

# THE EFFECT OF HONEY-SPOTS ON THE CONSUMERS' RESPONSIVENESS TOWARDS MOBILE ADVERTISEMENT

*Research paper*

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## Abstract

*This paper aims to investigate the impact of context on the consumers' responsiveness towards Location-Based Advertisement (LBA) on mobile devices. Based on existing theories and models, we show in a real-life scenario that the receiving context is crucial for the effectiveness of LBA. Our scenario promotes the idea of choosing a more distant location with a more suitable receiving context to increase positive factors (e.g. perceived relevance) while simultaneously reducing negative factors (e.g. perceived intrusiveness) which both ultimately affect the consumers' ad responsiveness. We conclude that an ideal location (or receiving context) to trigger mobile ads does not necessarily need to be in the immediate proximity to the offer. We call these locations with a particularly high level of ad responsiveness "honey-spot". To provide empirical evidence for the importance of the receiving context, we conducted a field experiment among 110 students for five weeks. Our results support the idea of honey-spots and show a significant impact on the perception of ads. Further, by increasing the spatial distance, we can keep positive factors intact and simultaneously reduce disturbing factors. Our findings contradict the predominant view in previous research that distance is the most important factor for the effectiveness of LBA.*

*Keywords: Location-based Advertisement, Ad Responsiveness, Receiving Context, Intrusiveness.*

## 1 Introduction

Today, the mobile advertising market is booming. Recent estimates show that more than \$ 228 billion will be spent on ads displayed on mobile phones and tablets worldwide in 2017; a 19.1 % increase compared to the mobile advertising spending in 2016. Mainly due to the ubiquity of mobile devices such as smartphones or tablets, the amount spent on mobile advertising makes up 62.5 % of the worldwide digital advertising spending (eMarketer, 2017).

Nowadays, there are more than 2.4 billion smartphones in use worldwide (eMarketer, 2016). Equipped with GPS and other sensors these devices are context sensitive and able to determine and collect the precise location of their user at any point in time. Due to these sensors, companies enjoy a wide range of possibilities to tailor their advertisement campaigns in accordance with the current location of the consumer, and target them when the effect of their ads are supposed to be particularly high and positive (e.g., companies can send targeted advertisement for a product sold in a nearby local shop) (Bruner and Kumar, 2007). 'Location-based advertisement' (LBA) is not new. Already decades ago roadside billboards displayed content related to their current location (e.g., turn right for McDonald's). Yet, LBA on mobile devices is special, as it can dynamically adapt their displaying behaviour to its current location. Further, context-aware LBA on mobile devices enables tailoring of the advertisement based on context parameters such as time, weather, interests, preferences, or situation (e.g. advertising for an open-air bar in the proximity to a consumer on a sunny day).

Indeed, previous research analysed LBA on mobile devices in various academic disciplines. As Bauer and Strauss (2016) note, the majority of studies that examine LBA, typically focus on technology and on questions how to technically implement LBA on mobile devices optimally. The majority of studies that examine user behaviour make use of verbal scenarios and surveys to examine different aspects of LBA such as gender (Banerjee and Roy Dholakia, 2012), push and pull (Unni and Harmon, 2007), media richness (Xu et al., 2009), situation (Banerjee and Dholakia, 2008), preferences (de Sa et al., 2013), or relevance to consumers' goals (van't Riet et al., 2016).

Only a few recent studies consider the consumers' perception of LBA in relation to location-congruency using a lab experiment (Hühn et al., 2012, Lee et al., 2015, van 't Riet et al., 2016). Location-congruency is defined as the extent to which messages like ads are tailored to the current location and is mainly operationalized by the spatial distance between the receiver and the location of the offering retailer. These lab experiments mostly use virtual environments to recreate scenarios. A rather small number of studies also examine the effectiveness of LBA on mobile devices in the field (Fang et al., 2015, Luo et al., 2013, Molitor et al., 2016). These studies essentially consider distance as an essential context factor of the consumer.

Only Hühn et al. (2017) investigate the consumers' perception of LBA in the real world. However, by comparing the result of Hühn et al. (2017) with recent lab experiments and field studies, a rather ambiguous picture of the location-congruency on the perception of LBA emerges (Hühn et al., 2012, Lee et al., 2015, Hühn et al., 2017). This raises the question whether and to what extent findings from recreated scenarios in the lab (Hühn et al., 2012, Lee et al., 2015, van 't Riet et al., 2016) are also valid in real-life settings.

Rau et al. (2013) tries to dissolve this ambiguity and investigates the factors that influence the avoidance of advertising on mobile devices. The results of their study show that the context of receiving (e.g. intrusiveness, cognitive workload) plays a crucial role in consumers' attitude towards mobile ads. Similarly, Heinonen and Strandvik (2003) describe the consumers' responsiveness towards mobile ads as function of relevance and disturbance in the receiving context (e.g. how, when, and where the consumer receives the ad). Accordingly, we postulate that in real-life settings, a variety of unknown and sometimes uncontrollable factors can affect the effectiveness of LBA. This leads to the problem that participants in recreated scenarios evaluate situations differently than they actually would in a real-life situation (Wehmeyer, 2007). Stress and cognitive workload, for example, are two such factors that are non-existent in laboratory experiments with stable environmental conditions but are likely to play a crucial role in real-life settings.

If the consumers' responsiveness and avoidance towards mobile ads depend on the receiving context, then it seems obvious that triggering advertisement in direct proximity to the product is not always the best solution. Hence, even if the product advertised could be acquired in immediate proximity, consumers can perceive advertising as disturbing and intrusive if the situation they received the ad (i.e. the receiving context) is inappropriate. This raises the question: what is a promising receiving context and how is it related to location? If it is possible to gauge the receiving context at certain locations, advertisers would be able to improve their mobile ad campaigns to maximise the consumers' responsiveness by selecting to send ads within the most suitable receiving context.

Therefore, this study investigates receiving context factors in specific types of locations that potentially have an impact on the consumers' responsiveness towards mobile ads. We introduce the term "honey-spot" to describe locations where consumers are in a receiving context with a particularly high responsiveness towards advertisement. We derive from previous literature potentially interesting locations that might work as honey-spots, implement a LBA campaign and test the effectiveness of honey-spots empirically in a field experiment among students in a medium-sized city in Western Europe.

Our results show that such honey-spots, i.e. locations where the consumer is more open to receive ad-like information can be helpful to increase the consumers' ad responsiveness significantly even if these locations are not in immediate proximity of the advertiser. Despite the higher distance, we can reduce

negative factors like the perceived intrusiveness by simultaneously keeping positive factors such as perceived relevance or value of ads intact. Our findings support the idea of honey-spots and highlight the important role of the receiving context in real-life situations.

The remainder of the paper is structured as follows. The next section provides a detailed overview of prior work in the field of LBA. Then, we provide the theoretical basis and settings. The development of our research hypotheses is relying on findings from previous research on LBA as well as behavioural science. Afterwards, we present our field study in order to test our hypotheses. Finally, we discuss our findings, derive practical implications, and present the theoretical contributions of this paper. The study concludes with a discussion of limitations and avenues for further research.

## **2 Related Work**

### **2.1 Location-based advertising on mobile devices**

Compared to traditional advertisement on mobile devices, such as SMS, MMS, or banners, LBA on mobile devices can dynamically adapt its displaying behaviour and advertisement content by exploiting the current location of the consumer. It is noteworthy that only tailoring the advertisement content to the location of the consumer makes advertisement truly location-based and thus not all mobile ads can be classified as LBA.

There are two different approaches to deliver LBA to mobile devices: the pull and the push approach. The push approach refers to the process where advertisers use carriers and other delivery networks to send (push) ads to the consumer, whereas the pull approach refers to a situation where the consumer requests ad-like information (Bruner and Kumar 2007).

As already mentioned, various academic disciplines analysed LBA on mobile devices. However, the majority of these studies are technology-oriented and focus on the technical aspects of LBA (Bauer and Strauss, 2016). Another important stream of research uses verbal scenarios and surveys to examine aspects of LBA. Nevertheless, when it comes to effectiveness and perception of LBA only a few recent studies assess LBA in a lab experiment (Lee et al., 2015, Hühn et al., 2012, van 't Riet et al., 2016) or analyze transactional data from the field (Molitor et al., 2016, Fang et al., 2015, Luo et al., 2013).

Recent lab experiments use virtual environments (VE) to examine the consumers' perception towards mobile ads in relation to locational congruity. Lee et al. (2015) investigate the psychological effects of locational congruity, information tailoring, and product involvement on consumers' attitudes toward LBA. The results of the lab experiment reveal that locational congruence positively affects the intention to use the advertised product and relevant LBA have positive effects because they are seen as less intrusive. Likewise, Hühn et al. (2012) show that location congruent LBA is perceived as less intrusive. Overall, both studies find a positive impact of location congruency, which seems to suggest that LBA is particularly effective because it can exploit information on the consumers' location. Another study by van 't Riet et al. (2016) investigates the perceived relevance in relation to location-congruency. Here, the authors are not able to find any correlation between relevance and distance.

When it comes to the real world the vast majority of studies examining LBAs are essentially looking at distance, as the only decisive contextual factor for the effectiveness of LBA: Fang et al. (2015) investigate the impact of location-based mobile promotions on contemporaneous and delayed sales, while Luo et al. (2013) analyze the impact of temporal and geographical targeting in a field experiment. Here, both studies use geofences to send ads tailored to the current location. Similarly, the study by Molitor et al. (2016) considers the effectiveness of mobile ads related to the provision of distance information and the presence of distance-based ranking of mobile ads. The unique field experiment conducted by Molitor et al. (2016) reveals a negative correlation between spatial distance and ad response rate measured by the click-through rate.

However, a recent study by Hühn et al. (2017) tries to transfer the results from previous lab experiments into the field. The authors investigate the effect of location congruency on perceived ad intrusiveness, value, and relevance of ads. The results indicate no effect of location congruency on perceived intrusiveness which seems to be in conflict with earlier findings from (Hühn et al., 2012, Lee et al., 2015).

Further, the results show a positive influence of location congruency on perceived relevance, which also seems to conflict with the findings from van 't Riet et al. (2016).

The following table provides a comparison of recent LBA studies in relation to the consumer factors.

Study	Field Exp.	Lab Exp.	Consumer Factors
Luo et al. (2013)	X		Location
Fang et al. (2015)	X		Location
Molitor et al. (2016)	X		Location
Hühn et al. (2012)		X (VE)	Location, intrusiveness
Lee et al. (2015)		X (VE)	Location, relevance, product involvement, and ad attitude
van 't Riet et al. (2016)		X (VE)	Location, relevance
Hühn et al. (2017)	X		Location, relevance, intrusiveness, and value

*Table 1 Comparison of previous LBA studies*

Thus, it remains unclear how location congruency influences the perception of mobile advertisement in a real-life situation. Further, when comparing the results of recent studies, the question arises whether and to what extent findings from recent lab experiments are also valid in real-life settings. In real-life settings, a variety of other factors — which are difficult or even impossible to control or to generate in laboratory experiments — could potentially affect the outcomes. Compared to laboratory experiments with stable environmental conditions, factors like stress and cognitive workload could potentially play an important role with respect to the perception of LBA in real-life settings. Consumers in real-life settings are likely to take other contextual factors into account which is unlikely under laboratory (Wehmeyer, 2007) or at least previous work have not tried to incorporate these factors up to date.

Therefore, the receiving context might influence the perception and thus the effectiveness of mobile ads and could be thus one possible explanation for the divergent results in previous research. Rau et al. (2013) investigate the factors that influence the avoidance of advertising on mobile devices. According to his results, the receiving context of mobile ads plays a crucial role in their acceptance. Consumers in a receiving context with high cognitive workload spend less time reading the advertisement, and the recall was lower in comparison to a receiving context with a lower cognitive workload. Further, this study reveals that the perceived intrusiveness, behaviour avoidance, and reactance are higher in receiving context featuring high cognitive workload. However, the study uses a laboratory experiment with a relatively small number of participants and generates the cognitive workload artificially, in a real-life situation, the receiving context can be far more complex and influence ad avoidance further. Another study by Lee et al. (2015) reveals that perceived intrusiveness mediates the effects of product involvement on the consumers' attitude toward LBA. This might explain the difference in Molitor et al. and Hühn et al.'s results. As Molitor et al. (2016) examine the pull approach to deliver the advertisement, factors such as intrusiveness may play a minor role in this scenario. In contrast to this, Hühn et al. (2017) examines a push approach and does not control for the receiving context in any way.

A thorough review of existent literature reveals that previous studies consider most factors isolated and do not pay enough attention to the particular receiving context. If the receiving context influences the perceived intrusiveness, attitude towards the advertisement, or the relevance of ads, then it is likely that it also affects the consumers' response to ads. This might explain the divergent results in previous studies and constitutes an important direction for research in the area of context-aware advertising.

Tailoring mobile advertisement to the consumers' current location makes LBA to some extent context-aware but using additional factors of the receiving context like cognitive workload or current activity could drastically improve the effectiveness of ads on mobile devices. If the receiving context has an impact on the perceived intrusiveness, relevance, and attitude towards the advertisement, the question arises: how can we make use of this insight and how can we consider the receiving context in order to optimize LBA? Influencing the receiving context is probably difficult or even impossible, but it might

be possible to choose an appropriate receiving context for LBA to improve its effectiveness. That leads to the question: Is the nearest location really always the best location to trigger advertisement using a push-approach? Or is it better to deliver ads at a more distant location because the receiving context — which consists of more factors than only distance — might be more appropriate?

To answer this question, this study focuses on the effect of the receiving context of LBA on the perception of advertisement on mobile devices. More specifically, it investigates the characteristics of the receiving context at different locations and examines its impact on the consumers' responsiveness towards mobile ads.

### **3 Theory and Settings**

Most field studies consider distance as the decisive context factor. The results suggest that: the lower the spatial distance, the higher the effectiveness of LBA. Therefore, a nearby location might be most promising because of the so-called location congruency. However, results from recent experiments contest this relatively clear picture of the effect of distance on the perception of LBA real-world settings. As already mentioned, we consider the receiving context to be the essential difference between both streams of studies.

However, to integrate the receiving context into the search for an ideal location for LBA, we make use of the relevance/disturbance framework by Heinonen and Strandvik (2003). The authors suppose a framework to measure the effectiveness of mobile marketing communication and describe the consumer responsiveness towards mobile ads as a “function of personally perceived relevance as well as on the disturbance/acceptance of the context of receiving”. Heinonen and Strandvik (2003) see the value and content of advertisement as the main driver of relevance. Regarding disturbance, the authors use the concept of intrusiveness by Li et al. (2002) as a factor that influences the consumers' perception towards marketing communication. Further, Heinonen and Strandvik (2003) describe a dependency between the receiving context and the factors of ad responsiveness function.

This dependency suggests that a location in proximity is not necessarily the most effective; rather, it appears to depend on the respective receiving context. Therefore, an ideal location maximises the individual factors of the ad responsiveness functions contextually.

Past studies have already examined individual factors of the ad responsiveness function with respect to factors of the receiving context. Starting with relevance, as one factor of the ad responsiveness function, Hühn et al. (2017) consider the perceived relevance in relation to location-congruency. Here, the authors find a negative relation between relevance and spatial distance: the smaller the spatial distance to the offer, the higher the perceived relevance. Continuing with disturbance, as the second factor of ad responsiveness function, this factor is operationalized through the theory of perceived ad intrusiveness. Li et al. (2002) define intrusiveness as a perception or psychological consequence that occurs when ongoing cognitive processes are interrupted. Consumers perceive ads as more intrusive when they already have to deal with high cognitive workload activities (Rau et al., 2013).

The finding by Rau et al. (2013) suggests locations where consumers are typically not engaged in a high cognitive workload activity, while the findings by Hühn et al. (2017) points to a location near to the offer. However, an ideal location increases positive factors like relevance while simultaneously reduces negative factors (like intrusiveness caused by cognitive workload). This location must be close to the offer to increase the relevance, but consumers should not engage in a high cognitive workload activity. Therefore, if consumers are occupied with ongoing cognitive processes at the location of the offer, then a remote location might increase the consumers' ad responsiveness.

Finally, we have to transfer these conceptual considerations to a real-life scenario. We start with the most typical scenario and assume that a company wants to promote a product that is on sale in a shopping mall. As theoretically outlined, the perceived relevance should be highest in the shopping mall due to the low spatial distance to the offer. However, because people at a shopping mall are potentially overwhelmed with perceptions, sensations, and cognitive processes (e.g., searching for a product,

making a purchase decision, evaluating an offer), they might perceive additional advertising on a mobile device as intrusive, and thus will not positively react to advertising.

People at locations featuring less cognitive workload might perceive advertising as less intrusive, potentially even helpful, and will be hence less inclined to avoid such ads. At an ideal location, consumers should not engage in a high cognitive workload activity. Summarizing these conceptual considerations, a promising type of locations are, for example, railway stations near the advertised product or shopping mall. Here, we expect people to be in a different receiving context and perceive advertising differently. In detail, because of the lower cognitive load, people perceive ads as less intrusive, while the short distance simultaneously increases the relevance of the ads. Therefore, we expect a higher ad responsiveness which in turn should positively impact the ads' effectiveness.

For the given scenario it would be thus promising to target consumers who are still in transit (especially when they are using public transport) and who are moving towards the mall. In this case, we could expect that this receiving context would lead to a more positive perception of the ad. Therefore, we expect a higher responsiveness which in turn has an impact on advertising success.

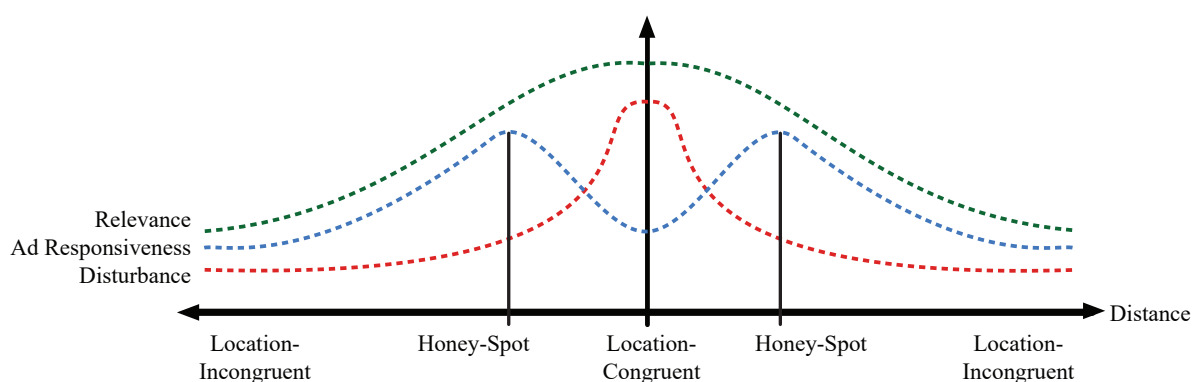


Figure 1 Ad responsiveness

Figure 1 illustrates the resulting ad responsiveness function (blue) and respective factors for the scenario. Relevance (green) is negatively related to spatial distance and therefore we expect a steady increase of perceived relevance with decreasing distance. If we consider disturbance through advertisement (red), we expect a strong increase in intrusiveness as soon as a consumer is in the shopping mall. Therefore, the disturbance is rather punctual and is highest when the consumer is in the shopping mall; respectively the spatial distance is the lowest. By looking at ad responsiveness, this line visualises the additive course of relevance and disturbance, with disturbance as a negative factor. The maxima of the function show a possible location where relevance is relatively high, but the disturbance relatively low. In the following, we will call locations with a high relevance and low level of disturbance “honey-spots”.

## 4 Hypotheses Development

Our hypotheses development uses the relevance/disturbance framework proposed by Heinonen and Strandvik (2003) and is inspired by Hühn et al. (2017). The hypotheses development follows a structured two-step approach: (1) describe the factors of the framework in relation to the receiving context, and (2) develop hypotheses about how those factors affect the consumers' perception. Afterwards, we summarise all the factors of the individual hypotheses and describe their influence on the consumers' ad responsiveness.

### 4.1 Relevance

Heinonen and Strandvik (2003) see the value and content of advertising as the main driver of relevance. The Construal Level Theory (CLT) provides the base how distance affects the perceived relevance. This theory describes the relationship between psychological distance and mental abstraction (Trope and Liberman, 2010). A high psychological distance accompanies a high degree of mental abstraction and

vice versa. Psychological distance is the distance of an object on a temporal, spatial, social or hypothetical dimension (Bar-Anan et al., 2006). The hypothetical distance denotes whether something is improbable and unrealistic (psychological distance) or probable and realistic (psychologically close). However, regarding spatial distance, previous studies show that news are more persuasive when they are related to nearby objects (Kim et al., 2008, Fujita et al., 2008). Luo et al. (2013) also find a negative relation between psychological distance and ad involvement. The authors suspect that lower construal level tends to generate more involvement which in turn leads to more relevance when something close.

A recent study supports this argument and reveals that participants perceive location-congruent ads as more relevant, compared to location-incongruent ads (Hühn et al., 2017). Based on the previous findings and in line with the CLT, we conclude that the perceived relevance at honey-spots (described in the previous section) is very similar, compared to a congruent location. Honey-spots are located within a short distance to the advertised product. Further, they are conveniently located, and the likelihood of visiting the location in the near future is also high. This in turn results in a low hypothetical distance. The lower hypothetical distance should generate a higher ad involvement, which in turn leads to a higher relevance. In line with the arguments and previous findings, we formulate following hypothesis:

**H1a:** *LBA at honey-spots and congruent locations is perceived as more relevant than incongruent locations.*

**H1b:** *LBA at honey-spots is perceived as relevant as in congruent locations.*

Heinonen and Strandvik (2003) relate relevance to the content of the communication and what kind of value the consumer receives. Therefore, we expect that the perceived value of advertisement will behave similarly to relevance.

**H1c:** *LBA at honey-spots and congruent locations is perceived as more valuable than in incongruent locations.*

**H1d:** *LBA at honey-spots is perceived as valuable as in congruent locations.*

## 4.2 Disturbance and Acceptance

Heinonen and Strandvik (2003) use the concept of intrusiveness by Li et al. (2002) to operationalise disturbance that influences the consumers' perception towards marketing communication which influenced by the context of receiving. Due to the digital and interactive nature of LBA on mobile devices using a push approach, consumers can receive advertising in any receiving context. Li et al. (2002) describe intrusiveness as a perception or psychological consequence that occurs when an audience's cognitive processes are interrupted. These interruptions can be extremely intrusive in an unexpected situation.

One aspect of the receiving context is the cognitive workload that might affect the perceived intrusiveness (Rau et al., 2013). Further, consumers perceive mobile ads as more intrusive when they already have to deal with high cognitive workload activities (Rau et al., 2013). The perceived intrusiveness is also associated with ad avoidance in online advertisements like a pop-up or a banner advertisement (Edwards et al., 2002, Cho and Cheon, 2004).

Previous research provides mixed results regarding the impact of location-congruency and intrusiveness. Research by Lee et al. (2015) and Hühn et al. (2012) find a negative effect of location-congruency on the perception of ad intrusiveness. Both studies use virtual environments with a high degree of exogenous control. In contrast, the study by Hühn et al. (2017) does not confirm the result in a real-world setting. The authors explain their insights by the lack of control of the receiving context and a high cognitive utilisation.

In our scenario, we expect a lower level of cognitive-workload at honey-spots compared to the (in-)congruent-locations. Based on the previously presented theories and studies, we expect that a low cognitive workload decreases the perceived intrusiveness. Therefore, we also expect a lower level of perceived intrusiveness at honey-spots. Due to the low level of intrusiveness, consumers perceive ads as less disturbing in this receiving context and perceive ads as more pleasant compared to others locations.

**H2a:** Cognitive workload at honey-spots is lower than in congruent and incongruent locations.

**H2b:** Intrusiveness at honey-spots is lower than in congruent and incongruent locations.

**H2c:** LBA at honey-spots is perceived as more pleasant compared to LBA in congruent and incongruent locations.

### 4.3 Consumer Responsiveness

As already mentioned, Heinonen and Strandvik (2003) describe the consumer responsiveness towards ads as a function of perceived relevance and disturbance/acceptance of the receiving context. If our previous hypotheses are correct, then the lower level of intrusiveness and high level of relevance at honey-spots should affect the consumers' ad responsiveness positively. In other words, we try to maximise the consumer responsiveness by reinforcing positive factors (H1a-d) and reducing the negative ones (H2a-b). As a result, consumers perceive this receiving context as more pleasant (H2c).

The following table summarises the expected results of each factor from the previous hypotheses regarding the consumers' ad responsiveness.

			Location		
			Incongruent	Honey-Spot	Congruent
Hypotheses	H1a/b	Relevance	Low	High	High
	H1c/d	Value	Low	High	High
	H2a	Cognitive Workload	High	Low	High
	H2b	Intrusiveness	High	Low	High
	H2c	Pleasant Receiving Context	Low	High	Low

Table 2 Overview hypotheses in relation to location

## 5 Methodology

### 5.1 Field Experiment

To test our hypotheses, we developed a mobile application with the ability to trigger push notifications to deliver ads at predefined locations. We invited students from a mid-sized university in Western Europe who were asked to install our app to receive coupons for the university cafeteria.

Our application captured typical context factors using local sensors (e.g. time, location, etc.). Further, it was also able to display a mobile questionnaire that measures perception factors (e.g. intrusiveness, relevance, etc.) that were not measurable by the local sensors of a smartphone. Moreover, our application was able to show coupons in the form of a QR-code uniquely valid for the university cafeteria.

Regarding the triggering behaviour of our coupons, the application includes a list of predefined types of locations. Given our hypotheses and scenario, we selected three types of locations where we expect differences with respect to the receiving context. Starting with the university, we defined an area with a 200 m radius around the centre of the university covering the campus and including the university cafeteria. This location is closest for coupon redemption. According to our hypotheses, we expect here the highest perceived relevance and value. At the university location the students may (should) however be engaged in studying activities (e.g., sitting in the lecture, doing homework) and thus we also expect the highest level of cognitive workload and hence the highest perceived intrusiveness of the ad. Further, we assess commuter hubs such as the main train station or tram stops as the second important type of location within our study. To be more specific, our study assesses eight small or medium-sized commuter hubs within a radius of 2 km away from the university centre. To detect if a participant was entering or leaving a predefined location we used geofencing. Each time a participant enters a certain type of area, our application decides randomly to trigger a push-notification or not. This feature prevents that the coupon always triggers at the same location and participants understand the triggering behaviour of the



application. Finally, we implemented a function that randomly triggers coupons at an arbitrary location within the city. Figure 2 visualises the distribution of the locations assessed and Table 3 provides an overview of the defined locations with a brief description.

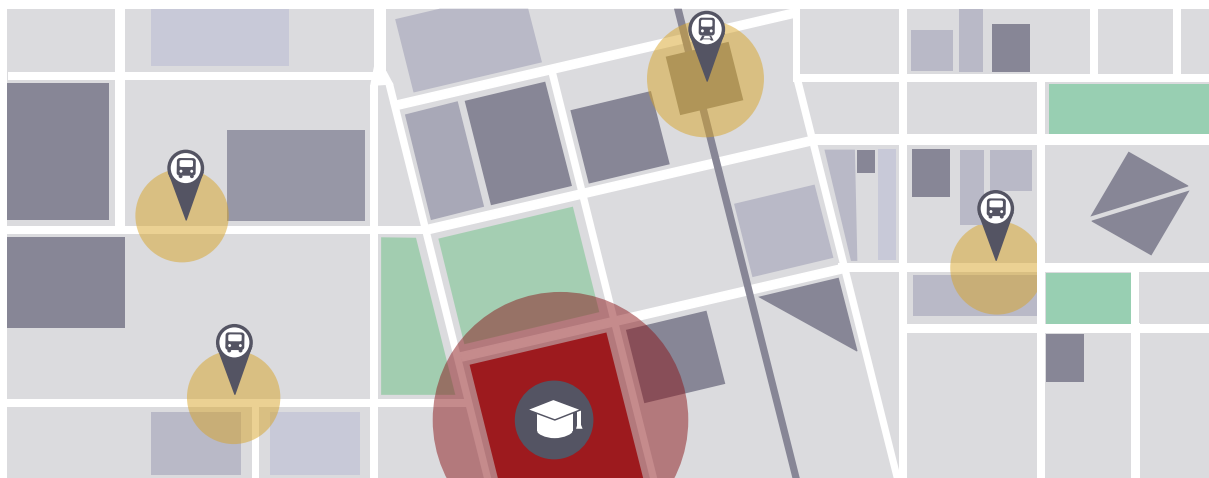


Figure 2 Map of all predefined locations (red: university, yellow: honey-spots)

Location Name	Location Congruency	Description
Core	Congruent	Center of the university (200 m radius) including the cafeteria.
Honey-Spot	Semi-Congruent	Seven train stations (100 m radius) and one main station (200m radius) located between 464 m and 1,984 m away from the university centre with an average distance of 1,102 m.
Random	Incongruent	Randomly selected location around the city.

Table 3 Overview: Types of locations

The application pushed the coupons during the opening hours of the cafeteria until one hour before closing time so that the participants had a real opportunity to redeem the coupon. During the experiment, each participant had the chance to receive a maximum of one coupon per day. We did not vary the content of the coupon over the entire period and the coupon could be redeemed for a free beverage in the cafeteria. Further, the coupons were not restricted to a certain type of beverage, the participants could decide for each coupon anew. This measure should rule out time specific preferences, e.g. a coupon for a free coffee might be perceived as more relevant in the morning than in the afternoon.

Before the start of the experiment, the students had to register for the experiment using the mobile application. During the registration, we instructed the participants to remember precisely the moment they would receive the coupon, and fill out the questionnaire in the evening. Further, we asked some general questions about their demographics, attitude towards advertising, and experience with the handling of mobile devices, and internet usage (see Table 4). The participants were aware that they were part of a study on location-based advertising, but they did not know the actual research scope or the criteria of the application for triggering coupons. The random triggering of the coupons at a certain area made it also difficult to understand the triggering behaviour.

If a participant received a coupon, she or he had to answer a survey on the same day at 7:00 pm. The invitation to the survey appears as a push notification, and by clicking on the notification, the app will open and start the mobile questionnaire. Participation in the questionnaire was voluntary and had no consequences or influence on the displaying behaviour of the coupon. This way, we aimed to prevent participants from entering incorrect information. Considering that a questionnaire right after the advertisement might increase negative feelings such as intrusiveness, the survey was displayed to its participants only in the evening of that same day. However, a questionnaire at the end of the day bears the risk that participants cannot recall the situation correctly. To solve this tradeoff, the questionnaire started

with some general questions about the receiving context, such as location (e.g. at home, at the university, at work, etc.), characteristics of the surroundings (e.g. conveniently situated, main road, etc.), and the time when participant read the advertisement (directly, after 5 minutes, after 10 minutes, etc.). All these pieces of information allow us to compare the given answers in the questionnaire with the measurements of the application to identify and filter incorrect answers.

<b>Gender</b>	Male: 74.55 %	Female: 25.45 %
<b>Age</b>	Mean: 21.15	Std. Dev.: 2.46
<b>Uses public transportation</b>	Yes: 84.55 %	No: 15.45 %
<b>Resides in the same city as the university</b>	Yes: 51.82 %	No: 48.18 %
<b>Number of installed apps with couponing function</b>	no apps	50.91 %
	1 - 2 apps	46.36 %
	> 3 apps	2.73 %
<b>Daily mobile phone usage</b>	≤ 30 min	0.00 %
	30 - 60 min	5.45 %
	1 - 2 hours	26.36 %
	2 - 3 hours	39.09 %
	> 3 hours	29.09 %

Table 4 Selected characteristics of the participants

<b>Construct</b>	<b>Origin</b>	<b>Question / Item</b>
Cognitive Work-load	Self-developed, based on the scale by Nowlis and Shiv (2005) which measures the degree of focus a person has on a particular activity	How busy were you at the time of receiving? I was not at all busy / I was very busy
Relevance	Self-developed, inspired by (Hühn et al., 2017)	How would you rate the relevance at the time of receiving? Not relevant at all / Very relevant
Value	(Xu et al., 2009)	When I saw the ad I thought the ad was valuable? Not valuable at all / Very valuable
Pleasant Receiving Context	Self-developed	How would you rate the time of receiving? Not enjoyable at all / Very enjoyable
Intrusiveness	(Edwards et al., 2002)	When the ad was shown, I thought it was... Not distracting at all / Very distracting Not disturbing at all / Very disturbing Not interfering at all / Very interfering Not intrusive at all / Very intrusive Not obtrusive at all / Very obtrusive
Pleasant Receiving Context	Self-developed	How would you rate the time of receiving? Not enjoyable at all / Very enjoyable

Table 5 Overview: Constructs within the survey

After the general section, we started the measurement of the constructs and items. Here, we mostly used the items from prior research and modified it slightly to fit the receiving context. The participants gave their answer on 7-point Likert scales, ranging from 1 ("not at all") to 7 ("very much"). Table 5 provides an overview of the constructs and sources used in the questionnaire.

As already mentioned, participation in the questionnaire was voluntary. Nevertheless, we offered the participants an incentive to achieve a higher participation rate. When responding to at least ten questionnaires, the participants were able to receive a financial compensation in cash or as a voucher for an online shop.

## 6 Results

The experiment took place from the mid of June until the end of July 2017 (5 weeks) among students at a medium-sized city in Western Europe. During this time, we sent a total of 599 coupons (core: 187; honey-spots: 239; random: 173) to 110 participants and received an average response rate of 63.1 % to the voluntary questionnaire.

To test the set of hypotheses, we use ANOVA to compare means of multiple groups of samples. The following table contains the mean and the standard deviation of each attribute at all types of locations.

	Location	Mean	Std. Dev.
<b>Cognitive Workload</b>	Core	3.934	1.958
	Honey-Spot	2.950	1.713
	Random	4.009	2.100
<b>Relevance</b>	Core	4.340	1.767
	Honey-Spot	4.190	1.851
	Random	2.982	1.868
<b>Value</b>	Core	4.443	1.913
	Honey-Spot	4.304	1.927
	Random	2.928	2.096
<b>Intrusiveness</b>	Core	2.600	1.504
	Honey-Spot	2.133	1.067
	Random	2.452	1.371
<b>Pleasant</b>	Core	4.792	1.782
	Honey-Spot	5.081	1.662
	Random	3.847	1.815

Table 6 Mean and standard derivation of the measured constructs

We analysed the data with ANOVA followed by Bonferroni multiple comparisons test.

	Group	Sum of Squares	Df	Mean Square	F	Sig.
<b>Cognitive Workload</b>	Between groups	96.850	2	48.425	13.38	0.000
	Within groups	1357.131	375	3.619		
<b>Relevance</b>	Between groups	127.009	2	63.504	18.90	0.000
	Within groups	1260.148	375	3.360		
<b>Value</b>	Between groups	161.930	2	80.965	20.77	0.000
	Within groups	1461.671	375	3.898		
<b>Intrusiveness</b>	Between groups	15.350	2	7.675	4.60	0.011
	Within groups	626.212	375	1.670		
<b>Pleasant</b>	Between groups	103.566	2	51.783	17.07	0.000
	Within groups	1137.781	375	3.034		

Table 7 Results of the ANOVA-analysis

The ANOVA analysis in Table 7 shows between the receiving-context at different locations differs significantly.

	Mean Difference (P-Value)	Honey-Spot	Core
<b>Cognitive Workload</b>	Core	0.984 (0.000)	-----
	Random	1.059 (0.000)	0.075 (1.000)
<b>Relevance</b>	Core	0.153 (1.000)	-----
	Random	-1.204 (0.000)	-1.358 (0.000)
<b>Value</b>	Core	0.139 (1.000)	-----
	Random	-1.376 (0.000)	-1.515 (0.000)
<b>Intrusiveness</b>	Core	0.467 (0.012)	-----
	Random	0.319 (0.138)	-0.148 (1.000)
<b>Pleasant</b>	Core	-0.288 (0.560)	-----
	Random	-1.234 (0.000)	-0.946 (0.000)

Table 8 Results of the Bonferroni post hoc test

Table 8 presents the results of the Bonferroni post hoc test, which allows us to discover mean differences between all location types. Regarding perceived relevance, the results show no significant differences between honey-spots and the congruent locations ( $p > .1$ ). This result shows that despite a higher distance relevance does not decrease significantly. However, the relevance of advertising decreases significantly at random locations ( $p < .01$ ). Both results provide support for hypothesis H1a and H1b and are in line with Hühn et al. (2017). Regarding the perceived value of the advertisement received, the participants perceive the value of the ads significantly lower at random locations compared to the other locations (both  $p < .01$ ). In addition, with regard to the cognitive load, the results indicate a significantly lower cognitive workload at honey-spots compared to random ( $p < .01$ ) and congruent locations ( $p < .01$ ). This result shows that considering the location and receiving context of ads companies can indeed target consumers in situations of low utilisation in a more efficient way. This insight supports the basic assumption of our scenario as well as hypothesis H2a. Concerning the intrusiveness of ads, the data reveals similar findings. The participants perceive mobile advertisement at honey-spots as significantly less intrusive than advertising in the immediate proximity ( $p < .02$ ) or random locations ( $p < .01$ ) supporting hypothesis H2b. However, what we cannot ascertain is the negative effect of location-congruency on the perception of ad intrusiveness found by Lee et al. (2015) and Hühn et al. (2012). Based on our data it rather seems that the intrusiveness depends on the receiving context factors such as cognitive workload or relevance. Regarding the pleasantness of the receiving context, our results indicate that receiving ads at random locations is less pleasant ( $p < .01$ ) while we found no statistically significant differences between the congruent location and honey-spots ( $p > .1$ ).

## 7 Discussion, Implications, and Limitations

This paper examines the impact of the receiving context on the consumer perception of and responsiveness towards mobile advertising. We promote the idea of choosing a more distant location with a more suitable receiving context to maintain positive factors (e.g. perceived relevance, value) while simultaneously reducing negative factors (e.g. perceived intrusiveness, cognitive workload) which affect the consumers' responsiveness towards mobile advertising. Based on this idea, we conclude that an ideal location (or receiving context) does not necessarily need to be in the immediate proximity to the offer. We introduce the term "honey-spots" for locations with a high level of responsiveness but higher distance if compared to a congruent location.

Our results support the idea of these honey-spots and show that the choice of location has a significant impact on the perception of mobile ads. Despite a higher spatial distance of honey-spots, the participants perceive ads at honey-spot as relevant and valuable as in congruent locations. Moreover, our findings show that participants perceive advertising at honey-spots significantly less intrusive. In sum, our experiment shows, by choosing an appropriate receiving context, we can minimise negative factors (e.g. intrusiveness) by simultaneously keeping positive factors such as relevance or value intact.

From a scientific perspective, our results indicate a negative relation between context-congruency and relevance. This finding is in line with CLT (Trope and Liberman, 2010) and findings by Hühn et al. (2017). Further, we note that our findings show a difference with respect to the perceived intrusiveness of mobile advertisement in honey-spots and congruent locations. Advertising at honey-spots is perceived as less intrusive despite the higher spatial distance, whereas ads delivered to random and congruent locations are perceived as more intrusive. These results are surprising and appear to be in conflict with previous literature which either found no effect (e.g. Hühn et al. (2017)) or a negative effect of location congruity on the perceived intrusiveness of advertisements (e.g. Lee et al. (2015) and Hühn et al. (2012)). A possible explanation for the difference regarding perceived intrusiveness in our and previous findings are probably related to the factors of the receiving context (e.g. cognitive workload). Based on Rau and colleague's insight that consumers seem to perceive advertising as more intrusive during activities with a high cognitive workload (Rau et al., 2013) we conjectured that the low cognitive utilisation in honey-spots decrease consumers' perception of ad intrusiveness. The data gathered within our field experiment supports our conjectures and stands in contrast to previous studies which were either laboratory experiments with a high control of the receiving context (Hühn et al., 2012, Lee et al., 2015) or field experiments without controlling for the receiving context at all (Hühn et al., 2017).

All in all, our study presents insights with practical implication for advertising companies. First, our results empower advertisers to develop more effective mobile advertising campaigns which reduce the negative effects of intrusiveness that lead to ad avoidance behaviour. Second, our results show that advertising in the immediate proximity of the advertised product is overrated. By use of honey-spots, we managed to show that consumers can perceive advertising at distant locations as equally relevant and valuable as at congruent locations. This is useful when multiple advertisers compete against each other in a certain location (e.g. at a shopping mall).

Our study comes with several limitations which could serve as starting point for future studies. One limitation could be the delayed mobile questionnaire, which was prompted only hours after the moment of ad exposure. On the one hand, displaying the mobile questionnaire only in the evening carries the disadvantage that participants might not remember their sentiments at the moment they received the ad correctly and thus over- or underreport their perceptions. In an attempt to decrease the bias in self-reported ad perception we instruct the participants try to remember the moment they received the ad. Further, we compare the given answers with the data collection to test for the plausibility of the given answers. On the other hand, a survey right after the moment of exposure (like, e.g. Hühn et al. (2017)) might impact the answers to the questionnaire too. If the participants perceive advertisement already as intrusive, a questionnaire right after the delivery of ads might reinforce the negative feelings, and could also lead to biased self-reported values and potentially to high dropout rates for the questionnaires. Given the above-mentioned trade-off that arises from displaying the mobile questionnaire right after the advert or in the evening, we postulate that as long as the factors are not measurable by local sensors, there is currently no perfect solution for solving this issue.

Finally, we emphasise implications of this study's insights for future research. First, this study shows that the perception of ads is more comfortable for the consumer at honey-spots, but the economic validity is still unknown. Yet, in order to conclusively ascertain the link between receiving context and effectiveness of LBA, we invite fellow academics to conduct further research on this topic. Moreover, in our study, we define only commuter hubs as honey-spots. However, it is possible that other location types have a similar or even stronger positive effect on the consumers' responsiveness towards advertisement.

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