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Theory and Other Dangerous Things

Loanword Associations and Processes

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Abstract: This paper presents a re-examination of the cognitive process model for word associations involving loanword stimuli originally proposed by Racine (2008). Unlike the research upon which the model was originally based, loanword stimulus frequency is accounted for in the current study. It was observed that regardless of the frequency or difficulty of loanword stimuli, second language learners responded with significantly more orthographic and null association responses than did native speakers. Results are discussed in terms of their implications for further research in modelling the cognitive processes involved in word association.

Introduction

Since the early years of the 20th century, the findings of word association (WA) research have been used to help uncover aspects of the mental lexicons of both first language (L1) users and, more recently, second language (L2) learners. These studies have often focussed on the word classes of the stimuli involved and the results have typically been used to make inferences about the structure of the mental lexicon in general and to make comparisons between the manners in which L1 and L2 vocabulary are stored therein. Despite researchers' interest in the types of words used to elicit associations, thus far, very little research has focussed on the unique group of lexical items known as *loanwords*. Loanwords are lexical items that exist in a learner's L1 as cognates borrowed from the L2. With very few exceptions (e.g., Van Hell & De Groot, 1998), WA researchers have yet to explore the unique position that these borrowed words may hold in the bilingual mental lexicons of L2 learners.

In fact, most L2 research implementing the WA test format has thus far displayed a particularly narrow focus of interest. Two areas in particular have been the prime focus of study. The first area involves how differences and similarities between the L1 and the L2 mental lexicons, as revealed through WA, relate to second language proficiency (e.g., Piper & Leicester, 1983; Racine, 2008; Schmitt, 1998; Sökmen, 1993; Wolter 2001, 2002; Yokokawa, et al., 2002). The second area of interest for many WA

researchers has been the examination of non-native speakers' (NNS) responses to determine whether they follow a developmental path known as the *syntagmatic-paradigmatic shift*. These researchers (e.g., Kudo & Thagard, 1999; Nissen & Henriksen, 2006; Orita, 2002; Söderman, 1993) wished to discover whether L2 learners' responses moved from predominately syntagmatic (collocational) and clang associations (based on orthographic or phonological similarities to the stimuli) to paradigmatic ones (e.g., semantic associations based on word class, meronymous and super/subordinate relations). Many early L1 studies (e.g., Entwisle, 1966; Ervin, 1961) showed that native speaker (NS) responses appear to shift in this way from childhood to adulthood as lexical development progressed. In fact, more recent WA studies have questioned the underlying assumptions upon which many of those studies are based (e.g., Fitzpatrick 2007, 2009; Wilks, 2009). In any case, WA researchers' preoccupation with L2 proficiency and development appears to have resulted in a scarcity of attention paid to the discovery of the cognitive processes that may mediate the associations themselves.

The current study was conducted to address these two research gaps in the WA literature. That is, this research was designed to examine the associations of NS and NNS respondents to loanword stimuli, and to attempt to make inferences about the cognitions which mediate these responses. Given the abundance of loanwords in Japanese – accounting for as many as half of all high-frequency word families and up to a quarter of all academic word families (Daulton, 2008) – this is clearly an important

Racine, J. P. (2011). Loanword associations and processes. *OTB Forum*, 4(1), 37-44.

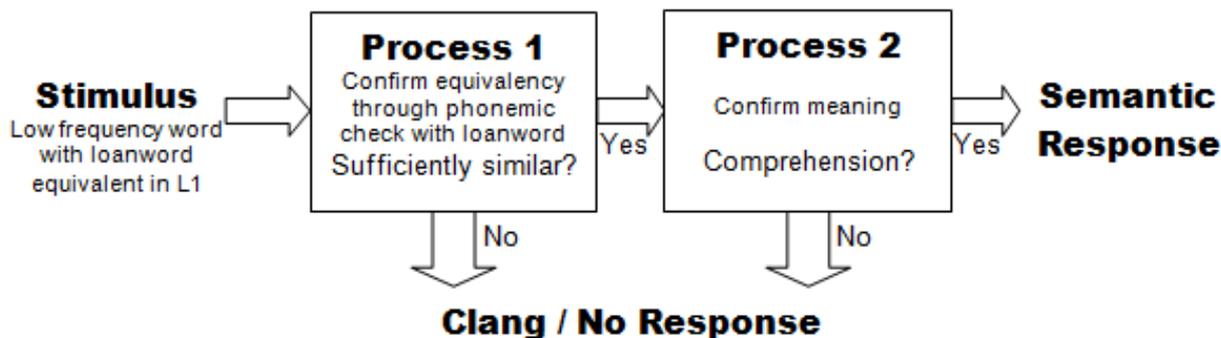


Figure 1. A cognitive process model for NNS word association responses to stimuli with L1 loanword equivalents (from Racine, 2008).

field of investigation for Japanese learners of English. To reach an understanding of the processes involved in accessing these words in the lexicons of learners is the ultimate goal of this research.

1.1 A Cognitive Process Model for Loanword Associations

In an earlier attempt to uncover the processes involved in loanword associations, Racine (2008) used two groups of low-frequency noun stimuli to examine differences between NS and NNS response patterns. One group consisted of nouns for which there were no loanword equivalents in Japanese (the NNS respondents' L1). These were *hospital*, *morning*, and *rabbit*. The others were *helicopter*, *asbestos*, *orchestra*, and *escalator*, all of which exist in Japanese as loanwords from English (ヘリコプター *herikoputā*, アスベスト *asubesuto*, オーケストラ *ōkesutora*, and エスカレーター *esukarētā*, respectively). Surprisingly, NNS respondents made fewer semantically related associates (i.e., paradigmatic and syntagmatic responses) to the loanword nouns than to those without a phonetically similar loanword in their L1. In other words, NNS responded with more clang and null responses than did NS, despite the presence of these words in their L1. Racine accounted for these counterintuitive results by proposing a cognitive model in which the processes that usually lead to semantic responses are superseded by an alternative process instigated by the salient phonological similarities between the stimulus and its L1 equivalent. This model is illustrated in Figure 1.

To illuminate features of this model, Racine provides the example of the stimulus

asbestos: Recognizing that this stimulus may have a loanword equivalent in their L1, NNS respondents initiate a phoneme-by-phoneme check to confirm that it is the same as the loanword, in this case, the Japanese word アスベスト (*asubesuto*; Figure 1, Process 1). Failing to confirm the equivalency, either due to taxed cognitive resources or failing to discover enough similarity between the pronunciations of the two, the participant is forced to provide a default, non-semantic response (i.e., a clang or null response). If the stimulus is in fact confirmed as the phonological equivalent of the L1 loanword, Process 2 is initiated. Here, assuming the participant understands the meaning of the loanword, she will be able to offer a semantic response of some kind, such as the frequently elicited paradigmatic response *danger* or the syntagmatic response *dangerous*.

This model accounts well for Racine's (2008) findings, but the experimental design and the findings upon which this model is based deserve re-examination. In particular, the stimuli with Japanese (L1) loanword equivalents (*helicopter*, *orchestra*, *asbestos*, and *escalator*) may have been too difficult or too infrequent to allow this kind of comparison to be made. In other words, second language learners were more likely to respond to these stimuli with non-semantic responses than to nouns without loanword equivalents (*hospital*, *rabbit*, and *morning*). However, the relative difficulty or infrequency of the loanwords may have rendered them too difficult for participants to successfully navigate the phoneme-by-phoneme process I had envisioned. Indeed, such lengthy, polysyllabic stimuli may tax the cognitive resources of NNS, thereby eliciting null responses as a default. To more

Table 1. *Word Association Stimuli*

	Non-loanwords	car desk chair tree
Nouns	Frequent loanwords	artist cracker card waitress
	Infrequent loanwords	asbestos helicopter escalator orchestra
Grammatical Words		she it I that a the and but in of all some
Adjectives		delicious heavy happy soft
Verbs		eat jump sleep walk

accurately test this hypothesis, simpler, more frequent stimuli with loanword equivalents must be utilized. The current study attempts to address this issue while testing the following hypothesis:

Due to taxing of cognitive resources during a phoneme-by-phoneme confirmation process, *noun stimuli with recognizable loanword equivalents in NNS respondents' L1 will elicit a larger proportion of non-semantic responses (i.e., orthographic and null responses) than will similar nouns without loanword equivalents.*

Method

The word association task was administered to 123 participants: 32 native English speakers (NS) and 91 non-native speakers (NNS). The NNS group consisted of second-year Japanese university students, all of whom were native speakers of Japanese and had achieved low-intermediate levels of English proficiency. The test was administered in written format and consisted of 32 lexical items. Forms were distributed to NNS participants by one of their teachers during a university English class. Respondents were told that they had approximately ten minutes in which to complete the form. Written instructions required participants to respond by writing the first word that came to mind for each stimulus item. They were told they need not respond to any items they did not understand or for which no response readily came to mind. They were also informed not to be concerned about correct spelling to ensure that the first

word they thought of (rather than a word that was easier to spell) was entered. Four versions of the survey were created to reduce the possible influences of priming and order effects. The instructions appeared in both English and Japanese so they would be readily understood by all participants.

Responses were coded into four categories: paradigmatic, syntagmatic, orthographic, and null responses. Responses were considered to be *paradigmatic* if they belonged to the same word class as their stimuli (e.g., chair → table). Responses were categorized as *syntagmatic* if they were semantically related to their stimuli, but were from separate word classes (helicopter → fly). Responses that exhibited orthographic or phonological similarities to the stimuli in the absence of any clear semantic relations were categorized as *orthographic* (walk → work). When respondents were unable to respond or if the response was illegible, a *null response (NR)* was recorded. To disambiguate responses, the survey included a section in which respondents could provide introspection reports concerning what they were thinking when they responded to the stimuli.

(2.1) Stimuli

The 32 lexical items listed in Table 1 were selected from a variety of word classes: adjectives, verbs, nouns, and grammatical words. The adjectives and verbs were not directly related to the current study, but were included so that respondents would not recognize that loanwords were the central focus of the study and perhaps respond unnaturally. Responses to the grammatical

word stimuli and the cognitive processes that mediate them were examined in research using these same WA test forms and have been explicated elsewhere (Racine, 2011).

The 12 nouns in Table 1 were selected to test the hypothesis that predicted that NNS respondents would make fewer semantic responses to nouns with loanword equivalents in their L1. These items included the four frequent non-loanwords originally used by Racine (2008). These are commonplace items, well known to many learners of English as a second/foreign language (*tree, desk, chair, and car*). The other eight nouns were chosen as representatives of words that exist in Japanese as loanwords from English. Four of these eight had also been utilized by Racine in the 2008 study: *orchestra, asbestos, escalator, and helicopter*. Although these items were originally selected for their loanword properties, as described above, they may have been inordinately difficult for those participants, and thus inappropriate choices for making comparisons directly to the more commonplace non-loanword nouns cited above. To clarify this issue, four more loanword nouns were added to the stimuli in this study: *artist* (アーティスト *ātisuto*), *cracker* (クラッカー *kurakkā*), *card* (カード *kādo*), and *waitress* (ウエイトレス *ueitoresu*). These were selected for their relatively high frequency of use in both languages as well as their linguistic simplicity in comparison with the infrequent loanword nouns listed above. Indeed, none of them are more than two syllables long in English.

Results

3.1 Overall Response Patterns

Based on the categories described above, the mean responses to all 32 lexical stimuli are illustrated in Figure 2. These findings replicate the typical response patterns found in most WA research to date: Participants responded with a large proportion of paradigmatic responses, somewhat fewer syntagmatic responses, and relatively few clang/orthographic and null responses (e.g., Meara, 1982; Piper & Leicester, 1983; Söderman, 1993). Another typical feature of these results as illustrated in the figure is the slightly elevated proportion of null responses (7.9%) for NNS respondents. Only 0.4% of NS responses fell into this category. Response patterns to nouns with or without L1 loanword equivalents are examined below.

3.2 Responses to Loanword Stimuli

The hypothesis predicted that NNS respondents would produce proportionately more orthographic and null responses to stimuli with recognizable loanword equivalents in their L1 than to those without such equivalents. To test this, NNS response patterns to nouns with or without loanword equivalents were examined. NNS responded to the four non-loan nouns (i.e., *tree, desk, chair, and car*) with non-semantic responses (i.e., orthographic or null responses) 18 times ($M = 0.18$; $SD = 0.44$). The eight nouns with loanword equivalents consisted of the four frequent loanwords (*artist, cracker, card, and waitress*) as well as the four infrequent

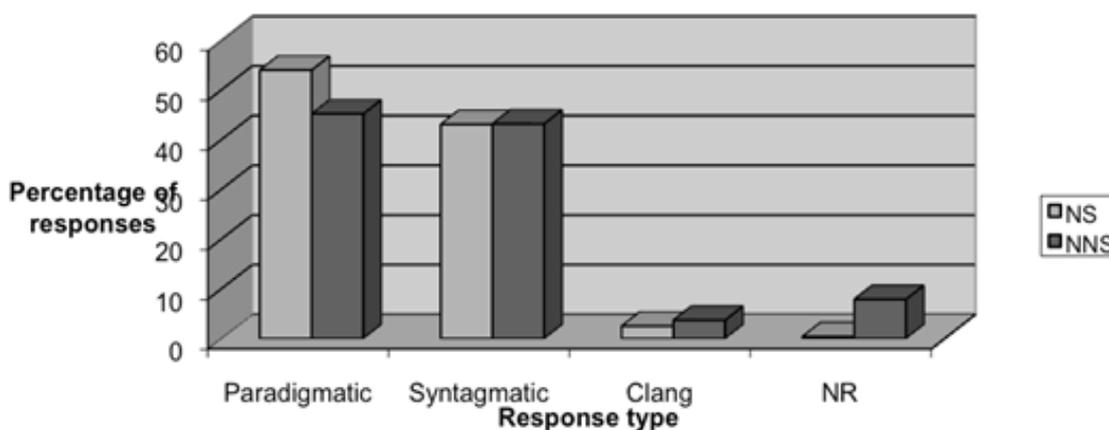


Figure 2. Percentage of response types per respondent group.

loanwords used by Racine (2008; *orchestra*, *asbestos*, *escalator*, and *helicopter*). NNS responded to these eight stimuli with non-semantic responses 98 times (weighted average = 0.54; $SD = 0.63$). A t -test revealed this difference to be significant ($t = 5.55$, $p < .001$, $df = 90$), thus supporting the hypothesis: Japanese NNS do in fact respond proportionately more often with non-semantic responses to items which have loanword equivalents in Japanese than to those without such equivalents.

To further examine the differences between responses to these two groups of nouns, those with L1 loanword equivalents were analyzed separately. The nouns with relatively infrequent loanword equivalents elicited non-semantic responses 48 times ($M = 0.53$, $SD = .82$). The more frequent loanword equivalents elicited non-semantic responses 50 times ($M = 0.55$, $SD = 0.75$). Table 2 displays the results of t -tests comparing these two groups' responses with the responses to non-loanword nouns as well as to each other. The table shows no significant difference between the numbers of non-semantic responses to the two noun groups with loanword equivalents. However, the table does show that this study replicates the results of Racine (2008) in that the infrequent loanwords once again elicited significantly more non-semantic responses than did the nouns without loanword equivalents. A more powerful test of this hypothesis is also illustrated in the table where even the items with simpler/more frequent loanword equivalents are seen to have led to significantly more non-semantic responses than did the non-loan items. This provides further support for the hypothesis and indicates that it was not merely the influence of the relative difficulty/infrequency of Racine's original loanwords that produced the effect. Even substantially simpler or more

frequent nouns with L1 loanword equivalents elicit a large number of non-semantic responses from second language learners.

Discussion

Loanword associations have received very little attention in the WA literature thus far. It was with this in mind, along with the desire to test Racine's (2008) cognitive process model for loanword associations that loanword stimuli were examined again here. Racine's process model for loanword associations (Figure 1) was based on his counterintuitive finding that NNS respondents appeared to be less able to offer semantically-related responses to noun stimuli with loanword equivalents in their L1 than to those without such equivalents. As I have argued above, however, that study may have been confounded by the use of overly difficult or infrequent loanword stimuli (*helicopter*, *orchestra*, *asbestos*, and *escalator*). If these stimuli were simply too difficult for the NNS respondents (i.e., too phonemically complex or, perhaps, completely unknown), then of course participants would not be able to respond with semantically related responses.

4.1 Validating the Phonemic-check Model

This study attempted to address this concern by including stimuli with loanword equivalents from phonemically simpler, more frequent words (*artist*, *cracker*, *card*, and *waitress*). However, when responses to either the frequent or infrequent loanwords were compared to those of the *non-loan* noun stimuli, both of the loanword stimulus groups had elicited significantly more non-semantic responses. That is, despite the presence of semantic equivalents in their L1, and regardless of the frequency of the stimulus words, Japanese respondents did not generate more semantically related responses. In other words, loanword equivalents in the L1 lexicon

Table 2. Results of t tests comparing NNS non-semantic responses to loanword and non-loanword noun stimuli.

Stimulus groups compared (mean response proportions)	t scores
infrequent loanword (.53) = frequent loanword (.55)	$t = 0.22$
infrequent loanword (.53) > non-loanword (.18)	$t = 4.47^*$
frequent loanword (.55) > non-loanword (.18)	$t = 4.39^*$

Note. $Df = 90$ * $p < .001$

do not appear to provide any additional advantage in eliciting responses related to the meanings or usage of the L2 stimuli. Indeed, it is possible that as cognitive resources are taxed during the processing of the phonemic characteristics of these stimuli, respondents are left unable to further process the meaning of the stimuli. This finding provides support for the hypothesis and replicates the results of Racine (2008). Besides the expenditure of cognitive resources as the determining mechanism for WA responses to loanwords, another means of accounting for these findings involves the salience of phonology in the minds of the respondents: If participants do in fact initiate a phoneme-by-phoneme check when encountering stimuli with loanword cognates in their L1, the resultant increase in the salience of phonological and orthographic connections between the stimulus and its loanword equivalent may result in a greater likelihood of clang and orthographic responses. In other words, the phonemic check may make formal features of the stimulus more salient to the respondent, thus resulting in an abundance of phonologically- and orthographically-related responses.

Although Racine had initially hypothesized the opposite effect – that loanwords would elicit more semantically related responses than would stimuli without loanword equivalents – it seems now that the opposite finding is quite robust. While the phonemic check model appears to account for the results well, further research is necessary to determine whether it is a depletion of cognitive resources that results in these findings or whether it is the enhanced salience of phonological features that underlies the processes described in the model above.

4.2 Stimulus Frequency and Difficulty

The careful selection of stimuli is crucial to the investigation of loanword associations. As noted above, the current study attempted to address the gap left in the wake of Racine's (2008) research where an attempt was made to compare non-semantic responses to quite frequent nouns (*hospital, morning, rabbit*) with those of rather infrequent nouns having loanword equivalents (*helicopter, asbestos,*

orchestra, escalator). It appeared as if loanword equivalents were taxing the cognitive resources of NNS as they initiated a phoneme-by-phoneme check of loanword stimuli, but in hindsight, strong conclusions seem unjustifiable. The current investigation attempted to rectify this discrepancy by utilizing less complex loanword nouns, but here too, no objective measure was taken to determine if these new stimuli were really understood by the NNS respondents. In other words, while *artist, card, cracker,* and *waitress* were presumed to be easily understood by the NNS participants, no objective measure was taken to determine if this was truly the case. Although NNS responded to these loanwords with proportionately more non-semantic responses than to nouns without loanword equivalents (providing support for the hypothesis), it is difficult to precisely determine whether this actually supports the phonemic-check model described above or not. If the subjects simply did not understand the loanwords, the proportion of orthographic and null responses would necessarily increase. This would not be due to the taxing of cognitive resources by way of a phoneme-by-phoneme process of confirming the equivalence of the loanword. This would simply be due to respondents' inability to respond to an unknown stimulus with a semantically-related response. Thus the hypothesis can be more clearly tested in future studies by administering a vocabulary test after the word association trials. In this way, responses to stimuli that were simply not understood by the participants could be ignored.

4.3 Stimulus Comprehension vs. Phonemic Recognition

Another issue that needs to be addressed before the phonemic-check model can be fully accepted concerns whether phonological encoding actually occurs independently of lexical comprehension. In the model proposed here, NNS respondents initiate a phoneme-by-phoneme check when encountering a stimulus that appears to have an equivalent loanword in their L1 (Figure 1). This process is followed by a second process in which the meaning of the stimulus is confirmed. The

problem is, however, that in initially recognizing potential similarities between the stimulus and the L1 word, respondents may have already brought many of the processes involved in comprehension to bear on the stimulus. That is, respondents have at least partially processed the meaning of the stimulus before even initiating the phonemic-check. Although it is beyond the scope of this paper to fully elaborate on this issue, psycholinguists and experimental psychologists have long acknowledged the many top-down and bottom-up processes that are initiated when encountering text or speech. Despite a great deal of research in this area, however, the precise role of phonological processes in lexical access and word comprehension is still very much unresolved and it is unclear whether these processes are initiated serially or in parallel (e.g., Kleiman, 1975; Paap, Newsome, McDonald, & Schvaneveldt, 1982; Rumelhart & McClelland, 1982). Only after a thorough examination of these issues can the phonemic-check model be considered truly validated.

Further Research and Conclusion

I have already raised a number of issues that require consideration if research into the cognitive processes involved in loanword comprehension is to make progress through the use of the WA methodology. For example, it is clear from the inconclusive findings of Racine (2008), that stimulus selection must be given careful consideration before strong conclusions may be drawn from the results of this kind of WA research. Also, as I have explained above, further studies in this area should be designed in a manner that yields results providing support for either the notion of cognitive resource depletion that was originally posited in the 2008 study, or the notion that salience of phonological features of the stimuli ultimately underlie the WA process for loanwords.

Another potentially rewarding research thread for the WA paradigm involves measuring the reaction time (RT) between the onset of a stimulus and its subsequent response. With very few exceptions (e.g., Fitzpatrick & Izura, 2011), the RT

methodology has been underemployed in WA research to date, as it has in linguistic research in general. It is clear, however, that this may become a very useful tool in testing the cognitive model proposed above. If the phonemic-check model for loanwords (Figure 1) is correct, then NNS must require longer latencies to process longer loanwords. Moreover, the elicitation of semantic responses should, on average, take longer than clang/orthographic responses, as semantic responses require the completion of more sub-processing. Measuring RTs during loanword WA trials may prove to be a very fruitful approach to examining the L2 learner's lexical process. Indeed, it may be just such psycholinguistic approaches to the traditional WA research paradigm that will yield the most rewarding results in future studies. The measurement of RT may aid researchers in their attempts to more accurately discern the processes involved in the WA process in general and the cognitions involved in loanword associations in particular.

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