Document Type: Original Article
https://dorl.net/dor/20.1001.1.26455455.2021.4.15.6.0 9

Iranian Journal of Learning and Memory 2021, 4(15), 77-83

The Cognitive Ease of Processing Semantically Related Words in Second Language Education

Vahid Rahmani Doqaruni, Ph.D.
Department of English Language and Literature, University of Gonabad, Iran

Abstract

The current study presents an alternative approach toward semantic relatedness research in second/foreign language (L2) education as it looks at the issue from a cognitive perspective. The participants were 35 intermediate English as a foreign language (EFL) learners. A semantic priming experiment was used to examine the cognitive processing of semantically related and semantically unrelated words. Repeated Measure ANOVA was run on reaction time and error rate data to establish any potential interaction between the primes and targets with reference to their semantic relatedness. The results showed that semantic relatedness does exercise a noteworthy influence on the ease of cognitive processing of L2 words. This facilitative effect is reflected in faster responses and lower errors on the part of the EFL learners when they dealt with semantically related words in comparison to semantically unrelated words, and can be attributed to the core mechanism of activation of lexical items in the human mind.

Keywords: Cognitive Processing, Facilitative Effect, Semantic Relatedness, Semantic Priming Experiment

Receive Date: 29 May 2021
Revise Date: 22 August 2021
Accept Date: 29 September 2021
Publish Date: 01 October 2021

Iranian Journal of Learning & Memory is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

Corresponding Author: Vahid Rahmani Doqaruni
Email: rahmani@gonabad.ac.ir

How to Site: Rahmani Doqaruni, V. (2021). The Cognitive Ease of Processing Semantically Related Words in Second Language Education. *Iranian Journal of Learning & Memory*, *4*(15), 77-83. https://dorl.net/dor/20.1001.1.26455455.2021.4.15.6.0 9

Introduction

Vocabulary instruction has received particular attention in the field of second/foreign language (L2) education in the last few decades (Beck et al., 2013; McKeown et al., 2012; Schmitt, 2008). However, despite much progress in the field with respect to vocabulary instruction, there is not a general consensus on what makes teaching and learning vocabulary more effective by teachers and learners, respectively. It has been argued that the way different words are presented to L2 learners might be the key to success in L2 vocabulary instruction (Beck et al., 2013).Therefore, grouping semantically related words in textbooks is a popular practice in the field of L2 education (Finkbeiner & Nicol, 2003). In fact, as Ibarrola and Gordo (2015, p. 26) pointed out, "we are so used to this approach that it would be hard to think of a different way to design and organize textbook and classroom contents". In the same way, L2 teachers also prefer to present new words and expand their students' vocabulary knowledge by using semantic relatedness practices and exercises, probably because this was how they learned an L2 as learners (Jiang et al., 2020). Semantically related groups are defined as the collection of words which share semantic and syntactic similarities (Tinkham, 1997). For example, words such as *apple*, *orange*, *pear*, *peach*, and *banana* form a semantically related group as they all fall under the superordinate concept *fruit* and belong to the same syntactic word class, i.e. *nouns*.

Despite such popularity, the results of the previous research on the benefits of presenting semantically

related words are controversial. While some studies consider teaching semantically related words more effective in comparison to semantically unrelated words (e.g., Hashemi & Gowdasiaei, 2005; Hoshino, 2010; Jullian, 2000), some others support the superiority of presenting semantically unrelated words over semantically related words (e.g., Erten & Tekin, 2008; Finkbeiner & Nicol, 2003; Papathanasiou, 2009; Wilcox & Medina, 2013). According to Papathanasiou (2009, p. 315), "we do not have enough convincing evidence to decide which of the two contrasting approaches to learning vocabulary is the more useful and appropriate for L2 vocabulary teaching". Due to such controversies, the idea of presenting vocabulary in semantic sets calls for further research in the field of L2 education.

Moreover, in order to get a new insight into semantic relatedness research, the current study presents a totally different approach from the previous studies as it looks at the issue from a cognitive perspective. More specifically, this alternative approach investigates English as a foreign language (EFL) learners' cognitive processing of semantically related and unrelated words. Cognitive processing refers to different functions of the mind which are assumed to be involved in the acquisition, storage, interpretation, manipulation, transformation, and use of knowledge (Krch, 2011). This is of particular importance because the effectiveness of any procedure of vocabulary learning or teaching is analyzed with respect to its power to stimulate the lexical items (Schmitt, 2008), which can be measured by designing and conducting cognitive studies. Despite this fact, the previous studies on semantically related/unrelated words have mainly focused on either their learning (e.g., Hashemi & Gowdasiaei, 2005; Hoshino, 2010; Ibarrola & Gordo, 2015; Papathanasiou, 2009), recall (e.g., Erten & Tekin, 2008), or retention (e.g., Wilcox & Medina, 2013). Hopefully, this new perspective would result in a better understanding of the complicatedness of vocabulary in relation to semantically related and unrelated words.

Research Questions

The present study aimed to find answers to the following research questions:

1) What is the effect of semantic relatedness on cognitive processing of L2 semantically related and semantically unrelated words?
2) What might be the possible reasons for such an effect?

Literature Review

There are two opposing camps in the field of L2 education with respect to teaching semantically related words and semantically unrelated words. One group of researchers is in favor of the beneficial effect of presenting L2 vocabulary in semantically related sets. In this way, Jullian (2000) conducted a classroom activity on the study of word meaning which explicitly taught semantically related vocabulary. Her findings showed that teaching words in lexical-sets enhanced the Chilean EFL students' vocabulary knowledge as they understood the meaning of the related words better and incorporated them into their L2 lexicon faster. Hashemi and Gowdasiaei (2005) investigated the effectiveness of vocabulary instruction through semantically related and semantically unrelated sets in an Iranian EFL context. They found out that students in the semantically related set group improved significantly in comparison to their peers in the semantically unrelated set group. Hoshino (2010) compared five types of word lists (synonyms, antonyms, categorical, thematic, and arbitrary) in a Japanese EFL classroom context to find out which of them facilitated L2 vocabulary learning. It was found that learning the words in the categorical list (i.e. related set) was more effective than other lists.

On the other hand, there are researchers whose findings are against packaging semantic related vocabulary in L2 textbooks and inside classrooms. For example, Finkbeiner and Nicol (2003) found a negative effect of learning semantically related L2 words when they were grouped together in translation tasks. More specifically, it was found that participants took longer when they translated semantically related words in comparison to their semantically unrelated counterparts. Conducting a study in a Turkish EFL setting, Erten and Tekin (2008) found similar results with reference to their subjects' word-picture matching test scores. Both of the immediate and delayed tests in their study revealed that learning words in semantically unrelated sets is significantly better than learning words in semantically related sets. Taking into account the participants' level and age, Papathanasiou (2009) compared the effectiveness of semantically related and semantically unrelated sets. Although no significant difference in test scores was found for the intermediate children, the results demonstrated that presenting new words in semantically related sets impeded L2 vocabulary learning of the adult beginners. Wilcox and Medina (2013) studied the simultaneous effect of semantic and phonological clustering on novice learners of Spanish as a Foreign Language. Both the immediate and delayed tests showed that participants had difficulty in learning

words when they were presented in semantic sets without phonological similarities.

Method

Participants

The participants were Iranian EFL learners from intermediate classes at a private language teaching school in Mashhad, northeastern Iran. Their ages ranged from 13 to 16 and were recruited for the study through invitation. In order to make sure that the participants in the study had the same proficiency level, a modified paper-based version of the Test of English as a Foreign Language which is simply called TOEFL (consisting of only structure and written expression and, reading comprehension sections) was taken from 41 students. The TOEFL is one of the most well-known and broadly recognized tests of English proficiency all around the world. Although previous research has shown that the TOEFL is a highly reliable test (e.g., Wainer & Lukhele, 1997), its reliability score was calculated for the present study which was .87.

Following the TOEFL results, 35 students (19 females and 16 males) were selected. In other words, 35 students could get the cut-off score of 15 and above for both structure/written expression and reading comprehension sections and successfully passed the test. They were all born and lived in Iran at the time of the experiment and spoke Persian as their native language. They all gave informed consent to participate in the study.

Task

This study adopts a quantitative research design. It specifically used a semantic priming experiment to examine the cognitive processing of semantically related and semantically unrelated words. In this task, participants see a pair of words presented one after each other, and are asked to decide whether or not the second word is related in meaning to the preceding word. The first word is referred to as the *prime* and the second one is called the *target*. In order to design and perform the experiment, PsychoPy (version 3), was employed.

Stimuli

In the present study, the semantically related stimuli consisted of the congruent noun-adjective dyads, for example: *Cake-Delicious* (positive prime, positive target) or *Accident-Tragic* (negative prime, negative target). On the other hand, semantically unrelated noun-adjective dyads were constructed by preceding target adjectives with semantically unrelated prime nouns, for example: *Pleasure-Tragic* (positive prime, negative target) or *Killer-Delicious* (negative prime, positive target).

Following the mentioned procedure, a set of 60 nouns (30 positive and 30 negative) and 30 adjectives (15 positive, 15 negative) were paired into 60 noun-adjective dyads in this study (for a complete list of noun-adjective dyads, see Appendix A). Half of the noun-adjective pairs were related in meaning and half unrelated in meaning. The noun-adjective dyads used in the present study were adopted and adapted from Jonczyk (2016).

The prime nouns and target adjectives were matched regarding the variables of valence, arousal, concreteness, frequency, and word length (for details on measuring these criteria see chapter 5 of Jonczyk, 2016). Considering relatedness, before the experiment, 33 intermediate EFL learners from the same private language school rated the relatedness of all noun-adjective dyads on a Likert scale from 1 (not related at all) to 6 (totally related). The results showed that related noun-adjective dyads were highly related (M = 5.57, SEM = .04), and unrelated noun-adjective dyads were highly unrelated (M = 1.52, SEM = .06).

Procedure

The participants were seated in a comfortable chair 100 cm away from a laptop monitor in a quiet room. They were asked to read a sequence of two words appearing on the screen (first, a noun and then, an adjective) and decide upon the presentation of the second word whether or not the two words were semantically related, by pressing an appropriate button on the keyboard. To make sure that the participants understood the procedure, prior to the experiment, a practice session was performed on 20% of similar data. In the actual experiment, participants completed one block of trial in their L2 (i.e. English). None of the noun-adjective dyads was repeated in the course of the experiment.

Each noun-adjective dyad was preceded by a fixation point that lasted 2000 milliseconds (ms). Subsequently, a prime noun was presented for 1000 ms in the center of the screen followed by a target adjective. The target adjective stayed on the screen until participant responded, but no longer than 2000 ms. The trials were presented in randomized order in white letters (font Times New Roman, size 20) over grey background. The whole data gathering process took almost 10 minutes for each participant. During the experiment, the researcher was present at all times.

Data Analysis

SPSS (version 24) was used for data analysis. 2 (prime noun: positive, negative) × 2 (target adjective: positive, negative) Repeated Measure ANOVA was run on reaction time (RT) and error rate (ER) data to establish any potential interaction between the primes and targets with reference to their semantic relatedness.

Findings

Table 1 shows the means and standard deviations of RTs (in millisecond) and ERs (in percentage) for different conditions of semantic relatedness between prime nouns and target adjectives.

Table 1.
Means and Standard Deviations of RTs and ERs

	RT(ms)	SD	ER(%)	SD
Positive-Positive	1.016	.11	10.8	.15
Positive-Negative	1.083	.13	16.2	.07
Negative-Negative	1.033	.10	12.4	.17
Negative-Positive	1.052	.17	15.3	.09

As Table 2 reveals, regarding RT, the Repeated Measure ANOVA analyzing the relationship between prime noun and target adjective showed a main effect of prime noun, $F(1, 34)=4.631$, $p=.032$, $\eta^2=.14$. The follow-up analyses revealed a pattern so that the fastest RTs belonged to positive primes (M=.877ms, SE=.033), then negative primes (M=.941ms, SE=.015). The analysis also showed a main effect of target adjective, $F(1, 34)=4.842$, $p=.029$, $\eta^2=.15$. Participants responded faster to positive target adjectives (M=.855ms, SE=.011) than negative target adjectives (M=.927ms, SE=.017). The interaction between prime noun and target adjective was statistically significant, $F(1, 34)=11.534$, $p=.010$, $\eta^2=.25$. Follow-up pairwise comparisons revealed that positive prime nouns before positive target adjectives elicited faster RTs (M=1.016ms, SE=.11) compared to negative target adjectives (M=1.083ms, SE=.13). The negative prime showed a similar pattern as when it came before negative target adjectives, it led to faster RTs (M=1.033, SE=.10) compared to positive target adjectives (M=1.052ms, SE=.17).

Table 2.
Tests of Within-Subjects Effects in RT

	Mean Square	F	Sig.	Partial Eta Squared
Prime	.043	4.631	.032	.14
Target	.041	4.842	.029	.15
Prime* Target	.038	11.534	.010	.25

As Table 3 reveals, considering ER, the Repeated Measure ANOVA analyzing the relationship between prime noun and target adjective showed a main effect of prime noun, $F(1, 34)=15.975$, $p=.001$, $\eta^2=.27$, with the highest ER related to negative primes (M=14.5%, SE=.011) followed by positive primes (M=12.1%, SE=.021). Also, the analysis revealed a main effect of target adjective, $F(1, 34)=11.720$, $p=.005$, $\eta^2=.19$, showing that participants were more accurate at identifying positive target adjectives (M=13.7%, SE=.015) compared to negative target adjectives (M=14.8%, SE=.016). The data also showed a statistically significant relationship between prime noun and target adjective, $F(1, 34)=8.547$, $p=.033$, $\eta^2=.15$. Follow-up analyses revealed more errors to negative target adjectives preceded by positive prime nouns (M=16.2%, SE=.07), compared to positive target adjectives preceded by positive prime nouns (M=10.8%, SE=.15). Considering negative prime nouns, positive target adjectives resulted in higher ER (M=15.3%, SE=.09) than negative target adjectives (M=12.4%, SE=.17).

Table 3.
Tests of Within-Subjects Effects in ER

	Mean Square	F	Sig.	Partial Eta Squared
Prime	.027	15.975	.001	.27
Target	.035	11.720	.005	.19
Prime* Target	.048	8.547	.033	.15

Discussion

The present study aimed to find out the effect of presenting semantically related/unrelated words on EFL learners' cognitive processing. In this way, a semantic priming experiment was designed in which a prime word (a noun) preceded the target word (an adjective). As the results show, semantic relatedness does exercise a noteworthy influence on the ease of cognitive processing of L2 words. With reference to the results, it is suggested that semantic relatedness is likely to facilitate cognitive processing of L2 words in learners' minds.

This facilitative effect can be attributed to the core mechanism of activation of lexical items in the human mind. It has been hypothesized that the activation of a mental concept leads to co-activation of semantically close concepts in the mental lexicon, which is due to the semantic bonds of lexicon in the human mind (Levelt et al., 1999; Reed, 2004). Since the trials in the present study (i.e. prime noun and target adjective pairs) were closely semantically related, "the cross-association between the two SRL [semantically related] items might

be activated repeatedly due to the overlapping of their semantic meaning" (Jiang et al., 2020, p. 217). In this way, as it is possible to form patterns of interrelated words in mind, teachers have been advised to teach vocabulary items to their students that belong to the same semantic field by organizing related words under topics as advance organizers (Hashemi & Gowdasiaei, 2005; Jullian, 2000).

Additional support for the findings of the present study is provided by the *levels-of-processing theory* (Craik & Lockhart, 1972). With respect to this theory, as the information is processed at a variety of levels, the quality of the retention is affected by the amount of cognitive effort that is given to the process. Considering that it is easier for learners to organize or chunk words that are semantically related, it is argued that "it would be more likely that words are processed at a deeper cognitive level in the LS [lexical-set] method than in the SU [semantically-unrelated], in which words are presented sporadically, irrespective of other semantically-related items" (Hashemi & Gowdasiaei, 2005, p. 343). In the present study, this deeper cognitive processing is reflected in faster responses and lower errors on the part of the EFL learners when they dealt with semantically related words in comparison to semantically unrelated words.

A caveat is in order. At first sight, the findings might seem in contrast to some of the previous studies which have found negative effect of semantic relatedness in L2 education (e.g., Erten & Tekin, 2008; Finkbeiner & Nicol, 2003; Papathanasiou, 2009; Wilcox & Medina, 2013). However, it is worth noting that most of these studies have focused on the effect of semantic relatedness on language acquisition which is completely different from the aim of the present study which has taken into account the cognitive processing of L2 words in semantic relatedness research. Not surprisingly, using a cognitive semantic priming task, which is a more appropriate methodological design for investigating the aim of the present study, has resulted in different, and not opposite, findings. In other words, the results of the present study provide a new insight into the present research on semantic relatedness from the new perspective of L2 cognitive processing.

Conclusions

Considering the complicatedness of vocabulary teaching and learning in L2 education, the previous researchers working on semantic relatedness have done a good job as they have designed complicated studies by taking into account multiple variables such as participants' level and age (e.g., Hashemi & Gowdasiaei, 2005; Papathanasiou, 2009), phonologically similar/different clusters (e.g., Wilcox & Medina, 2013), and counterbalancing of tasks (e.g., Finkbeiner & Nicol, 2003). However, to the best of my knowledge, no previous study has ever dealt with cognitive processing of semantically related words in L2. This is surprising because research has shown how effective a cognitive-based methodology can be for studying vocabulary in the L2 classroom (Boers, 2013) and the present study was a response to this need.

In this way, a semantic priming task was designed to test the effectiveness of presenting words in semantically related sets, and compare it to presenting words in unrelated sets in an Iranian EFL context. Although the previous research has found mixed results with respect to teaching semantic related words, the present study provides positive results in favor of cognitive processing of semantically related words in L2. Hopefully, the findings of the present study shed more light on the complicated nature of vocabulary in L2 education and provide further evidence of the benefits that cognitive approaches can afford to study L2 issues in the field.

According to the findings of the present study, it seems to be more beneficial to package words of related meaning together in textbooks as presenting words in semantically related sets, rather than semantically unrelated sets, may be cognitively more facilitating for L2 learners. This seems to be in line with the cognitively based organization of lexicon in the human mind (Levelt et al., 1999; Reed, 2004). In addition, a simple look at the commercial books on the market shows that presenting words in semantic clusters has gained support by many different methods and approaches to teaching and learning an L2. Meanwhile, material developers have found presenting semantically related words a more convenient way for designing L2 syllabi in comparison to semantically unrelated words. Moreover, it has been proposed that displaying the relationships among words in lexical-sets promotes L2 learners' conceptual vocabulary learning (Finkbeiner & Nicol, 2003), and helps them to gain linguistic awareness with reference to word meaning (Jullian, 2000). Yet, it can be assumed that teachers favor teaching words in semantically related sets as it is considered effective and useful. As Ibarrola and Gordo (2015, p. 34) summarized, *"Teaching vocabulary in semantically related sets follows the communicative needs of EFL learners, is reflected in the structure of textbooks and, consequently, it is simply much easier for teachers to teach words that are semantically related at the same time".*

Although the findings provide conclusive answers to the research questions, some limitations of the present study need to be acknowledged. For one, the present study was conducted with a small number of participants

from only one English language teaching school. Furthermore, only the intermediate-level students were recruited in the present study. To make sure that the findings of the present study are generalizable, replicate studies in various EFL contexts and with different proficiency students are necessary. For another, the design of the study only let to investigate the immediate effect of semantic relatedness on cognitive processing of L2 words. In other words, considering the design of the present study, it is not possible to say whether such an effect will remain over time.

Bearing these limitations in mind, it is suggested that this study be replicated in other educational settings to find out whether the results are generalizable. Meanwhile, in order to study the delayed effect of semantic relatedness on cognitive processing of L2 words, new methodological designs need to be created regarding this issue. In other words, although specific conclusions have been reached with respect to such an effect in immediate tests, this effect needs to be corroborated in delayed tests so that more significant educational implications are warranted. In this way, supplementary tests with an interval of two weeks or more could be used to gain a deeper insight into the effect of semantic relatedness on L2 learners' cognitive processing.

Conflicts of Interest

No conflicts of interest declared.

References

Beck, I., McKeown, M., & Kucan, L. (2013). *Bringing Words to Life: Robust Vocabulary Instruction*. New York: Guilford Press.

Boers, F. (2013). Cognitive Linguistic approaches to teaching vocabulary: Assessment and integration. *Language Teaching*, *46*(2), 208–224.

Craik, F. I. M., & Lockhart, L. S. (1972). Levels of processing: A framework for memory research. *Journal of Verbal Learning and Verbal Behavior, 11*, 671–684.

Erten, I. H., & Tekin, M. (2008). Effects on vocabulary acquisition of presenting new words in semantic sets versus semantically unrelated sets. *System*, *36*(3), 407–422.

Finkbeiner, M., & Nicol, J. (2003). Semantic category effects in second language word learning. *Applied Psycholinguistics*, *24*(3), 369–383.

Hashemi, R. H., & Gowdasiaei, F. (2005). An attribute-treatment interaction study: Lexical-set versus semantically unrelated vocabulary instruction. *Regional Language Centre Journal*, *36*(3), 341–361.

Hoshino, Y. (2010). The categorical facilitation effects on L2 vocabulary learning in a classroom setting. *Regional Language Centre Journal*, *41*(3), 301–312.

Ibarrola, A., & Gordo, M. A. (2015). Should EFL teachers present vocabulary in semantically related sets? *Porta Linguarum*, *23*, 25–40.

Jiang, M. Y., Jong, M. S., Tse, C., & Chai, C. (2020). Examining the effect of semantic relatedness on the acquisition of English collocations. *Journal of Psycholinguistic Research*, *49*, 199–222.

Jonczyk, R. (2016). *Affect-Language Interactions in Native and Non-Native English Speakers: A Neuropragmatic Perspective.* Cham: Springer International Publishing.

Jullian, P. (2000). Creating word-meaning awareness. *ELT Journal*, *54*, 37-46.

Krch, D. (2011). Cognitive processing. In J. S. Kreutzer, J. DeLuca, & B. Caplan (Eds.), *Encyclopedia of Clinical Neuropsychology* (pp. 627-627). New York: Springer.

Levelt, W. J. M., Roelofs, A., & Meyer, A. S. (1999). A theory of lexical access in speech production. *Behavioral and Brain Sciences*, *22*(1), 1–75.

McKeown, M., Beck, I., & Sandora, C. (2012). Direct and rich vocabulary instruction needs to start early. In E. Kame'enui & J. Baumann (Eds.), *Vocabulary Instruction: Research to Practice* (pp. 17-33). New York: Guilford Press.

Papathanasiou, E. (2009). An investigation of two ways of presenting vocabulary. *ELT Journal*, *63*(4), 313–322.

Reed, S. K. (2004). *Cognition: Theory and applications*. Belmont: Thomson Wadsworth.

Schmitt, N. (2008). Instructed second language vocabulary learning. *Language Teaching Research*, *12*, 329–363.

Tinkham, T. (1997). The effects of semantic and thematic clustering on the learning of second language vocabulary. *Second Language Research*, *13*(2), 138-163.

Wainer, H., & Lukhele, R. (1997). How reliable are TOEFL scores? *Educational and Psychological Measurement, 57*(5), 741-758.

Wilcox, A., & Medina, A. (2013). Effects of semantic and phonological clustering on L2 vocabulary acquisition among novice participants. *System*, *41*(4), 1056–1069.

Appendix A: Noun-adjective dyads

Positive-Negative	Prime	Target	Positive-Negative	Prime	Target
−;−	Fire	Burnt	+;+	Millionaire	Famous
+;−	Paradise	Burnt	−;+	Virus	Famous
+;+	Date	Romantic	−;−	Cemetery	Depressed
−;+	Fever	Romantic	+;−	Reward	Depressed
−;−	War	Dead	+;+	Joke	Funny
+;−	Waterfall	Dead	−;+	Nightmare	Funny
+;+	Puppy	Cute	−;−	Virus	Ill
−;+	Misery	Cute	+;−	Triumph	Ill
−;−	Orphan	Alone	+;+	Massage	Relaxed
+;−	Affection	Alone	−;+	Crisis	Relaxed
+;+	Sport	Healthy	−;−	Slaughter	Cruel
−;+	Tumor	Healthy	+;−	Birthday	Cruel
−;−	Explosion	Ruined	+;+	Fantasy	Incredible
+;−	Treasure	Ruined	−;+	Death	Incredible
+;+	Hug	Friendly	−;−	Disaster	Terrible
−;+	Hell	Friendly	+;−	Peace	Terrible
−;−	Crime	Horrible	+;+	Entertainment	Joyful
+;−	Love	Horrible	−;+	Vomit	Joyful
+;+	Miracle	Lucky	−;−	Infidelity	Unfaithful
−;+	Flood	Lucky	+;−	Duck	Unfaithful
−;−	Surgery	Injured	+;+	Childhood	Wonderful
+;−	Delight	Injured	−;+	Stress	Wonderful
+;+	Kiss	Passionate	−;−	Prisoner	Tortured
−;+	Poverty	Passionate	+;−	Spring	Tortured
−;−	Victim	Raped	+;+	Trophy	Proud
+;−	Food	Raped	−;+	Betrayal	Proud
+;+	Home	Safe	−;−	Widow	Lonely
−;+	Terrorist	Safe	+;−	Passion	Lonely
−;−	Corpse	Murdered	+;+	Chocolate	Satisfied
+;−	Respect	Murdered	−;+	Burial	Satisfied