Exploring the behavioral drivers of review valence

The direct and indirect effects of multiple psychological distances

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Abstract

Purpose – Although the literature has established the effect of online reviews on customer purchase intentions, the influence of psychological factors on online ratings is overlooked. This paper aims to examine these factors under the perspective of construal level theory (CLT).

Design/methodology/approach – Using review data from TripAdvisor and Booking.com, the authors study three dimensions of psychological distances (temporal, spatial and social) and their direct and interaction effects on review valence, using regression analysis. The authors examine the effect of these distances on the information content of online reviews using a novel bag-of-words model to assess its concreteness.

Findings – Temporal distance and spatial distance have positive direct effects on review valence. Social distance, on the other hand, has a negative direct effect. However, its interaction with the other two distances has a positive effect, suggesting that consumers tend to "zoom-out" to less concrete things in their ratings.

Practical implications – The findings provide implications for the interpretation of review ratings by the service providers and their information content.

Originality/value – This study extends the CLT and electronic word-of-mouth literature by jointly exploring the effect of all three psychological distances that are applicable in post-purchase evaluations. Methodologically, it provides a novel application of the bag-of-words model in evaluating the concreteness of online reviews.

Keywords Online reviews, Construal level theory, Review valence, Review text concreteness

Paper type Research paper

1. Introduction

Imagine that you are on holiday having happy times of relaxation with your friends/family or even alone. At the hotel, however, there are some smaller or bigger annoyances. The couple in the next room is a bit noisy, the breakfast is not to your taste and the swimming pool is not of the dimensions that you believed it would be based on the photos on the hotel's website. After returning home, you receive a message that asks for an evaluation of your experience with the hotel. You can choose to do it right away, but you can also opt to postpone it until a later date. Could the decision of when to write the review affect your evaluation?

The main theoretical underpinning behind the formation of online ratings is that of expectation confirmation (Oliver, 1980) where consumers' a posteriori evaluations derive from the deviations of the real experience with their a priori expectations. Nevertheless, this process may be regulated by several psychological factors that influence the way ratings are formed and their subsequent textual justification. This is primarily related to the recall mechanisms that consumers use when evaluating an experience. Social psychology suggests that psychological distances (temporal, spatial, social and hypothetical) have an effect on the way

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people think about objects and events (Trope and Liberman, 2010). The closer someone is with the event, he/she "zooms-in" into his/her experience, focusing on the more concrete aspects, even on small details (low-level construals). On the other hand, as someone becomes more and more distant, the "lens" he/she uses to recall the experience "zooms out" to the more abstract aspects (high-level construals). In our example, it is possible that if the review is posted immediately after returning home, focusing more on the small annoying details would result in a lower rating, than if the review is delayed for an amount of time.

Several studies in the literature have examined the effect of psychological distances on consumers, mainly on pre-purchase decisions and evaluations (Yan *et al.*, 2016; Zhao and Xie, 2011). On the other hand, few studies such as those of Pizzi *et al.* (2015) and Huang *et al.* (2016) explore their effect on post-purchase evaluations. Considering the significant influence that post-purchase evaluations (expressed through online reviews) exercise to sales, it is important to understand if similar dynamics such as that of future decisions affect past experiences. These effects also have implications for the information content of online reviews, as lower-level construals will result in more concrete reviews that contain more useful information for managers to improve their service offering.

We address these gaps by studying the concurrent effect of three distances (temporal, spatial and social) in a hospitality setting and how they impact hotel ratings. In doing so, our study complements and extends previous research in the construal level theory (CLT) literature by jointly exploring the effect of a third distance (social distance). Specifically, we answer the following set of questions:

- Does the time elapsed between customer experience and the date he/she posts the review have an effect on the rating provided?
- Is the geographical distance between the country of the customer and the destination country a factor that may influence the overall satisfaction?
- If a customer's culture is close to the visiting country and/or the customer knows the local language, does it make the experience better?

The importance of examining the concurrent effect of all distances rather than in isolation has been pointed in the literature as a way to address reduced sensitivity (Maglio *et al.*, 2013) or asymmetries (Zhang and Wang, 2009). To examine the effect of one distance in isolation without controlling for the others and their interaction is problematic and could lead to wrong conclusions, as some dimensions could be considered more primary than others (Bar-Anan *et al.*, 2007).

Our study examines the influence of psychological distances on a rather unexplored context, that of electronic word of mouth (eWOM), and their effects on the formation of online ratings. The closest study in the literature is the one by Huang *et al.* (2016), who examine the formation of online ratings in restaurant service encounters. Our study is different in several ways. First, we examine three dimensions instead of two, including social distance. Second, reviews in hotel service encounters, compared with reviews in restaurant service encounters, usually arrive from a more dispersed pool of international reviewers, creating a bigger variation regarding the spatial and social distances. As a result of the different variation of spatial distances, a significant portion of restaurant reviews could come from locals or repeated customers, and therefore, reverse causality could be an issue. In our sample, we exclude local visitors, thus diminishing such concerns. Finally, the duration of a service encounter in hotels is longer than the service encounter in restaurants, which could result in different mental representations (Miao and Mattila, 2013), and therefore, the effect of psychological distances may be different.

A parallel contribution of our study is methodological and deals with the measurement of review text concreteness/abstractness using an automated procedure. We introduce a novel bag-of-words approach based on the work of Brysbaert *et al.* (2014) that offers several advantages compared with standard coding practices used in the literature (e.g. the linguistic categorization model), allowing us to analyze the whole sample of reviews.

To this end, the rest of this paper is organized as follows. Section 2 provides the theoretical background and the hypothesis formulation. In Section 3, we present a description of the data used, the operationalization of the variables and the empirical specification for the analysis. Section 4 provides the results and the hypothesis testing, and our study concludes in Section 5.

2. Literature review and hypotheses

2.1 Electronic word of mouth

With the emergence of Web 2.0 and the advent of review aggregators, there is a revitalization of the word-of-mouth (WOM) studies mainly exploring online reviews. Online reviews substitute or complement the traditional forms of WOM and customer-to-business communication about product quality (Chevalier and Mayzlin, 2006). A stream of studies in extant literature investigates eWOM and its impact on products or services from several different perspectives, such as their influence on sales, reviewer motives to engage in eWOM or elements that make a review helpful (Brodie *et al.*, 2013; Korfiatis *et al.*, 2012; Zhao *et al.*, 2015).

Specifically in tourism and hospitality, online reviews offer unprecedented opportunities for firms to understand and respond to their customers' preferences (Leung *et al.*, 2013). Given the significant influence that online reviews exert on hotel booking intentions (Zhao *et al.*, 2015), and as a complementary tool to traditional customer satisfaction measures (Kim *et al.*, 2017), we find a proliferation of studies for the specific topic (e.g. see Kwok *et al.*, 2017, for a systematic analysis on 67 studies with online reviews as their core theme). However, there is a considerable asymmetry on the volume of literature that examines the behavioral determinants of review valence and the influence of psychological factors on online ratings. We address this from the perspective of the CLT.

2.2 Construal level theory and consumer evaluations

Extant literature in social psychology postulates that people's memories of events are inconsistent with their perception of these events at the time they happen (Wirtz *et al.*, 2003). A theoretical framework that explains those differences, CLT, argues that as the psychological distance from objects, events or individuals increases, people tend to use different mental representations (construals) when they recall their experiences with them (Trope and Liberman, 2010).

Four psychological distances and their respective construal levels are established in CLT, namely, temporal, spatial, social and hypothetical distances (Trope and Liberman, 2010). The temporal distance changes people's mental representations of events and consequently mediates temporal changes in the perceived value given. Specifically, people use abstract mental representations (high-level construals) when they are planning or thinking about distant future events compared with more concrete mental representations (low-level construals) when they are thinking about near-distance events. The same dynamics also apply in the case of spatial, social and hypothetical distances, where social distance is defined as the measure of space between two or more social groups or

individuals. However, for post-experience evaluations, the hypothetical distance is non-applicable, as it applies to the likelihood of an event occurring in the future.

Several studies examine the effect of psychological distances on consumer evaluations and choices. Ding and Keh (2017), by conducting two laboratory experiments, show in the context of service evaluations and choice that customers when on low-level construals rely more on intangibles, whereas customers when on high-level construals rely on tangible aspects. Wright *et al.* (2012) report effects of psychological distance on customers' perceptions about the validity of marketing claims. Customers in low-level construal mind-sets have a higher truth rating than customers on high-level construals. Chung and Park (2013) found that both social and temporal distances have an effect on consumers' evaluations of a company with ambivalent behavior in terms of morality or competence. Finally, the results of Zhao and Xie (2011) show that the recommendation of others is more persuasive on distant than the near future. A common characteristic of all these studies is that they examine future decisions and are performed in a controlled laboratory context. However, evaluating the effect of these distances under realistic marketing mix conditions is challenging, as asymmetries in their effect may be materialized (Zhang and Wang, 2009).

2.3 Hypothesis development

Although the theoretical background of CLT relates construal levels with future events, Pizzi *et al.* (2015) extend this understanding by including also past events. In a consumer preference framework, they found that consumers rely on more concrete attributes to represent near-past experiences compared with more abstract attributes that are used for distant-past experiences. They also report an effect of the temporal distance on overall satisfaction, as respondents give more (less) weight to high than low-level attributes when the time distance from the experience increases (decreases). Their results support that "satisfaction judgments shift over time as a result of the different psychological mechanism that are activated as the function of the time elapsing between service experience and its evaluation" (p. 484).

We expect the more "distant" a reviewer is from an experience, the less negative to feel about it. This is also supported by evidence from clinical psychology. Siedlecka *et al.* (2015) show that there is a correlation between rumination of negative events and temporal psychological distance. Kross *et al.* (2012) also explain the mechanism that enables people to reduce anger and negative emotions from negative experiences. They report that a self-distant perspective that is connected with more abstract information enables individuals to focus on their experience without reactivating their aversiveness compared with a self-immersed approach where the mental representation of experiences is more concrete. Spronken *et al.* (2016) explore if the temporal distance from an event induces more positive thoughts about it and in a laboratory experiment found evidence to support it. The results from Huang *et al.* (2016) also point to this direction, reporting that the temporal and spatial distances are positively associated with the review rating. Considering that stated above, psychological distances and high-level construals should induce positivity to the overall satisfaction. As such, we expect:

H1. The *temporal distance* between the hotel stay and the time point of review publication has a significant *positive* effect on review valence.

H2. The *spatial distance* between the location of the reviewer and the location of the hotel has a significant *positive* effect on review valence.

Williams *et al.* (2013) report influences of psychological distances on affect-based evaluation. Specifically, their results show that distance reduces the intensity of experiences, but at the same time, abstract thoughts increase the positivity in both negative and positive experiences, improving evaluations. Kim *et al.* (2008) examine the effect of temporal and social distances on consumer evaluations and found that customers with a greater distance focus more on abstract information. Based on the results of Huang *et al.* (2016), who report a "distance boosting effect" of the temporal and spatial construals on the review rating, we expect high-level construals to be realized with a more positive rating, as they are more abstract. Consequently, low-level construals will be realized with a more negative rating owing to their concreteness. In that direction, we examine how textual features of online reviews are affected by psychological distances. High-level construals would result in more abstract textual justifications and positive ratings, as a by-product of the reasoning we followed in *H1* and *H2*. On the other hand, low-level construals will lead to more concrete textual justifications, which will lead to less positive ratings. As such, we consider the following hypothesis:

H3. Review text concreteness has a negative effect on review valence.

For the social distance, we expect the adverse relationship, as according to Liberman *et al.* (2007), in-groups are perceived more positively than outgroups, and therefore, social distance reduces positivity. Karakayali (2009, p. 538) suggests that when the social distance is high, "relationships tend to lose their affective content or, worse negative affections dominate the relationship". Moreover, social closeness and familiarity display a positive and statistically significant correlation (Segal *et al.*, 2003), and familiarity activates affective responses and might provide a sense of security and comfort to customers (Tasci and Knutson, 2004). Even from ancient history it is known that people panic when they cross the boundaries of certainty (Korstanje, 2011). In general, social distance and the specific operationalization in the form of cultural distance will have an influence on customer experience through their interaction with either locals or employees and other customers. Customers from different cultures have different expectations of service employee behavior (Kong and Jogaratnam, 2007); therefore, deviations from the expected behavior derived directly from cultural differences may be perceived as negative. Furthermore, literature denotes the effect of customer-to-customer interactions (Nicholls, 2011) on the overall experience and its importance in service environments (Martin and Pranter, 1989). This is more pronounced in hospitality services where the interaction among the customers is for a more prolonged period than in other forms of service encounters. In that aspect, cultural differences among customers may lead to tensions because of the different views of what is a socially accepted behavior. Therefore, the cultural distance between a customer's country of origin and the host country is expected to have a negative effect on his/her service evaluation. Thus, we have:

H4. The *social distance* between the reviewer and the host country has a significant *negative* effect on review valence.

3. Data and methods

3.1 Data set description

We collected online reviews from TripAdvisor for all London-based hotels. Our choice to sample reviews from a specific city is grounded on two reasons. First, we wanted to secure homogeneity in the experience levels for all reviewers. Second, as an alternative proxy for measuring the

social distance, we use the knowledge of the local language, and we capture this by the language used in the review text. Reviewers in these platforms usually communicate in English, so the selection of a city where the official language is English is a natural choice. Our dependent variable is the review score, a Likert scale variable that takes values between 1 and 5.

An initial data set of more than 900,000 reviews from TripAdvisor was collected. After excluding those reviews where the reviewer's location was not disclosed and those from the UK, we have a final sample of $N = 215{,}034$ reviews. The basis of the exclusion was to ensure the distinction of the effect of social and spatial distances, as in the case of UK customers, they would be equal (*Social D*) to or close (*Spatial D*) to zero. In addition, we wanted to avoid reverse causality in the case of spatial distance, as locals may choose to stay in a faraway hotel because perhaps they are loyal customers. These reviews come from a pool of travelers from approximately 90 countries, where US travelers account for ~30 per cent of the total sample. The ratings are provided for a total of 1,022 hotels, with an average of 210 reviews per hotel. The average time to post a review in our sample is 1.3 months. From the 215,034 reviews, 151,707 are in English, and the average length of a review with English text is 136 words.

3.2 Operationalization of variables

3.2.1 Temporal distance. Temporal distance (*Temporal D*) captures the time between the service encounter and the time that the review was posted on TripAdvisor. For each review, we computed the temporal distance from a self-reported field where the reviewer declared the month and year of staying and subtracted that from the date of the review publication. As we do not have information about the exact review date, the distance is measured in elapsed months.

3.2.2 Spatial distance. Our second explanatory variable, the spatial distance (*Spatial D*), is operationalized as the geographical distance between the self-reported reviewer location and the city of London. From the self-disclosed location of the reviewer, we compute the longitude and latitude, and derive the geographical distance from central London by applying the shortest distance between those two pairs of latitude and longitude with the Haversine method. We used a comprehensive named entity recognition procedure to identify the location coordinates of the reviewer (e.g. Boulder, CO) using the Google Maps API.

3.2.3 Social distance. A key idea that facilitates our study is that a form of social distance is the interpersonal similarity and that people perceived similar others as socially closer (Liviatan *et al.*, 2008). Consequently, as the cultural similarity is a form of interpersonal similarity with others, we used Hofstede *et al.*'s (2010) cultural dimensions to measure the social distance of the reviewer with the country he/she visits. As a proxy for the social distance (*Social D*), we computed the cultural similarity between the country of the reviewer's location and the UK. This operationalization of the social distance was calculated by using the Kogut and Singh (1988) formula:

$$Distance_{ju} = \frac{1}{4}\sum_{n=1}^{4}\frac{(D_{ji} - D_{ui})^2}{V_i}$$

where D_{ji} is the *i-th* dimension for country *j*, D_{ui} is the value of this dimension for the UK and V_i denotes the variance of that specific dimension. We used only four out of the six main Hofstede dimensions (Power distance, Uncertainty avoidance, Masculinity and Individualism) to compute the distance measure, as for several countries in our sample, there are no values for the other two (Long-term orientation and Indulgence). Hofstede *et al.* (2010) measures core social values across different nationalities, such as if people accept and expect

inequalities and are respectful or obedient to hierarchy (Power distance), if the collective interest is more important than individual interest (Individualism), the degree of tolerance of people toward uncertainty and ambiguity (Uncertainty avoidance) or the degree of emotional role differences among the two genders and how society perceives "tough" and "soft" values (Masculinity).

Ghemawat (2001) discusses the concept of distance and the different forms that should be taken into consideration before expanding in a foreign market. The author considers the cultural distance not only as a factor of social norms but also in terms of religious beliefs, race and language differences. Although social norms are many times invisible, other cultural attributes such as the language are more easily identifiable. Having that in mind as an alternative proxy for the operationalization of the social distance, we use the source language of the review text. Reviewers who have the ability (and confidence) to express their evaluation in English (and therefore we assume are more fluent and have more interactions with the locals during their stay) should feel less socially distant in London compared with the reviewers who do not have the same ability. We recognize that even in the group of reviewers who choose to write a review in a different language, there could be English-fluent speakers, but on average, the two groups should have a significant difference. Therefore, as an alternative specification, we use a dummy variable that captures the language of the review text (Language) and takes the value "0" if the text is in English and "1" otherwise. Our operationalization of social distance is in line with the extant literature. Karakayali (2009) summarizes social distance into four distinct conceptions, namely, affective, normative, interactive and cultural and Habitual distances. Whereas culture pertains to the cultural and habitual distance, which refers to the cultural similarity between two groups, language pertains to the interactive social distance, which focuses on the frequency of the interaction between groups. Apparently, a common language is the tool that will facilitate the interaction between groups and individuals.

3.2.4 Control variables. For robustness, we control for hotel average review score, monthly dummies to capture seasonality, dummies for customer types (business, family, couple, solo or group) and the reviewer's level of contribution, which captures a snapshot of the reviewers' involvement in providing reviews on TripAdvisor.

4. Results

4.1 The effect of psychological distances on review valence

We are interested in examining the effect of temporal, spatial and social distances in review score, but we also aim to evaluate the effect of the interaction among these variables. Therefore, our main model includes the interaction among the pairs of distances and a triple interaction of all distances. Considering the nature of our dependent variable, we use an ordinal logistic regression. For each particular review i in our data set, our econometric specification has the following form:

$$\begin{aligned}\text{ReviewScore}_i = {} & \beta_1 \text{TemporalD} + \beta_2 \text{SpatialD} + \beta_3 \text{SocialD} \\ & + \gamma_1(\text{TemporalD} \times \text{SpatialD}) + \gamma_2(\text{TemporalD} \times \text{SocialD}) \\ & + \gamma_3(\text{SpatialD} \times \text{SocialD}) + \gamma_4(\text{TemporalD} \times \text{SpatialD} \times \text{SocialD}) \\ & + \delta_1 \text{Hotel Average} + \delta_2 \text{Reviewer Experience} \\ & + \sum_{l=1}^{11} \delta_3^l \text{Month} + \sum_{k=1}^{4} \delta_4^k \text{Customer Type} \end{aligned} \quad (1)$$

where β corresponds to the direct effects of the distances, γ reflects interaction effects and δ corresponds to the coefficients of the control variables. Our estimation procedure considers two pairs of models to be estimated using a maximum likelihood estimator. The first pair of our models considers *Social D* operationalized by the cultural distance and the other pair operationalizes *Social D* using the language. In each pair, the first model considers a regression of the dependent variable with the three distances and the control variables, whereas in the second model, we also include the interaction effects. Results are reported in Table I and reveal that all three distances (*Temporal D*, *Spatial D* and *Social D*) have a significant and direct effect on review valence.

When all interaction effects are considered, temporal distance has a positive effect on the review score ($\beta_1 = 0.037$, $p < 0.001$), confirming *H1*. The effect of spatial distance ($\beta_2 = 0.021$, $p < 0.001$) is also significant, confirming *H2*. The effect of social distance, either expressed through the cultural distance index ($\beta_3 = -0.013$, $p < 0.001$) or through the language of the review text ($\beta_3 = -0.022$, $p < 0.001$), has the expected negative relationship with the review score, thus confirming *H4*.

The interactions of Social D with the other distances are reported to be significant and positive, and this result provides further validity to the expectations derived from the CLT and reveals a distance boosting effect ($\gamma_2 = 0.021$, $p < 0.001$; $\gamma_3 = 0.024$, $p < 0.001$) on review valence.

4.2 Review text concreteness and review valence

To evaluate *H3*, we followed a novel approach using the dictionary of Brysbaert *et al.* (2014) in a bag-of-words model to score the concreteness of the review text. The scoring dictionary contains a set of 40,000 lemmas and their corresponding concreteness value and is primarily based on the SUBTLEX – US word frequency list (Brysbaert and New, 2009) and supplemented with additional words such as those found in shop catalogs. Owing to its coding nature (with the concreteness rating sourced from human coders), this dictionary represents an ideal base for our text scoring task. The advantage of using this approach over a set of trained human coders using other approaches, such as the linguistic

Table I.
Ordinal logistic regression results for the effect of psychological distances on the review score (DV)

Dependent variable: review score	Direct effects		Interaction effects	
Temporal D	0.037*** (0.004)	0.038*** (0.004)	0.037*** (0.004)	0.028*** (0.005)
Spatial D	0.016*** (0.004)	0.019*** (0.004)	0.021*** (0.005)	0.014** (0.005)
Social D (Hofstede proxy)	−0.015*** (0.004)		−0.013*** (0.005)	
Social D (Language proxy)		−0.027** (0.010)		−0.022*** (0.010)
Temporal D × Spatial D			−0.008 (0.005)	−0.007 (0.006)
Temporal D × Social D			0.021*** (0.004)	0.020* (0.009)
Spatial D × Social D			0.024*** (0.005)	0.022* (0.010)
Temporal D × Spatial D × Social D			0.002 (0.005)	−0.016 (0.009)
Hotel average rating	1.924*** (0.008)	1.922*** (0.008)	1.923*** (0.008)	1.921*** (0.008)
Reviewer's level of contribution	−0.079*** (0.002)	−0.079*** (0.002)	−0.080*** (0.002)	−0.079*** (0.002)
Monthly dummies	Yes	Yes	Yes	Yes
Customer type dummies	Yes	Yes	Yes	Yes
McFaden's R^2	0.126	0.126	0.126	0.126
AIC	507,979	507,658	507,940	507,953
Observations	215,034	215,034	215,034	215,034

Notes: *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

categorization model (De Angelis *et al.*, 2017), is the coverage of the sample and the efficiency of the human coders involved. In our analysis instead, we were able to estimate a concrete/abstract score for the total sample of reviews written in the English language using an automated procedure.

We used a language identification procedure on the review text to extract only those reviews written in English (N = 151,714). From each review, we removed the punctuation marks and transformed the case of each word to match it with the lemmas in the concreteness dictionary. Considering a review r_i with its textual justification, we consider the resulting set of n unigrams (single words) after all pre-processing in this review text as:

$$r_i = \{u_{i1}, \ldots, u_{in}\}, \forall\ n > 0$$

As the dictionary we used contains all word forms, no stemming was needed. For the textual content of each review, we calculated the total number of words that match a lemma in the concreteness dictionary and the total score resulting from the sum of each concreteness rating for this particular word as follows:

Let C be the universe of all the tuples in our scoring dictionary such as $C^n = ((c^1,v^1,),\ldots, (c^k, v^k,))$, where v is the corresponding concreteness score. We match the unigrams of our review text with the set of unigrams that correspond to the concreteness values and then sum this result and weight it with the length of the unigrams in this review text as follows:

$$AvgConcreteness = \frac{1}{n}\sum_{1}^{k}(v_k \in r_i \cap C)$$

The number of lemmas found in the dictionary comprised an average 89 per cent of the total words for a particular review, a very high portion of the review text supplied. An example is provided in Table II, as well as two examples of highly concrete and abstract review text for a given length.

Having computed the mean concrete score of the text, we measured the relationship between review valence and concreteness using all of the previously mentioned control variables. Additionally, we also controlled for review length (ReviewLength).

Consequently, our econometric specification has the following form:

$$\begin{aligned} ReviewScore = {} & \beta_1 ConcreteScore + \beta_2 ReviewLength + \delta_1\ Hotel\ \ Average \\ & + \delta_2 Reviewer\ \ Experience + \sum_{l=1}^{11}\delta_3^l Month \\ & + \sum_{k=1}^{4}\delta_4^k Customer\ \ Type \end{aligned} \tag{2}$$

To ensure robustness, we run additional estimations by imposing arbitrary cutoffs on the minimum length of the review text (Nwords = 50 and Nwords = 100) and estimating the model separately. Results are reported in Table III and confirm the negative relationship between review score and concreteness ($\beta = -0.560, p < 0.001$; $\beta = -0.586, p < 0.001$; $\beta = -0.485, p < 0.001$) for all the thresholds of the minimum review length. Therefore, *H3* is confirmed.

4.3 Mediation analysis

Building on *H3*, we wanted to evaluate whether concreteness mediates the distance boosting effect of the psychological distances on the formation of review valence. To evaluate this, we used the four-step Baron and Kenny procedure (Baron and Kenny, 1986) to test whether the

Lemma	Score
good	1.64
location	3
nice	2.18
price	3.63
if	1.19
you	4.11
book	4.9
well	3.33
in	3
advance	2.57
staff	4.36
is	1.59
helpful	1.76
room	4.79
pretty	2.4
small	3.22
though	1.2
Average score	*2.874*
Low concreteness example (1.90)	"Great Experience" 5/5 Reviewed 7 July 2012. *The location is great and nothing is too much trouble for the staff. Overall, had a great stay and would stay again*
High concreteness example (3.03)	"If you need to be in the area – good choice" 5/5 Reviewed 5 July 2013 Old building – needs a bit of refurbishment. Rooms facing the road are noisy from heavy traffic. Bathroom on my room had paint peeling off the ceiling. Breakfast is ok, basic, but filling. Staff very helpful

Table II. Example concreteness scoring for a review in our sample (TripAdvisor data set) as well examples of reviews with low and high concreteness ratings

Notes: Individual lemma scores obtained from the list of Brysbaert *et al.* (2014). The average score has been computed based on the sum of each lemma's individual score over the total number of lemmas that were found to be contained in the review text. *Example review:* "Neat!" (4 out 5 stars) Reviewed 15 October 2011 *Good location. Nice price if you book well in advance. Staff is helpful. Room pretty, small though*

Dependent variable: review score	(1) (All reviews)	(2) (Review length >50)	(3) (Review length >100)
Concreteness	−0.560*** (0.036)	−0.586*** (0.045)	−0.485*** (0.066)
Review length	−0.002*** (0.000)	−0.002*** (0.000)	−0.001*** (0.000)
Hotel average rating	1.952*** (0.010)	1.948*** (0.011)	1.898*** (0.014)
Reviewer's level of contribution	−0.077*** (0.003)	−0.069*** (0.003)	−0.043*** (0.004)
Monthly dummies	Yes	Yes	Yes
Customer type dummies	Yes	Yes	Yes
McFaden's R^2	0.121	0.121	0.115
AIC	350003	294032.9	187495.8
Observations	151,707	125,137	76,747

Table III. Ordinal logistic regression results for the effect of review content concreteness on review score (DV)

Notes: $^{*}p < 0.05$; $^{**}p < 0.01$; $^{***}p < 0.001$

direct effect of each of the psychological distances on review valence becomes weaker for concrete reviews.

Table IV reports the bias-corrected indirect effects on review valence for the mediation estimation. A bias-corrected bootstrapping procedure with $n = 10.000$ iterations was used to

obtain confidence intervals (Hayes, 2013). Standardized indirect effects were computed for each of 10,000 bootstrapped samples, and the 95 per cent confidence interval was calculated by determining the total effects at the 2.5th and 97.5th percentiles. The bootstrapped standardized indirect effects for Time D ($\beta = 0.001, p < 0.05$) and Spatial D ($\beta = 0.001, p < 0.001$) were positive and significant, and the 95 per cent confidence interval ranged from [0.001, 0.002]. We found a significant negative indirect effect for Social D ($\beta = -0.003, p < 0.001$) with a 95 per cent confidence interval for Spatial D between [−0.004, −0.002]. All confidence intervals did not include zero. The results confirm that the indirect effect of the psychological distances on review valence is mediated through the effect they have on review text concreteness.

4.4 How concreteness affects review text polarity?

For the stability of our results, we performed a second study with a different data set collected from Booking.com. This data set containing $N_{booking} = 252{,}874$ reviews allows us to use the same type of controls (with the exception of reviewer experience), but it has two distinct advantages over the TripAdvisor data set. First, the response variable is measured on a continuous rating scale (0 to 10), allowing for more variation. Second, when a customer provides a review, he/she writes his/her positive and negative points in two different text boxes. In that way, the impact of review text concreteness between positive and negative reviews can be compared. This provides further support for *H3*.

As can be seen in Table V, we ran three different estimations on the new data set. For all models, concreteness is highly significant for the positive part ($\beta = -0.034, p < 0.001$) and

Table IV. Bias-corrected unstandardized indirect effects of the psychological distances on review score (DV) using review text concreteness as a mediator

Dependent variable: review score	Estimate	*Z*-score	Bootstrap CI (95%)
Temporal D	0.001* (0.000)	2.043*	[0.001,0.002]
Spatial D	0.001*** (0.000)	3.044***	[0.001,0.002]
Social D	−0.003*** (0.000)	−9.822***	[−0.004, −0.002]

Notes: Social D has been computed using the cultural distance as a proxy, as we use only the reviews that contain English text ($N = 151{,}707$). Number of bootstrap samples for bias-corrected bootstrap confidence intervals is 10.000, *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

Table V. Linear regression results for the effect of concreteness on review score for positive, negative and all part of the review text from the Booking.com data set

Dependent variable: review score	(1) (Positive text)	(2) (Negative text)	(3) (All)
Concreteness (Positive)	−0.034*** (0.008)		−0.055** (0.008)
Review length (Positive text)	0.014*** (0.0001)		0.018*** (0.0001)
Concreteness (Negative text)		−0.344*** (0.008)	−0.202*** (0.008)
Review length (Negative text)		−0.012*** (0.0001)	−0.016*** (0.0001)
Hotel average rating	0.863*** (0.003)	0.872*** (0.011)	0.808*** (0.003)
Monthly dummies	YES	YES	YES
Customer type dummies	YES	YES	YES
R^2	0.264	0.271	0.334
Observations	252,874	252,874	252,874

Notes: *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

with a higher and significant coefficient for the negative part ($\beta = -0.344, p < 0.001$) of the review text. When both parts are taken together, the effect of concreteness is significant and in the same direction ($\beta = -0.055, p < 0.001$; $\beta = -0.202, p < 0.001$) as in the estimations provided in Table IV. The outcomes of the third model, where we evaluated the concreteness of the positive and negative text simultaneously, reveal that for the review score, the concreteness depicted in the negative text has a higher effect. The results of this analysis further confirm *H3*, suggesting that concrete textual justifications are normally associated more with the negative than the positive part of the review comments.

5. Discussion and conclusions

5.1 Conclusions

Our results reveal that psychological distances and their interactions influence customer evaluations. This effect appears both in the review rating and the review text. We highlight the implications for theory and practice in the sections that follow.

5.2 Theoretical implications

This study adds to the eWOM literature by exploring the effect of psychological distances sourced from the CLT literature by evaluating for the first time the joint effect of three distances (temporal, spatial and social). We also contribute to the CLT literature by studying past experiences and not future decisions. Although we confirm the positive effect of temporal and spatial distances, as in Huang *et al.* (2016) and Pizzi *et al.* (2015), we assess the direct effect for the social distance simultaneously and we find a negative relationship. By jointly estimating the effect of all three distances, we add to the stream of the CLT literature that discusses psychological distance sensitivities and asymmetries (Maglio *et al.*, 2013; Zhang and Wang, 2009). More specifically, not only did we find that the direct effects are significant in the presence of all three dimensions, but we also report a "distance boosting effect" of the social distance with each of the other two distances.

We also considered the indirect effect of the psychological distance on review valence by evaluating the impact of high- and low-level construals on review text concreteness. In doing so, our study has a methodological contribution introducing a bag-of-words approach to measure concreteness based on the dictionary provided by Brysbaert *et al.* (2014).

5.3 Practical implications

Our results provide significant managerial implications for the interpretation of review ratings by managers. Established service quality measurement frameworks such as ServQual (Parasuraman *et al.*, 1988) consider customer feedback as a measure that is independent of time. Our results highlight that the time elapsed between the service encounter and customer feedback is a significant parameter to consider when evaluating the input of customer reviews in service improvement initiatives. The effect of spatial and social distances also adds an additional level of their interpretation, considering that the service encounter framework that we have considered is highly heterogeneous regarding customers' cultural backgrounds.

Our findings have implications for managers regarding the time needed to approach the customers for surveys or to post their reviews. Given the effect of online reviews on hotel room bookings, granting some time before asking customers to rate their experience should result in a higher rating. On the other hand, managers who use online reviews to improve their hotel's service offering, and therefore more concrete information is required, should target to elicit customer feedback as soon as possible. Our findings have implications also for platform intermediaries and customers. An indirect result is that customers with cultural

closeness with the hotel will be more positive in their evaluation, and thus, international customers may get influenced by positive reviews from people with different cultural norms. However, reviews from customers who are culturally close are more representative of what to expect for a customer belonging to the same cultural group.

The results related to the effect of psychological distances on review text concreteness provide additional insights to the direction of review helpfulness. Literature reports that customers perceive as more helpful those reviews that are more concrete than abstract (Li *et al.*, 2013). Considering this, online travel intermediaries should promote more reviews from customers where the temporal distance is lower. This is more applicable in the case of hotels that already have a large volume of reviews available for consumers. Viglia *et al.* (2016) find that a large review volume tends to have decreasing returns on hotel occupancy rates. Using the temporal distance as an interface filtering cue, online travel intermediaries can address this issue and increase the conversion rates of their offerings.

Having in mind that overall customer satisfaction may be regulated by cultural distance, hotel managers can be more proactive to communicate to customers possible "cultural shocks" or codes of conduct within or outside the hotel. This could take several different forms such as information packages at check-in. This information will allow guests to get more adjusted and less "surprised" to the culture of the visiting country. Similar information should also be communicated online. Proper signaling in some areas of the hotel (e.g. for proper conduct in shared areas) should inform visitors about acceptable behaviors. An area of improvement could be the training of employees to cross-cultural understanding. Some cultures are more "silent" and more reluctant to complain in a foreign country (Sparks, 2001). Consequently, personnel should be able to understand how some cultures react and try to elicit information from guests about possible issues and subsequently apply service recovery strategies to increase customer satisfaction. Service recovery strategies such as apology, correction, explanation and compensation have been found to increase positive WOM, but this requires that the hotel management identifies the problem and proceeds with corrective actions (Lewis and McCann, 2004).

5.4 Limitations and future research

Our study has several limitations that derive mainly from the nature of online reviews. Online reviews are known to exhibit specific biases, such as self-selection bias (Li and Hitt, 2008) or response biases (Hu *et al.*, 2009), and in some cases can be a subject of manipulation (Mayzlin *et al.*, 2014). However, even in the presence of such biases, given the effect of online reviews on sales, it is important to understand the behavioral determinants of review characteristics. Nonetheless, primary data offer the ability to elicit and control for customers' personal characteristics, which are not available in online reviews. This has implications for the computation of cultural distance, as other measures could be used there as well (i.e. religion) or the participants could be directly asked how socially close they feel in their experiences.

In addition, the computation of the social distance using the hotel customers' self-declared country of origin may not always be a true proxy of the social distance, as it may not capture the specific cultural background (e.g. expats). Also, Hofstede dimensions are aggregate measures and measuring through individual responses could be more representative. However, we address this using language as a second cultural proxy with similar results. Nevertheless, our operationalization of the social distance is through the lens of in-group versus outgroup distance and not self versus others. In the former form, all reviews should be considered socially close, as they reflect the reviewer's personal experiences.

Ghemawat (2001) also argues that the geographical distance should not be considered as a matter of distance *per se* but in conjunction with other characteristics, such as the physical size of the country.

Several avenues for future research can be initiated regarding other features of online reviews that are also important, such as review helpfulness. Recent studies have shown that linguistic features of the review affect the perceived helpfulness of a particular review (Mertz *et al.*, 2014; Singh *et al.*, 2017). However, as we show in our study with the effect of temporal, spatial and social distance, consumer characteristics may also be taken into account considering the cultural differences between those who write the review and those who assert its helpfulness. The study by Zhao and Xie (2011) about the influences of the social distance to consumers' responses to peer recommendations supports such a hypothesis.

Also, it will be interesting to see the moderating role of emotions and their effect on the perceived distance and consequently the abstractness of the text. The effect of some distances can also be regulated by the adoption and use of technology. With the use of communication services, people can feel at the same time "home" and "away" (White and White, 2007) if they are in contact with friends and family. Therefore, a possible direction could be to study the moderating role of communication with family and friends to the effect of geographical and social distances.

Future research could measure the effect of a negative experience on the time to post and if there are differences with positive or neutral experiences. Although hypothetical distance is not valid on post-purchase experiences, studying service evaluations and choices under the influence of all four distances is an intriguing subject for study in pre-purchase settings. In addition, we expect differences in the perception of geographical and social distances based on demographics. For example, Millennials or Generation Z, who are more exposed to new technologies and social media, could be perceived culturally closer to the same-generation people from other countries compared with baby-boomers or Generation X. Historical connections or trade flows among countries could also moderate the effect of geographical and/or social distances (Ghemawat, 2001). Finally, our results consider the context of services and not of products. In products, these dynamics may have different directions, as it is an ongoing process and the temporal distance between purchase and review posting may reveal failures that occurred during a product's usage life-cycle.

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