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**How online advertising competes with user-generated content in  
TripAdvisor. A neuroscientific approach.**

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## **How online advertising competes with user-generated content in TripAdvisor. A neuroscientific approach.**

### **Abstract:**

The previous literature has almost ignored the interaction of user-generated content (UGC) and advertising content embedded in social media platforms. Visual attention is an important factor for tourist services in analyzing the value of online ads inserted close to UGC. Drawing on cognitive load theory, congruence research and dual processing models, the purpose of this study is to determine the effectiveness of online advertising on social media. A first study based on eye-tracking and EEG analysis was conducted to assess if there was a difference in visual attention and engagement when an ad was embedded in TripAdvisor content. Our findings showed that synergies between social media content and advertising content positively affect users' visual attention. A second study, using an online survey, was carried out to assess the impact of congruent/incongruent ads on ad recall (2a) and, using eye-tracking, on visual attention (2b). Appropriate managerial implications are provided.

*Keywords: visual attention; TripAdvisor; dual-processing theories; advertising effectiveness; eye-tracking*

## **1. Introduction**

Social media has quickly become one of the most popular channels for disseminating information on brands (Bigne, Ruiz, & Curras-Perez, 2019). Online reviews have a significant impact in the travel industry (Chu, Lien, & Cao, 2019). Recent market research reveals that, in 2018, 65% of customers read online reviews for local restaurants and cafes before making purchase decisions (BrightLocal, 2018).

Given the increasing competition in the hospitality industry, research into how the information cues in consumer-generated reviews affect advertising effectiveness of tourism services is important. Dual-process theories provide comprehensive data on how individuals process information, establish their validity assessments and later form decision outcomes (Eagly & Chaiken, 1993). These theories posit that consumers process information using two routes, central/systematic processing and peripheral/heuristic processing.

When searching for advice on social media, consumers frequently encounter advertising content mixed in with user-generated content (UGC). While researchers have demonstrated the impact of online customer reviews on company sales, an uninvestigated issue is how the interaction of UGC and advertising content affects consumers' visual attention, ad recall and engagement. Although online ad effectiveness has been extensively analyzed through different measures, such as behavioral data (e.g. click-through rate) and self-reported measurements (e.g. attitudes and acceptance) (Belanche, Flavián, & Pérez-Rueda, 2017), scant attention has been devoted to analyzing online ads embedded in social media sites, through unconscious measurements, such as neurophysiological tools. The literature review found few eye-tracking based studies that examined the impact of visual advertising stimuli and their effects on behavior related to online tourism services, and comparing the results with self-reported recall measurements (Muñoz-Leiva, Hernández-Méndez, & Gómez-Carmona, 2018). Attention has been recognized as the primary factor in advertising

effectiveness since the appearance of the earliest models, such as AIDA (Edward, 1925). Without attention, advertising cannot persuade the consumer (Edward, 1925; Cao, 1999). Visual attention has been taken to be a proxy of interest and preference, particularly measured through eye-tracking (for a review, see Wedel & Pieters, 2014), in different fields, including tourism research (for a review, see Scott, Zhang, Le, & Moyle, 2019). Research into advertising asymmetry has shown that higher consumer engagement with ads increases advertising recall and message involvement (Vecchiato et al., 2011).

A research question that remains underinvestigated is whether the same ad can have different effects depending on the media context in which it appears, that is, is the advertised product or service in a context relevant for the consumer? For example, subtle forms of congruence, such as matching company advertisements and the third-party ads embedded alongside them, could have an impact on visual attention and ad recall. The effects on congruity in advertising have been extensively researched (Moorman, Neijens, & Smit, 2002) including specifically in online settings (Hsieh, Lo, & Chiu, 2016), but this has been little studied in social media.

The specific goals of this study are: (a) to identify which heuristic UGC information cues (e.g. star rating, volume of comments, consensus, ratings of the specific features of restaurants, other consumers' reviews, location) attract most consumer visual attention; (b) to analyze how online advertising embedded in social media competes with heuristic UGC cues to influence consumer visual attention patterns and engagement, and (c) to analyze the effects of online advertising of congruent/incongruent products on visual attention and ad recall. Specifically, we examine whether congruence between the advertisement and the ad has an impact on ad recognition (henceforth "recall"). Two studies were carried out to achieve these goals, measuring both self-reported and unconscious responses (eye-tracking and EEG). In Study 1, data was analyzed to assess if there was a difference in visual attention and

engagement when ads are embedded with TripAdvisor content. A second study was carried out to assess the impact of congruence/incongruence on ad recall (study 2a) and visual attention (study 2b).

This study contributes to the existing body of literature, as follows. First, it extends visual processing research by exploring consumers' viewing behavior, combining UGC and online advertising. Second, the study assesses the impact of different heuristic information cues on consumers' visual attention and engagement in social media. Third, the study analyses the effect of congruence on visual attention and ad recall and explores its possible interaction with UGC valence. Fourth, the paper contributes to previous studies by combining self-reported measures with unconscious responses. The literature review found few applications based on eye-tracking methodologies examining the impact of visual advertising stimuli, and their effects on online tourism services-related behavior, and comparing the results with self-reported recall measurements (Muñoz-Leiva et al., 2018).

## **2. Heuristic information processing, visual attention and engagement**

### *2.1. Information processing on social media*

Based on the dual-process literature on heuristic processing, the present study applies the heuristic-systematic model (HSM) (Chaiken, 1980). The HSM model puts forth a dual-process conceptualization in which individuals use systematic (examining all pieces of information) and/or heuristic (using informational cues, such as consensus, as simple decision-making rules) strategies when evaluating information on which to make a judgment.

A *star rating* is considered the simplest and most concise heuristic cue for consumers to process (Yoon et al., 2019). Consumers immediately understand ratings and, therefore, expend more effort and time processing the textual information. Consumers' reviews may be affected by *consumer consensus*. The absence of support for an online review can create uncertainty in readers and cause the review to be rejected (Kim & Lee, 2015); consequently,

opinions endorsed by other consumers (consensus) are more persuasive and trusted than individual reviews about the same product. Consensual information is a heuristic cue that has been successfully examined from the HSM perspective (Chaiken, 1980). The presence or absence of consensus with an overall rating may affect consumers' visual attention and engagement, as they may agree more with messages that other reviewers endorse, without fully absorbing the semantic content of the persuasive argumentation (Kim & Lee, 2015).

Therefore, we pose RQ1:

*RQ1: Which UGC heuristic information cues influence visual attention?*

Consumers acquire visual information from ads in two ways: (i) actively, using their focal vision, looking directly at the ad; (ii) passively, even when they do not look at an ad, using their peripheral vision (Wedel & Pieters, 2014). Cognitive load theory (Sweller, 1988) describes the limitations of the working memory to process incoming information. When consumers are evaluating information on TripAdvisor, the processing of advertising content is disrupted by the increase in cognitive demand generated by the evaluation task. Previous research has suggested that multitasking only has a negative impact on memory if the sum of the cognitive load imposed by processing the information in the ad and the evaluation task surpasses the consumer's cognitive capacity (e.g. Duff & Sar, 2015). Therefore, we pose

RQ2:

*RQ2: Does online advertising embedded on TripAdvisor affect (a) consumers' visual attention toward the ad, (b) consumer engagement?*

The reduced impact of some informational cues might be explained because people pay less, or even no, attention to certain peripheral variables. On the other hand, cue-salience hypothesis explains that greater focus is put on some cues than on others (Markowitz, Shewcraft, Wong & Pesaran, 2011). Therefore, we analyze how UGC and online advertising

impact on the consumers' attention and engagement when they are presented in the same setting. Accordingly, we pose RQ3;

*RQ3: How do UGC and online advertising compete for the consumer's visual attention when (s)he is evaluating a tourist provider review?*

To answer these research questions, the first study used a behavioral experimental approach with a within-subject design with ads embedded in the TripAdvisor websites of Italian restaurants. Spain was chosen as the study context. Spain accounts for 12.7% of the EU-27 total value added of the food and beverage service activities (FBSA) sector (Cabiedes-Miragaya, 2017). Spain has the greatest density of bars per person in the world (1/174). We chose TripAdvisor as it is the largest online community where consumers write reviews on restaurant service and food, and Italian restaurants due to their popularity. We used eye-tracking to measure visual attention and EEG to measure engagement.

## 2.2. Study 1

### 2.2.1. Experimental design

As shown in figure 1, three slides of stimuli from TripAdvisor were used: two of them with an online advertisement ("Trip 1" and "Trip 2") and the third without the advertisement ("Trip 3"). For Trip 1 and Trip 2 each slide was divided into areas of interest (AOIs) reflecting the actual TripAdvisor layout: the overall restaurant score (AOI 1), number of opinions (AOI 2 and AOI 6), consensus (breakdowns) of consumer reviews (AOI 3 and AOI 8) and overall scores and headings of reviews of the restaurant (service and food) (AOI 4), scores of the attributes of the restaurant - service, value for money, food and atmosphere (AOI 5), client profile (AOI 9), calls to action to post reviews (AOI 7), and location of the restaurant (AOI 10). These two slides resulted in 11 AOIs. The slide without the advertisement had ten AOIs, placed in a layout different to the other two slides (Trip 3).

TAKE IN FIGURE 1

The participants viewed the stimuli through a 1920 x 1080-pixel monitor. The Tobii Pro TX300 device was used to monitor eye movements (eye-tracking), and iMotions software version 7.1.1.0 (<https://imotions.com/guides/>) was used for the data recording. This records at 300 Hz and has a built-in 23-inch monitor. We used the B-Alert X10 (Advanced Brain Monitoring) device to record the electroencephalogram (EEG) signals. The metrics for high engagement (HE), cognitive workload (WL), and frontal asymmetry (FA) were obtained through the ABM software built into the iMotions software.

### *2.2.2. Data collection, sample and procedure*

A company specializing in market research recruited the participants March-April 2018 from a sample of 104 Spanish TripAdvisor users (females 54.5%; 38.4% aged 25-30, 18.2% aged 31-40; 22.2% aged 41-50; and 21.2% aged 50-60; mean age: 37 years; 51.5% workers, 29.3% students, and 19.2% unemployed; 51.5% had used TripAdvisor more than three times in the previous three months. All participants viewed the four screens depicted in Figure 1. The “Neutral stimulus” was presented before Trip 3. The last two screens were presented in the same order for all participants.

### *2.2.3. Results*

#### *a) Eye-tracking measurements*

Due to some incorrect data being obtained from the eye-tracking (ET), only 100 participant responses were retained as a valid sample. Continuous measures were used: time spent, time to the first fixation (TTFF), and number of fixations. RQ1 addresses which UGC heuristic information cues influence visual attention in the stimuli that contain an ad (Trip 1 and Trip 2). The gaze time metric revealed that each AOI received a different level of attention. The top central part of the TripAdvisor layout received more attention in both slides (around 27%). This was the biggest AOI, and the information contained in it might have been more relevant to the participants. A medium-sized area with the breakdown (consensus) of



online ratings (AOI\_3) was the second most significant area in terms of attention paid in both slides (Trip 1, 15.9%, and Trip 2, 18.30%). The gaze attention paid to this AOI was higher than other areas of similar size located at the bottom of the pages (AOI\_8 and AOI\_9), in the top right area (AOI\_10), and at the top left area (AOI\_1 and AOI\_2). The AOIs paid least attention were the smallest; number of comments (AOI\_2, and AOI\_6) and “call to action to post a review” (AOI\_7). The fixation time metric offers additional support to previous findings, as it measured the time spent on each AOI as a percentage of total available time, based on fixation time. This showed that the participants spent almost the same time on each AOI. This interesting finding suggests that the subjects followed a common visualization pattern with the AOIs. This means that, when a tourist looks at TripAdvisor content, his/her visual attention pattern is the same for all pages.

Given the attention given to online advertising of a product embedded in TripAdvisor pages (RQ2), we analyzed the gaze time spent on AOI\_1. The attention given to the ad was 1.19 seconds for Trip 1 and 0.87 seconds for Trip 2. The percentage of attentional time was 6.3% and 5.78%, respectively. Overall, the attention given to the online ad was ranked fourth, behind the central area (online ratings of specific attributes) (AOI\_5), the area with the consensus of online ratings (AOI\_3), and the area with the online rating and heading of the comments given by two reviewers (AOI\_4). The fixation time values were a bit lower than gaze time (Trip1: fixation (s) = 0.81, gaze (s) = 1.19; Trip 2: fixation (s) = 0.54, gaze (s) = 0.87), due to the different nature of the two metrics. The view pattern provided an important finding. The fixation times confirmed that the online ad embedded in TripAdvisor was ranked as the fourth in terms of attention paid to each area on the TripAdvisor page, partially supporting previous research. Hernández-Méndez and Muñoz-Leiva (2015) found that greater attention is paid to text featured on banners than to images. In restaurant menus, Yang (2012) found that the bottom areas attracted statistically significant fewer fixations than other areas.

Our results showed that the ad stimulus located at the right-hand bottom of the page attracted attention, demonstrating that images are important for capturing attention. The area of least focal attention (i.e. the right bottom area) attracted increased attention when an ad was located there. Thus, patterns of attention are probably driven by the nature of the stimuli.

RQ3 investigates whether the attention paid to the ad is at the expense of attention paid to other AOIs. The lower the TTFF, the higher is the attention paid to that AOI. The areas which attracted most gaze attention (AOI\_5 and AOI\_3) also had the lowest TTFF on both TripAdvisor pages (Trip1=2.9 and 2.8, and Trip2=2.9 and 2.6 seconds, respectively), followed by AOI\_4 and AOI\_10, and the area where the ad was located (AOI\_11), with a TTFF of 10.3 and 8.5 seconds, respectively (values similar to those of area AOI\_10, located in the top right area). We conducted a comparative analysis of the time spent on the AOIs (in seconds and as a percentage of the total time) between the TripAdvisor pages containing the ad (Trip 1 and Trip 2) and the page without the ad (Trip 3). The results showed more time was spent on the pages with the advertisement stimulus than on the page without the ad. The gaze time and the time spent, in percentage terms, on the two pages with the ad was 15.5s for Trip 1 and 80.7%, and 11.6s and 80.4% for Trip 2, and 9.3s and 74.5% for the TripAdvisor page without the ad. Therefore, the percentages of attention paid to the ad was 6.2% for Trip 1 and 5.8% for Trip 2.

Overall, attention paid to the TripAdvisor pages is driven by three main issues, partially depicted in Figure 2. The colored spots represent the areas fixated on by the participants. The scale goes from green to red, in which red represents the most time spent on the area, and green the least (red>orange>yellow>green). First, top left and top central areas are paid the most attention. Second, the attention paid to the online ad is not at the expense of the other stimuli on the TripAdvisor page. Moreover, the results showed a common view pattern on all pages.

## TAKE IN FIGURE 2

### *b) Brain response measurements*

EEG signals were recorded to assess if there was a difference in neural signals evoked across the three TripAdvisor pages (Trips 1, 2, and 3). The following metrics were used as dependent variables (DV): “mean high engagement (HE)”, “mean workload (WL)”, and “mean asymmetry (AM)”. Valid EEG data were obtained from 83 participants for HE, 81 for WL, and 82 for AM (unused data for 18, 20, and 19 participants respectively; and three extreme outliers, based on SPSS criteria, were eliminated). Separate within-subject ANOVAs were carried out for each EEG metric, showing a statistically non-significant effect ( $F_{HE}(2, 81) = 0.582, p = .586$ ;  $F_{WL}(2, 79) = 1.834, p = .166$ ;  $F_{AS}(2, 80) = .497, p = .610$ ), meaning that it is not possible to reject the null hypothesis that the metrics are the same across the groups. This result highlights that consumers do not expend high cognitive effort when processing social media content with embedded online ads.

### **3. Effects of ad congruence on visual attention and ad recall**

#### *3.1. Congruence in advertising*

Congruence in advertising research is used to describe contextual advertising (Wojdyski & Bang, 2016). The concept relates to the surroundings of ads, mainly in terms of content (thematic congruence). This is important for advertisers as it is key for the decision on where to place ads. Moreover, strength of ad congruence varies based on the properties that match the ads to the context in which they are embedded (Dahlén, Rosengren, Törn, & Öhman, 2008); the goal of the advertiser is to increase attention paid to ads by making them more relevant to users (Wojdyski & Bang, 2016). In the present study we understand congruence to be based on a measure of the relationship between the webpage content and the ad embedded on the site. A congruent TripAdvisor condition means that, for example, on a pizza restaurant’s TripAdvisor website, embedded ads will promote the same type of food

(pizzas/pizza restaurants). An incongruent condition exists when the food/restaurant types do not coincide.

Previous research has suggested that the same ad can have different effects on the consumer's visual attention and memory depending upon the media context in which it appears. The literature on the impact of congruence on advertising effectiveness has provided contradictory results (Dahlen, et al., 2008; Craton, Lantos, and Leventhal, 2017; Belanche, et al., 2017). Some research has shown that the fit between advertising messages and executional cues facilitates information processing (MacInnis, & Park, 1991), while the existence of incongruent stimuli involve the viewer in greater information processing effort (Dahlen et al., 2008). Some related research has shown that thematic congruence between advertisements and magazines positively affects ad recall (Moorman, et al., 2002). De Pelsmacker, Geuens, and Anckaert (2002) examined congruence between media context and advertisements. Their study confirmed the influence of context/ad similarity on brand recall in a TV context, but not in print advertising. Social media can be considered close to print, where the online posts are the context. However, Dahlen et al. (2008) showed that advertisements for brands that do not match with the magazine (i.e. thematic congruence) need more processing. More recently, Rieger, Bartz, & Bente (2015) embedded congruent, partially-congruent and incongruent ads in news websites to investigate the effects of context congruence on both website and ad recall. These authors found that with unaided, as well as aided, recall measures, congruence led to higher recall ratings for both the website and the ad. In the context of YouTube skippable advertisements, Belanche, Flavian and Perez-Rueda (2017) showed that in incongruent conditions, highly arousing ads demand greater cognitive processing because of the associated greater distraction.

To complement the open discussion on the effects of congruence on ad recall, we pose the following RQ:

*RQ4: Does congruence between social media content and ads embedded in social media increase ad recall?*

Although behavioral data provides valid answers to many questions, it is not easy to measure accurately the reasons behind observed behaviors. Hence, in recent years, consumer research has incorporated unconscious aspects of consumer choice through the observation of brain mechanisms (Bagdziunaite, Nassri, Clement, & Ramsøy, 2014). Neural activity can be measured in relation to marketing-relevant behaviors, such as attention, memory, affect, and choice, which are crucial for a better understanding of consumer behavior (Plassmann, Venkatraman, Huettel, & Yoon, 2015). Despite the increasing recognition of the value of employing neuro-techniques in marketing research, the service field still lacks research applying neuro-tools and “the time is ripe for service researchers to adopt neuro-tools” (Verhulst, De Keyser, Gustafsson, Shams, & Van Vaerenbergh, 2019).

As described in study 1, eye-tracking has been extensively used to measure visual attention in advertising. This study uses eye-tracking to measure how the specific visual and textual features of positive- and negatively-valenced online reviews influence eye movement. Several eye-tracking measures are used in this study, such as time taken to first fixation, total duration of fixation, and number of revisits to certain areas of interest. These measures will contribute to explaining the effectiveness of congruent/incongruent online ads embedded in social media.

Previous literature has demonstrated that semantic incongruency creates novelty and directs attention (eye movements) toward semantically inconsistent objects (Heckler & Childers, 1992; Henderson et al., 1999; Underwood et al., 2007). Simola et al., (2013) suggested that incongruence increases the visual attention paid to ads, whereas congruence improves ad recall. Accordingly, we pose RQ5:

*RQ5: Does congruence between social media content and ads embedded in social media increase visual attention paid to the ad?*

### 3.2 Study 2

A within-subject design was used with TripAdvisor stimuli of four types of restaurants in Spain (pasta, pizza, paella, steak). We chose the restaurant types based on the number of restaurants on TripAdvisor Spain in each category, as a proxy of the overall preferences of Spanish people. Our webpages used the same upper part layout as TripAdvisor presents when displayed on a desktop. We decided not to include any comments on the basis that their subjective nature would be a source of confusion.

We conducted an online pre-test with 32 participants (mean age 27.7) to verify whether the ads chosen were perceived as congruent or incongruent. Participants rated pairs of images using a slider bar ranging from 0 to 100 (0 = not congruent at all, 50 = neutral, and 100 = very congruent). The image pairs were composed of a photograph of the advertised restaurant with either a congruent or an incongruent ad. Thus, each participant rated eight pairs in total (4 restaurants x 2 types of ad). The order of presentation was randomized across participants. A within-subjects ANOVA showed that the ad congruence manipulation was valid ( $F(1, 31) = 297.726, p = .000$ ). The four ads chosen as congruent had a mean congruence of  $M = 79.164$  ( $SD = 17.046$ ), and the four ads chosen as incongruent had a mean congruence of  $M = 18.047$  ( $SD = 16.009$ ). We also looked at the congruence level means for each stimulus. The four congruent stimuli all had means above .50 (using a 95% C.I.), and the four incongruent stimuli all had means below .50 (95% C.I.).

We measured ad recall by comparing the percentage of correctly identified ads for each one of the four conditions. As a complementary analysis, we also examined the number of false recognitions, that is, ads that were not shown to participants, but were recalled.

#### 3.2.1 Study 2a - Online study

In study 2a we assessed the main effects of ad congruence and valence, and their possible interaction, on ad recall. We carried out a within-subjects (WS) 2 x 2 design with ad congruence (congruent x incongruent) and rating valence (positive: 4.5 stars x negative: 1.5 stars) as the independent variable (IV), type of restaurant as a covariate, and ad recall as the dependent variable (DV). Ad recall was measured through recall of the visual ads, following Moorman et al. (2002).

We used four different types of restaurant (pasta, pizza, paella, steak) and four stimuli: (1) positive valence and ad congruence (PVAC); (2) negative valence and ad congruence (NVAC); (3) positive valence and ad incongruence (PVAI); and (4) negative valence and ad incongruence (NVAI). Each participant viewed four stimuli (one for each condition, linked to one different restaurant per condition). Four groups of participants were used in order to cover all 16 stimuli (four types of restaurant x four conditions) (Table 1). The presentation order was randomized across participants.

#### TAKE IN TABLE 1

##### *a) Data collection, sample and procedure*

The data were collected in January 2020. The 295 participants, who all live in Spain (57% female; age range: 18-67, mean age: 33.3; 62% workers, 27% students, and 11% unemployed; 93% use TripAdvisor to search for restaurants) answered a survey on the online platform ClickWorker. The participants were paid a small amount of money for undertaking the experiment.

The participants received an email from the online survey platform inviting them to complete the survey, which was designed using the SurveyMonkey platform (SurveyMonkey Inc., San Mateo, California, USA). Participants viewed a screen displaying the first TripAdvisor stimulus (Figure 3). The second TripAdvisor stimulus was then presented. The order of presentation of the four stimuli was randomized across the participants. Then three

questions were fill-in (liking for the presented foods, frequency of eating in restaurants, frequency of using TripAdvisor to search for restaurants). Thereafter, a screen with pictures of the eight ads was displayed (however, the participants each saw only four of them; their display positions were randomized across the participants.), and the participant had to identify the ads (s)he had viewed during the experiment. Finally, they answered some demographic questions (e.g. gender, age) and a manipulation check question (i.e. a question asking about the purpose of the experiment).

### TAKE IN FIGURE 3

#### *b) Results*

The participants viewed four TripAdvisor stimuli, each linked to one of four conditions (PVAC, NVAC, PVAI, NVAI). A within-subject binary logistic regression (generalized linear mixed model), was carried out, using ad recall as the dependent variable (binary variable, 1: participant recalled the ad; 0: participant did not recall the ad) and controlled for restaurant type. This analysis showed a main significant effect of congruence, congruent ads being recalled more than incongruent ( $F(1, 1174) = 37.234, p = .000$ ). There was neither an interaction effect of valence and congruence, nor a main effect of valence. Figure 4 shows the percentages of ads correctly recalled per condition. A separate analysis of each restaurant type revealed that the congruence effect was not found in restaurant 3 (Figure 5).

The visual inspection of the number of false recognitions showed that congruence (but not valence) also played a role in the number of mistakes made. However, this time the effect was opposite to that found with ad recall. Here a congruent condition led to less false recognitions than an incongruent condition; the results were consistent across all restaurant types (Figure 6).

### TAKE IN FIGURE 4



TAKE IN FIGURE 5

TAKE IN FIGURE 6

RQ4 investigates if congruence between social media content and embedded ads increases ad recall. The findings showed that congruence affects ad recall. We showed that congruence increases percentage of ad recall, and also on the number of false recognitions, compared to the incongruent condition. However, one caveat important to mention is that congruence did not affect ad recall for restaurant 3, but it did affect the number of false recognitions. We also found that valence was not statistically significant for increasing ad recall. Our findings support previous studies on the effects of congruence (Simola et al., 2013).

### *3.2.2 Study 2b - Laboratory study<sup>1</sup>*

The laboratory study is designed to obtain unbiased insights on the effects of ad congruence on visual attention (RQ5). To this end, we are currently collecting neurophysiological data, through eye-tracking.

#### *a) Data collection, sample and procedure*

100 participants living in Spain (50% female; age range: 18-50) were recruited via an external agency. We used the same design as for Study 2a. We measured neurophysiological responses, as follows: time spent in fixations (ms), number of fixations for each AOI, and number of revisits to specific AOIs. The procedure was as follows. The participants arrived in the laboratory and signed the informed consent form. They viewed the instructions for the experiment on the computer screen. Calibration of the eye-tracking operation was performed before the experiment. The experiment used iMotions software (iMotions 8.1, København V, Denmark). Participants viewed the stimuli through a 23-inch 1920 x 1080-pixel monitor. The

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<sup>1</sup> Data collection of the laboratory study is in progress. Results for this part of the study will be presented at the conference.

Tobii Pro TX300 device was used to monitor eye movements (eye-tracking) and ET metrics were recorded using iMotions software. We used the same task as Study 2a. However, to obtain good quality ET data, instead of a self-paced visualization of the TripAdvisor stimuli, in Study 2b participants viewed each TripAdvisor stimulus for 30 seconds.

#### *b) Data checking*

We checked the data recording quality for one participant (Figure 7) to ensure the equipment and software were working correctly.

TAKE IN FIGURE 7

## **5. Conclusions**

### *5.1 Theoretical contributions*

In this study we analyzed the influence of: (i) heuristic information UGC cues on TripAdvisor by disaggregating the main informative content of their AOIs and (ii) an online advertisement embedded in a TripAdvisor page. Using eye-tracking we examined how consumers allocate visual attention in social media. The EEG metrics showed that the cognitive load of consumers viewing UGC about a restaurant in TripAdvisor does not increase when an online ad is embedded in the page. Our findings provide new insights into consumers' visual processing behaviors. First, users follow visual patterns when looking at tourism services' content. Not surprisingly, the size of the AOI affects visual attention. However, attention is not totally driven by size; rather, particular heuristics attract the user's attention. Specifically, the area of the TripAdvisor page which attracts the most visual attention is the top central part. Second, this study extends knowledge of the operationalization of HSM and significantly contributes to the identification of the role of heuristic cues in consumers' visual attention in social media. The heuristic cues that attract higher visual attention are the scores of the specific restaurant attributes (atmosphere, service,

value for money and food), followed by the general breakdown of the comments in low consensus situations, and star ratings and headings of individual reviews about specific restaurant attributes. The star ratings of online reviews are heuristic informational cues that facilitate the customer's evaluation of specific attributes of products and services. The results about the impact of specific scores of online reviews on visual attention complements previous research that showed that the level of detail in a message plays a powerful role in the persuasion process (Bigne et al., 2019). The breakdown of the overall comments in low consensus scenarios also attracted visual attention. This supports previous research (Kim & Lee, 2015) that showed that evidencing consensus in online communications plays a pivotal role in influencing how potential consumers incorporate UGC into their evaluations about companies. Where others do not provide social support for an opinion, this can induce uncertainty in consumers, and result in them rejecting the opinion. Consequently, the visual attention paid to the presence/absence of consensus in overall star ratings is high, as consensus is a strong communication cue of persuasiveness and trustworthiness (Kim & Lee, 2015). However, the volume of comments had a low impact on visual attention. A further contribution of the study is that it highlights the effectiveness of the advertising content embedded in TripAdvisor pages, as the attention paid to ads is not at the expense of the attention paid to other content. Indeed, the gain in terms of percentage of attention paid to the ad was around 6%. A methodological contribution of this study is the design, with its application of neuroscientific metrics. This study complements previous research that contrasted individuals' self-reports with unconscious measures of visual attention and engagement. The congruent condition improved ad recall and led to less false ad recall than the incongruent condition, supporting the results of some previous ad congruence studies (Moorman et al., 2002; Rieger et al., 2015). Therefore, this paper adds to earlier research into the effects of congruence by showing that it impacts on memory, both in recalling ads that

have been viewed and in false recognition of ads that have not been viewed. Furthermore, rating valence has no main effect, nor an interaction effect with congruence on ad recall.

## *5.2 Managerial implications*

This study provides insights into which online advertising content (incongruent/congruent) to use, and where to place it, in social media, such as TripAdvisor. These insights will help practitioners capture consumers' visual attention, which should be a primary objective in marketing communications, given the information overload faced by consumers. Our findings have implications for different professional groups involved in online advertising through social media, as we propose ideas for more effective distribution of items in the TripAdvisor interface.

In response to our first goal (i.e. to identify which heuristic UGC information cues most attract viewer attention), including ads close to the central part of website content should be considered. The information included in this part attracts the greatest attention; in TripAdvisor, the central part of pages contain the overall ratings, and specific ratings for the different attributes, of the evaluated locations (Study 1 used the 2018 TripAdvisor layout). Since users spend more time on these specific AOIs, it seems to make sense, to maximize ad effectiveness, to present the advertising: (1) with a medium-to-large size, and (2) as close as possible to the areas that attract most attention.

It is also interesting to highlight the conclusions regarding our second goal (i.e. to analyze how online advertising competes with heuristic UGC cues to influence consumer visual attention and engagement). The presence of ads does not reduce the attention paid to the other AOIs. In other words, the presence of advertisements can be welcomed by restaurant review sites, as they do not detract from the attention paid to the UGC posted close by. This result is in line with previous studies (e.g. Guitart et al., 2019) that supported the effectiveness of banner advertising, even when users do not look directly at the ads (due to multitasking),

since they still perceive the information through their peripheral vision. This, in turns, might positively affect brand recognition.

Regarding our third goal (i.e. to analyze the effect of online advertising of congruent/incongruent products on visual attention and ad recall), ad congruence and editorial content should be taken into consideration. Subtle types of congruence can make a difference to ad recall. In order to increase ad recall and, thus, to enhance ad effectiveness, congruence should be high. This finding shows that ads should match their surrounding online content.

### *5.3 Limitations and future research lines*

This study has some limitations that open new lines of research. Since the stimuli were shown statically, a new analysis including dynamic ads (animated GIFs or videos) should provide more realistic insights. The engagement with the TripAdvisor page is not statistically different when an ad is embedded. Therefore, we propose to run an experiment to check the impact of ad congruence embedded on social media on consumer engagement. Although the location of the ad in the interface followed the original TripAdvisor format, it would be interesting to change its size. The layout of the stimuli reflected only the desktop version of TripAdvisor advertisements, and only one form of incongruence was tested. Future research should test other forms of incongruence and use mobile stimuli. In addition, different segments and platforms can be used (e.g. hotels), to see if the findings can be generalized.

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# FIGURES

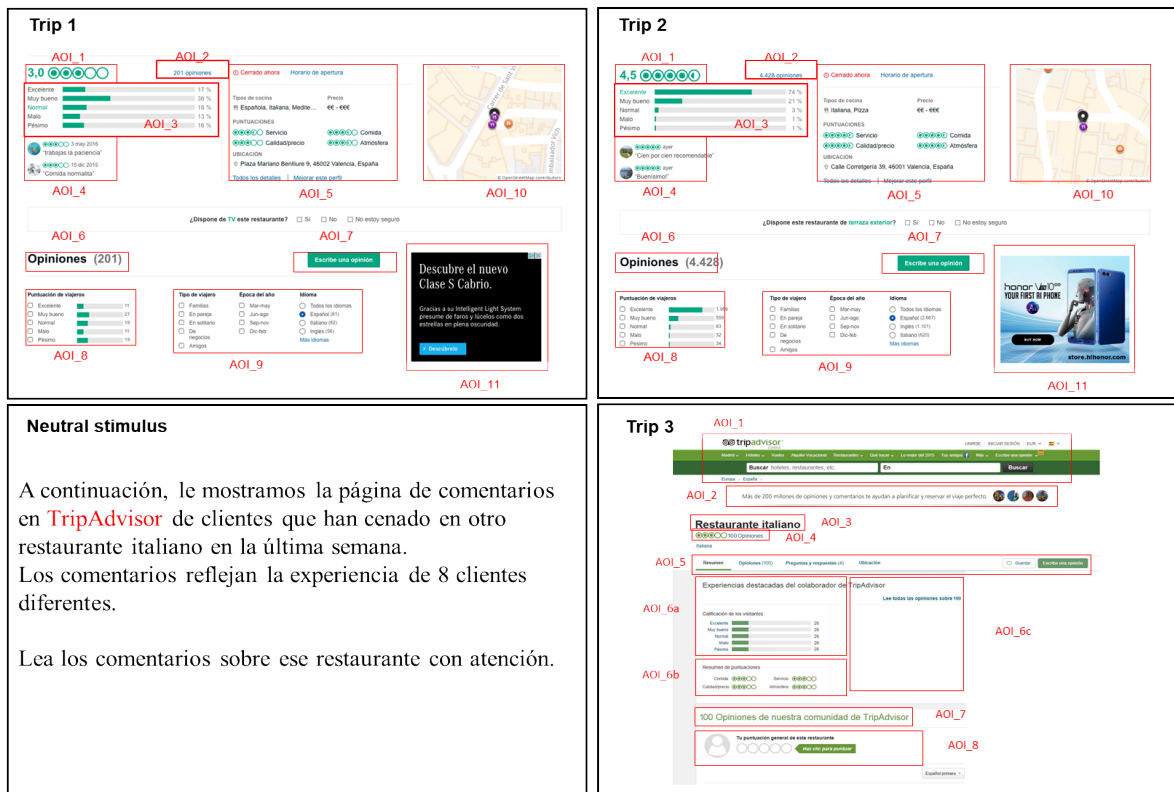


Figure 1. Stimuli on a TripAdvisor page.



Figure 2. Heatmap of Trip 1 and Trip 2.

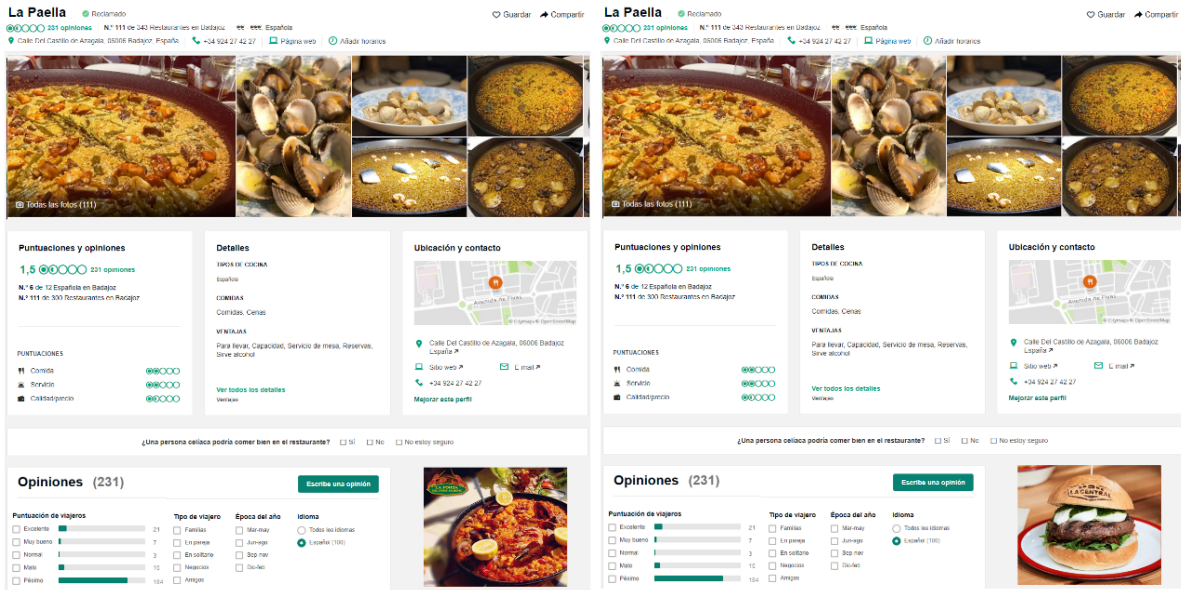


Figure 3. Example of one of the four stimuli. Left picture: stimulus with a congruent ad. Right picture: stimulus with an incongruent ad.

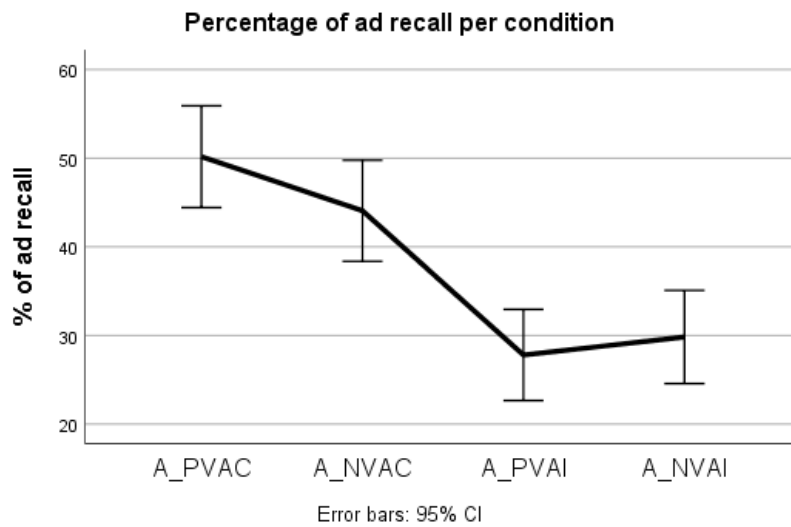


Figure 4: Percentage of ads correctly recalled per condition. Error bars represent 95% confidence interval.

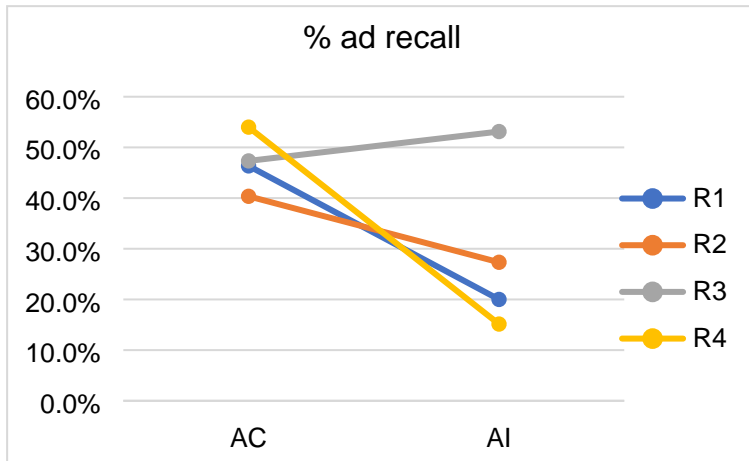


Figure 5: Percentage of ads correctly recalled per restaurant type. Data were combined based on valence (AC = PVAC + NVAC, AI = PVAI + NVI). The error bars are omitted to facilitate interpretation.

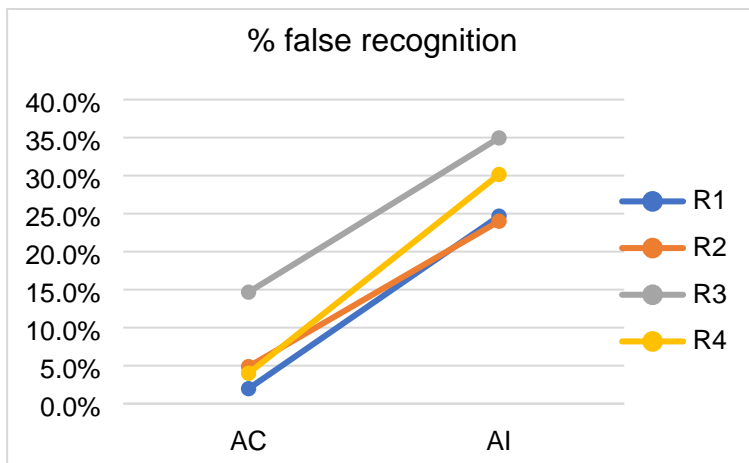


Figure 6: Percentage of ads falsely recognized per restaurant type. Data was combined based on valence (AC = PVAC + NVAC, AI = PVAI + NVI). Error bars are omitted to facilitate interpretation.

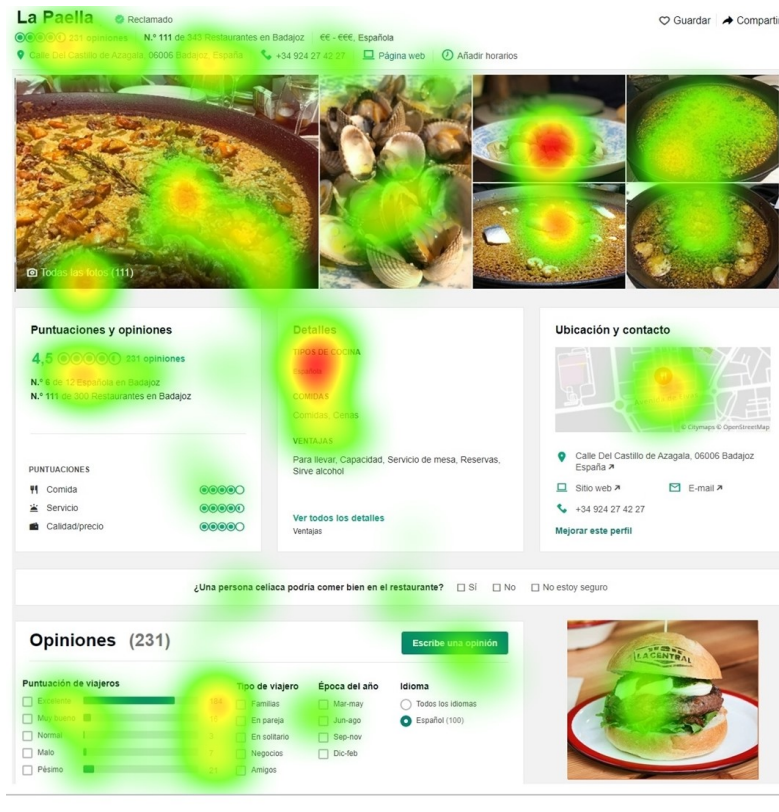


Figure 7: Heatmap of the eye-tracking results of one of the participants. The map was generated to check data recording quality.

**TABLES**

	Restaurant 1	Restaurant 2	Restaurant 3	Restaurant 4
Group 1	PVAC	NVAC	PVAI	NVAI
Group 2	NVAC	PVAC	NVAI	PVAI
Group 3	PVAI	NVAI	PVAC	NVAC
Group 4	NVAI	PVAI	NVAC	PVAC

Table 1. List of the four groups and conditions.