

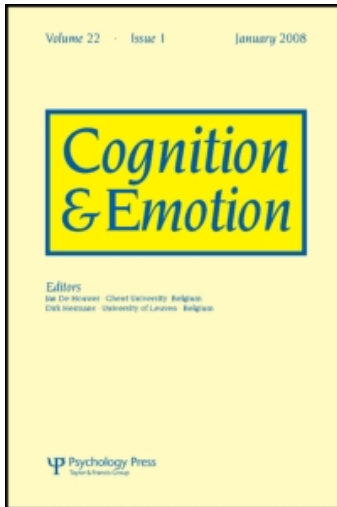
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### Does retrieval-induced forgetting occur for emotional stimuli?

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## Does retrieval-induced forgetting occur for emotional stimuli?

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Retrieval-induced forgetting (RIF) is a phenomenon where the retrieval of an item impairs memory for items associated to the retrieved item. This effect has been robustly demonstrated with a wide range of stimuli. A few studies have investigated this phenomenon with emotional memories for autobiographical life events and for pathology-specific memories in clinical populations. The present study investigated whether RIF would be observed for stimuli of positive and negative emotional valence in the normal population. On a recognition test, the effect was observed both on measures of accuracy and response time with neutral words, but no RIF was observed for words of negative and positive emotional valence. In addition, RIF was observed only for studied items and did not extend to all members of the studied categories. This observation was made possible by the use of a recognition task in the test phase, and is accounted for in terms of episodic inhibition (Racsmány & Conway, 2006).

**Keywords:** Emotion; Forgetting; Retrieval-induced forgetting; Recognition; Memory.

Recently, innovative experimental paradigms within the field of cognitive psychology have been employed to investigate the nature of inhibition in memory. An experimental design that makes possible the investigation of unconscious suppression of memories is the retrieval practice paradigm (Anderson, Bjork, & Bjork, 1994). Participants in these studies are not instructed to forget anything. On the contrary, they are requested to remember as much as possible, and it is the effect that retrieving memories has on related memories that unintentionally and unconsciously causes

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inhibition. In this design, participants study words divided into categories, e.g., the category *Fruit* with the exemplars: *orange*, *banana*, *apple*, etc., and the category *Professions* with the exemplars *nurse*, *accountant*, etc. In the second phase, participants engage in retrieval practice on half of the exemplars from half of the categories. That is, a particular participant might practise the retrieval of half of the exemplars in the *Fruit* category, e.g., *Fruit–orange* but not *Fruit–apple*, and none of the *Professions* exemplars. The retrieval practice of a given item is induced by making the participants complete cued stem-recall tests, e.g., *Fruit–or* \_\_\_\_\_. Finally, performance on a memory test is then examined for three item types: retrieval practised items (Rp+): *orange*; non-practised competitors from the same category (Rp–): *apple*; and baseline items from non-practised categories (Nrp): *nurse*.

It comes as no surprise that recall of the practised exemplars (Rp+) is better than the baseline exemplars (Nrp). It is the impaired recall of the non-practised competitors (Rp–) relative to the baseline exemplars (Nrp) that is the key finding, which has become known as “retrieval-induced forgetting” (hereafter RIF; Anderson et al., 1994). This type of forgetting is explained by the inhibitory mechanisms active in the retrieval practice phase occurring between study and test, resulting in a temporary deficiency in one’s ability to retrieve material stored in memory. The phenomenon has been demonstrated in numerous populations and with different stimuli such as words, pictures, visuospatial materials and mock eyewitness scenarios (see Anderson, 2003, for a review).

Only a few studies have been carried out employing material of emotional valence in the retrieval practice paradigm. Barnier, Hung, and Conway (2004) and Wessel and Hauer (2006) asked participants to generate autobiographical memories of differing emotional valence, which were then used as the stimuli in an RIF procedure. These studies produced contrasting results, with Barnier et al. (2004) reporting RIF for positive, negative and neutral autobiographical memories. Although they predicted more RIF for neutral and positive memories than for negative ones, there was no interaction between RIF and valence. Wessel and Hauer (2006) used positive and negative autobiographical memories as stimuli and observed an RIF effect only in the negative condition.

Some studies have investigated RIF with respect to emotional disorders. Amir, Brigidi, Coles, and Foa (2001) studied a sample of people with generalised social phobia, where memories of negative aspects of social interactions can be intrusive and highly disturbing. Their stimuli consisted of negative social words (e.g., *Dating–rejection*), positive social words (*Party–friends*) and neutral non-social words (*Fish–herring*). Note that the emotional stimuli were not autobiographical. Non-anxious controls demonstrated RIF for all categories, whereas the social phobics produced RIF only for the neutral and the positive words, and not for the psychopathology-

relevant words. The findings were accounted for by the negative social words' intrusiveness for the individuals suffering from social phobia, making them resistant to the inhibition in RIF.

Moulds and Kandris (2006) investigated RIF for neutral and depression-related words in high- and low-dysphoric participants. They made a prediction along the lines of Amir et al.'s (2001) findings, namely that because dysphoric individuals would have problems with inhibiting negative memories, they would therefore show a lack of RIF for depression-related words. This was confirmed, as RIF was observed for neutral words but not for the depressive stimuli. Interestingly this pattern was observed also for the low-dysphoric group, and the current study followed up on this finding, by asking whether negative words in general, and not only psychopathology-relevant words, would be resistant to RIF. If low-dysphoric participants show no RIF for depressive words, which are negative but not particularly salient for them, would this result also be observed with a wider range of negative words? And, if so, is it the disturbing nature of negative memories per se or is it the more general aspect of their strong emotional content that makes them resistant to suppression? Studies suggest that positive memories have many of the same properties as negative memories, e.g., in terms of intrusiveness (Berntsen, 1996, 2001). Hence, would such a lack of inhibition be demonstrated for pleasurable memories as well? Previously, only Amir et al. have investigated RIF for both positive and negative stimuli, other than autobiographical events, in the normal population. Their non-anxious controls showed RIF for both positive and negative words, but note that, as indicated by the category titles (conversation, party, job, dating) and the words (e.g., Conversation: argue, babble, criticism, nowhere, silence, sustain), there is no reason to believe that the negative words in this study were especially negative for the control group, so that the RIF might be interpreted as the standard effect found for neutral words. The Moulds and Kandris (2006) study suggests that no RIF would occur for negative words, as was the case in their low-dysphoria group.

Initially, it was argued that RIF would not occur on recognition memory tests, based on the idea that presentation of the item itself would release it from its inhibited state (Anderson et al., 1994). However, Hicks and Starns (2004), and Veling and van Knippenberg (2004) have demonstrated the typical RIF effect on a cue-independent recognition test consisting of an old/new decision task. In the test phase the exemplars are presented one at a time without the category cue, implying that every non-practised exemplar of the category is actively suppressed on its own, and not only in the context of the common denominator: the category name. Furthermore, as noted by Perfect, Moulin, Conway, and Perry (2002), a reaction-timed cue-independent recognition test might be a more optimal measurement of the activation of a memory representation than recall, and, indeed, Veling and van

Knippenberg (2004) found the typical RIF effect with response times as the dependent variable.

Using a response-timed recognition test is useful in other ways too. First, it is one way to eliminate an interpretation of RIF in terms of output interference: When recall is used as the final test,  $Rp+$  items tend to be recalled first and thus may interfere with the recall of  $Rp-$  items, obviating the need for an explanation of any advantage of  $Nrp$  over  $Rp-$  in terms of inhibition. Second, using a response-timed recognition test will reduce the possibility of floor effects, as may have been the case for the negative conditions in Moulds and Kandris' (2006) study.

An advantage of using a recognition test is that it allows one to shed light on the question of whether RIF is observed only for  $Rp-$  items or for all items from a studied category, including items not studied in the first phase of the experiment. This is important in terms of better specifying the episodic or semantic nature of RIF. If the phenomenon is explained in terms of inhibition due to overlap of semantic features between  $Rp+$  and  $Rp-$ , then retrieval practice should in fact inhibit the mental representations of all non- $Rp+$  category members, whether they were studied in the first phase of the experiment (as is the case for  $Rp-$  words) or not. In fact, this issue was first investigated by Perfect et al. (2002) who, in the category verification task used in the test phase of their Experiment 5, included words not presented in the study phase but which were exemplars of studied categories. The observation that there was no difference in response times between the extra-list items that came from  $Rp$  and  $Nrp$  categories led to the conclusion that RIF is only observed for words studied in an experiment's first phase and does not extend to other words from the same semantic category. Recently, Camp, Pecher, and Schmidt (2007) strongly supported this notion in a series of RIF experiments where the participants performed a cue-independent recall test for words semantically related to the ones studied in the retrieval phase. The semantically-related words were not inhibited.

Their results are more compatible with an account of RIF in terms of Racsmany and Conway's (2006) concept of episodic inhibition, which has been applied to both deliberate and automatic forgetting. According to episodic inhibition theory, episodic memory traces can have a pattern of activation and inhibition superimposed upon them, at the level of individual items within the trace, and independent of the strength of the episodic trace itself. The pattern has a priming effect, that can increase or decrease the accessibility of the representations of individual items contained in the trace, over long periods. On this account, the retrieval practise of the  $Rp+$  items leads to the pattern being activated for them and inhibited for the  $Rp-$  items. Thus RIF should not be observed for category members not seen in the experiment, but only for studied items that were not presented in the retrieval practice phase, i.e.,  $Rp-$  items. The episodic inhibition account

assumes that the inhibition will only emerge on a task requiring access to the episodic trace, and in the present experiment the issue of whether RIF extends to all category members was investigated in an explicit test of memory.

In sum, the present study investigated whether the results of Moulds and Kandris (2006) extend to positive words and to other, more general, types of negative words. It employed a recognition task with response times in the test phase, which provides the possibility of investigating whether RIF extends beyond studied items to all items from a category.

## METHOD

### Participants

Thirty-five students (10 women) with a mean age of 25.5 years ( $SD = 3.5$ ) participated in the study without receiving any reward. The experiment took approximately 40 minutes, including debriefing.

### Design

The study used a within-subjects design with two independent variables: Retrieval practice (with the levels of  $Rp+$ ,  $Rp-$ ,  $Nrp$ ,  $ExtraList Rp$  and  $ExtraList Nrp$ ), and Emotional Valence (with the levels of Negative, Neutral and Positive). The dependent variables were recognition accuracy and response time.

### Materials

A group of seven psychology students was instructed to come up with categories of positive, neutral or negative emotional valence, and at least 10 associated exemplars strongly associated to each category label. The 20 resulting categories and exemplars were rated individually by seven other psychology students on a scale from  $-3$  through  $0$  to  $+3$ , after Amir et al. (2001). This process gave 3 categories at each level of emotional valence, each with 8 exemplars. The categories by emotional valence group were: Negative: "Assault", "Agony" and "Debt"; Positive: "Love", "Party" and "Humour"; Neutral: "Materials", "Kitchen" and "Transport". Word frequency was obtained from the Oslo Corpus of Tagged Norwegian Texts database (<http://www.tekstlab.uio.no/norsk/bokmaal/english.html>), which consists of approximately 18.5 million words from the most common magazines, newspapers, books and public reports in Norway. The properties of word length, word frequency and emotional ratings for the levels of emotional valence are presented in Table 1. Separate one-way ANOVAs with the independent variable of emotional valence confirmed that the

TABLE 1  
Mean properties of the words used in the study phase (with standard deviations in parentheses)

	<i>Word length</i>	<i>Word frequency</i>	<i>Emotionality</i>
Positive	6.96 (2.44)	465.2 (399.9)	2.48 (0.34)
Neutral	6.46 (1.96)	263.5 (282.3)	0.16 (0.40)
Negative	7.42 (1.79)	188.8 (218.4)	-2.44 (0.41)

*Note:* Word length was measured in number of letters, word frequency in number of appearances in the Oslo Corpus of Tagged Norwegian Texts, and emotionality on a scale from -3 to +3.

groups differed in emotional strength,  $F(2, 69) = 974.3$ ,  $p < .0001$ , and also showed that while there was no difference between the groups on word length,  $F(2, 69) = 1.27$ , *ns*, there were differences on word frequency,  $F(2, 69) = 5.13$ ,  $p < .01$ . *T*-tests showed that positive words were of higher frequency than negative and neutral words,  $t(46) = 2.97$ ,  $p < .01$  and  $t(46) = 2.02$ ,  $p < .05$ , respectively, but that the latter two did not differ from each other,  $t(46) = 1.02$ , *ns*. These figures are in line with the frequency of emotional words in the language. Typically, positive words are the most frequent, followed by neutral words and lastly negative words (Jakobovits, 1966).

In addition a set of 72 words was generated to make up the “No” trials in the recognition test. Half of these words were semantically associated to the categories in the study (ExtraList Related words), whereas the other half were not (ExtraList Unrelated). The English translations of the studied words and the ExtraList Related words are included in the appendix. Two neutral categories (sport and buildings) were generated as buffer categories, included first and last in the study phase to minimise primacy and recency effects.

To ensure that the studied and the extra-list words were equally memorable, 20 participants performed an episodic memory task where the words from the nine lists in the experiment’s study phase plus the ExtraList Related and ExtraList Unrelated words were presented in a random order. This was followed by an old/new decision task, where all seen words were mixed randomly with related and unrelated unseen words. The mean recognition rates were 0.73 ( $SD = 0.20$ ) for lists from the Study phase, 0.76 ( $SD = 0.23$ ) for ExtraList Related words and 0.73 ( $SD = 0.14$ ) for ExtraList Unrelated words. Mean correct response times were 771 ms ( $SD = 109$ ), 772 ms ( $SD = 102$ ), and 768 ms ( $SD = 103$ ), respectively. One-way ANOVAs revealed no differences on speed or accuracy, and thus that the words presented in the experiment did not differ in memorability from the ExtraList Related and ExtraList Unrelated words.

## Procedure

All participants were tested individually on the same computer. A script was created with E-Prime for the experiment (Schneider, Eschman, & Zuccolotto, 2002). The experiment consisted of four phases:

1. *Study phase.* Participants saw 8 words from each of the 9 experimental categories plus two fillers, giving a total of 88 words. Each exemplar was presented with the category name, e.g., *Assault–incest* for 2000 ms. Between presentations there was an interval of 500 ms with a blank screen, a fixation cross for 1000 ms, and a blank screen for another 500 ms. All exemplars from a category were presented sequentially and the categories were presented in a different random order for each participant. The buffer categories were presented as the first and last category of the study phase for all participants.

2. *Retrieval practice phase.* Participants were instructed to complete the stem of exemplars presented (e.g., *Assault–inc\_\_\_*) with the word presented in the Study phase, on the keyboard. Such Category–word-stem pairs were displayed one at a time. Each participant was given half of the exemplars from two categories from each emotional valence to perform retrieval practice on. The selection of categories and the selection of items to be practised was randomised for each participant. All pairs were presented three times in a different random order for each participant, giving a total of 72 retrieval practice trials per participant.

3. *Distractor task.* The participants performed a visual search task for approximately 10–15 minutes.

4. *Test phase.* The recognition task included the 72 words from the study phase and the 72 words new to the subjects (ExtraList Related and ExtraList Unrelated). Participants were instructed to decide whether each word had been presented in the study phase or not. The category cues were not presented at test, and the words were presented in a random order. Each word was presented separately for an old/new decision where the participants responded by pressing the Y or N key on the keyboard. Each word remained on the screen until a response had been made or 3000 ms had passed.

## RESULTS

The rates of correct recall by emotional condition in the retrieval practice phase were 95.2% for positive words, 90.1% for neutral, and 96.0% for

negative, indicating that the participants were very successful in retrieving the exemplars. From the final recognition task, the mean accuracy rate and response times to correct responses were computed for each participant in each standard RIF condition (Rp+, Rp-, Nrp), as well as the ExtraList Related condition, divided into items from Rp and Nrp categories. For each condition for each participant, latencies were checked in order to remove any more than three standard deviations from the mean for that cell: no responses were removed due to this criterion. Table 2 shows the mean accuracy and response times for each condition, with standard deviations in parentheses.

For the accuracy data, a two-way ANOVA was carried out with the within-subjects independent variables of Emotional Valence (negative, neutral, positive) and Retrieval Practice (Rp-, Nrp). Neither of the main effects was significant, however the interaction between Emotional Valence and Retrieval Practice was,  $F(4, 136) = 6.1, p < .005$ . Paired sample *t*-tests within each level of emotional valence showed that the only significant difference was in the neutral condition,  $t(34) = 3.5, p < .05$ , i.e., RIF was only

TABLE 2  
The mean proportion accuracy and response time in milliseconds by condition (with standard deviations in parentheses)

<i>Emotional valence</i>	<i>Retrieval practice</i>	<i>Accuracy</i>	<i>RT</i>
<i>Negative</i>	Rp+	.96 (.06)	806 (150)
	Rp-	.81 (.21)	922 (163)
	Nrp	.75 (.20)	932 (206)
	ExtraList Rp	.74 (.53)	953 (188)
	ExtraList Nrp	.81 (.20)	960 (244)
<i>Neutral</i>	Rp+	.97 (.05)	791 (119)
	Rp-	.65 (.21)	975 (240)
	Nrp	.81 (.11)	874 (135)
	ExtraList Rp	.79 (.15)	925 (201)
	ExtraList Nrp	.81 (.21)	925 (286)
<i>Positive</i>	Rp+	.89 (.08)	737 (114)
	Rp-	.78 (.17)	868 (175)
	Nrp	.68 (.23)	873 (144)
	ExtraList Rp	.80 (.14)	891 (183)
	ExtraList Nrp	.83 (.20)	887 (164)

*Note:* Rp+ is the condition where words were practised in the retrieval practice phase, Rp- refers to words that for each participant were from the same categories as the Rp+ but that were not themselves practised, and Nrp refers to the condition where words came from categories where no words were practised. The ExtraList conditions are comprised of words that were not presented in the Study phase: the ExtraList Rp words came from categories where some were practised in the Retrieval practice phase, and the ExtraList Nrp words came from categories where no words were practised in the Retrieval practice phase.

observed for neutral words. For the negative condition,  $t(34) = 1.2$ , *ns*, and for the positive condition,  $t(34) = 1.6$ , *ns*.

For response times to correct responses, a two-way ANOVA was performed between Emotional Valence (negative, neutral, positive) and Retrieval Practice (Rp–, Nrp). Again, neither of the main effects was significant while the interaction between Emotional Valence and Retrieval Practice was significant,  $F(4, 136) = 2.1$ ,  $p < .05$ . Nrp and Rp– were compared separately for each level of emotional valence, by means of paired sample *t*-tests. As above, the only significant difference between Nrp and Rp– was in the Neutral condition,  $t(34) = 1.9$ ,  $p < .05$ , on a one-tailed test; for positive,  $t(34) = 1.1$ , and for negative,  $t(34) = 1.2$ . The same analysis was performed for all response times, including errors, and produced an identical pattern of results.

The RIF effect observed in the neutral condition did not extend to non-studied neutral items, as shown by a *t*-test comparing ExtraList Related Rp words with the ExtraList Related Nrp words separately for accuracy and response time, in both cases  $t(34) < 1$ . Indeed the response-time difference between the conditions was under 1 ms.

In sum, the analysis of the data provided converging results from accuracy and response time. Both dependent variables revealed a statistically significant RIF effect in the neutral condition, but not in the negative or positive condition. The lack of difference between ExtraList Rp and ExtraList Nrp indicated that RIF is only observed for studied words.

## DISCUSSION

In this study a standard RIF effect was observed for words of neutral emotional valence. However, words rated as being of negative or positive emotional character were not subject to any such detrimental effect. The findings are in line with Amir et al. (2001) who found a lack of RIF for negative words about social interaction in people suffering from generalised social phobia, and Moulds and Kandris (2006) who found a lack of RIF for negative words in both high and low dysphorics. While these studies used stimuli that are disturbing to a particular population, the present study used stimuli that are unpleasant or pleasurable to most people. This might imply that it is the same underlying mechanisms of memory that is operating in pathological and normal populations, though to a more selective extent in the former.

On the other hand, both Amir et al. (2001) and Wessel and Hauer (2006) found that the better-remembered valence did not produce RIF. In that sense our results are not consistent with the previous literature. Also, we failed to observe RIF for positive stimuli, which is in contrast to Amir et al.'s finding

with their healthy control group. Future research will have to determine the source of these discrepancies. They may, for example, be due to the different task used at test, or to the relative strength of the emotional stimuli used.

Note that the differences in word frequency between the conditions cannot account for the results in any simple way, because no RIF was observed for positive words, which were significantly more frequent than the other types, or for negative words, whose frequency did not differ from that of neutral words. Neither can the degree of concreteness of the words explain the findings. The more concrete a word is, the more memorable it is (Paivio, 1986). The neutral words were more concrete than the emotional, and assuming that the level of remembering is linked to the level of forgetting, less inhibition of the neutral words should have been observed.

A pertinent question regarding memory studies employing emotional material is whether findings of enhanced memory can be explained by the distinctiveness of the words instead of their emotionality. It is well known that memory is enhanced for distinct items, the “von Restorff effect” (Pesta, Murphy, & Sanders, 2001), and it has been shown that distinctiveness reduces the RIF effect (Smith & Hunt, 2000). The degree of distinctiveness of a given item is related to what degree it stands out of the context, e.g., having the word *penis* in a category of *Instruments: guitar, piano, cello, penis, flute, drums*, would clearly make *penis* distinct, whereas in the category *Sexual anatomy: vagina, clitoris, penis, uterus, testicles*, the same word would not be distinct. The latter is certainly the case in an RIF experiment, where all the items are presented as exemplars of semantically-related categories; hence the distinctiveness effect of any given item will be marginal.

The finding that negative and positive words were not subject to any inhibition is in line with the literature on how disturbing memories are usually very memorable both in pathological and normal populations (Brewin, 2003; Christianson & Engelberg, 1999; McNally, 2003) and how pleasurable memories possess many of the same properties (Berntsen, 1996, 2001). An important difference is that while previous studies have demonstrated enhanced remembering of emotional material, the present study demonstrates the converse: less forgetting of emotional material. Christianson and Engelberg (1999) suggested that emotions per se may constitute a form of memory that is encoded and stored as memories of their own. Hence, emotional material has an extra memory trace, which results in a relative resistance to extinction. This is in accordance with theories from neuroscience, which consider emotional material to follow an extra and stronger mode of processing than non-emotional material (LaBar & Cabeza, 2006; LeDoux, 1996).

The inclusion of the extra-list conditions allowed us to replicate Perfect et al.'s (2002) and Camp et al.'s (2007) reports that RIF was restricted to words that were studied in the first phase of the experiment. Accounts of RIF

purely in terms of semantic mechanisms appear unable to account for these results. So, if the practising of Rp+ items inhibited the non-practised semantic features (or items) from that category, then retrieval practice would have inhibited the mental representations of all non-Rp+ category members, whether they were studied or not. This is not what was observed. In contrast, the result is easily interpretable in terms of Racsmány and Conway's (2006) episodic inhibition account of RIF, where Rp- items are inhibited within the *episodic* memory trace, and where there is therefore no reason for extra-list category members to suffer RIF. Further research could profitably explore the limits of, and interplay between, semantic and episodic factors in memory inhibition.

A limitation to this study might be the degree of emotional valence of the stimuli used. All material included was rated as strongly emotional as a member of their category and presented in the context of the category, but this can never produce the same degree of emotionality experienced in real-life situations, and generated, for example, by the retrieval of certain autobiographical memories. At least at this early stage of the research, RIF is found for negative material in autobiographical memory (Barnier et al., 2004; Wessel & Hauer, 2006) but not for negative emotional words. If researchers can devise ways to overcome the procedural and methodological challenges involved, this inconsistency could be resolved by investigating RIF for autobiographical material and for words within the same experiment. As an additional aid to pinning down the operative mechanisms, non-experienced, non-personalised vignettes could be used, because like autobiographical memories they are stories but like words, they would not require "mental time travel" (Tulving, 1983, 2002).

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## APPENDIX

Translations of the words presented during the study phase and the ExtraList Related words (in Norwegian all items were single words, and no two words shared a root)

<i>Words presented in study phase</i>	<i>ExtraList words</i>	<i>Words presented in study phase</i>	<i>ExtraList words</i>
<i>Assault</i>		Dancing	
Torture	Harassment	Invitation	
Rape	Maltreatment	Birthday	
Kidnapping	Hit man	Celebration	
Paedophilia	Persecution	<i>Humour</i>	
Bullying		Laughter	Amusing
Force		Comedy	Giggle
Incest		Smile	Jest
Extortion		Funny	Stand-up comedy
<i>Anxiety</i>			
Nightmare	Hate	Joke	
Nerves	Frightened	Humorous	
Sleepless	Startle	Joy	
Worry	Insecurity	Sketch	
Sweat		<i>Kitchen</i>	
Depression		Oven	Breadbin
Fear		Sink	Knife
Panic		Fork	Washcloth
<i>Debt</i>		Refrigerator	Table
Instalment	Tax shock	Plate	
Interest	Loan office	Napkin	
Bankrupt	Mortgage	Chair	
Debt recovery	Deadline	Pan	
Reminder		<i>Transportation</i>	
Debt officer		Driver	Taxi
Payments		Tram	Timetable
Blacklisted		Toll road	Petrol
<i>Love</i>		Ticket	Bus
Affection	Wedding	Speed	
Happiness	Cuddle	Conductor	
Soulmate	Togetherness	Season ticket	
Kiss	Valentine	Passenger	
Romance		<i>Material</i>	
Infatuation		Concrete	Cotton
Life partner		Iron	Plaster
Intimacy		Rubber	Copper
<i>Party</i>		Steel	Tin
Music	Punch	Woodwork	
Friends	Cakes	Aluminium	
Entertainment	Weekend	Plastic	
Company	Club	Asphalt	