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### Biases in use of positive and negative words across twenty natural languages

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# Biases in use of positive and negative words across twenty natural languages

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Positive events are more common (more tokens), but negative events are more differentiated (more types). These observations and asymmetries about the world are consistent with a number of features or biases favouring positive adjectives that have been shown for English. Compared to their opposites, positive adjectives in English are more likely to be unmarked, negated into their opposite, define the entire negative to positive dimension, and occur first in conjunctions with their negative opposite. In this paper we document that these biases have considerable generality, appearing in all or almost all of 20 natural languages. The greater differentiation of negative states is illustrated here by the demonstration that five common nouns describing negative states in English (disgust, risk, sympathy, accident, murderer) have equivalents in most or all of the 20 languages surveyed, but the opposite of these nouns is not lexicalised in most of the 20 languages.

*Keywords:* Emotion; Language; Valence; Biases; Negativity.

There is evidence for both positive and negative biases in affect and information processing in humans and other animals. A positive bias seems based on an asymmetry in the world as it interacts with organisms: the fact that most of the events experienced in life have positive implications. On the other hand, in the world, there is also a negative asymmetry: negative events come from a more differentiated set of situations and require more differentiated responses, and are generally more potent (Rozin & Royzman, 2001). These contrasts have been identified and developed by a number of authors (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001; Cacioppo, Gardner, & Bernston, 1997; Kahneman & Tversky, 1979;

Peeters, 1971, 1991; Peeters & Czapinski, 1990; Rozin & Royzman, 2001). In this paper, we briefly review the evidence for and accounts of both of these biases and link them to asymmetries in the interaction of the world with the organism. We extend the analysis into some cross-cultural aspects of language.

The phenomenon of negativity bias (Baumeister et al., 2001; Cacioppo et al., 1997; Peeters, 1971, 1991; Rozin & Royzman, 2001) refers to four widespread tendencies, present in humans and non-human animals, as taxonomised by Rozin and Royzman (2001): negative potency, negative differentiation, negative gradient steepness, and negativity dominance. Negative potency

and negative differentiation are the two features most relevant to the present review.

Negative potency refers to the fact that negative events tend to be more potent than the equivalent positive events (Baumeister et al., 2001; Brown, 1948; Jordan, 1965; Kahneman, Knetsch, & Thaler, 1990; Kahneman & Tversky, 1979; Peeters, 1991; Peters & Czapinski, 1990; Rozin & Royzman, 2001). Loss aversion is a major instance of negative potency (Kahneman & Tversky, 1979). Related phenomena are that animals and humans learn more quickly about negative than about positive events (Rozin & Royzman, 2001), and that negative events are more perceptually salient and attention getting than positive events (Baumeister et al., 2001; Peeters, 1991; Rozin & Royzman, 2001; Taylor, 1991). Negative potency probably results from two aspects of negative events: (1) they are rarer, and hence carry more informational value than positive events—this is Peeters' (1971); Peeters & Czapinski, 1990) informational negativity effect (see also Kanouse & Hansen, 1972); and (2) the threat of some negative events (the prospect of death) is generally more adaptively important than the benefits of most positive events (Rozin & Royzman, 2001). Thus, even though positive events are more frequent, in light of the greater salience of negative events, news of human affairs, as indicated, for example, by the front pages of newspapers, highlights negative events. The greater potency of negative events can result not only directly from their rareness (informational value), but the fact that our neutral baseline is actually hedonically positive (Parducci, 1995), leaving the opportunity to generate maximally larger negative events.

The second feature, negative differentiation, refers to the fact that a wider range of terms is used to describe negative states (e.g., emotions) than positive states (Rozin & Royzman, 2001). Also, more effort is spent in processing and questioning negative events (Baumeister et al., 2001; Peeters & Czapinski, 1990; Taylor, 1991). Negative differentiation is probably a result of the fact that there are more different types of threats than benefits that are encountered, and, most

critically, there is a wider range of response options in the face of negative events. Negative events can prompt attack, withdrawal, or freezing, whereas positive events almost always prompt approach. In this regard, it is notable that of the "standard" six basic emotions in Western academic psychology, four are negative (anger, disgust, fear, sadness) and only one is positive (happiness); surprise, the sixth emotion, is not obviously valenced.

A somewhat complementary positive bias has also been described (e.g., Cacioppo et al., 1997; Peeters, 1971), sometimes referred to as the "Polyanna effect" (Boucher & Osgood,1969; Osgood & Hoosain, 1983; see Matlin & Stang, 1978, for a summary). The positive bias is manifested in a number of ways, including Gilbert's (1991) demonstration of a default bias to assume that any information received is correct. There is abundant evidence that positive events are more common than negative events in the daily life of animals and humans, and this is supported by the much higher incidence (tokens) of positive words in narratives describing human experience, in fact or fiction (see below).

The interplay of positive and negative biases has been considered, particularly by Peeters, who couples the idea of greater informational value of negative events with the idea that because of the higher frequency of positive events, people expect the positive, but compensate for this expectation by extreme sensitivity to negative outcomes Peeters (1971, 1991).

## Positive–negative biases in language

The interplay of positive and negative biases can be observed in language, and it is the aim of this paper to document language asymmetries across many languages. Since language is used to describe the world, and since there is an asymmetry that many more events are positive than negative in the world, it is appropriate that positive words (tokens, not types) occur with much higher frequency than negative words in English (Benjafiel, 1983; Matlin & Stang, 1978; Zajonc, 1968). There is evidence from English for

a positive bias directed at positively valenced, as opposed to negatively valenced adjectives (on account of the higher frequency of positive events; more tokens). We confirmed this in a preliminary study, searching for positive and negative valenced adjective frequency in an extensive corpus of over 100 million words of both spoken and written British English (Leech, Rayson, & Wilson, 1971, also available on the Internet). We searched for frequency of English usage for the seven adjectives we examined across languages in the first part of the present study and their opposites (opposites listed after the solidus: pleasant/aversive, sad/happy, dirty/clean, bad/good, sincere/*no obvious opposite in English*, pure/contaminated, beautiful/ugly). We also searched for the negation of any of these words, when it formed a word in English, which was the case for 5 of 7 positive words (unpleasant, unhappy, unclean, insincere, impure) and only one negative word (uncontaminated). The search revealed that the positive word was always used more frequently in both the written and spoken corpora scanned, where data were available. "Good" is much more frequent (795 cases per million words) than "bad" (153). "Happy" is much more frequent (117) than the sum of unhappy (19) and sad (34). "Pleasant" (27) is more common than the sum of "aversive" (0)[1] and "unpleasant" (13). "Beautiful" (87) is much more common than "ugly" (14). "Clean" (48) is more common than "dirty" (26) and "unclean" (0). "Pure" (34) is much more common than the sum of "impure" (0) and "contaminated (0). Neither "sincere" nor its possible opposites (including "insincere", "deceptive", or "dishonest") appeared in the corpora, indicating that their incidence was less than 10 times per million words.

Osgood and Hoosain (1983) and Osgood, May, and Miron (1975) have shown some evidence of positive bias in languages other than English. They list the top ten qualifiers in a number of languages, and there is a significantly higher incidence of positive adjectives as com-

pared to neutral or negative ones in most of the languages surveyed.

One of the important forces in the evolution of language is increasing efficiency in communication. Just as more frequent words tend to be shorter, there is evidence that presumably on account of their higher frequency, positive words have a privileged position, at least in English. This conclusion is based on a number of observations on English, some presented in Matlin and Stang's (1978) review of asymmetrical (biased) positive linguistic marking from the research literature on the English language. First, *positive adjectives are more likely to be unmarked and positive adjective reversal predominates*. In general, negative words are often composed of the positive root negated with a prefix (e.g., unhappy, insincere, unpleasant), while the reverse is exceptional (e.g., unselfish, uncontaminated). For example, in English, happy and unhappy are both words while sad and unsad are not; clean and unclean are both words while dirty and undirty are not. This is described linguistically as the fact that the positive term in a positive–negative pair is usually unmarked. Related to this point, in English, the only or principal opposite for some positive words is their negated form (e.g., pleasant and unpleasant), but it is rare for a negative word to have only the negated form as its positive opposite.

Second, *negated positive adjectives tend to have a negative valence, whereas negated negative adjectives tend to be neutral in valence*. In dictionaries, negative words are often defined by negations of their positive opposites (e.g., "bad" defined as "not good"), while the reverse ("good" defined as "not bad") is exceptional. One reason for this may be that a negated positive word is negative (unhappy is a negative, not neutral state), while a negated negative word is usually neutral ("unsad" is neutral rather than happy). Supporting findings come from Peeters (1974); when high school and university students were asked to rate similarities between the meanings of terms, they rated the negative/negated positive pair (e.g., "grim" and

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[1] The Leech et al. (2001) database does not report frequencies below 10 in 1,000,000 words. Hence, "0" actually stands for less than 10/1,000,000.

"not friendly") more similar than the positive/ negated negative pair (e.g., "friendly" and "not grim")—but see Colston (1999) for some contextual limitations on this phenomenon.

Third, *usually, only positive adjectives are used to refer to the whole positive–negative dimension.* Positive adjectives can more often be used to describe the entire range of the meaning of the dimension defined by opposite word pairs; the negative adjective usually applies only from the negative end to neutral. For example, in English, if two people are both sad, it sounds right to say that one is happier than the other, though they are both sad. But if two people are both happy, it does not make as much sense to say that one is more sad than the other. As a consequence of this bias, positive words tend to define a dimension (thus happiness describes the domain from sad to happy), while negative words tend to span a reduced domain, from negative to neutral (e.g., for unsad, not bad).

Fourth, *in conjunctions or disjunctions, positive adjectives are usually mentioned before the opposite negative adjectives.* When opposite words are mentioned together, as in the "X and/or Y" construction, the positive word tends be to mentioned first (e.g., good and bad, happy and sad). This positive precedence, at least in English, is strong enough to overcome the documented force to mention shorter words first, such that "happy and sad" sounds better than "sad and happy". (Of course, as in all generalities, there are some exceptions, as for example "black and white" in English.)

We have presented a summary of some asymmetries in English putatively based on the higher frequency of positive events in the world. The literature on positive and negative biases in psychology suggests that this same feature of the world, coupled with the greater potency and range of negative events, should lead to a *negative* bias in language. Some negative states or situations might be lexicalised while their corresponding positive opposites may not be so recognised in the same language. For example, in English, there is a word, "sympathy", for caring about another's misfortune, but there is not a word to describe taking pleasure at another's good fortune (we say, "I feel good for you" or "I share your joy").

In this study, we extended some existing evidence for positive asymmetries in English to a wide range of languages, in order to explore their generality. We also explored the claim that there are more different words to describe negative events. Our strategy, in general, was to take a set of clear examples of positive and negative asymmetries in English and determine whether they also held in a variety of 20 other natural languages, including languages representing most language groups in the world. The positive bias we examined was that positive adjectives occupy a privileged position relative to negative adjectives. We began by selecting a set of common adjective pairs in English that showed the positive asymmetries we have described (happy–sad, good–bad, clean–dirty, pleasant–aversive/unpleasant, pure–contaminated, beautiful–ugly, and sincere–insincere), and determined the degree to which the four positive asymmetries described above hold in 20 other languages. To explore the implications of greater differentiation in negative terms—for example, in English there are many more adjectives to describe pain than pleasure (Rozin & Rozman, 2001)—we identified five important nouns in English (murderer, risk, accident, disgust, sympathy) that do not have single-word opposites, and determined whether the same situation held in 20 other languages. Consistency with English would encourage the view that these language asymmetries are general, correspond to the negative–positive biases described within psychology, and perhaps have the same causes.

## METHOD

We interviewed one native speaker of each of 20 languages, not including English. The languages were: Mandarin, Cantonese, Japanese, Korean, Vietnamese, Thai, Tagalog, Ibo, Arabic, Turkish, Tamil, Hindi, German, Icelandic, Swedish, French, Portuguese (Brazilian), Spanish, Russian, and Polish. The languages were selected by convenience, with some attention to including

many different language groups. The informants, one for each language, were the first 20 qualified informants we could find. All were students or employees of the University of Pennsylvania. We made some effort to include an American Indian or Austronesian language, but could not find a qualified informant on the university campus. These 20 languages covered a variety of language groups and included, as a set, the languages spoken by the great majority of the world's population (other than English speakers).

It was essential that all informants had an intuitive sense of the language they were being interviewed about, since the questions had little to do with "rules" of syntax, but rather relied on what "sounds right". The base requirement for selection of informants was that they had learned to speak the language in question fluently before puberty. All currently spoke their native language principally when at home. All were fluent in English, though often not native speakers of English. All interviews were carried out in English by one of the investigators. Informants were told that this was a study about the usage of various words in their native language.

In Part 1 of the interview, the informants were asked ten questions about eight adjectives, half positive, half negative, and the subtleties of their meanings and usage. The eight adjectives were pleasant, sad, dirty, disgusting, bad, sincere, pure, and beautiful. These "reference" adjectives were selected in advance by the authors, such that some were negative and some positive. They were common adjectives in English, but were selected by convenience, with the proviso that we knew in advance for all cases that the positive asymmetries we were exploring were present for these words in English. No selection of data occurred after the initial selection of the target adjectives.

We included the word "disgusting" with the seven other adjectives in the first part of the interview, even though this word has neither a positive opposite or a negated version in English. As it turned out, this was the case for most languages. It seemed more appropriate, in retrospect, to include disgusting (or disgust) among the nouns in English with no opposite, in Part 2 of

the study. So, in the results section, disgust is discussed in Part 2, as a unique negative word.

Informants were asked ten questions about each of the seven selected words, including their opposite and negations of either. In the interest of smoothness of communication, we describe the questions along with the responses in the results section (see Table 1).

In the second part of the interview, participants were asked if there were words for risk, murderer, accident, and sympathy in their respective languages, and then if there were positive opposites for these words. Positive opposites do not exist in English. In the interview sessions, the opposite of risk was defined as "the chance that something positive will happen", the opposite of murderer as "someone who saves a life" (we also asked about a word for saving many lives, but this would not be a strict opposite to murderer), the opposite of accident as "an unexpected positive event", and the opposite of sympathy as "feeling good about someone else's *joy* or *good fortune*". As indicated above, we also included the word disgust, probed in Part 1, in the results for Part 2.

As is often the case in language studies, we relied on the linguistic knowledge and intuitions of a single native speaker. Any uncertainty or inaccuracy of a single informant would, of course, not bias our findings but would add "noise" and make it more difficult to demonstrate a strong commonality across languages. In order to roughly assess the degree of variation within a language, we interviewed 10 native English speakers (8 of them students at the University of Pennsylvania), presenting our full protocol of questions for three of the adjectives: sad, good and pleasant, and for all five "unique" negative nouns (including disgust). Responses on questions for sad, bad and pleasant were unanimous or almost unanimous for almost all items. The only items for which there was substantial disagreement was the questions about whether one could use the positive word on the negative side of neutral and the negative word on the positive side of neutral. Although in a majority of cases, as stipulated in the literature (see above), the positive word is more likely to be used on the negative side than the negative word

**Table 1.** *Results for each of seven adjectives on positive asymmetry across 20 languages\* (number followed by/relevant total languages if <20, below % in **bold**)*

| | Feature | Sad | Dirty | Beautiful | Bad | Sincere | Pure | Pleasant | Mean% |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Is there a positive word? | 20 **100** | 20 **100** | 20 **100** | 20 **100** | 16 **80** | 18 **90** | 18 **90** | **94.3** |
| 2 | Is there a negative word? | 20 **100** | 19 **95** | 17 **85** | 19 **95** | 11 **55** | 14 **70** | 8 **40** | **77.1** |
| 3 | Can the positive word be negated? | 14 **70** | 13 **65** | 12 **60** | 12 **60** | 14/16 **88** | 14/18 **75** | 10/18 **56** | **69.1** |
| 4 | Can the negative word be negated? | 8 **40** | 10/19 **53** | 9/17 **53** | 9/19 **47** | 7/11 **64** | 5/14 **36** | 1/8 **12** | **42.9** |
| 5 | Is the negation of the positive word neutral or extreme? (# extreme) | 13/14 **93** | 10/13 **77** | 8/12 **67** | 11/12 **92** | 13/14 **93** | 9/14 **67** | 9/10 **90** | **82.7** |
| 6 | Is the negation of the negative word neutral or extreme? (# extreme) | 0/8 **0** | 3/10 **30** | 4/10 **40** | 4/9 **44** | 4/7 **57** | 1/5 **20** | 2/3 **67** | **36.9** |
| 7 | Would the informant rather be "unnegative" or "unpositive"? (# prefer unneg.) | 15/16 **94** | 12/13 **92** | 11/13 **85** | 14/16 **88** | 8/10 **80** | 7/8 **88** | 9/9 **100** | **89.6** |
| 8 | Can the negative word be used on the positive end of the spectrum? (# yes) | 11/20 **55** | 11/19 **58** | 5/18 **28** | 9/19 **47** | 4/12 **33** | 4/13 **31** | 3/9 **33** | **40.7** |
| 9 | Can the positive word be used on the negative end of the spectrum? (# yes) | 13/20 **65** | 14/18 **78** | 10/19 **53** | 13/19 **68** | 5/12 **64** | 4/13 **42** | 8/10 **80** | **64.3** |
| 10 | Does it sound better to say the negative or positive word first? (# pos. first) | 11/13 **85** | 8/13 **62** | 14/14 **100** | 12/17 **71** | 8/9 **89** | 8/10 **80** | 9/9 **100** | **83.9** |
| | Mean positive advantage by word† | 42.4 | 26.6 | 28.8 | 28.2 | 32.0 | 33.0 | 42.8 | |

*Notes*: *Clarification of the interpretation of the number of relevant cases for each cell in the table. Consider the "Pleasant" column. Frame 1 indicates that 18 (of the 20) languages have a synonym for "pleasant"). Frame 3 reports "10/18". This means there were 18 cases where one could ask whether there was a relevant synonym for "pleasant" (Frame 1), and in 10 of these cases, it could be negated. Frame 5 reports 9/10, meaning that in 9 of the possible 10 cases where there was a negation of a positive word (note the 10 in Frame 3), the negated positive word was negative, as opposed to neutral. Items for which the informant indicated totally uncertain or no preference are not included in the numerator or denominator. †Positive advantage over negative, calculated as the mean of five indicators of positive bias: the positive–negative% difference for items with separate positive and negative items; (3–4),(5–6),(8–9) or percent positive preferred – 50 (chance) for items that directly compare positive and negative (item 7–50) (item 10–50).

on the positive side, there is sufficient disagreement on these items (items 8 and 9 in Table 1), that we decided not to count English as a clear example of the wider range for use of positives than negatives.

For the five "unique" negative words, for which we probed whether there was an English opposite, we had 50 reports (5 words times 10 respondents). For murderer, three respondents offered no opposite, and no more than two people offered the same word. Two indicated "lifesaver" and two "saviour". In our opinion, neither is a precise opposite but a case can be made for each. Six of ten individuals offered no opposite to accident. One offered "serendipity" and one "providence". These are possible opposites, but the majority response was none. For risk, there were three no responses, with "chance" the most common alternative, occurring four times. In our view, chance is not a proper opposite, because it is not positively marked: one can as likely have a positive or negative chance. Seven of ten participants offered no opposite for "sympathy", and six of ten offered no opposite for "disgust". For neither "sympathy" nor "disgust" was any specific potential opposite offered by more than one respondent.

## RESULTS

### Part 1: Positive bias

The presentation of the results is organised around the four types of positive bias described in the introduction. The interview protocol followed this same sequence, and involved a total of 10 questions. For each bias, we describe each relevant question followed by the results from 20 languages for that question. The results for each question are presented in Table 1. Our basic measure of the significance of a bias was a chi-square or binomial that included all relevant observations from the 20

languages and 7 adjectives. In each case, one category for the chi-square was positive versus negative, and the other was presence or absence of the feature being examined (e.g., negation permitted). For the cases where our measure was a positive versus negative comparison, we employed a binomial, with the null assumption that positive would dominate negative 50% of the time.

### 1. Positive adjectives are more likely to be unmarked and positive adjective reversal predominates

Informants were asked for the synonym for each of the eight words (including "disgusting") in their native language. Four of the words (pleasant, good, sincere, beautiful) were positive and four (bad, sad, dirty, disgusting) were negative. We then asked if there was an opposite word for each adjective. The results from this exercise (except for disgusting, which we decided really belonged in Part 2) are presented in Table 1, organised not by the original word and its opposite, but in terms of responses to: "Is there a positive word?" (frame 1, Table 1) and "Is there a negative word" (frame 2, Table 1).

With respect to marking, across the seven adjective pairs (not including disgusting) and all 20 languages, in 94.3% of the cases (132 out of 140, 7 words $\times$ 20 languages, there was a unique positive word, while in 77.1% there was a unique negative word, $\chi^2(1, \ 279) = 16.80, \ p < .001.$[2] Therefore, in this set of 7 adjectives, the positive state is more likely to be unmarked. In one case, "pleasant", there was a significantly higher number of positive (18) than negative (8) words, $\chi^2(1, 39) = 10.98, p < .001$. Of the seven words, in six cases there was a higher incidence of positive than negative words ($p < .05$, 2-tailed binomial), while for one word, there was an equal number (all languages had unique words for happy and sad).

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[2] An argument can be made that the observations that we report are not truly independent; that is, the 20 languages are related to some extent, but we treat them as independent for the purpose of computing and interpreting the chi-square. Also, note that we are not including English in the 20 languages, since we used English to select the instances. Nonetheless, English is a positive supporting instance in each case.

"Positive reversal predominates" claims that positive adjectives are reversed (negated) more than are negative adjectives. Informants were asked: "Can the positive word be negated?" (the example was then solicited; frame 3, Table 1) and "Can the negative word be negated?" (frame 4, Table 1). More of the seven positive words (across the 20 languages) were negated (69.1%) than the negative words (42.9%); $\chi^2(1, 239) = 11.82$, $p < .001$, see first footnote to Table 1 to explain the different numbers for the various binomial and chi-square tests. All seven of the target words had a higher incidence of positive negation than negative negation (7/7, $p < .02$ by 2-tailed binomial).

### 2. Negated positive adjectives tend to be negative (opposite) in valence, whereas negated negative adjectives tend to be more neutral

Informants were asked: "Is the negation of the positive word neutral or (opposite) extreme?" (frame 5 Table 1); "Is the negation of the negative word neutral or (opposite) extreme?" (frame 6 Table 1); and "Would you rather be 'unnegative' or 'unpositive'?", e.g., unhappy or unsad, (frame 7 Table 1).

The judgements about negations could only be made if a negation was acceptable in the language. Hence, the total number for most words, especially the negative words, was less than 20. Negation of the word produces the opposite valence for many more positive words (82.7%) than negative words (36.9%); $\chi^2(1, 140) = 32.23$, $p < .001$. For each of the seven target words, the negated positive was more negative (7/7, $p < .02$). In 89.6% of cases, the informants would prefer to be "un-negative" rather than "un-positive", indicating a more extreme value for the negated positive (76/85, $z = 7.27$, $p < .001$).

### 3. Usually, only positive words are used to describe the entire positive–negative dimension

Positive words can be used comparatively on the negative side of the spectrum (x and y are both sad, but y is happier), whereas this is much rarer for negative words (x and y are both happy, but y is sadder). Informants were asked to imagine a scale from extremely negative to extremely positive, with a neutral point in the middle. Then four points were shown on the scale, two between neutral and negative and two between neutral and positive:

Negative_____Neutral_____Positive
     1         2         3        4
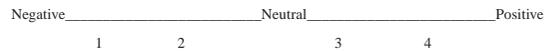
Participants were asked to imagine four things from a category they selected (e.g., people, moods, meals, evenings, clothing, whatever could be appropriately described by each dimension) that would fall at each of these points. For example, for English, if the word was bad, opposite good, good would be at the positive end and bad at the negative end. If four different things were placed at points 1 through 4, the informant would be asked: "Can you say 1 is worse than 2? 4 is better than 3? 3 is worse than 4 even though they are both good? (frame 8, Table 1), 2 is better than 1, even though they are both bad?" (frame 9, Table 1). The first two questions confirm the more standard uses of the comparative words. The second two questions probe the proposed bias: judging by English, it should happen more often that 2 can be described as more positive than 1, than that 3 can be described as more negative than 4. However, as noted above, for this pair of questions, there was a clear majority opinion among 10 English informants, but not a unanimous judgement.

Of the 85 positive–negative adjective pairs, there were 64.3% of cases where the positive word could be used comparatively on the negative side of neutral, but only in 40.7% of cases could the negative word be used at the positive end of the dimension, $\chi^2(1, 220) = 3.781$, $p < .001$. This held for all 7 adjectives (7/7, $p < .02$).

### 4. In conjunctions/disjunctions, positive adjectives are mentioned first

Informants were asked: "Does it sound better to say the negative or positive word first? (when connected by a conjunction)", e.g., "good and bad" versus "bad and good" (frame 10, Table 1). Positive first was scored as 1, no preference as 0.5, and negative first as 0. The positive word was

typically mentioned first in 83.9% of all cases (70/85, $z = 5.97$, $p < .001$), and this occurred for all 7 adjective pairs (7/7, $p < .02$).

### Overall positive bias

Positive bias predicts that for each of the seven words, the values in frame 3 will be higher than frame 4, frame 5 higher than frame 6, and frame 8 higher than frame 9. It also predicts that frames 7 and 10, both of which are comparative statements, will yield values over 50%. This involves 5 predictions for each of 7 words, or 35 predictions. In all 35 cases, the direction predicted by positive bias is observed. We created an overall positive bias score for each of the seven adjectives by summing the differences across these three predictions: frames $(3–4) + (5–6) + (8–9) +$ (frame 7 score $–50) +$ (frame 10 score $–50$); the latter two becoming the net effect over 50% for the two comparative questions. These positive bias (or positive advantage) scores are displayed in the bottom line of Table 1.

*Adjective and language differences.* The range of positive biases across the seven adjectives is rather small, ranging from a minimum for dirty ($\bar{x} = 26.6$) to maxima for sad ($\bar{x} = 42.4$) and pleasant ($\bar{x} = 42.8$). English showed the largest percent of cases with positive dominating negative and Arabic the least, with all languages showing more of the designated positive features than negative features.

## Part 2: Unique negative words

Informants were presented with each of four nouns with negative valence. In each case, they were asked if there was a word to represent this English word in their language, and then if there was a word that represented the opposite of the target negative word in their language. The negative target word and the possible positive opposite were described for each word. The information on disgust(ing) was actually collected in Part 1, but retrospectively we realised that it was more appropriate to use the noun, disgust, in Part 2. In the opinion of the authors, English has

each of the negative words indicated, but does not have an opposite for any of them. The English tally, which generated the hypothesis, is not included in any of the results (percentages of languages) presented below. In a few cases, a language had a single word that represented both the designated word and its opposite. These languages were not included in the scores below. Also, in a few cases, the informant reported a single word synonym or antonym that was only marginally appropriate, in his or her opinion. We scored the presence of the word as 0.5 (as opposed to 1) in those cases.

*Murderer (a person intentionally taking of the life of another person).* Nineteen languages (95%) have a murder synonym, but only 5/20 (25%) have a murder antonym. (We judge English not to have an antonym: the word "saviour" is usually applied to individuals who save a group of people, not one person.)

*Accident (a single, non-intentional negative event).* English has no word to represent a single non-intentional positive outcome (we say, instead, a "stroke of good luck" or something of that sort). Overall, 18.5/19 (97%) languages have a synonym for "accident", whereas 8/19 (42%) have an antonym (Cantonese is not included as having a synonym or an antonym, because it has one word that covers both).

*Risk (a probability of a negative outcome).* While 18/20 (90%) languages have a synonym for "risk", only 4/20 (20%) have a word for a probability of a positive outcome (in English, by our interpretation, there is no such word; the closest words are: "opportunity" or "benefit", but these words do not have the probabilistic implication of "risk". An alternate suggested by a few speakers is "hope", but this is a mental term, unlike risk).

*Sympathy (feeling bad as a result of some unfortunate state of affairs in another person).* There is no opposite for sympathy in English. Overall, 15.5/19 (82%) of languages had a sympathy synonym,

whereas only 4.5/19 (24%) had an antonym (Arabic is not included as having a synonym or an antonym, because it has one word that covers both).

*Disgust(ing).* A total of 19/20 (95%) languages had a synonym for "disgust (ing)" and only 4 (20%) had an antonym.

In only one case, across the 20 languages and 5 target words, or 100 possible word pairs, was there an instance in which the positive word existed and the negative did not. While 13 languages (not including English) had a word corresponding to each of our five negative English exemplars, none had a positive opposite to each, and only two had 4/5 opposites.

## DISCUSSION

We have reported a combination of findings that suggest a positive bias (at least for adjectives) in frequency of word occurrence, and in a variety of differences privileging the positive adjective in syntactic and semantic frames. We also report a negative bias favouring lexicalisation of at least certain nouns identifying negative situations. The positive bias findings with adjectives can generally be accounted for in terms of linguistic efficiency, resulting from the more frequent occurrence/ usage of the positive adjectives, related to the more frequent occurrence of positive events. In other words, the positive bias in individuals is an adaptive response to asymmetries in negative versus positive events in the world.

The frequency account is not at all adequate to account for the negative bias in nouns. An inverse frequency account would hold that because certain negative events (e.g., murder) are rare, we are more inclined to have a word to designate the event. But this account will not work for the negative bias we describe for all five nouns: for example, while murder is rare, so is saving a life; and sympathy is at least as common as the shared joy of another person (Royzman & Kumar, 2001; Royzman & Rozin, 2006). What seems to be a common account for all five nouns (including

"disgust/disgusting") is that individual negative events are more significant/important than positive events (Rozin & Royzman, 2001). This distinction can result from either the lower frequency of the negative events (an asymmetry in the world), or their inherently greater significance (another asymmetry in the world).

In keeping with our analysis of negative bias (Rozin & Royzman, 2001), murder is salient because negative moral events have special importance in judging character (someone who murdered one person and saved the lives of five others, is still generally considered a bad person). The dominance of sympathy over its opposite seems to illustrate the general fact that we are more moved, and there is more moral import to being moved, by negative than by positive experiences of others (Royzman & Kumar, 2001; Royzman & Rozin, 2006; Rozin & Royzman, 2001). In this case, it may be true that sympathy occurs more frequently than its opposite, but not because negative events happen to others more than positive events. In fact, in English and Russian, there are *three* distinct words with the meaning of emotional concern about the negative situation of another person (sympathy, compassion, and pity for English), and no single positive equivalent. Although the English word "empathy" is neutral, meaning sharing of another's feelings, it is almost always used with respect to sharing the negative feelings of others (Royzman & Kumar, 2001; Rozin & Royzman, 2001). It sounds a bit strange in English to say one empathises with a person on the occasion of their reception of a great award or after winning a lottery.

The lexicalisation of accident more frequently than its opposite may simply have to do with the generally greater significance of negative events. The same may be the case for risk. Another relevant consideration is Parducci's (1995) point that although positive events are more common than negative events, extreme positive outcomes are less common than extreme negative outcomes, so for extreme words, the frequency account might predict negative words without positive opposites.

The frequent absence of an opposite for disgust or disgusting probably results from another feature of negativity bias. In general there are more negative than positive emotions (Rozin & Royzman, 2001). We account for this by the fact that there are more response alternatives to the experience of a negative event (withdrawal, freezing, attack) than there are for positive events (approach). Hence, insofar as we link emotion to response tendencies, there should be examples of negative emotions without corresponding positive emotions.

The results we report, in general, support our formulation of negativity bias (Rozin & Royzman, 2001), in that the examples we document of positivity bias fall under the same frequency account that is used to support negativity bias. More frequent entities must be represented more frequently in language, and hence more efficiently, while these same events, partly due to their frequency, are likely to have less import as individual events.

This study is far from definitive, and primarily serves to encourage the study of affective asymmetries in language. We only surveyed 20 languages, and left out a number of major language groups, such as American Indian or Austronesian languages. We used only one informant for each language. We selected our seven adjectives based generally on their salience and frequency in English, and the fact that they illustrated the asymmetries under study. These adjectives are in no sense a random sample of valenced adjectives. However, we have examined the 120 most common adjectives in British English (Leech et al., 2001); three of our exemplars, good (2nd most common), bad (31st) and happy (89th) are on this list. Other clearly valenced adjectives on this list include the pair black (40th) and white (48th), clear (34th), true (57th), strong (52nd), poor (64th), fine (74th), natural (79th), nice (81st), popular (111th) and dark (115th). Accepting this as a list of most common valenced adjectives (14, including two opposite pairs), we note that 10 are positive and 4 are negative. If we incorporate the opposites of the unpaired words (true–false, strong–weak, rich–poor, fine–coarse, natural–artificial, nice–nasty, happy–sad, and light–dark, in addition to white–black and good–bad), we judge that only four of the terms (clear, true, natural, popular), all positive, are negated in English. In terms of normal ordering, we judge that only two (black–white, nasty–nice) occur in negative-first order, while six (true–false, strong–weak, rich–poor, fine–coarse, natural–artificial, good–bad) favour the positive word first. This short exercise suggests that the seven words we selected are not unrepresentative with respect to positive bias.

We selected the five unique negative words based on our own intuitions about English. However, we believe these words do represent a general feature of language and the human mind. We can think of other English words that seem to have the same unique negative property: "disaster" or "catastrophe", "damage", "madness", "fear", or "embarrassment". Furthermore, although one might oppose "good" to "evil", the normal opposite is "bad", and we can find no word that uniquely corresponds to "evil", with its clear moral connotation. A full exploration of this claim would involve a systematic sampling of English words. There are certainly positive nouns in English that represent situations that do not have corresponding negative occasions, for example, "wedding", "honeymoon" and "party". Of course, there are named negative situations that do not have positive equivalents, such as "funeral". Furthermore, there are controversial cases, as for example an arguable claim that "miracle" may be the opposite of "catastrophe" or "disaster". The only English affective adjective that we can think of that may be positive without a negative equivalent is "awe", but in Part 1, we do report, for the seven adjectives we selected, that while the positive state is directly lexicalised in 96.6% of cases, the negative state is lexicalised in significantly fewer cases (78.1%). Of course, this is because the positive adjective form is typically unmarked, which generates a marked negative

opposite. The marked negative opposite is an adjective that can stand instead of the negative adjective.

We hope that this study calls the attention of emotion researchers to some interesting and widespread valenced biases in the use of language. We believe these biases are adaptive responses to asymmetries in the world, as it interacts with organisms. We hope that our analysis encourages further work on the mental representation of valence in a linguistic context, as well as work extending and clarifying the conception of negativity bias, and positive and negative asymmetries in language.

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