

The Green Eyed Monster: Linguistic Influences on Concepts of Envy and Jealousy in Russian and English*

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ABSTRACT

The present study examined linguistic relativity in the domain of emotion terms. Exp. 1 showed that American English speakers use the word “jealous” to describe both situations involving *envy* and those involving *jealousy*, whereas Russian speakers describe emotions involved in the situations using the Russian terms *revnuet* and *zaviduet* in a mutually exclusive manner. Bilinguals performed according to the language they were tested in. In Experiment 2 we sought evidence for conceptual consequences of the difference in how emotion terms mapped onto situations for English and Russian speakers. In a non-linguistic triad sorting task, all subjects clearly distinguished jealousy situations from envy situations, but monolingual English speakers and bilinguals were more likely to see envy situations and jealousy situations as similar than Russian speakers. In a free sorting task, high agreement across all groups was shown in sorting jealousy, envy and control situations. However, native Russian speakers, in contrast to native English speakers, labeled the groups in a mutually-exclusive way. While providing some evidence for the weak view of linguistic relativity, overall the study shows that despite the difference in labeling the emotions of jealousy and envy, Russian speakers, English speakers and bilinguals are very similar in how they conceptualize emotionally-laden situations.

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Do people who speak different languages think about the world differently? Or more precisely, “Are our own concepts of ‘time,’ ‘space,’ and ‘matter’ given in substantially the same form by experience to all men, or are they in part conditioned by the structure of particular languages? Are there traceable affinities between (a) cultural and behavioral norms and (b) large-scale linguistic patterns?” (Whorf 1956). These ideas of linguistic relativity and linguistic determinism, collectively known as the Sapir-Whorf Hypothesis have been the subject of considerable lively and ongoing debate among cognitive scientists.

Most of the early work on this issue was conducted in the concrete and measurable domain of color terms (e.g., Heider 1972; Berlin & Kay 1969). Results are mixed and the import of these studies is still under considerable debate (Jameson & Hurvich 1978; Davies 1998; Levinson 2000). However, even Heider mentioned that color space is “far from being the domain well suited to study the effects of language on thought,” given that it is largely driven by the physiology of color vision (Heider 1972, p. 20).

Recently the relations between language and thought have been pursued under the heading of “weak linguistic determinism” (e.g. Hunt & Agnoli 1991; Lucy 1992; Bloom & Keil, in press). The weak view suggests that although language does not constrain thought in a rigid way, linguistic differences may translate into conceptual differences by making certain concepts more salient to its speakers, setting what can be best described as default modes of thinking. One interesting possibility is that the strength of linguistic relativity may also differ by domain. For instance, Bloom and Keil suggest that language might exert a mild influence on thought in certain domains, such as mathematical reasoning, memory for scenes, or spatial navigation.

For instance, Bloom (1981) argues that speakers of Chinese — a language that lacks explicit marking of hypothetical propositions — should have more difficulty in reasoning hypothetically than speakers of English — a language which does explicitly mark such propositions. Au (1983), however, failed to replicate these results, and found little support for the Sapir-Whorf Hypothesis. In the domain of spatial thinking, Levinson (1996) showed that speakers of Tzeltal Mayan language who, unlike English speakers, describe a location of an object in space using absolute spatial terms, also tend to use cardinal directions in a task that required

rearranging a row of objects after being reoriented. Although the role of language in the spatial domain has been questioned (Li & Gleitman 2002), the issue is far from being resolved as new evidence comes from both sides of the argument (Levinson, Kita, Haun & Rasch 2002). Investigating another abstract domain of thought, Boroditsky (2001) examined reasoning about time in Mandarin speakers (who habitually use vertical terms to talk about temporal relations) and English speakers (who usually talk about time as if it were a horizontal continuum). Results showed that Mandarin speakers were faster to confirm that March comes earlier than April if they had just seen a vertical array of objects than if they had just seen a horizontal array, and the reverse was true for English speakers.

This issue is also a source of debate among psycholinguists studying the representation of word meanings in the bilingual lexicon. Because the meanings associated with names of objects tend to have little variation across languages, it was suggested that they may have a shared semantic representation in the bilingual lexicon (de Groot 1992). Abstract words, on the other hand, tend to have greater variability of meaning across languages, since they don't have a clear and tangible external referent the way concrete words do. Therefore, it is likely that their meanings have language-specific representation in the bilingual lexicon (Jin 1990). If the lexicalization of abstract concepts varies more across languages than that of concrete concepts, and linguistic input is crucial for the acquisition of abstract concepts, then language may have its greatest influence on thought for abstract concepts. Thus, to the extent that language influences thought at all, abstract domains seem more likely to produce linguistic influences on thinking.

To expand the search for linguistic relativity in abstract domains, we examine the domain of emotion terms. Russell (1991) suggested that there is a particularly strong relationship between linguistic labeling and categorization of emotions. One reason for this is the fact that much of the evidence for categorization of emotions involves words — something researchers have to resort to in the absence of Munsell chips for emotions. Also, there are many known cases of emotion terms that exist in one language but do not exist in others. For example, *Shadenfreude* in German means “pleasure derived from another's displeasure” (Russell 1991). This term does not exist in English, although by imagining a romantic rival

suffering a tragic accident, we can easily understand the concept behind it. Nevertheless, it would be interesting to see if this linguistic difference causes German and English speakers categorize emotions differently. For example, we may expect that German speakers have a single conceptual category representing a concept that is distributed among a number of categories in English. More generally, Russell proposed that labeling an emotion may have an effect on subsequent cognitive processes, such as encoding, responding to, and remembering emotions. Cross-linguistic variability of emotion terms may lead to the possibility that people who speak different languages have different conceptual representations of emotions. For example, speakers of different languages may disagree on what emotions seem more similar to them or on the degree of overlap between various members in the domain of emotion terms. Alternatively, it could be that underlying conceptual structure of emotions is fairly universal, and that differences in how language maps onto this conceptual structure have no impact on the structure itself. The study by Romney, Moore & Rush (1997) showed that a combination of the two alternatives is possible as well. While they found a number of significant and interesting differences in the Japanese and English semantic structures of emotion terms, they concluded that these differences represented a very small proportion of the overall effect — the fact that the English and the Japanese share a single model of the semantic structure of emotion terms.

The linguistic difference that will be investigated in this paper is the habitual use of words *jealous* and *envious* by American English speakers, and words *ревнует* and *завидует* by Russian speakers. Members of each pair refer to two distinct emotions identified by social psychologists — the emotion of jealousy and the emotion of envy (Parrott & Smith 1993; Salovey & Rodin 1986). The emotion of jealousy is usually described as a situation where a person fears losing an important relationship with another person to a rival. The emotion of envy is defined as a situation where a person lacks another's superior quality, achievement, opportunity or possession and either desires it or wishes that the other lacked it (Parrott & Smith 1993). These definitions are very similar to the definitions provided for these words in English and Russian dictionaries.

At first glance the situation looks simple: there are two emotion terms in each language, and two emotions that these words refer to. One would

expect that these words would map on to emotions the same way in both languages. But any Russian-English bilingual will agree that the reality of how these words are used by Russian and English speakers is far from being as simple. In Russian there is a one-to-one mapping of emotion terms to actual emotions: the word *revnuet* is used to refer to the emotion of jealousy; the word *zaviduet* is used to refer to the emotion of envy. In English, on the other hand, the word *jealous* is applied to both jealousy and envy (see Fig. 1).

American English speakers habitually refer to different kinds of situations using the word *jealous*:

e.g. *You have a nice car. I'm so **jealous!***

*Don't flirt with that man. Your boyfriend is already **jealous.***

In contrast, Russian speakers use the formal equivalent of *jealous* (*revnuet*) to refer only to what Americans often call romantic jealousy. If the two sentences above had to be said in Russian, two different words would have to be used to describe the emotions about someone's car and the emotional state of a man whose girlfriend is flirting with someone else.

e.g. *U tebya khoroshaya mashina. Ya tak tebe **zaviduyu!***

*Ne zaigrivay s tem muzhchinoy. Tvoj paren' uzhe **revnuet.***

We are interested in whether this discrepancy in the way that labels map onto categories of emotions has any consequences for how speakers of

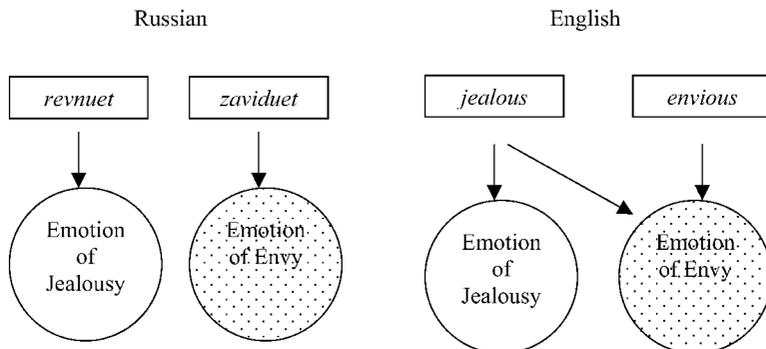


Figure 1. Mapping of words *ZAVIDUET/REVNUET* and *ENVOUS/JEALOUS* to the emotions of jealousy and envy in Russian and English.

English and Russian conceptualize situations that evoke envy or jealousy. To demonstrate an effect of language on conceptual structure, we must first show a systematic linguistic difference in the way Russian and English speakers use words *jealous/envious* and *revnuet/zaviduet* to refer to the emotions of jealousy and envy. This step will be taken in Experiment 1. The second step is to show a corresponding non-linguistic difference in the way Russian and English speakers categorize envy and jealousy situations. This will be done in Experiment 2.

The existence of nonlinguistic conceptual differences corresponding to observed linguistic differences between English and Russian monolinguals would provide evidence in favor of linguistic relativity. In contrast, if monolingual speakers of English and Russian show few conceptual differences, that would suggest of more universal conceptual space relatively impervious to linguistic differences. In addition, we are interested in the mechanism by which such conceptual differences, if any, come about. We attempt to pinpoint these mechanisms by examining not only monolingual Russian and American English speakers, but also testing Russian-English bilinguals — i.e., native speakers of Russian who are also fluent in English. Bilinguals are a particularly interesting test case because they allow us to begin to tease apart the influence of native language, language being spoken at the time, and mere exposure to a language that may parse emotional space differently. In general, we hope that examining bilinguals as well as monolinguals will help to shed light on the mechanisms by which language may influence conceptual structure.

Experiment 1

Method

Participants. Three groups of subjects were involved in Experiment 1: 22 monolingual speakers of Russian (MR), 22 monolingual speakers of American English (ME), and 22 Russian-English Bilinguals. Bilinguals were randomly assigned to either Russian or English testing conditions. Overall, 11 bilinguals were tested in Russian (BR) and 11 were tested in English (BE). The age of MR ranged from 19 to 37 years ($M = 24.9$), ME ranged from 18 to 28 ($M = 21.4$), and bilinguals ranged from 19 to 28 ($M = 23.3$).

Table 1

Participant information on various aspects of second language proficiency and age, broken down by subject groups – Russian Monolinguals (MR), Bilinguals tested in Russian (BR), Bilinguals tested in English (BE), and English Monolinguals (ME)

	MR	BR	BE	ME
Speaking	1.73	5.73	6.27	–
Listening/ comprehension	1.86	5.91	6.18	–
Reading	2.00	6.30	6.5	–
Writing	1.91	5.09	5.91	–
2 nd language experience (when started)	0 years	4.6 years (10 y.o.)	7.7 years (11 y.o.)	0 years
Age	24.9	23.5	23.1	21.4

¹ Although bilingual subjects were randomly assigned to the language of testing condition, the difference in their experience with English may be an issue of concern. However, see Boroditsky (2001) for results showing that the age of 2nd language acquisition is more influential than the number of years it has been spoken.

MR were recruited in one of the Moscow public libraries. They were rewarded for participation in the study with Northeastern University T-shirts. ME were undergraduates at Northeastern University fulfilling their Introductory Psychology research participation requirement. Bilinguals were recruited in Moscow and in Boston. Bilinguals from Moscow (18 out of 22 total) were either students at English language University programs, worked at a workplace where English is the dominant language or have spent a considerable amount of time in the U.S. Bilinguals from Boston (4 out of 22 total) grew up speaking Russian and learned English later in life when their families moved to the U.S. Although it is possible that bilinguals recruited in Moscow were different from bilinguals recruited in Boston, there was no difference in their self-assessed knowledge of English or number of years they have been speaking English.

MR and ME reported virtually no knowledge of English or Russian respectively, when asked to rate its various aspects on a 1 to 7 scale. These ratings were different for bilinguals (see Table 1).

Materials. Each subject was presented with 5 stories describing prototypical envy- or jealousy-arousing situations (2 jealousy stories and 3 envy

stories). No boundary envy-jealousy scenarios were used in this experiment due to the lack of clear theoretical predictions for such cases. A typical envy story would describe a situation where one of the two friends gets something that the other one wants very much — a job or a role in a play, while both of them are equally qualified for it. A typical jealousy story would describe a couple involved in a romantic relationship where one of the partners suspects the other one's unfaithfulness. Full stories are provided in Appendix A.

The stories had been pretested to ensure that they indeed describe prototypical envy and jealousy situations. 25 English speakers were asked to assign them to one of the three categories: (1) Stories that are consistent with the emotion that has the following definition: “a person lacks another's superior quality, opportunity or possession and either desires it or wishes that the other lacked it.” This is one of the standard definitions of envy in social psychology literature that we adopted for the task (Parrott & Smith 1993). (2) Stories that are consistent with the emotion that has the following definition: “a person fears losing an important relationship with another person to a rival.” This is one of the standard definitions of jealousy (Parrott & Smith 1993). (3) Stories that are not consistent with any of the emotions defined above. The actual words *jealousy* and *envy* were never mentioned either in definitions or instructions given to the subjects. Results of this pretesting showed that the stories were consistent with the definitions; every subject assigned the stories to the expected category, and no stories were assigned to the third category.

All stories were translated into Russian and then subjected to back-translation into English by another translator who was not familiar with the experiment. The final English translation was virtually identical to the original English copy. The Russian version of the materials is provided in Appendix B.

Procedure. Participants were tested individually in a quiet room. Instructions to MR and ME were given in Russian or English respectively. Depending on what testing conditions they were assigned to, bilinguals were given the instructions in either Russian or English. The experiment was conducted by a Russian native speaker who was also fluent in English.

After reading each story subjects were presented with 10 words denoting various emotions (happy, jealous, upset, satisfied, glad, proud,

surprised, envious, sad, content), envy and jealousy among them, and asked to rate the appropriateness of each of those words for the description of the emotion one of the protagonists was likely to feel in the situation described in the story. Filler terms were used to avoid making the purpose of the experiment too obvious; responses to these terms are not further analyzed. The ratings were to be done on a 1 to 7 scale, with 1 meaning "not appropriate" and 7 — "very appropriate."

Results

Envy stories The data were analyzed by calculating the mean appropriateness rating for words *jealous/revnuet* and *envious/zaviduet* across all three envy stories and comparing them for each group of subjects (see Figure 2). As expected, Russian speakers made a sharp distinction between the appropriateness of *zaviduet* and *revnuet* to describe the emotion of characters in envy stories. They rated *zaviduet* as much more appropriate than *revnuet* ($M_{zav} = 5.30$ and $M_{rev} = 2.62$, $t(65) = 8.41$, $p < .001$). English speakers, on the other hand, rated *envious* and *jealous* as being equally appropriate for describing emotions of the main characters in envy stories ($M_{env} = 6.02$ and $M_{jel} = 5.97$, $t(65) = .40$, $p = .371$). Bilinguals tested in Russian showed results similar to Russian monolinguals, rating *zaviduet* higher than *revnuet* ($M_{zav} = 5.52$ and $M_{rev} = 4.21$, $t(32) = 3.73$, $p = .009$). Bilinguals tested in English showed no such distinction ($M_{env} = 4.64$ and $M_{jel} = 4.42$, $t(32) = .93$, $p = .141$).

An additional analysis was done to compare difference scores between ratings of *zaviduet* and *revnuet* for each group of subjects tested in Russian and *envious* and *jealous* for subjects tested in English. The difference score for each subject was obtained by subtracting the mean *revnuet/jealous* rating (across all envy stories) from the mean *zaviduet/envious* rating (across all envy stories). A high difference score would mean a high degree of differentiation between the two emotion terms; a low score indicates little differentiation. The results of a single factor ANOVA showed that the difference scores were significantly higher for Russian Monolinguals than for any other subject group, $F(3, 62) = 14.76$, $p < .001$. Paired comparisons (Fisher's PLSD tests) also showed that bilinguals tested in Russian had higher difference scores than English monolinguals ($p = .02$) and bilinguals tested

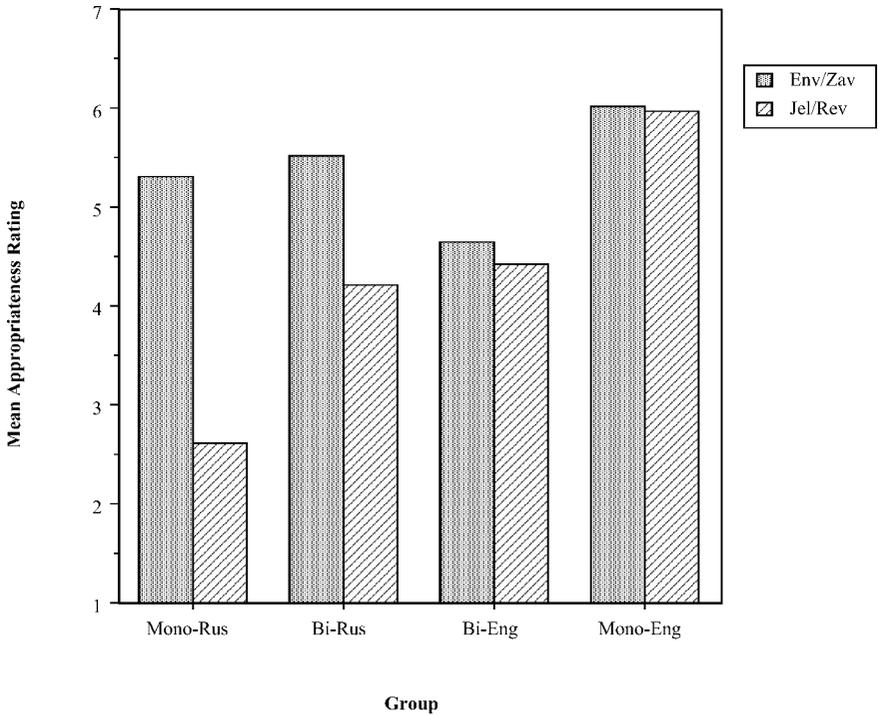


Figure 2. Results of Experiment 1 — Envy stories.

in English (this difference was marginal, $p = .08$). English speakers did not differ from bilinguals tested in English ($p = .75$).

Jealousy stories. The data were analyzed by calculating the mean appropriateness rating for words *jealous/revnuet* and *envious/zaviduet* across the two jealousy stories and comparing them for each group of subjects (see Figure 3). All groups of subjects rated *jealous* higher than *envious* when they had to describe the emotion of characters in jealousy stories. Russian speakers rated *revnuet* much higher than *zaviduet* ($M_{rev} = 6.23$ and $M_{zav} = 2.55$, $t(43) = 12.37$, $p < .001$) and English speakers rated *jealous* higher than *envious* ($M_{jel} = 6.48$ and $M_{env} = 5.18$, $t(43) = 6.04$, $p < .001$). Bilinguals tested in Russian rated *revnuet* higher than *zaviduet* ($M_{rev} = 6.41$ and $M_{zav} = 3.05$, $t(21) = 8.46$, $p < .001$) and bilinguals tested in English rated *jealous* higher than *envious* ($M_{jel} = 5.41$ and $M_{env} = 3.27$, $t(21) = 4.49$, $p = .004$).

However, the results of a single factor ANOVA show that the difference between the ratings of *jealous/revnuet* and *envious/zaviduet* was greater

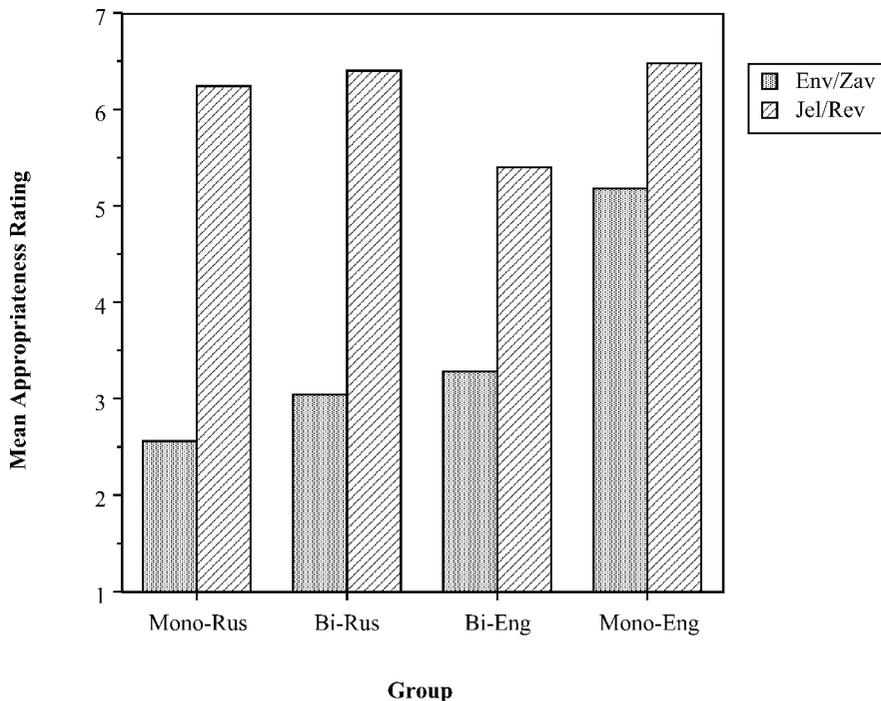


Figure 3. Results of Experiment 1 — Jealousy stories.

for Russian speakers than for English speakers and bilinguals tested in English $F(3, 62) = 10.38$, $p < .001$. Fisher's PLSD paired comparisons showed that bilinguals tested in Russian also had higher difference scores than English speakers ($p < .001$) and marginally higher than bilinguals tested in English ($p = .06$). Russian speakers did not differ from bilinguals tested in Russian ($p = .57$) and English speakers did not differ from bilinguals tested in English ($p = .14$).

Discussion

The results of Experiment 1 show a clear linguistic difference between subject groups. Monolingual Russian speakers applied words *zaviduet* and *revnuet* differently to envy vs. jealousy stories. They gave *zaviduet* much higher appropriateness ratings than *revnuet* for envy stories and they did the opposite on jealousy stories — *revnuet* was rated much higher than *zaviduet*. In contrast, monolingual English speakers viewed the words *envious*

and *jealous* as being equally appropriate for describing the emotions of characters in envy stories. Monolingual English speakers did rate *jealous* as more appropriate than *envious* for jealousy stories, but the differentiation was still less pronounced than for monolingual Russian speakers.

For bilinguals, testing language determined responses. Bilinguals tested in Russian responded like Russian monolinguals, whereas bilinguals tested in English responded like English monolinguals, despite the fact that both groups of bilinguals had Russian as their native language and were similar regarding their fluency in English. Bilinguals speaking English seemed to blur the distinction between envy- and jealously-invoking situations in a way that bilinguals speaking Russian did not. However, bilinguals tested in Russian did not respond exactly like monolingual Russian speakers; for envy stories, the difference between the ratings of *revnuet* and *zaviduet* was greater for Russian speakers than for bilinguals tested in Russian. So while they clearly differed from English monolinguals and bilinguals tested in English, these two groups also differed from each other, with bilinguals “moving” in the direction of English monolinguals. This raises the possibility that the overlapping conceptual representation of the two emotions in English has affected bilinguals by making jealousy and envy seem more similar to each other than they normally would to native Russian speakers. Apparently, it also affected the way they use words *revnuet* and *zaviduet* in Russian. Bilinguals tested in English, on the other hand, did not differ from English monolinguals in the difference score analyses, either on jealousy or on envy stories. Therefore, in addition to the previously identified comparisons (Russian monolinguals vs. English monolinguals, bilinguals tested in Russian vs. bilinguals tested in English), we might also expect non-linguistic differences between Russian monolinguals and bilinguals tested in Russian.

Overall, results of Experiment 1 provide clear evidence for linguistic differences in how emotion terms map onto emotion-laden situations in English and Russian, and allow us to build a schematic representation of how the Russian words *zaviduet* and *revnuet* and the English words *envious* and *jealous* apply to emotions (see Fig. 4). We can conclude that these terms overlap only marginally in Russian but strongly in English. The next step in testing the linguistic relativity hypothesis is to show a corresponding non-linguistic difference. Therefore, in the next experiment we will ask

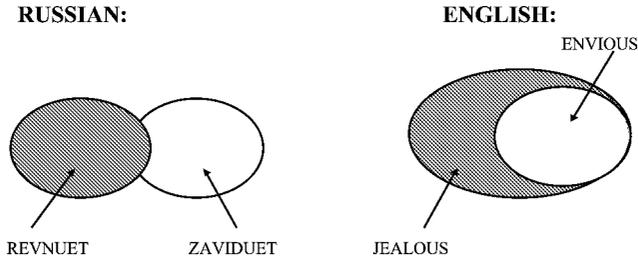


Figure 4. Schematic representation of the relationship between the domains in the world that the Russian words *ZAVIDUET* and *REVNUET* and the English words *ENVIOUS* and *JEALOUS* apply to.

whether Russian and English speakers differ in how they classify situations that would make one either jealous or envious.

Experiment 2

Experiment 1 provided evidence that monolingual speakers of Russian show a strong preference for using *zaviduet* to describe situations involving envy, and *revnuet* to describe situations involving jealousy. Monolingual speakers of English show a preference, albeit weaker, to use *jealous* to describe jealousy situations, but use *jealous* and *envious* interchangeably to describe envy situations. In Experiment 2 we used a triad sorting and a free sorting task to examine possible non-linguistic differences in how Russian and English speakers categorize jealousy and envy situations. Considering monolinguals only, a strong version of linguistic determinism would predict that English speakers may fail to differentiate situations designed to invoke jealousy versus envy, or may do so much less reliably than Russian speakers. A weaker version might predict that although both groups are able to differentiate the situations, jealousy and envy situations might seem more similar to English speakers than to Russian speakers. A lack of conceptual differences would indicate a common underlying representation of emotional terms unaffected by language.

Conceptual differences between monolingual speakers of English and Russian — if found — could be elucidated by bilingual responses in several ways. First, all native Russian speakers may perform similarly — regardless of testing language — and differently from the native English speakers. This would suggest that one's native language establishes

some conceptual constraints that later language-learning does not change. Second, monolingual Russian speakers and bilinguals tested in Russian might perform similarly, and look distinct from bilinguals tested in English and native English speakers, suggesting the presence of relatively flexible emotion categories, and that the language being spoken perhaps renders certain distinctions or similarities salient online. Finally, all speakers of English (i.e. monolingual speakers of English and both bilingual groups) might pattern similarly, and differ from the monolingual Russian speakers. This would suggest that learning English had some effect on how emotions concepts are organized, regardless of native language or language currently being spoken.

Method

Participants. Same as in Experiment 1.

Materials. Twenty-seven 1-sentence long situations were developed for this experiment using some of the materials designed by the social psychology research on the emotions of jealousy and envy (Salovey & Rodin 1986). The situations were of three kinds — jealousy-evoking (e.g. “Your boyfriend dances with someone else at a dance”), envy-evoking (e.g. “Your boyfriend buys something you want but cannot afford”) and controls that evoked generally negative feelings (e.g. “Your boyfriend lost your dog”). For a complete list of all situations see Appendix C. All situations involved a boyfriend or a girlfriend to avoid the possibility that subjects use the differences in the kind of person involved to guide their reasoning in the tasks.

As in Experiment 1, these situations were pretested by asking 25 English speakers to assign them to one of the three categories: (1) a category that contained a standard definition of envy; (2) a category that contained a standard definition of jealousy; (3) a category for situations that were not consistent with any of the definitions. Again, the actual words *jealous* or *envious* were not mentioned either in definitions or instructions given to subjects. All envy, control and five out of nine jealousy situations were unanimously assigned to the expected category. The remaining four jealousy situations were assigned to the expected category by the majority of subjects (all $X^2(2) > 18.47$, $p < .001$).

All situations were translated into Russian and back-translated into English. The final English translation was virtually identical to the original copy. The Russian version of the situations is provided in Appendix D. Each situation was written on a small (8 cm × 3 cm) card.

Procedure

Task 1: Triads. Subjects were presented with 12 triads of the following types: Type **JJE** — 2 jealousy and 1 envy situation; Type **EEJ** — 2 envy and 1 jealousy situation; Type **JJB** — 2 jealousy and 1 control situation; Type **EEB** — 2 envy and 1 control situation; Type **EJB** — 1 jealousy, 1 envy and 1 control situation. There were 3 triads of type **JJE** and **EEJ**, and 2 triads of types **JJB**, **EEB**, and **EJB**. Three different sets of triads were created, each set made up of different combinations of the same situations. All subjects were randomly assigned to one of the three sets. The order of presentation of triads in a set was randomized as well. Participants were presented with each triad and asked to “pick any 2 situations that go together.” After the completion of the task subjects were asked to provide an explanation for each of their selections.

Task 2: Free sort. Subjects were given all 27 cards with situations, asked to read them carefully and to “sort them into as many groups as they liked according to the kind of emotion they would be likely to experience in such situations.” After the sorting had been completed, subjects were asked to explain what emotion united the situations in each group that they had formed.

Because the same group of subjects was used in Experiment 1 and both tasks of Experiment 2, the order of presentation of all three tasks was completely counterbalanced across subjects to avoid systematic effects of tasks on each other.

Results and Discussion

Triad sorting task. Subjects’ sortings were analyzed by calculating the proportion of times they selected two envy situations in **EEJ** and **EEB** triads, two jealousy situations in **JJE** and **JJB** triads, and the envy and jealousy situations in **EJB** triads (see Table 2).

Table 2

Results of triad sorting task showing the percentage of times different groups of subjects separated jealousy and envy situations from each other and from control “bad” situations

	JJ/E Triad	EE/J Triad	JJ/B Triad	EE/B Triad	EJ/B Triad
Rus.	88%	74%	75%	77%	21%
Biling. Rus	64%	73%	73%	68%	59%
Biling. Eng	79%	70%	82%	82%	50%
Eng.	91%	74%	91%	84%	52%
Mean	80%	73%	80%	78%	46%

Triads where jealousy and envy situations were pitted against each other or against controls were sorted in a very similar way by all subjects. Separate ANOVAs run for each type of triad showed no difference between subject groups. On average, subjects in all groups separated envy and jealousy situations from each other and from control situations 78% of the time. This pattern shows clear differentiation of jealousy and envy situations. Already at this point we have evidence against the strong view of the linguistic relativity hypothesis. All groups of subjects reliably distinguished between envy and jealousy situations.

The only triad where the difference between subject groups was found was the EJB triad where all three kinds of situations were combined — envy, jealousy and controls. Russian speakers were less likely to pick envy and jealousy situations from this triad than any other group of subjects, $F(3, 62) = 4.26$, $p < .01$. They did it only 21% of the time. In fact, the most common response that Russian speakers gave when presented with and EJB triad was that all situations looked very different to them and they could not pick any two that go together. They gave this response about 50% of the time. In contrast, bilinguals tested in Russian, bilinguals tested in English and English monolinguals picked envy and jealousy situations from the EJB triad 59%, 50% and 52% respectively (these groups did not differ reliably from each other).

Overall, we can conclude from the triad sorting task that all groups of subjects were able to distinguish between envy and jealousy situations, and did so to similar degrees. This shows remarkable convergence, and suggests that linguistic differences documented in Experiment 1 do not lead English speakers to conflate envy and jealousy situations.

However, English speakers and bilinguals were more likely than Russian speakers to group envy and jealousy situations together. This finding corresponds to the linguistic difference found in Experiment 1 — that English speakers use the word *jealous* to refer to both envy and jealousy situations and Russian speakers do not. Perceiving greater similarity among envy and jealousy situations may be a cognitive consequence of that linguistic difference. Interestingly, bilinguals — regardless of whether they were tested in English or Russian — responded very much like English speakers on the EJB triads. Most strikingly, Russian-English bilinguals tested in Russian performed differently than Russian monolinguals. The only factor that can explain this difference is exposure to English — both groups were native Russian speakers tested in Russian. It may be that bilinguals' familiarity with the English way of labeling the emotions of jealousy and envy highlighted the similarity between them, thus altering bilinguals' conceptual representation of these emotions. This can be taken as evidence for the weak view of the linguistic relativity hypothesis.

Free sorting task. Three kinds of analysis were performed on the data collected in the free sorting task. The first analysis was designed to examine overall agreement between subject groups in how they sorted envy, jealousy and control situations. A procedure well-suited to address this question is the Cultural Consensus Model (Romney et al. 1986). To perform this analysis, we scored each participant on each possible pair of situations (there were a total of 81 possible pairs). Each pair was coded as 1 if the situations were sorted into the same group and 0 if they were not. The resulting matrix consisted of subjects (the horizontal axis) X pairs of situations (the vertical axis). It was subjected to the principle component factor analysis. Using this procedure, consensus is indicated if: (1) the first factor eigenvalue is much greater than subsequent eigenvalues; (2) the first factor accounts for much more variance than the following factors; (3) all subjects load positively on the first factor. All these criteria were met by the results of the analysis: (1) The first eigenvalue was 22.41 which is greater than subsequent eigenvalues 3.28, 2.68, 2.05; (2) The first factor accounted for 34% of the variance with subsequent factors accounting only for 5%, 2.68% and 2.05%; (3) All subjects loaded positively on the first factor. There was no difference between subject groups in the amount of agreement with the first factor, $F(3, 62) = 1.327$, $p = .274$. We

can conclude from this analysis that a strong consensus exists among all participant groups. Contrary to predictions of linguistic relativity, all groups sorted envy, jealousy and control situations in a similar way.

The second analysis was an attempt to follow up the findings of the triad sorting task suggesting that English speakers and bilinguals perceived envy and jealousy situations as more similar than Russian bilinguals. If so, those exposed to English might be more likely to form groups in the free-sorting task that mix envy and jealousy situations than Russian monolinguals. The groups formed by each subject were analyzed by calculating a proportion of mixed jealousy/envy groups out of all groups formed by each subject. Any group that had one or more situations of each kind was considered a mixed jealousy/envy group. Overall, the number of such groups was low. On average, 19% of all groups formed by Russian monolinguals, 18% by English monolinguals, 15% by bilinguals tested in Russian and 22% by bilinguals tested in English were mixed. There was no difference between the groups, $F(3, 62) = .294, p = .83$. In spite of the linguistic difference seen in Experiment 1, groups did not differ in the frequency of combining envy and jealousy situations in a free-sorting task.

In the third analysis we looked at the groups formed by subjects with two specific questions in mind: (1) Do Russian and English speakers differ in how many separate envy and jealousy groups they formed in their sorting? (2) Do Russian and English speakers differ in how they assigned labels to groups they had formed? To examine this, groups formed by each subject were coded in the following way: the group was labeled "Envy group" if more than half the situations in it were envy situations; the group was labeled "Jealousy group" if more than half the situations in it were jealousy situations. Groups made of control situations and groups made of only 1 situation were excluded from the analysis. Of interest is the number of each kind of group, and the way in which the group was labeled. The results of this coding procedure are presented in Table 3 along with the number of groups that were called *jealousy* and/or *envy*.

Two results of this analysis are of note. First, in line with the consensus analysis reported above, subject groups did not differ on the number of envy and jealousy groups formed (see Table 3). This was confirmed by a 2 (Situation Group: Envy, Jealousy) \times 4 (Participant Group) Chi Square analysis ($\chi^2(3) = 0.93, p = .82$). Second, despite the strong agreement

Table 3
Groups and their labels in a free sorting task

	Called “jealousy”	Called “envy”	Called “jealousy and envy”
English Monolinguals			
36 “jealousy groups”	11 (31%)	0	1 (3%)
28 “envy groups”	10 (36%)	4 (14%)	2 (6%)
Russian Monolinguals			
32 “jealousy groups”	17 (53%)	0	0
25 “envy groups”	0	7 (28%)	0
Bilinguals tested in English			
20 “jealousy groups”	7 (35%)	0	0
12 “envy groups”	0	1 (8%)	0
Bilinguals tested in Russian			
18 “jealousy groups”	9 (50%)	0	0
14 “envy groups”	0	8 (57%)	0

in how situations were sorted into groups, there were striking differences in how these groups were labeled (see Table 3). English speakers assigned the term *jealousy* to jealousy groups 31% of the time, but also used the term to describe envy groups 36% of the time. This fits with the results from Experiment 1 suggesting that English monolinguals apply *jealous* to both jealousy and envy situations. Moreover, English monolinguals applied both *envy* and *jealousy* to a single group on 3 occasions. In striking contrast, native Russian speakers, whether mono- or bilingual, never described an envy group using the term *jealous/revnuet*, nor did members of these groups ever use both words for a single group. Even bilinguals who were tested in English labeled the groups in a way that was consistent with their native language, and not the language they were tested in. This is slightly at odds with the results from Experiment 1, in which bilinguals tested in English responded very similarly to English speakers.

In sum, the results of Experiment 2 provide little evidence for linguistic relativity. Few conceptual differences emerged; participants were remarkably similar in their patterns of grouping situations both in triads and in a free-sorting task. This outcome is very similar to the one reported by Romney et al. (1997) who found that 66% of the total semantic structure of Japanese and English emotion terms came from a common model shared

by both English and Japanese speakers. Only 6% of that structure was due to Japanese and English culture-specific models. Despite the overwhelming conceptual universality that emerged from the “global picture” in our study, there was, however, evidence for a very specific effect of language on conceptual structure; participants who had learned English either as a first or second language saw envy and jealousy situations as more similar than participants who had never learned English. Finally, justifications for free-sort grouping clearly distinguished native English speakers from native Russian speakers. Thus, in contrast to Experiment 1, performance on the conceptual tasks in Experiment 2 reveals an influence of exposure to English, and also an influence of being a native speaker of Russian, but little effect of language being spoken at the moment.

General Discussion

The goal of this study was to investigate the possibility of language affecting thought in the abstract domain of emotion terms, and to test bilinguals as well as monolinguals to help pinpoint the source of any differences. We sought first to document systematic differences between how Russian and English speakers map the terms *revnuet/zaviduet* and *jealous/ envious* onto situations designed to evoke emotions of envy or jealousy. Experiment 1 revealed a clear linguistic difference. Russian monolinguals preferentially applied *revnuet* to jealousy situations and *zaviduet* to envy situations. In contrast, although English monolinguals preferentially applied *jealous* to jealousy situations, they were equally likely to apply *jealous* or *envious* to envy stories. In sum, Russian monolinguals mapped their terms onto emotions in a mutually exclusive way, whereas English speakers used their terms interchangeably, at least for envy stories.

In Experiment 2 we looked for nonlinguistic conceptual correlates of this linguistic difference, predicting that Russian speakers should make clearer conceptual distinctions between envy and jealousy situations than English speakers. Two general findings emerged. First, we were largely unable to find conceptual differences corresponding to the linguistic differences from Experiment 1. Second, despite the remarkably similar performance across groups on nonlinguistic tasks, we did find some evidence for effects of language on thought. And finally, when results of both experi-

ments are taken together, we see a number of effects that can be thought of as “effects of language on language.” Below we discuss these findings.

When asked to perform a free-sorting of situations designed to elicit emotions of envy, jealousy, or simply negative emotions, we found a remarkable consensus in responses. Not only was there a clear consensus statistically, but contrary to predictions based on performance on the linguistic task, English speakers were no more likely than Russian speakers to group envy and jealousy situations together. Likewise, on the triad oddity task, no differences were observed in the tendency to differentiate envy situations from jealousy situations. Thus, the bulk of evidence suggests few conceptual differences despite clear linguistic differences.

We did, however, obtain one finding in support of weak linguistic relativity. In mixed triads, English monolinguals and both bilingual groups were more likely to group envy and jealousy situations together than were Russian monolinguals. This effect illustrates the value of testing bilinguals as well as monolinguals. Had we tested only monolinguals, the interpretation of this effect would necessarily remain ambiguous; the linguistic difference might have caused the conceptual difference, but it is equally plausible that a cognitive difference, due to any of a myriad of cultural factors, might have caused the linguistic difference. However, examining responses from bilinguals allows us to begin to answer questions about causal direction. Regardless of native language or language being spoken at the moment, all and only fluent speakers of English perceived envy and jealousy situations as at all similar in the triad task. This suggests that the process of becoming fluent in English may have had the conceptual consequences of highlighting similarities between envy and jealousy that might not otherwise be salient. Thus, by examining bilinguals as well as monolinguals, we can argue that this finding represents a clear, albeit limited, instance of language determining thought, rather than just a correlation between the two.

While the finding just discussed suggests only a small influence of language on conceptual structure, a number of other results suggest the influence of one language on the use of another. These results necessarily focus on the bilingual populations. First, consider performance on Experiment 1. For the most part, bilinguals (all native Russian speakers) performed in a way that was consistent with the language they were tested

in. Bilinguals tested in Russian made the Russian distinction in labeling jealousy and envy stories, whereas bilinguals tested in English made no distinction for envy stories, just like native English speakers. However, analysis of difference scores revealed greater differentiation between *revnuet* and *zaviduet* on envy stories for Russian monolinguals than for bilinguals tested in Russian. Thus, bilinguals tested in their native language are affected by the knowledge of their second language; advanced knowledge of English may have influenced their use of *revnuet* and *zaviduet*. Otherwise, performance in Experiment 1 was completely consistent with the language being spoken.

In contrast, Experiment 2 reveals evidence for the effects of native language on how participants labeled the groups they formed. Specifically, despite forming comparable proportions of envy, jealousy, and mixed groups, English monolinguals were equally likely to label envy groups and jealousy groups with the term *jealousy*, but Russian monolinguals and both groups of bilinguals never used the word *revnost'* or *jealousy* to label envy groups. In this respect, all native speakers of Russian were similar, and contrasted with native speakers of English. For bilinguals tested in English, this seems to contrast with their willingness to apply the term *jealous* to envy stories in Experiment 1.

These results allow us to begin to paint a picture of the interaction of language and thought in the domain of emotion terms. First, we found few conceptual differences between speakers of English and Russian; how one categorizes emotional situations appears to be largely independent of how emotional terms map onto those situations in one's language. However, becoming fluent in a language that shows a different mapping of labels onto emotions seems to have both the conceptual effect of increasing the perceived similarity between emotions, and the linguistic effect of influencing how labels are mapped onto situations in one's native language. Moreover, by examining bilingual as well as monolingual speakers, we were able to transcend correlations between language and thought and begin to understand more complex underlying relations. In sum, we have shown that despite clear linguistic differences in how emotion terms map onto situations, speakers of English and Russian for the most part share an underlying conceptual organization of those situations, but also that language can have local effects on that organization.

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Appendix A

Jealousy Stories:

Anthony and Julia have known each other since they first met in 8th grade. Now they are grownups and their friendship has developed into a romantic relationship. Anthony appreciates the mutual trust in their relationship, but the events of the last week made him doubt Julia's faithfulness. A few days ago when he called her late at night, a male voice he has never heard before answered the phone, and yesterday Anthony saw Julia at a café engaged in a conversation with an attractive man.

Marina and Andrew have been friends ever since they first met in 10th grade. Many years have passed and their friendship developed into a romantic relationship. Marina is very committed to Andrew, but she's beginning to doubt whether he feels the same way. She was unpleasantly surprised a few days ago when she saw Andrew not only dancing but also flirting with one of her friends at a party, and yesterday Andrew mentioned that he is going away for a weekend to visit his former girlfriend.

Envy Stories:

Boris and Natasha are a married couple. They are very happy together and want to have a big family with a lot of kids. However, they found out that they'll never be able to have their own children. The only option they have is adoption that is a long and complicated process. Last weekend they went to visit their friends whom they've known since they were college students. These friends of Boris and Natasha's just had their second baby who is incredibly beautiful and looks a lot like her parents.

Paul and Max are friends. They are college seniors and they both dream of working for the same company — IBM. Having done equally well on their interviews, they were both offered 3-month internships. After their internship was over Paul and Max applied for the same job at IBM. However, despite them both being equally well qualified, Max got the job and Paul did not.

Anna and Maria are friends. It's their last year of training in a theater/acting college and they both dream of playing Ophelia in their favorite play "Hamlet." Unexpectedly, they get a chance to audition for this role in a theater. Anna and Maria's instructors think that both women are very talented and are equally fit to play this role. However, after the audition the role was offered to Maria, and not Anna.

Appendix B

Антон и Юлия знают друг друга с 8-ого класса, где они и познакомились. Сейчас они взрослые и их дружба переросла в романтические отношения. Антон ценит взаимное доверие, установившееся в их отношениях, но события последней недели заставили его усомниться в верности Юлии. Несколько дней назад, когда Антон позвонил ей домой поздно вечером, ему ответил незнакомый мужской голос, а вчера он случайно увидел Юлию в кафе, сидящую за столиком с привлекательным мужчиной и увлечённую разговором с ним.

Марина и Андрей были друзьями с тех пор, как они познакомились в 10-ом классе. Прошло много лет и их дружба переросла в романтические отношения. Марина очень привязана к Андрею, но она начала сомневаться в том, что Андрей испытывает сходные чувства. Несколько

дней назад она была неприятно удивлена, увидев как Андрей не только танцевал, но и заигрывал с одной из её подруг на вечеринке у друзей, а вчера Андрей упомянул, что он уезжает на выходные навестить свою бывшую девушку.

Борис и Наташа женаты. Они очень счастливы и хотят иметь большую семью и много детей. Однако они узнали, что они никогда не смогут иметь своих собственных детей. Их единственный выход — усыновление — долгий и сложный процесс. На прошлые выходные они ездили в гости к друзьям, которых они знают со студенческих времён. У этих друзей только что родился второй ребёнок — невероятно красивая девочка, очень похожая на её родителей.

Павел и Максим — друзья. Они учатся на последнем курсе и оба мечтают работать на одну компанию — IBM. После того, как они одинаково успешно прошли собеседование, им обоим предложили трёхмесячную практику в этой компании. По окончании практики, оба Павел и Максим подали документы на одну и ту же открывшуюся вакансию в IBM. Однако, несмотря на то, что они были одинаково высоко квалифицированы, работу получил Максим, а не Павел.

Анна и Мария — подружки. Они учатся на последнем курсе театрального училища и обе мечтают сыграть Офелию в их любимой пьесе «Гамлет». Неожиданно у них появляется возможность участвовать в прослушивании на эту роль в театре. Преподаватели Анны и Марии считают, что обе девушки очень талантливы и одинаково подходят на эту роль. Однако после прослушивания роль предложили только Марии, а не Анне.

Appendix C

Envy situations:

Your boyfriend has a better job than you.

Your boyfriend is more attractive than you.

Your boyfriend appears to have everything.

Your boyfriend buys something you wanted but could not afford.

Your boyfriend is more intelligent than you

Your boyfriend is more talented than you.

You have to work while your boyfriend is out partying.

Your boyfriend gets a job that you want.

Your boyfriend has a more impressive resume than yours.

*Jealousy situations:**You phone your boyfriend and a voice you haven't heard before answers.**Your steady date has lunch with an attractive opposite sex person.**Your date dances with someone else at a dance.**Someone is flirting with your date.**Your boyfriend wants to see other people.**Your boyfriend visits the person he used to go out with.**You find out your lover is having an affair.**Your boyfriend goes on a long trip without you**Your boyfriend breaks up with you.**Control situations:**Somebody is gossiping about your boyfriend.**Your boyfriend lost in a competition.**You are late for a date with your boyfriend.**A party you were going to with your boyfriend was cancelled.**Your computer crashed and you lost all of your boyfriend's documents.**Your boyfriend lost your dog.**Your boyfriend got a really bad haircut.**Your boyfriend is very sick.**Your boyfriend crashed your car.***Appendix D***У вашего парня работа лучше, чем у вас.**Ваш парень более привлекательный, чем вы.**Кажется, что у вашего парня есть абсолютно всё.**Ваш парень покупает то, что вы хотите, но не можете себе позволить.**Ваш парень умнее, чем вы.**Ваш парень талантливее, чем вы.**Вам приходится работать в то время, как ваш парень веселится на вечеринке.**Ваш парень получает работу, которую хотите вы.**У вашего парня более впечатляющее резюме, чем у вас.**Вы звоните своему парню и вам отвечает незнакомый голос.**Ваш парень обедает с привлекательным представителем противоположного пола.*

Ваш парень танцует не с вами на дискотеке.

Кто-то заигрывает с вашим парнем.

Ваш парень желает встретиться с другими девушками.

Ваш парень идёт в гости к девушке, с которой он встречался раньше.

Вы узнаете, что у вашего парня роман с кем-то другим.

Ваш парень уезжает надолго без вас.

Ваш парень бросает вас.

Кто-то сплетничает о вашем парне.

Ваш парень проиграл на соревновании.

Вы опаздываете на свидание с вашим парнем.

Вечеринка, на которую вы собирались с вашим парнем, отменена.

Ваш компьютер сломался и вы потеряли все документы вашего парня.

Ваш парень потерял вашу собаку.

Вашего парня очень плохо подстригли.

Ваш парень очень болен.

Ваш парень разбил вашу машину.

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