying terms that may be available for the latter, but not for the former.

We propose LA as a tool for selecting words for inclusion in teaching materials, and for examining quantitative and qualitative aspects of the lexicon used by students. To date, the most commonly used tool for determining the lexicon that should be learned by EFL students is frequency; however, this is not necessarily the most accurate method for selecting vocabulary, due to its use of written texts as the only data source. By contrast, lexical availability data is extracted directly from individual subjects, thus offering an easy and flexible way to identify words for inclusion in dictionaries and teaching materials, and to assess vocabulary knowledge in an EFL classroom.

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7. Appendix 1. Fifty most available words and their lexical availability index (LAI) for Body Parts, and Food and Drink

BODY PARTS		FOOD AND DRINK	
WORD	LAI	WORD	LAI
eye	0.584643722	soda	0.372724146
leg	0.574759126	rice	0.339714795
arm	0.554391026	water	0.333879411
nose	0.428951353	juice	0.323178023
mouth	0.420631856	beer	0.311608583
finger	0.413273066	potato	0.310687929
hand	0.410607874	coffee	0.258296639
ear	0.402070045	apple	0.251822889
shoulder	0.331666321	chicken	0.236672133

hair	0.328193009	meat	0.236260757
knee	0.306748033	bread	0.215874225
neck	0.299886733	tea	0.215101138
elbow	0.298095196	wine	0.211419329
foot	0.286375463	lettuce	0.204623982
nail	0.257915586	tomato	0.194851562
toe	0.257409453	milk	0.188190654
back	0.213741690	coke	0.153091595
stomach	0.208965763	fruit	0.152237132
tongue	0.158354700	onion	0.143637523
lip	0.153480843	fish	0.138291508
heart	0.145489678	pizza	0.135172129
eyebrow	0.145044401	orange	0.133487508
wrist	0.139952481	spaghetti	0.128365815
teeth	0.139112160	hamburger	0.126119718
tooth	0.137990385	pasta	0.111781090
brain	0.127426967	vegetable	0.108708628
hip	0.125877500	carrot	0.106834546
chin	0.121791914	banana	0.100875266
ankle	0.108218536	salad	0.092181906
cheek	0.107694700	cake	0.089749075
face	0.106420003	watermelon	0.088087775
chest	0.093473889	vodka	0.085792542
lung	0.092725582	bean	0.084197141
forehead	0.085893281	whisky	0.083684042
eyelash	0.085299008	avocado	0.080246568
waist	0.078230672	strawberry	0.073219076
bone	0.074262857	cereal	0.071088925
liver	0.052044652	pear	0.067462824
skin	0.05161741	cookie	0.063849673
belly	0.045287084	sugar	0.059699126
limb	0.043664899	pork	0.056560751
muscle	0.0434139	chips	0.054907013

breast	0.037637901	beef	0.053179838
shin	0.037212152	soup	0.052875258
kidney	0.030823974	egg	0.04929072
throat	0.029082814	barbecue	0.048288334
blood	0.024359733	jam	0.047749326
larynx	0.022111887	sausage	0.045716338
nape	0.020721082	chip	0.045505282
ass	0.020721082	chocolate	0.044874847