The acquisition of concrete, abstract, and emotion words in a second language

Jeanette Altarriba¹ and Dana M. Basnight-Brown¹,²
¹University at Albany, State University of New York, USA
²United States International University, Nairobi, Kenya

Abstract
The purpose of the current work was to investigate whether wordtype moderates the learning of vocabulary words in a new language. English-speaking monolinguals were trained on a matched set of concrete (e.g., jewel), emotion (e.g., angry), and abstract (e.g., virtue) words in Spanish. Participants learned a set of Spanish words and then engaged in a Stroop color-word task where they determined the color in which the words appeared (none were related to color). They also engaged in a translation recognition task where foils included semantic associates of the newly acquired word. Results indicated that although the semantic representations of all three wordtypes were acquired, there was a gradient in the degree to which those meanings were automatically activated. The pattern of data indicated that newly learned emotion words vs. non-emotion words produced faster color naming times, longer recognition times, and higher error rates in recognition.

Keywords
abstract words, concrete words, emotion words, second language acquisition

1 Introduction
One of the goals of the current investigation was to uncover the ways in which various wordtypes (concrete, abstract, and emotion) may be acquired, and to discover whether or not there is a gradient in learning these words. That is, is it possible that certain wordtypes acquired in a new language are learned more easily than others? If this is indeed the case, then methods of learning a new language can be directed towards enhancing the memory representation for those wordtypes that are not learned as easily as others.

In first language (L1) acquisition, concrete words (e.g., table, paper) are typically learned prior to abstract words (e.g., liberty, myth) (Schwanenflugel, Akin, & Luh, 1992). Concrete words have also been shown to be processed faster and remembered better than abstract words. Paivio and
colleagues have argued that this benefit for concrete words stems from the fact that they are coded in terms of both a verbal label and an image – Dual Coding Theory (Paivio, 1986). Schwanenflugel et al. (1992) noted that the advantages demonstrated by concrete words may also stem from the fact that concrete words have greater ‘context-availability’ than abstract words. It is typically easier to think of a context in which concrete words appear than it is to think of a context in which a given abstract word appears. Thus, context acts as a cue or aid to the retrieval of concrete words more so than for abstract words. However, little is known regarding the acquisition of emotion words – words that either label an emotion (e.g., happy) or evoke an emotion (e.g., prison).

Research comparing concrete and abstract words to an additional wordtype – emotion – has revealed that words describing an emotion produce higher rates of recall and are rated as being less concrete as compared to concrete words, but higher in imageability as compared to abstract words (Altarriba & Bauer, 2004). That is, there is evidence to suggest that concrete, abstract, and emotion words are processed and represented differently within a first language. Within fluent, Spanish–English bilingual speakers, Altarriba (2003) reported that ratings of context-availability were higher for emotion words that were presented in a bilingual’s first language as compared to cases in which those same words were presented in a second language. To date, however, there have been no empirical studies of the acquisition of a second language that have included all three wordtypes – concrete, abstract, and emotion.

The purpose of the current study was to examine whether different wordtypes, specifically, concrete, abstract, and emotion words, are acquired differently in a second language. Native speakers of English were trained on items in Spanish and were later tested on these items in a color determination task (i.e., the Stroop color word task) and in a recognition task. A recognition task, was also used to assess the differential learning of these three wordtypes after an initial learning phase (Ferré, Sánchez-Casas, & García, 2000). Should the interference produced by either the Stroop task or the recognition task produce different findings across wordtype, it may be concluded that indeed, these words are acquired and represented in different ways in a second language. Specifically, newly acquired emotion words may produce longer recognition times and/or may be named faster, as they are not likely to be encoded as strongly as they could have been if learned within a specific context, as in real-world situations.

2 Method

2.1 Participants

The participants were 60 students from the University at Albany, State University of New York, who completed this study in partial fulfillment of the introductory to psychology course requirements. All were monolingual English speakers with no known reading or speech disorders, and all had normal or normal-to-corrected vision and no color blindness. All individuals were screened on Ishihara’s (1939) test of color blindness and completed the Beck Depression Inventory II (BDI-II – Beck, Steer, & Brown, 1996). Nine individuals who scored greater than 13 on this measure were not included in the analyses.

2.2 Materials

There were 24 English words selected: 8 concrete items (e.g., ankle), 8 abstract items (e.g., virtue), and 8 emotion items (e.g., scared). All concrete words were members of the same semantic category (i.e., body parts) and were selected from the Battig and Montague (1969) norms. According
to the Bradley and Lang norms (1999), all emotion words were negatively valenced (mean of 2.54 on a 9-point scale) and high in arousal (mean of 6.07 on a 9-point scale). It is important to note that in the current work, the emotion stimuli were words that labeled an emotional state, as opposed to emotion-laden words (e.g., butterfly; cancer; prisoner).

All three wordtypes were matched on frequency and length in English (Kučera & Francis, 1967). In accordance with the pattern observed by Altarriba and Bauer (2004), concreteness and imageability norms for this subset of items revealed significant differences between the three wordtypes. Concreteness ratings were significantly higher for concrete words ($M = 5.62$) as compared to both abstract ($M = 3.21$) and emotion ($M = 3.01$) words. Imageability ratings were highest for concrete words ($M = 6.86$), followed by emotion words ($M = 5.51$), and lowest for abstract words ($M = 2.43$; differences were significant across all three wordtypes). The Spanish translations of these words (all noncognates) were matched on length across the three wordtypes.

2.3 Procedure

Each participant was tested individually, and each session began with a learning phase where each Spanish word was presented visually and auditorily, one at a time (e.g., Altarriba & Mathis, 1997). In each trial, a ‘+’ sign or fixation appeared in the center of the screen for 500 ms (milliseconds). Following the fixation, the Spanish word appeared in the center of the screen for 500 ms. Then, the English translation appeared one line below the Spanish word. Both words then remained on the screen for an additional 7500 ms. During this visual presentation, participants heard the word pairs repeated twice. All words had been recorded by a native Spanish-speaking, Spanish-English bilingual, female speaker. The intertrial interval was 1 second. Participants learned the Spanish translations in three sets of eight, and each set was studied three times in a row.

After viewing/listening to three continuous rounds of the first set of eight items, participants completed two forms. One form contained all eight English words listed at the top, and participants wrote the appropriate English translation next to each Spanish word. Their errors were pointed out, and then, participants were given a list of the eight Spanish words and were asked to choose the word that best fit a given English sentence. Once again, the experimenter pointed out any incorrect responses. Once these two tests were completed and corrected, participants learned the second set of eight items. Two additional forms identical to the ones described for the first set were administered. The same procedure was completed for the third and final set of eight items.

Once all of the learning cycles and corresponding forms were completed, each individual was given two overall tests (one with words to match, and another with definitions) that included all 24 newly acquired words. Only individuals who scored 90% or higher on the final two tests were included in the analyses, simply because the acquisition of the wordtypes should be examined only in those who truly learned and mastered the new items. There were 13 participants who did not reach this criterion.

Once the acquisition phase was finished, the color-naming and recognition tasks were completed (with each task being counterbalanced across participants). In the color-naming task, participants were required to make a key press denoting the ink color of the word presented. Words appeared in red, white, green, or yellow ink (i.e., keys ‘z’, ‘x’, ‘m’, and ‘,’ respectively). There were four lists constructed, each containing the same 24 words, but with the presentation of each word appearing in a different ink color in each list. On each trial, a fixation appeared in the center of the screen followed by the Spanish word. Each word remained on the screen until the participant responded or for a maximum of 2000 ms. After each response, the word ‘CORRECT’ or ‘INCORRECT’ appeared on the screen for 1000 ms. Participants were given practice.
In the recognition task, a fixation appeared in the center of the screen followed by the Spanish–English word pair which remained until the participant responded or for a maximum of 2000 ms. Participants were instructed to press the ‘z’ key if the two words were the correct translations of each other (e.g., hips-caderas) or the ‘m’ key if they were not (feedback was presented on each trial). Incorrect trials were created in two ways: (a) as a semantic foil, where an incorrect English word highly associated to the correct English word was paired with the Spanish item (e.g., waist–caderas), or (b) as an unrelated pair, where there was no semantic overlap between the Spanish and English words (e.g., boxer-caderas). All incorrect word pairings (semantic foils and unrelated) were matched on frequency and length. All items in the semantic foil condition were selected from the Nelson, McEvoy, and Schreiber (1998) norms. Each word chosen was the highest associate listed.

3 Results

Separate analyses of variance (ANOVAs) were conducted on the latency and the error rate data for participants \(F_1\) and items \(F_2\). Reaction times more extreme than 3 standard deviations from the participant’s mean were treated as outliers and deleted (< 4%). Only effects significant at \(p < .05\) or stronger are reported in the following.

3.1 Color-naming task

Planned comparisons conducted on the response latencies to the different wordtypes revealed that emotion words were responded to significantly faster \((M = 684, SD = 154)\) than concrete \((M = 717, SD = 148)\) \([t_1(37) = 2.356, p = .02; t_2(7) = 2.598, p = .03]\) and abstract words \((M = 716, SD = 158)\) \([t_1(37) = 2.237, p = .02; t_2(7) = 1.70, p = .10]\). Error rates were consistently low (< 3% in each condition), and no differences in accuracy were observed across the three wordtypes.

3.2 Recognition task

In the recognition task, a 3 (Wordtype: emotion, concrete, abstract) × 3 (Condition: correct translation, semantic foil, unrelated) ANOVA was conducted on the response latency and accuracy data. For participants, wordtype and condition were treated as repeated measures factors. For items, condition was repeated, while wordtype was a between subjects factor. The results revealed a main effect of wordtype \([F_1(2, 36) = 19.394, p < .001; F_2(2,22) = 6.453, p < .01]\), indicating that the concrete items were responded to faster than the abstract and emotion words. For correct responses, differences emerged between the wordtypes for participant data, such that concrete word pairs were responded to significantly faster than abstract \([t_1(37) = 2.067, p < .05]\) and emotion word pairs \([t_1(37) = 4.527, p < .01]\) (see Figure 1). In addition, correct responses for abstract word pairs were responded to significantly faster than correct responses for emotion word pairs \([t_1(37) = 2.375, p < .05]\). Most importantly, planned comparisons revealed that for incorrect responses, concrete semantic foils significantly differed from concrete unrelated pairs \([t_1(37) = 2.831, p < .01; t_2(7) = 2.518, p < .05]\), abstract semantic foils differed from abstract unrelated pairs \([t_1(37) = 2.883, p < .01; t_2(7) = 1.494, p = .18]\) and emotion foils differed from emotion unrelated pairs \([t_1(37) = 4.578, p < .01; t_2(7) = 3.091, p = .01]\).

Differences between the three wordtypes also emerged in the error data (see Figure 2). Results from the ANOVA conducted on the error rates revealed a main effect of wordtype \([F_1(2, 36) = 11.904, p < .001; F_2(2,22) = 4.047, p < .05]\) and of condition \([F_1(2, 36) = 30.442, p < .001; F_2(2, 22) = 20.532, p < .01]\). The interaction between wordtype and condition was also reliable \([F_1(4, 34) = 3.553,\)
In the planned comparisons, differences in error rates for the incorrect responses emerged for all three wordtypes (i.e., more errors observed for semantic foils as compared to unrelated incorrect responses) [concrete: $t_1(37) = 2.615, p = .01; t_2(7) = 3.086, p = .02$; abstract: $t_1(37) = 3.019, p < .01; t_2(7) = 3.386, p = .01$; emotion: $t_1(37) = 5.946, p < .001; t_2(7) = 4.667, p < .01$]. Furthermore, error rates for the semantic foil condition produced differences between the wordtypes, with emotion semantic foils eliciting significantly more errors than concrete [$t_1(37) = 4.486, p < .01; t_2(7) = 3.335, p = .01$] and abstract semantic foils [$t_1(37) = 3.253, p < .01; t_2(7) = 2.011, p = .08$].

4 Discussion

The current findings suggest that the three wordtypes – concrete, abstract, and emotion – were not acquired in the same way, even though the same basic mode of acquisition was used to teach these words in a new language. In the Stroop task, faster response times were produced for emotion words as compared to concrete and abstract words. These results contrast the typical emotional Stroop effect that has been reported for fluent speakers of a first language (i.e., slower response times for emotion words as compared to neutral words). The current finding suggests that emotional stimuli, when newly acquired, do not capture attention as quickly as concrete and abstract words in
the timecourse of processing, since they do not produce the interference effects that have been reported in typical emotional Stroop tasks. However, this is not entirely surprising given that these emotion words do not possess as strongly and richly developed a semantic component as do those emotion concepts that have been experienced over a long period of time in varying contexts.

Data from the recognition task suggest that the semantic representations for all three wordtypes were encoded to some degree, as the recognition data revealed the greatest interference when rejecting semantic foils as compared to unrelated foils (for all three wordtypes). Therefore, it appears that semantic information was encoded for each of the three wordtypes at some level, but perhaps just not enough for the emotion words to elicit an interference effect in the Stroop task. In addition, further examination of the responses to the emotional stimuli in the recognition task reveals that even though semantic foils were responded to significantly slower than unrelated foils, the participants were consistently slower to respond to emotion words across all recognition conditions. This suggests that, like the finding from the Stroop task, the general representation for emotion words is weaker overall, causing participants to be slower to recognize emotion words overall as compared to concrete and abstract words.

Most important, the current data demonstrate a gradient with regards to the acquisition of the different wordtypes, further suggesting that a representational difference exists between these three types of words. The presence of a representational difference for these newly acquired words contributes to previous studies that have examined the level of semantic activation during L2 processing. Moreover, the current article provides the first demonstration of this gradient in the acquisition of a new, second language where emotional stimuli have been learned.

While research on the acquisition of emotion vocabulary in a second language is in its infancy (Dewaele, 2006), researchers have suggested that second language users are often hindered by their limited emotion vocabularies especially when they need to express anger or frustration. We know from studies of word representation in bilinguals (see e.g., Altarriba, 2003; Pavlenko, 2008) that emotion words in particular appear to be more deeply encoded in the native language, likely because of the strong connections between those words and the context in which they are learned. Thus, the implication from the current data is that emotion words in a second language should be presented within a context – written, spoken, visual – that complements the valence of that word to again form a kind of ‘cue environment’ that could facilitate later retrieval or recognition of that particular word. The current work further emphasizes the importance of method of instruction on the efficiency with which a second language is acquired – a topic of important debate, in the language acquisition literature (cf. Laufer, 1998).

References


About the authors

Jeanette Altarriba, PhD, is a professor in the Department of Psychology and Chair of the Department of Psychology at the University at Albany, State University of New York. Dr. Altarriba is well published in the areas of bilingualism, language acquisition and language learning, and cognition and emotion. She has authored and co-authored numerous research articles and book chapters, and her work has appeared in various national and international venues such as the Journal of Memory and Language; Emotion; Memory & Cognition; Memory; Experimental Psychology; Behavior Research Methods; Perception & Psychophysics; Cognition & Emotion; the International Journal of Bilingualism; and Bilingualism: Language and Cognition. She has edited and co-edited several volumes of work: Cognition and Culture; An Introduction to Bilingualism: Principles and Processes; and Sentence Processing in Bilinguals. Her newest co-edited work, Memory, Language, and Bilingualism: Theoretical and Applied Approaches is soon to be published by Cambridge University Press. Additionally, Dr. Altarriba is the recipient of an Early Career Award from the American Psychological Association for Teaching and Training.

Dana M. Basnight-Brown, PhD, is a postdoctoral researcher and professor, whose primary research focuses on human memory and language processes, particularly within the domain of bilingualism. She has co-authored research articles that have appeared in journals such as Memory & Cognition; Journal of Memory & Language; The Mental Lexicon; Behavior Research Methods; Journal of Experimental Psychology: Learning, Memory, and Cognition; and Cognition & Emotion. She has also co-authored several chapters that appear in books on cognitive and psycholinguistic topics related to word recognition, morphological processing, and speech disorders. In addition to research, she has served as a lecturer or visiting professor at the University at Albany, Massachusetts College of Liberal Arts, College of Saint Rose, and Skidmore College. She currently serves as a full-time foreign faculty fellow at the United States International University in Kenya, East Africa.