Don't judge a book by its cover!

Mike Bardet
mike.bardet@epfl.ch

Diana Petrescu
diana.petrescu@epfl.ch

Introduction

In the consumer society in which we live today, how do appearances influence our critical thinking and opinions? Does something as simple as a color could influence our feelings ? To answer these questions, we analyze a concrete case : the impact of colors and brightness of book covers on the reviews and ratings of the book.

Dataset

The dataset used is the Amazon Review Dataset. This dataset has been merged with another Amazon Dataset containing the cover image for each book. After the merge, books with less than 5 reviews have been removed, in order to increase the precision of the average rate per book.

Final dataset : 1'786'163 reviews for 47'976 different books.

Methodology

Star rating

People rate a book by giving a star rating (1 to 5 stars) along with a textual review. The star rating is 5 most of the time, so we decicded to adjust this score by also analysing the textual reviews in order to determine the feeling of the reviewer. We use VADER (Valence Aware Dictionary and sEntiment Reasoner) which has the advantage to be able to analyse social media text (it handles expression, abbreviations, smileys, etc.).

Dominant color extraction

In order to extract the dominant color of cover images, we use K-means clustering as this method worked the best (compared to taking the most frequent or the average color). We keep the two most dominant colors as this describes the best every cover.

Three most dominant colors of book covers examples

Dominant color classification

We classify the extracted dominant colors into 16 distinct colors. To know which color is the closest to the extracted dominant color, we represent the colors using the CIELAB color space. This is because the euclidean distance between color does not represent well our perception of difference between colors.

Cover brightness

To measure the brightness of a book cover, we use the perceived brightness as stated by Finley (2006). Assuming some color channels are perceived as brighter than other, the perceived brightness is computed by using different weights for each color. The result is a number between 0 (black) and 255 (white).

Perceived brightness versus simple brightness

Results

We separate the reviews into two groups: 1-star rating and 5-star rating. We compare the distribution of colors.

Difference (%) between colors in 5-star and 1-star rating

Black and all warm colors except yellow are more present in the 1-star rating set, while white and cold colors are more present in the 5-star rating set. Our hypothesis is that color close to red and black elicit aggressive feeling, which could lead to lower ratings. Conversely, green, blue, and white evoque something more peaceful, which could lead to better ratings.

Also, the perceived brithness is 138.3 on average for 1-star and 143.7 for 5-star. A t-test shows that the difference is significative. Books with a high rating are brighter than books with a low rating.
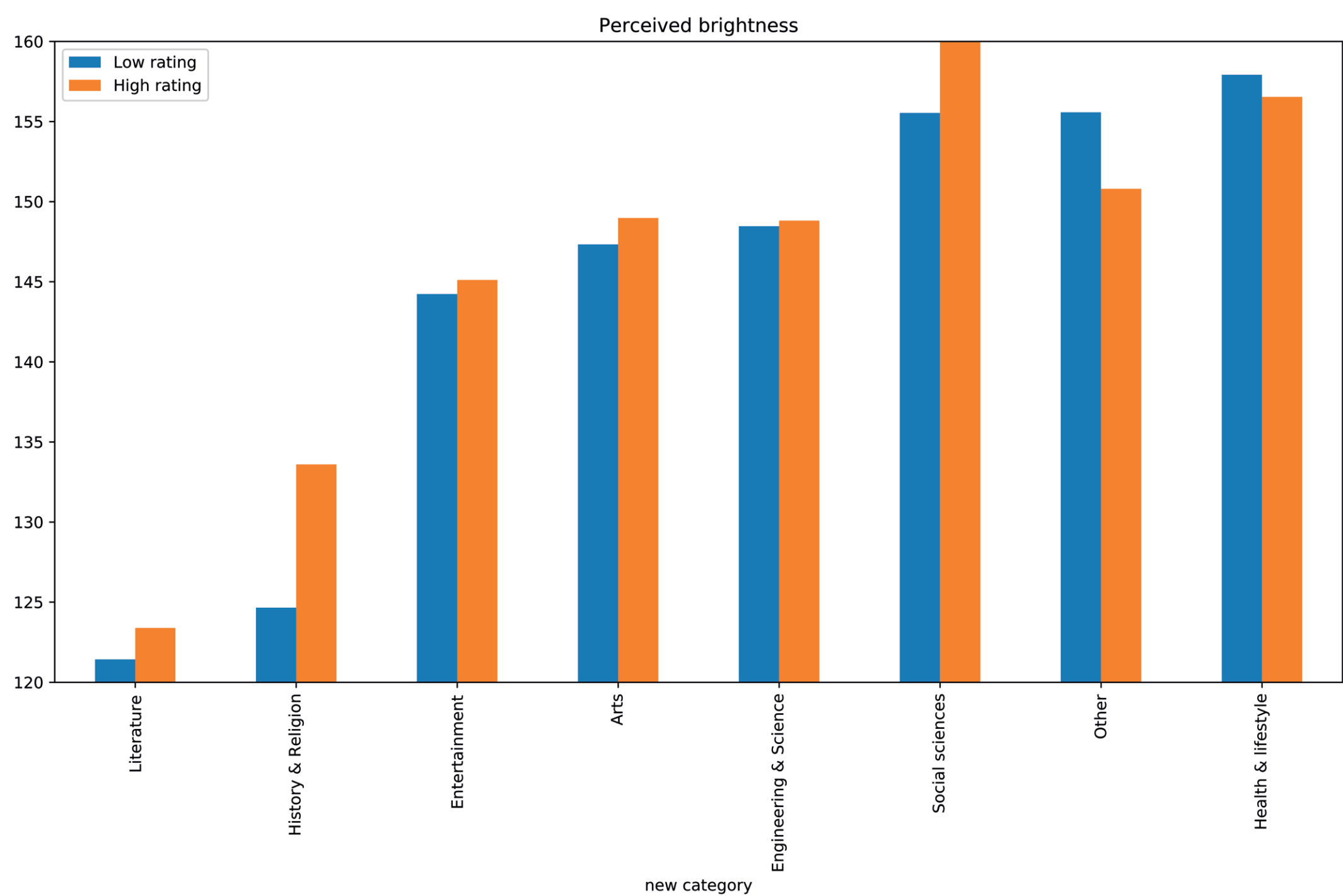
Perceived brightness depending on the category and rating

Concerning book categories, we found that "serious" books (e.g. engineering and sciences) are rated lower compare to "fun" books (e.g. arts and entertainment). Also, category "Health & lifestyle" has brighter books on average compare to "Litterature" which has the lowest brightness. This may be because "Litterature" contains mostly fictional stories, thus we may want to trigger curiosity by using dark colors, which represent mystery and deepness. On the contrary, for "Health & lifestyle", we want to convey trust and happiness, which are better represented by bright colors.
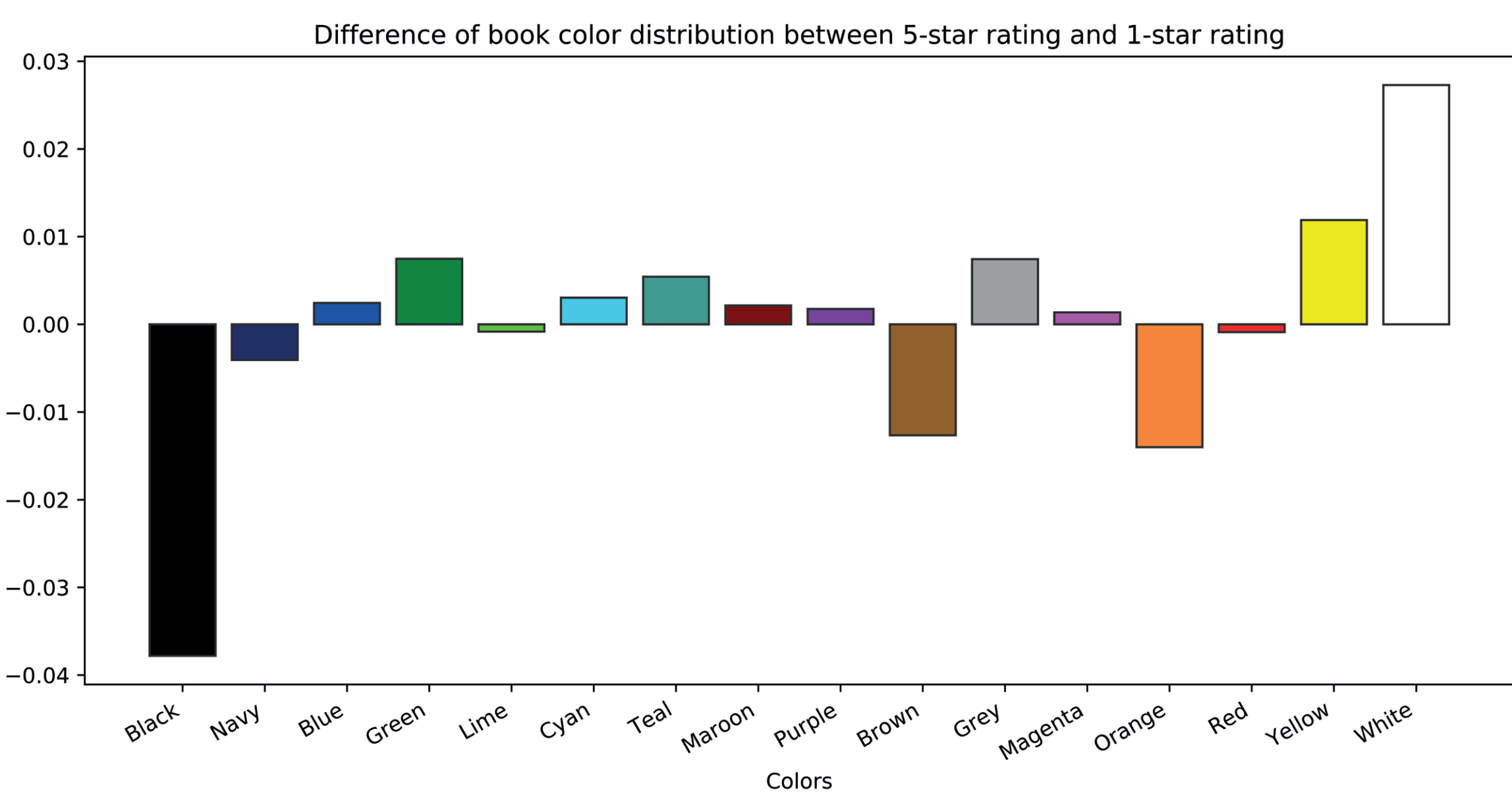
Conclusion

There is a significant relationship between book colors and ratings. However, it is hard to talk about causality. For that, we would need for example two different colors or brightness for the same book and we could then directly compare the average rating between people who have the different versions of the book cover. Unfortunately, on practice this is not feasible on large scale. On the other side, this raises some new questions, like if a book would be bought more often if its colour is bright.