Measuring Historical Emotions and Their Evolution: An Interdisciplinary Endeavour to Investigate The 'Emotions of Encounter'

Medindo emoções históricas e sua evolução: um esforço interdisciplinar para investigar os "As Emoções do Encontro"

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RESUMO

O estudo empírico das emoções em diários de viagem e relatórios espanhóis requer conhecimento cultural, bem como o uso de anotações linguísticas e métodos quantitativos. Nosso relato é sobre um projeto interdisciplinar no qual nós realizamos anotações sobre emoções, numa seleção de textos que abrangem vários séculos, a fim de analisar a diferença através de diferentes momentos no tempo. Nós mostramos que de fato a conotação emocional muda qualitativamente e quantitativamente. Junto a esta avaliação, nós esboçamos estratégias para uma futura automação. Esta abordagem de leitura escalonável combina visões quantitativas e qualitativas e identifica desenvolvimentos ao longo do tempo que suscita uma investigação mais profunda.

Palavras-chave: Análise de Emoções;

ABSTRACT

The empirical study of emotions in Spanish travelogues and reports requires cultural knowledge as well as the use of linguistic annotation and quantitative methods. We report on an interdisciplinary project in which we perform emotion annotation on a selection of texts spanning several centuries to analyze the differences across different time slices. We show that indeed the emotional connotation changes qualitatively and quantitatively. Next to this evaluation, we sketch strategies for future automation. This scalable reading approach combines quantitative with qualitative insights and identifies developments over time that call for deeper investigation.

Keywords: Análise de Emoções Emotion Analysis; Annotation; Scalable Reading; History of Cultural Encounter;

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Anotação; Leitura Escalonável; História do Encontro Cultural; Diários de Viagem e Relatórios em Espanhol.

Travelogues and Reports in Spanish.

INTRODUCTION

While the following contribution is *not* a view formulated from the Global South, its close links to this region's cultural history may offer a useful perspective for those whose locus of enunciation is situated within this region. If the division of our connected common world into divided hemispheres of the Global North and the Global South makes any sense, it is in delineating the existing divisions in power structures within the social world-system. And the history of this divide has, of course, its roots in the large history of European colonial expansion, starting with Columbus' "invention" of the Americas in 1492 (ZAVALA, 1992), producing the subsequent "encounter" between the pre-Columbian American cultures and the Spanish conquerors. More than an encounter, or "encuentro de dos mundos" as it was labeled 500 years later in the official ceremonies, for Americans it was nothing less than a clash of civilizations. Unsurprisingly, it resulted in huge resistance against the official ceremonies and the labeling in 1992, when the Spanish state and its institutions were attempting to 'celebrate' this event (STEFFAN, 1989; BERNECKER et al., 1996). Remembering this colonial past still produces strong feelings even five hundred years after the initial landing, as can be seen both in the arguments of 1992, and, more recently, in the demolition of Columbus monuments (XIMÉNEZ De SANDOVAL, 2018).

After some preliminary reflections on the object we are analyzing and the methodology of analysis (1), we shall present the textual digital corpus and the criteria which led to its construction (2). Based on this corpus, we shall then discuss how we manually annotated an initial sample of texts for emotions (3). Next, we shall discuss different perspectives and challenges to scaling up this analysis with computational methods (4). Finally, an analysis of these results enable us to formulate perspectives and challenges for future research (5). Starting from the observation that the cultural encounters between the Global North and the Global South are still emotionally highly charged centers of conflicting perspectives, we believe that this topic is of particular interest to the readers of this LIINC issue. In general terms, we have decided to focus on a body of texts that picks out cultural encounters as a central theme, using a digital humanities' methodology. More specifically, we are interested in which way emotions are communicated by texts which report on encounters with the foreign, thus sharpening the focus of our research onto an as-yet unexplored dimension of travelogues.

EMOTIONS IN ENCOUNTERS: PRELIMINARY REFLECTIONS

A myriad of studies exists on the history of the encounter based on the main Spanish-language sources of the 16th century, from the Diaries of Columbus (which we only know via the excerpts made by Las Casas) to Juan de Acosta, Francisco de Aguilar, Bernal Díaz del Castillo, Bartolomé de Las Casas, Gonzálo Fernández de Oviedo, Álvar Núñez Cabeza de Vaca etc. They focus mostly on the experience of cultural and epistemological "otherness" (TODOROV, 1982; GREENBLATT, 1991 being the most internationally well-known, but LÓPEZ De MARISCAL, 2004; BORCHMAYER, 2009 being relevant more recent studies). In addition, there is also a lot of existing

research on the history of emotions (e.g., FREVERT, 2011; ROSENHEIM; RICCARDO, 2018). If one integrates both approaches and goes 'digital', a series of questions about the history of emotions arises that can be applied to a digital corpus of historical texts which centre on the experience of encounters with foreign peoples and countries. Did the discoverers, conquerors, and travellers report only the emotions of the 'Other' (as Columbus does when he reports in his Diary that the first Indians he meets have fear of getting raped by alien cannibals) or do they report also their own emotions? How do they express emotion in their encounter with the Other, be it foreign people or countries? Is there a development over time observable in the articulation of emotions expressed in factual narratives of cultural encounters? Can, for example, the travel reports published in the early modern period be characterized as 'cold', distanced and uninvolved depictions, while on the other hand narratives from the 19th century onwards dispose of a rich emotional vocabulary, because the concept of interiority had been discovered earlier in the century and its language has been practiced ever since? Do the estimations of human readers differ with respect to the expression of emotions in historical texts if compared to the results yielded by a machine learning model?

In this study, we aim at answering these questions by focusing on 20 narrative depictions of encounters between men from Europe and Latin America, who reported on their intercultural experiences. All of the texts under analysis were published in Spanish and are available as digitized textual form in open access.

It is obvious that there are differences and time delays between the experience of emotions and their verbal presentation in printed books. The emotions experienced in the historical situation as such are inaccessible. Only after the event does the complex chain of mediation begin in which at least two delays have to be taken into account. The first delay is a gap in time between the experience of an emotion and its first (usually handwritten) notation by the author. The second is the gap between this authoritative first notation and the date of publication, which became decisive for its reception later on. The time gaps in our corpus are often especially large, for several reasons. Firstly, the time span between the first encounters in the late fifteenth and the sixteenth century and the first printed text editions is in itself often very long because the written reports remained for a long time in the status of manuscripts. A particularly well-known example is the publication of Columbus' travel diary. The time span between experience and Columbus' first recording represents a first temporal level of mediation. However it is the time span that lies between this original recording and the subsequent publication that is especially long, since the latter took place for the first time only in the 19th century. Furthermore, in the 19th century the original text of Columbus was no longer available as a source; only a summary transcription of the manuscript produced by Las Casas in the 16th century had survived. In general terms, one can say that most 16th-century sources were published only after much delay as part or as an effect of the publication of the *Historia Americae sive novis orbis* by Theodor de Bry (1590–1634), which had an enormous influence on the so-called *leyenda negra*, the longstanding contentious debate about the moral guilt of the Spanish conquerors, and in general on the European image of the Americas (PERPLIES, 2017). These are the reasons why we distinguish in our project between the dating of the experience on which the records are based (journey date) and that of the published text on whose language utterances our analyses are based (publication date).

While the topic under scrutiny has at its centre the meeting of people from different continents, we also present a brief overview of machine learning approaches to

emotion recognition in texts. The focus on emotion analysis in this domain results from the unexplored spaces of current quantitative and data-driven research, which nearly exclusively focuses on contemporary expressions of emotions. An exploratory investigation of historical texts thus seems promising. Given the research perspective on *longue durée*, we decided to opt for a diachronic approach in order to focus on the historical development of emotion expression in writing, and to this end looked for a corpus of texts in which emotional experiences are reported, and distributed over a long historical sequence. With regard to an exchange between the Global North and the Global South, which topic other than the renewed cultural encounters between two continents would have been more fitting. While the texts covering the phase of the discovery of the Americas (the 16th and early 17th century) have often been subject to research, related literature, such as reports on travels, natural histories, or chronicles from other centuries, has been neglected. Moreover, the dominant perspective of research focuses on travel literature of people who came from Europe and visited Latin America. But cultural encounters are two-way negotiations, and experiences of the Other are not the privilege of Europeans; for this reason, we explicitly included texts in our corpus which reported on the travels of Latin American people to Europe or North America, and of Europeans who visited the United States. The criterion for inclusion was the availability of the text in Spanish; this permitted the inclusion of translations of travel literature previously published in another language.

CONSTRUCTING A DIGITAL CORPUS OF HISTORICAL TRAVELOGUES AND REPORTS IN THE SPANISH LANGUAGE

While travelogues and reports in English are quite well documented and exhaustive bibliographies already exist (SCHRAMER, 1997; ROSS, 1998), the same cannot be said for the Spanish-speaking cultural area. There are obvious reasons for this situation. As the travel literature of encounter 'belongs' to Spain as well as to the many Hispanophone South American and Caribbean states, there are multiple and disparate library infrastructures without a single, centralizing hub. In the absence of pertinent bibliographies on Spanish-language travel literature, we therefore had to start compiling our corpus by means of a comprehensive search through the library catalogue of the Ibero-American Institute – Prussian Cultural Heritage Foundation in Berlin (IAI). The IAI was an obvious choice for us, not only because of its quantitatively very significant collection, but most importantly because of its balanced coverage of all areas of the Spanish-speaking world, not only those of the Southern continent, Central America and the Caribbean, but also to some extent the Spanish-language literature of North America and, to an even lesser extent, Spain itself. In this catalogue, all entries tagged as 'travelogues' by the librarians can be collected for each century, and the results filtered by language. Using this method, we retrieved more than 1,500 entries from a time span encompassing five centuries: from the beginning of the 16th to the end of the 20th century. Working through this list, we subsequently checked to see if these texts were available in electronic format (whether as scans or full texts). A significant part of our initial compilation has already been digitized. As is typical for historical collections, the texts differ substantially in their quality; some texts are available in a manually transcribed, double checked form through Project Gutenberg, while others are only available as the partially corrupt output of Optical Character Recognition (OCR) applied to scanned book pages.

Ultimately, we were able to collect around 350 texts (AUTHOR 1; AUTHOR 2, 2019), the earliest being the "Carta de relación" by Hernán Cortés. The creation of this corpus according to only two criteria ('cultural encounter' and 'Spanish-language') inevitably led to a broad diversity of textual genres, with travelogues in the narrow sense (men reporting chronologically on what they have seen during their visit of foreign countries), but also documents which one could describe as having an historiographic, ethnographic, spiritual, or moral-philosophical character. Genres blur into each other in the literature on the conquest of America – not only is the report of the individual's travels and the encounter with the Other found at the heart of these accounts, but descriptions of the geology, flora and fauna are also central to the narrative, since the interest (at least in the early descriptions) clearly lies in the exploration and exploitation of the territories visited. The heterogeneity of the texts can also be read from the genre markers used in the titles of the books, with "historia natural", "crónica", "relación", "viaje", "descubrimiento", "descripción" and "expedición" being amongst the most often used descriptors in our subsample. With respect to the publication dates, the sample of 350 texts is evenly distributed and the continuity of publications is notable. These texts may be first publications, editions of previously unpublished sources, or translations into Spanish. Even around anniversaries such as 1892, no specific increase in the number of texts published can be observed.

From this corpus of electronically available texts, we chose the sample of 20 texts which forms the basis of this study. In order to be able to put the differences between two periods into focus and in this way collect indicators of a historical development of emotion expression, we chose ten texts each out of two time windows. The ten early texts were published between 1746 and 1788, the ten later texts between 1858 and 1894. Thus the time span in which these 20 texts were published encompasses 150 years, with a gap of 70 years in between the two time windows. There are some very famous texts in this sample (such as "Naufragios" by Alvar Núñez Cabeza de Vaca, "Crónica del Perú" by Cieza de León, the first part of Bartolomé de Las Casas' "Historia de la Indias", and the first publication of Colón's "Diario" as a monograph), but also lesser-known texts, such as the travel accounts of the Mexican Guillermo Prieto in the United States and the Spaniard Rafael Puig y Valls in the United States, México, Cuba, and Puerto Rico. The time window pertaining to the 18th century does not contain an account written by a Latin American traveller. The reasons for this may lie not only in the fact that such accounts were rare in the 18th century, but also because any extant accounts remain to be digitized. However, it is not only Spaniards who are the writers in the early-text corpus: two reports were written by Italians (Boturini Benaducci and Molina) and translated into Spanish. The later time window contains travelogues by the Argentinians Lucio Victorio Mansilla and Paul Groussac as well as the Mexican Guillermo Prieto. The texts by the Spaniards Gorgonio Petano y Mazariegos and Rafael Puig y Valls, as well as those by Guillermo Prieto and Paul Groussac describe – at least in part – travels to North America. The corpus therefore forms more than just a part of the European Americana (ALDEN; LANDIS, 1980–1997) and is culturally more balanced. It comprises geographically and culturally differing positions and perceptions of cultural foreignness. This diversity of scenes of cultural encounters within a linguistically homogeneous corpus explicitly goes beyond a Eurocentric perspective and thus provides a broader basis for our research question than a corpus of texts narrowly focused on the texts of the Spanish conquerors to which much of the earlier research is limited.

EMOTION ANNOTATION

Figure 1: Screenshot of the annotation environment in Google Docs

Instance is not relevant	Anger	Fear	Joy	Surprise	Sadness	Disgust	Comment		Book	ContentCentury
								Nuestros caballos, mediante esa segunda educacion, cobran un vigor estraordinario.	Mansilla-Excursion-1877.txt	19
0 relevant	0 Not Prese	0 Not Preser	0 Not Prese	2 Normal Intensity	0 Not Present	0 Not Present		Y como durante veinticuatro horas permanecen al palo, sin comer ni beber, con el freno puesto, resisten asombrosamente á las mas largas privaciones.	Mansilla-Excursion-1877.txt	19
								De ahí la superioridad del indio en la guerra de fronteras.	Mansilla-Excursion-1877.txt	19
								Inga Yupangue fué el que mandó hacer estos aposentos, a lo que los in- dios dicen, y sus predecesores acrecentaron sus edifi- cios.	CiezaLeon-CronicaDelPeru-Vol1-1880.t	16
0 relevant	0 Not Prese	0 Not Preser	0 Not Prese	0 Not Present	0 Not Present	0 Not Present	k.E.	El templo del sol fué grande y muy labrado.	CiezaLeon-CronicaDelPeru-Vol1-1880.t	16
								A donde están los edificios hay un altozano en lo más alto de una sierra, la cual tenían siempre limpia.	CiezaLeon-CronicaDelPeru-Vol1-1880.t	16
								* * * * Es hermoso hallar el dia En el limpio azul del cielo, Cuando sin un solo velo La aurora su luz envia....	Prietro-Viaje-Vol1-1877.txt	19
0 relevant	0 Not Prese	0 Not Preser	1 Low Inten	0 Not Present	1 Low Intensity	0 Not Present		Pero pasa alegría.... ¿Y habrá una cosa más rara, Clara, Aunque no lo quieras creer?	Prietro-Viaje-Vol1-1877.txt	19
								Miéntras más miro tu cara, La miro con más placer.	Prietro-Viaje-Vol1-1877.txt	19
								Adoran también al sol, y parécense en las costumbres y afectos a sus comarcanos; porque fue- ron, como ellos, sojuzgados por el gran Topainga Yu- pangue y por Guaynacapa, su hijo.	CiezaLeon-CronicaDelPeru-Vol1-1880.t	16
0 relevant	0 Not Prese	0 Not Preser	0 Not Prese	0 Not Present	0 Not Present	0 Not Present	k.E.	Otro camino sale hacia el nacimiento del sol, que va a otras poblaciones llamadas Quixo, pobladas de indios de la manera y costumbres destos.	CiezaLeon-CronicaDelPeru-Vol1-1880.t	16
								140 ¡PEDRO DF.	CiezaLeon-CronicaDelPeru-Vol1-1880.t	16
								En Tierra Adentro yo no habia pernoctado bajo techumbre mejor.	Mansilla-Excursion-1877.txt	19
0 relevant	0 Not Prese	0 Not Preser	0 Not Prese	0 Not Present	0 Not Present	0 Not Present	k.E.	El toldo del Cacique Ramon superaba á todos los demás.	Mansilla-Excursion-1877.txt	19
								Mi alojamiento era un galpon de madera y paja, de doce varas de largo por cuatro de ancho y tres de alto.	Mansilla-Excursion-1877.txt	19
								Preguntado si sabe quel dicho arancel se guardaba así por los dichos tenientes como por alcaldes susodichos, como por los alguaciles, como por los escribanos que eran de las dichas abdiencias ó si llevaban más derechos de los en ellos contenidos, dijo: que sabe quel dicho arancel no se guardaba, porque los dichos tenientes no llevaban derechos y que los dichos alcaldes y alguaciles y escribanos no los han guardado.	Coleccion de Documentos-Vol1-1885.tx	16

Emotion analysis in text is commonly understood as the task of assigning one of multiple predefined emotions (for instance corresponding to the fundamental emotions defined by EKMAN, 1992; or PLUTCHIK, 1980) to textual segments. In our preliminary study, the textual unit of analysis was defined as a sentence. The target sentences were presented with one sentence before and after, respectively, so that the annotator could place the meaning of the target sentence in its situational context.[1]

The annotation task was as follows: The annotator needed to decide for each target sentence whether any number out of six emotions (Anger, Fear, Joy, Surprise, Sadness, Disgust) was expressed by the author. Following this decision, the annotator was asked to rate the emotional intensity between low, medium and high. To ensure completeness of the analysis, instances which are not relevant were also to be marked (for instance because they contain metadata of the text, or page numbers). The annotation was performed in a spreadsheet online application with the ability to select the emotion from a dropdown menu. Figure 1 shows a screenshot of the annotation environment.[2]

The raters were guided by an annotation guideline document which was evaluated in two iterations of preliminary annotations of 50 target sentences in context. We measured the inter-annotator reliability of the emotion annotations (ignoring intensities) using Cohen's Kappa (ARTSTEIN; POESIO, 2008), a standard measure for measuring the quality of categorical annotation. It ranges between –1 and 1, with 0 indicating chance-level agreement and 1 perfect agreement. In the first iteration, we obtained an average kappa of 0.37 (with kappa for anger being 0.2, for fear 0.26, for joy 0.45, for surprise 0.3, for sadness 0.61 and for disgust 0.36). The main reason for these differences was that one of the annotators also considered emotions appearing in context sentences, not just the target sentence, as stated in the

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[1] Of the 20 texts, 12 are manually transcribed. For the 8 remaining, we manually corrected the target sentences. Sentence segmentation was performed automatically.

[2] Upon acceptance of this article, we shall make our corpus with annotations and trained models publicly available.

guidelines. An adaptation of the guidelines led to an average of 0.49 kappa (anger: 0.2, fear: 0.85, joy: 0.4, surprise: 0.37, sadness: 0.79, disgust: 0.311). This level of agreement is generally regarded as 'moderate', indicating that the task is challenging, but most aspects are reproducible. On this basis, we proceeded to the main annotation task. As of the time of writing, we have not yet analysed the striking differences in agreement between annotations.

Our main annotation took place on 1865 target sentences in context and proceeded with single annotation only. The sentences were drawn randomly from the corpus described in Section 2, that is, longer works also make up a larger share of the annotated sentences. We performed minimal preprocessing, only removing footnotes. We found 1708 sentences to be relevant and annotated those for emotions.Overall, we find that emotions are comparably sparse in this uniformly sampled data set. There is no directly comparable contemporary emotion corpus, but in the closest candidate, the Tales corpus of historic folk tales with emotion annotation (ALM et al., 2005), around 40% of all sentences contain at least one emotion. In our annotation, this is true only for 31.4% of the target sentences (536). This might be a result of the difference between (short and fictional) folk tales and (long and factual) travel books which contain more descriptive text elements, but it is also worth considering the analysis below.

The most prominent annotated emotions are disgust (198 instances), followed by surprise (114) and joy (148). Less frequent are fear (87), sadness (61), and anger (55), while 142 sentences contain more than one emotion. Disgust is most often paired with other emotions, such as anger (31), fear (18), and sadness (21). The only other combination that occurs more than 10 times is joy with surprise (18).

We performed an in-depth analysis that is made possible specifically by the diachronic nature of our corpus, namely contrasting the emotions annotated in different centuries. As discussed above, we can either cluster the emotions by the *publication century* of their texts, or by the century in which the described journeys have taken place, denominated here as the *journey century*. It is perhaps best to proceed by first discussing the analysis by publication century. Table 1 shows the results as the percentage of sentences (relative to all sentences) from the respective centuries that contain the annotated emotions, and the overall percentage of emotional target sentences.

Table 1: Differences of emotion ratio between publication dates (in %).

	Anger	Disgust	Fear	Joy	Sadness	Surprise	Overall
18th cent.	2.4	11.3	6.0	7.5	3.7	4.5	29.4
19th cent.	4.2	11.9	3.9	10.1	3.4	9.3	33.7

As the table shows, differences between texts published in the 18th and 19th century are present, but not striking, with a mild increase in the overall amount of emotions expressed (from 29 to 34 percent). Some emotions remain largely constant (disgust, sadness), some become more prominent (anger, joy, surprise), some less so (fear).

Overall, the analysis may be taken to indicate that positive emotions increase (with the notable exception of anger).

We turn to the analysis by journey century in Table 2 and Figure 2.

Table 2: Analysis of emotion change across journey century (in %)

	Anger	*Disgust*	*Fear*	*Joy*	*Sadness*	*Surprise*	*Overall*
16th cent.	2.3	6.5	7.4	6.6	2.9	5.1	25.4
17th cent.	0	0.9	8.2	9.1	0	3.6	20.0
18th cent.	2.7	13.6	4.8	7.5	4.1	4.8	30.1
19th cent	5.1	14.1	3.3	11.4	4.0	10.6	37.8

Figure 2: Visualization of the change of emotion frequency across centuries

Change of the Presense of Emotion Across Centuries
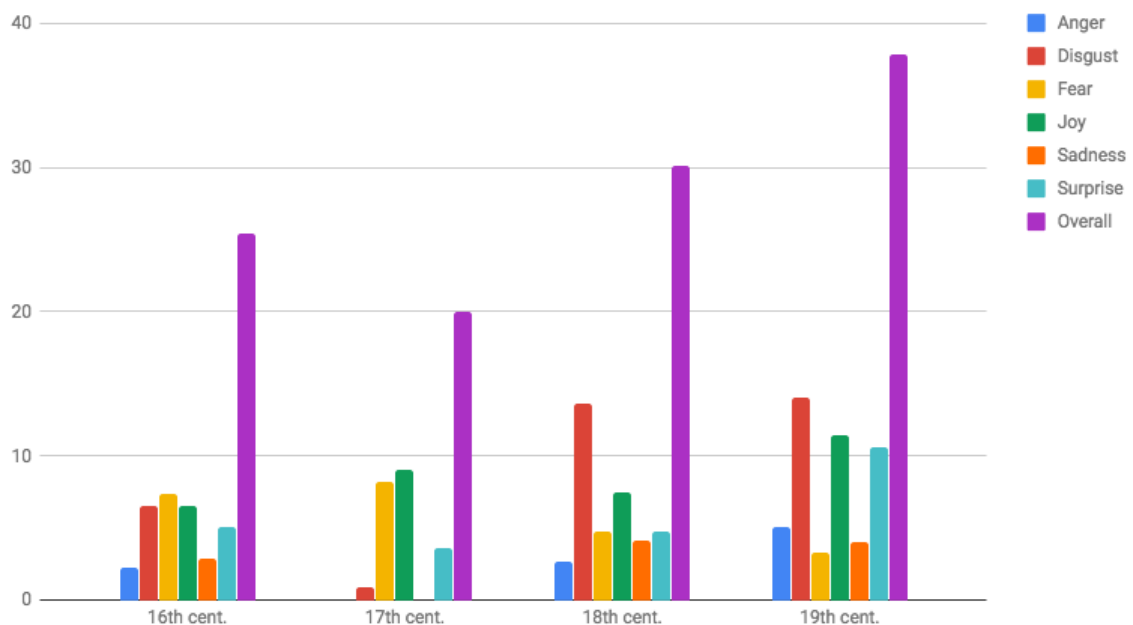
This analysis brings out differences between the centuries more clearly. It is advisable to view the results for the 17th century with a grain of salt, since we have only a single work dealing with 17th-century matters (by García de Nodal), a result of which being

that the numbers of the 17th century are both computed from a small sample and are more indicative of the specific properties of that work than of the 17th century in general. As a consequence, the outliers (no anger, no sadness, hardly any disgust) must also be interpreted through this lens.

A comparison between the 16th century on one hand and the 18th and 19th centuries on the other, however, shows a clear shift in the textual content regarding emotions. The overall percentage of emotional sentences grows from 25% in the 16th century to 30% in the 18th century and to 38% in the 19th century, comparable to the relative frequency of 40% for emotion sentences in the Tales corpus (ALM et al., 2005). At the level of individual emotions, we see an increase for four emotions (anger, disgust, joy, sadness, and surprise) and a decrease only for fear, with the most substantial increases for disgust (from 6.5% to 14.1%), joy (6.6% to 11.4%), and surprise (5.1% to 10.6%).

These observations might generally reflect that travelling, over time, changed from a highly dangerous, life-threatening undertaking to a pastime in which the traveller was confronted with unexpected new experiences (surprise) – some of them negative (more disgust), some of them positive (joy). We took a closer look at the increase of anger-annotated sentences between the 16th and 19th century and found that the anger of the voyager of the 16th century was either directed against competitors from other nation-states, or it was triggered by conflicts within the crew; in the 19th century, on the other hand, the travellers expressed to a high degree their anger at political or social grievances, often associated with the verbalization of disgust. Furthermore, every single one of the 18 sentences in which joy and surprise co-occur belongs to the 19th journey century category.

In sum, our emotion annotation provides an interesting starting point for an analysis of the development of traveling over the centuries. At the same time, its limitations are clear: we could only annotate small samples from a handful of works. Given this situation, we must be careful that the conclusions that we draw are not determined by individual works, individual authors, or the topics that they cover – as our case of the 17th journey century illustrates. One way to ensure correctness would be statistical testing, but the more interesting perspective, which enables further quantitative as well as qualitative study, is the creation of a larger annotated corpus – ideally with minimal human effort. This goal is both supported by and enables the training of statistical models to automatically predict which emotion is expressed in a sentence. In the following section, we shall discuss the preliminary steps that have been made in this direction.

PERSPECTIVES ON AUTOMATIC EMOTION PREDICTION

The analysis of personal states as described by authors, including the classification of subjectivity, sentiment, and opinions as well as emotions, is a topic of relatively recent interest in computational linguistics, starting to become popular 15 years ago with the analysis of subjectivity by Wiebe (2004). A big boost was given to this line of research with the availability of social media data and product reviews (HU, 2004) and the fundamental idea of using hashtags or star ratings to learn sentiment analysis models without the need for manual annotation (Go, 2009). One formulation of sentiment analysis is to frame it as the task which takes units of text (whether sentences or documents) as the input and assigns labels to them that express whether they express a positive, a negative, or a neutral point of view. From a technical standpoint, emotion analysis can be framed as an extension of this task:

again, units of text form the input, and the goal is to assign labels to them – only in this case there are more labels, namely all emotions of interest. Such labeling tasks are generally called *text classification* (MANNING et al., 2008).

A simple idea for this task is to use a set of word lists, one list for every class (a list with words being associated with anger, a list of words being associated with joy, etc). With such a resource, the assignment of an emotion to a text can be accomplished by counting the number of words from a specific class and labeling the text with this emotion if the fraction is above a certain threshold. While this approach is straightforward and transparent, it generally does not lead to good performance. Problems include gaps in the lists, language diversity, contextual effects, and nonlexical expression of emotions. Specifically, we opted against this approach because no lists of emotion words exist for historical Spanish. Any translation from other languages or use of a Spanish list from a different domain would have required thorough evaluation and, presumably, revision.

The dominant paradigm used in computational linguistics to model such classification tasks is called *supervised machine learning*. This paradigm, which commonly leads to better results than the use of word lists, requires a dataset that is annotated, i.e., contains both text units and their desired classes. When these text units are represented in terms of their properties (so-called *features*), statistical analysis methods can be applied to learn a mapping from features to classes. In the case of sentiment analysis, for example, individual words are often used as basic features: words like *great, super, nice* indicate a positive point of view, while *awful, bad, rotten* stand for the opposite. Note that the classification approach typically uses (nearly) all words which occur in the text – no manual preselection of indicative words is necessary.

A recurring problem of learning from data is that classifiers tend to degrade when one moves away from the particular type of data that the classifier was learned from. The reason is that features tend to change their meaning when one moves, for example, among domains in sentiment analysis: when talking about drinks, *cold* is a positive feature, while presumably it is a negative feature when talking about a beach holiday. This is particularly challenging when working with diachronic data (in which language change is a real possibility) and data from a small number of separate authors (for whom the model has to learn a kind of "average" over authors' styles). Nevertheless, words represent a simple and robust baseline as features for text classification. When all words that occur in a textual unit are simply counted to represent the unit, irrespective of their position, this is called a *bag-of-words* representation. The documents that these bag-of-words representations are learned from – the training data – need to be *representative* of the domain where the prediction is taking place. In this situation, one option is to use a Spanish annotated corpus from a different domain, for instance the contemporary product review corpus by Navas-Loro et al. (2017). An alternative is to use an English corpus which is machine-translated to Spanish (see BOSTAN, 2018 for an overview of existing resources). Both options are not straightforward, as it is an open research question how to transfer such data sets to novel domains in other languages. For this reason, we limited our classification experiments to those which use our annotated data for training and for testing. This approach does not represent the current state of the art in emotion classification, in which words and sentences are represented as vectors in high-dimensional space ("embeddings"). However, since no embeddings have been created specifically for historic Spanish corpora, any use of other embeddings is

highly questionable. Therefore, for a pilot experiment we decided upon a bag-of-words representation of a simple model without the use of other data sets.

Since the small size of our data set makes learning a full model for emotion classification (that would distinguish among specific emotions) difficult, we only present results on a simplified model that distinguishes between emotion and non-emotional sentences. We operationalized this with a maximum entropy classifier, which learns how every word combination contributes to the classification decision. We then trained on a subsample of instances with 947 neutral sentences and 418 emotion-expressing sentences and evaluated the model on 224 neutral and 118 emotion-expressing sentences.

The evaluation of classification tasks in computational linguistics is typically carried out by considering two measures: precision and recall. *Precision* describes what percentage of the predicted classes are correct (by virtue of matching manually annotated classes), and *recall* how many of the manually annotated classes are correctly predicted. In our experiment, we found that the system is able to detect 25% of the sentences annotated as emotional (recall). Among the sentences predicted as emotional by the system, 64% are correct (precision). The F_1 is therefore 36%. We qualitatively inspected the results and were not able to identify patterns while comparing the true positive and false negative results, i.e., in those instances where emotions were correctly predicted, and where the prediction was 'neutral' but the annotator had identified an emotion. In the case of false positives (i.e., where an emotion was predicted but the annotator had classified the sentence to be neutral), we could determine wrongly identified signal words which were attenuated by the context to be responsible for the incorrect classification. In the latter case, context proved to be decisive for the recognition of an emotion. These results suggest that the system is able to identify non-emotional sentences relatively well, but that it still struggles with identifying the wide linguistic variety of emotion expressions that signal emotional sentences. Even though this is to be expected with the very limited amount of training data that we currently have, this indicates that increasing the recall of the model will be a central topic of future work. Strategies include the (semi-)automatic generation of more training data as well as more sophisticated representations of word and sentence meaning beyond simple bags of words.

SUMMARY

With this article, we propose the study of travelogues with a connection to South America as a topic of significance in the discourse between the Global North and Global South. In particular, we propose that a diachronic study of such travelogues with regard to the 'emotions of encounter' can yield significant insights into the dynamics of intercultural contact, of travelling, and of the literary status of emotions over several centuries.

We believe that this endeavour offers a very natural setting for a meaningful collaboration between the humanities and computational linguistics, since the research questions are firmly grounded in historical, linguistic, and literary theory, but answering them in an empirically credible fashion requires methods for operationalizing the notion of emotion via annotation and, ideally, for automating annotation in order to scale up emotion analysis to larger corpora.

The pilot activities reported on in this article demonstrate the feasibility and potential fruitfulness of this vision. A vision which has been made possible through the

contribution of a corpus of historic travelogues spanning several centuries, the performance of emotion annotation on the documents, the evaluation of the annotation, and finally the planning of strategies for future automation. Using a 'scalable reading' approach that combines quantitative with qualitative insights, significant developments over time can be identified that warrant future investigation. A considerable increase in the percentage of emotion sentences from the 16th to 19th century can be observed, as well as a shift in the relative percentages of emotion categories, with fear particularly decreasing. The prediction model for emotion classification built on a subset of our annotated sample with a maximum entropy classifier performed within the boundaries of 25% recall and 64% precision. In this sense, we can report success for the collaboration and believe that the present study can serve as a blueprint for similar collaborations on other topics.

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