

# THE EFFECT OF JOINT CONSUMPTION ON MOBILE COUPON REDEMPTIONS – A FIELD EXPERIMENT

*Research paper*

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## Abstract

*Proximity-based geotargeting of same-day mobile coupons (m-coupons) has become a valuable part of companies' marketing communications. However, this strategy is ineffective at eliciting redemptions from non-proximal consumers, due to the negative effect of consumers' momentary distance from the offline point of sale (POS). Therefore, the size of the addressable consumer population is bounded. We propose a novel solution that harnesses m-coupon characteristics to increase their redemption likelihood for non-proximal consumers. Importantly, our method neither requires the collection of additional contextual data nor investments in specialised IT capabilities. Utilizing social m-coupons that can only be redeemed in a group of multiple consumers, we turn each redemption into a joint consumption decision. Social m-coupons foster peer influence and provide additional utility to consumers by encouraging social interactions with their peers. We test the effect of joint consumption on consumers' m-coupon redemption likelihoods in a randomized field experiment in cooperation with a large metropolitan movie theatre. We find that social m-coupons have a positive direct effect on redemptions and also reduce consumers' sensitivity to their distance from the movie theatre. The effect of social m-coupons is comparable in magnitude to the effect of increasing the discount from 1€ to 3€.*

*Keywords: Location-based Services, Contextual Effects, Joint Consumption, Field Experiments.*

## 1 Introduction

The convergence of several emergent technologies, such as mobile networking, GPS, sensory devices, and real-time business analytics, enables marketers to cheaply collect and act on contextual data detailing consumers' momentary physical environment. Consequently, they can design dynamic mobile marketing strategies that adapt to an individual consumer's circumstances at a specific point in time and space. The emphasis on the dynamic and real-time nature of these strategies also reflects the opportunity to optimize marketing communications on a more fine-grained level and to purposefully target consumers via their smartphones when and where they are most susceptible. This has spawned a gamut of novel business models (Veit et al., 2014) centred around mobile marketing.

Most notably, proximity-based geotargeting of m-coupons has garnered interest from practitioners (e.g., Matchinguu<sup>1</sup>, Verve Wireless<sup>2</sup>, O2 Local<sup>3</sup>) and researchers alike (Luo et al., 2014; Danaher et al., 2015; Fang et al., 2015; Molitor et al., 2016; Molitor et al., 2017). Here, a consumer is targeted with m-coupons based on the geographic proximity of her real-time location to an offline POS – the location of

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<sup>1</sup> <http://www.munich-startup.de/ecosystem/matchinguu-ug/>

<sup>2</sup> <https://www.verve.com/>

<sup>3</sup> <https://www.o2online.de/vorteile/apps-zusatzdienste/local/>

the seller running the promotion. Since offline transportation costs are high, a consumer's choice of location is not a coincidence. On one hand, geotargeting uncovers heightened demand from consumers who reveal their shopping intentions via their geographic locations. On the other hand, geotargeted m-coupons may also causally influence consumer behaviour by triggering impulse purchases as well as facilitating need recognition.

Targeting consumers proximal to the offline POS is very effective at generating incremental sales from m-coupons (Fang et al., 2015). However, the redemption likelihood for m-coupons decreases with the distance from the offline POS due to higher transportation costs, such that only a limited population of consumers can be mobilized without further increasing the face value of promotions (Zubcsek et al., 2017). Approaches to alleviate this issue have been suggested, such as more sophisticated geotargeting based on location context (Fong et al., 2015) and consumers' past location trajectories that are also revealing of current preferences (Ghose et al., 2015; Zubcsek et al., 2017); or, harnessing these sources of contextual data to tailor m-coupons to specific consumer segments' preferences. However, these methods raise a number of problems that, in turn, may be costly to firms: first, marketers need to collect even richer contextual data, which is challenging in itself and is becoming increasingly controversial due to consumers' growing privacy concerns (Pogue, 2011); second, marketers need to acquire the IT capabilities to execute increasingly complex real-time targeting strategies.

To our knowledge, the literature does not propose any methods to increasing the effectiveness of proximity-based m-coupons besides by using more sophisticated geotargeting or personalization. Specifically, the literature does not treat the promotion itself and its characteristics as a defining element of a consumer's context (Andrews et al., 2016a; Grewal et al., 2016). We address this gap in the literature by proposing to causally manipulate consumers' (perceived) context via m-coupon characteristics. Altering a consumer's context relevant to the m-coupon redemption decision, then, leads to differential response behaviour. First, we test the effect of social m-coupons compared with single-person m-coupons. Social m-coupons that can only be redeemed by a group of multiple consumers, turn an m-coupon redemption into a joint consumption decision; thereby, also changing consumers' pertinent social context. More precisely, we are not interested in observing whether peer influence induces consumers to endogenously form a group in order to undertake an activity jointly rather than alone. Instead, we exogenously predetermine that a user may only redeem an m-coupon together with her peers. This m-coupon characteristic, in turn, fosters social interactions that facilitate peer influence and add to a consumer's utility received from the m-coupon redemption. Second, we test the effect of providing consumers with their exact real-time distance from the offline POS, which renders distance more salient in their redemption decision process compared with other pieces of contextual information.

This paper makes two primary contributions to the literature. First, we identify and test a novel m-coupon characteristic in the mobile couponing domain, namely, social m-coupons. We find that social m-coupons increase consumers' overall redemption likelihood and additionally reduce their sensitivity to their geographic distance from the offline POS. Contrary to higher discounts, social m-coupons do not reduce the profitability of promotional campaigns; managers require neither additional contextual data, nor more fine-grained real-time targeting capabilities to improve the performance of their campaigns; the marginal costs of implementing social m-coupons are negligible. Second, we contribute to the contextual marketing literature by investigating the interactions of consumers' physical and social context. We find the interactions to be comparable in magnitude to the main effects. We demonstrate for the first time that by manipulating a consumer's perceived social context, the negative effect of geographic distance on m-coupons redemptions can be mitigated. One on hand, we demonstrate the complex interactions taking place between different elements of a consumer's context that have been largely neglected in the past. On the other hand, we demonstrate that firms can encourage a specific consumer behaviour by directly manipulating these interactions. Different from earlier studies (Forman et al., 2008; Meyners et al., 2017), we use real-time geographic location instead of home-address location to measure a consumer's physical context. Regardless of whether a consumer faces a buying decision online or offline, she cannot elude the influences of her physical and social environment. She is exposed to all dimensions of context concurrently; therefore, it is important to understand how these

dimensions jointly affect decisions in order to purposefully address consumers when and where they are most responsive.

In cooperation with a large metropolitan movie theatre in Germany, we conduct a randomized field experiment to test the joint effects of geographic distance from the offline POS, social m-coupons, the provision of real-time distance information, and the discount on the redemption likelihood of same-day push-based m-coupons for movie tickets. The m-coupons were distributed to users via a mobile app that was built specifically for the field experiment. In the course of six weeks, we collected 768 observations from 338 unique users including their real-time geographic locations when using the app. We observe 26 m-coupon redemptions that we match with users on the individual level to obtain a panel data set with consequential consumer decisions.

The remainder of this paper is structured as follows: In Section 2, we review the related literature and present our research model. In Section 3, we describe the design of our field experiment, the relevant variables, and present descriptive results. In Section 4, we develop our econometric model, discuss our estimation results, and present robustness checks. In Section 5, we conclude with a discussion of the implications and limitations of our work.

## 2 Research Model and Related Literature

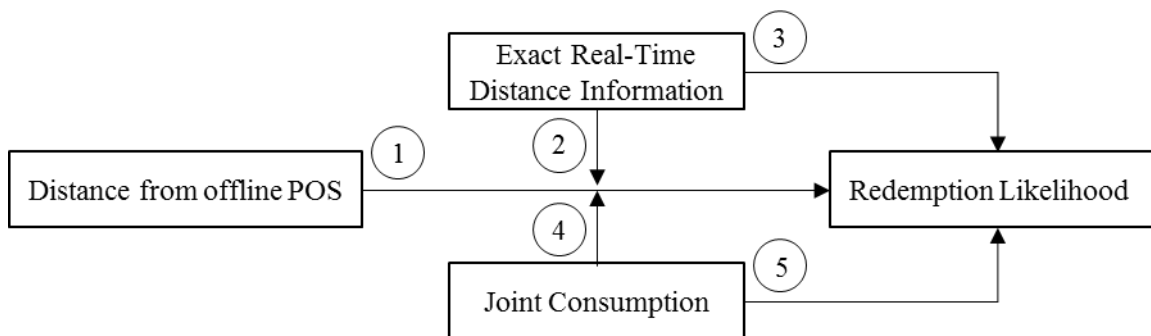


Figure 1. Research Model

Our objective is to identify and test characteristics that improve the capacity of m-coupons to elicit redemptions from non-proximal consumers. We investigate the effect of social m-coupons and the provision of real-time distance information on consumers' redemption decisions. Our research model in Figure 1 contains five distinct relations: (1) We test the main effect of geographic distance from the offline POS on the redemption likelihood of same-day push-based m-coupons; (2) we exogenously vary the provision of exact real-time distance information to consumers and measure the moderating effect on their sensitivity to distance; (3), we control for the direct effect of distance information on redemptions; (4) we exogenously vary consumers' relevant social context by distributing social m-coupons that can only be redeemed by a group of multiple consumers in order to measure the moderating effect of joint consumption on their sensitivity to distance; and (5) we also control for the direct effect of joint consumption on redemptions. We are primarily interested in the moderating effect of joint consumption and provision of distance information on a consumer's sensitivity to her distance from the offline POS. A detailed description of our field experiment is provided in the next section.

Our work is primarily related to prior research on mobile couponing and contextual effects covered in the marketing and information systems literature. Context is defined as a multidimensional construct that captures all the characteristics of a consumer's environment or situation in which decisions are made and actions are taken (Belk, 1975; Abowd et al., 1999). In this review, we focus on a consumer's physical context, determined by her geographic location, and social context, determined by the people and their interactions relevant to the situation.

We begin by discussing the relevant literature on a consumer's physical context. Numerous empirical studies have established that m-coupon redemptions become less likely as the distance between a consumer and the offline POS increases (Luo et al., 2014; Danaher et al., 2015; Fang et al., 2015; Molitor

et al., 2016; Molitor et al., 2017). For same-day push-based m-coupons, Luo et al. (2014) find that beyond the transportation costs consumers must incur to make a redemption (Bell et al., 1998; Forman et al., 2009), geographic distance also affects how consumers construe m-coupons. In accord with Construal Level Theory (Liberman and Trope, 1998; Liberman and Trope, 2008), geographically more distant products or activities associated with the m-coupon are construed in more abstract terms compared with proximal ones. This, in turn, leads to lower involvement and purchase intention, such that an m-coupon that needs to be redeemed in a non-proximal location becomes increasingly less relevant to consumers. Luo et al. (2014) also uncover an interaction between distance and an m-coupon's sales-lead time: for next-day m-coupons, consumers non-proximal to the offline POS are more likely to redeem their m-coupon compared with proximal consumers; however, the overall redemption rate significantly decreases. Fang et al. (2015) show that geotargeted push-based m-coupons also facilitate need recognition and trigger non-impulsive purchases. Consumers who were proximal to the offline POS at the time of receiving an m-coupon also went on to make relatively more delayed, subsequent-day purchases. Molitor et al. (2016) establish the negative effect of distance from the offline POS on the response to pull-based m-coupons, which consumers intentionally search for when in a choice mode. Based on these unanimous findings with respect to the effect of distance on the redemption of m-coupons in a wide range of settings, we also expect to find a negative relationship between the distance from the offline POS and the redemption likelihood depicted in relation (1).

Also for pull-based m-coupons, Molitor et al. (2017) find that the provision of real-time information on consumers' distance from the offline POS reduces the overall response to m-coupons. On one hand, they argue that consumers may systematically underestimate the exact distance from the offline POS. On the other hand, provision of distance information may make distance more salient to consumers rendering it more influential in the decision process (Guhl et al., 2017). Based on these insights, we expect distance information to increase consumers' sensitivity to distance, such that relation (2) results in a stronger negative effect of distance on the redemption likelihood. The direct effect of distance information on the redemption likelihood shown by relation (3) is less clear based on theory, as distance information in and of itself should not alter the utility and costs associated with m-coupons.

Further building on their previously discussed results, Molitor et al. (2017) find that distance has an even stronger negative effect when m-coupons are displayed to the consumer in a random order compared with a distance-based sorting. The randomly sorted presentation may increase choice complexity, which prohibits consumers from applying simple decision-making heuristics. With respect to our research model, this may imply a similar effect of joint consumption. When consumers face a joint consumption decision, they have to evaluate more information compared with an individual redemption decision, increasing choice complexity. However, it is not necessarily clear that the influence of distance should increase, as reported by Molitor et al. (2017). Operating under bounded rationality (Kahneman, 2003), consumers may either systematically under- or overweight distance in their redemption decisions as a result of the increased choice complexity. Furthermore, in a joint consumption setting two further mechanisms may, in fact, lead to a weaker influence of distance. First, needing to process more information inevitably leads to a lower influence of distance as the total weight a consumer can allocate is finite. Second, additional information may make distance less salient to consumers. Ultimately, relation (4) needs to be tested empirically, as it is unclear what and how strong the effect of the discussed mechanisms may be.

Turning to a consumer's social context, a non-interactive social presence may affect consumer decisions. Andrews et al. (2016b) find that consumers are more likely to redeem m-coupons in a geographic location with high crowdedness. The authors argue that consumers adaptively turn inwards and immerse themselves in their smartphones in order to escape the intrusion of their personal space. In the offline retail context, Argo et al. (2005) find that the mere presence of others may also affect a consumer's need for impression management and, in turn, their brand choices; consumers choose more expensive product alternatives when feeling observed. For the purchase of in-flight services, Gardete (2015) finds that the observing proximal passengers' purchases increases the likelihood of a purchase by the focal consumer and also influences product choice. In addition to the influence of non-interactive strangers, a consumer's peers also influence behaviour. Luo (2005) finds that when shopping, the presence of friends

increases the urge to make impulse purchases, while the presence of family exercises a monitoring function and decreases it. In joint consumption settings where consumers make purchasing decisions together with their peers, it is well known that peer influence causes a consumer's decision on whether and how much to consume to depend on her peers' consumption behaviour. Hartmann (2010) investigates golfers' decisions to play alone versus together. He finds that golfers gain a significant amount of additional utility, if joined by a partner. In order to emphasize the importance of peer influence on golfers' decision to play, he estimates that on average 35% of a golfer's customer value can be attributed to her effect on her partners. In a study of gambling behaviour, Park and Manchanda (2015) find that the increase of a peer's bet leads to an increase of the focal consumer's bet as well. In the context of household television programme viewership, Yang et al. (2010) observe intra-household behavioural interactions, namely, the dependence of one family member's utility from watching television on other family members' actions, which may determine joint consumption. This goes beyond interdependent preferences which may also arise from merely similar preferences (i.e., homophily). Therefore, we hypothesize that social m-coupons provide a greater utility to consumers by enhancing their social interactions with peers and turning the m-coupon redemption into a joint consumption decision. The higher gain from social m-coupons may increase the likelihood of their redemption. However, there are competing mechanisms at work. Social m-coupons can only be redeemed if both peers are available to watch a movie, such that coordination costs between peers increase, which may decrease the redemption likelihoods. Whether the increase in utility or in coordination costs overweighs, resulting in a negative or positive sign of relation (5), is ultimately an empirical question that we test in our field experiment.

### **3 Data Description**

In this section, we introduce our experimental design, describe the mobile app used for data collection, report summary statistics, and provide some descriptive results.

#### **3.1 Experimental Design**

The field experiment was conducted in cooperation with a large metropolitan movie theatre in Germany. Subscribers to the movie theatre's promotional newsletter received an invitation by e-mail prompting them to try a novel mobile couponing app. The app was made available for iOS and Android smartphones in their respective app stores. Each invitation contained a unique subscriber-specific registration code that was required to create a user account. We employed a full-factorial between-subjects 2x2 experimental design in which each app user was randomly assigned to one of four treatment groups by a server-sided allocation mechanism at the time of registration. Users remained in the same treatment group throughout the field experiment. We independently manipulated two distinct m-coupon characteristics to generate the treatment groups as displayed in Table 1. First, real-time information on a user's geographic distance from the movie theatre was provided in the app in the `DISTANCE_INFO` condition, while no distance information was provided in the `NO_DISTANCE_INFO` condition. Second, users in the `SINGLE_PERSON` condition received m-coupons that could be redeemed alone at the cashier in the movie theatre. In the `SOCIAL` condition, every user individually received an m-coupon; however, they were only granted the discount, if they redeemed their m-coupon jointly in a group, together with at least one other person. With the m-coupon type characteristic, we vary the relevant social context in which m-coupon redemption decisions are made by imposing joint consumption upon users in the `SOCIAL` condition. Still, every group member needed to have the app on her smartphone and redeem her own m-coupon. The discount was granted individually to each user. Alternatively, we could have required only one person per group to have the app and an m-coupon, but chose to implement the `SOCIAL` condition in this more restrictive way in order to be able to collect geographic location information on each user. If a user in the `SOCIAL` condition tried to redeem an m-coupon alone, she was refused. All users assigned to the `SOCIAL` condition were encouraged to refer the app to their friends and invite them to download it. To make referrals as convenient as possible, we included an additional app feature only available to users in the `SOCIAL` condition: A referral page containing three buttons to open either an SMS, WhatsApp, or e-mail template with a brief description of the study and a unique

referral code that could be unambiguously matched to the sender. If someone used the referral code to register a user account, we could establish that she knew the referral's sender. This way, we constructed a network reflecting the social ties between users in the SOCIAL condition. Importantly, referred users were always assigned to the same treatment group as the sender. This ensured that all users who knew each other were exposed to the same versions of the app and m-coupons. If a user did not use the referral feature to invite a friend to use the app, but instead passed on the registration code she had herself used to create a user account, we manually connected the users afterwards. Based on the timestamps of their registration, we determined who learned about the app from the newsletter and who was referred.

		M-Coupon Type	
		SINGLE_PERSON	SOCIAL
Distance Information	DISTANCE_INFO	1: SINGLE_PERSON & DISTANCE_INFO	2: SOCIAL & DISTANCE_INFO
	NO_DISTANCE_INFO	3: SINGLE_PERSON & NO_DISTANCE_INFO	4: SOCIAL & NO_DISTANCE_INFO

Table 1. Experimental Treatments

After creating an account, users were eligible to receive up to ten push-based m-coupons in the course of six weeks. The field experiment's timeline is shown in Table 2. Each week in the timeline spans seven consecutive days beginning with a Thursday. We choose these cycles because new movies always begin screening on Thursdays. Users who registered after the start of the field experiment did not receive all m-coupons. On ten different days, an m-coupon was simultaneously pushed to all users at 5 p.m. and was valid until 9 p.m. on the same day. To avoid users planning their visits to the movie theatre in advance, we randomly selected the ten days on which one of the m-coupons would be distributed and withheld these dates. This was necessary in order to be able to test the effect of a user's immediate geographic location at the time of receiving an m-coupon on her redemption decision. Users could redeem the m-coupons at the cashier in the movie theatre for a discount on a movie ticket of their choice. The discounts were randomly varied between 1€, 2€, and 3€ per ticket and user – approximately 7% to 40% off the ticket price which varies day-to-day. All users always received the same discount on any given day.

M-Coupon No.	1	2	3	4	5	6	7	8	9	10
Week	1	1	2	2	3	3	4	5	5	6
Discount	3€	2€	3€	1€	3€	1€	3€	1€	1€	2€

Table 2. Timeline of Field Experiment

### 3.2 Experimental Mobile App

The mobile app was specifically built for this field experiment as our primary means of data collection. As displayed in Figure 2, it contained only four features that were all essential to the experiment: 1) Users needed to register a user account. This was necessary in order to track each user throughout the observational period. Beyond clicks, referrals, and sessions, we also collected a user's geographic location every time the app was opened. Users who did not provide access to their location data were excluded from the study, as this data was essential. 2) The referral page enabled users to invite friends to download the app. This feature was only available to users in the SOCIAL condition. 3) Push notification immediately informed users when new m-coupons became available, provided we had received their consent. Push notifications were an important communication tool during the field experiment. Due to the short validity and the randomly chosen days for the distribution of m-coupons, we could not rely on users to discover the offers on time by themselves. 4) Lastly, when an m-coupon became newly available, it was displayed in the app on a separate page along with some information regarding the

conditions of use and a barcode (not in the screenshot; found at the bottom of the page in the app). If a user navigated to this page in the app outside of the validity period of one of the ten m-coupons, she encountered a message announcing that further discounts would follow on an unspecified future date. Also, for a user in the DISTANCE\_INFO condition, her geographic distance from the movie theatre was displayed on this page in the app. We placed this piece of information here to make it salient to users. The discount was granted by the cashier in the movie theatre after scanning the barcode. Each user was allotted a set of ten unique m-coupon identification numbers upon registration, such that we could individually match each redemption with the data collected on the users in the app. We received the data on which m-coupons were redeemed from the movie theatre's CRM system at the end of the field experiment.

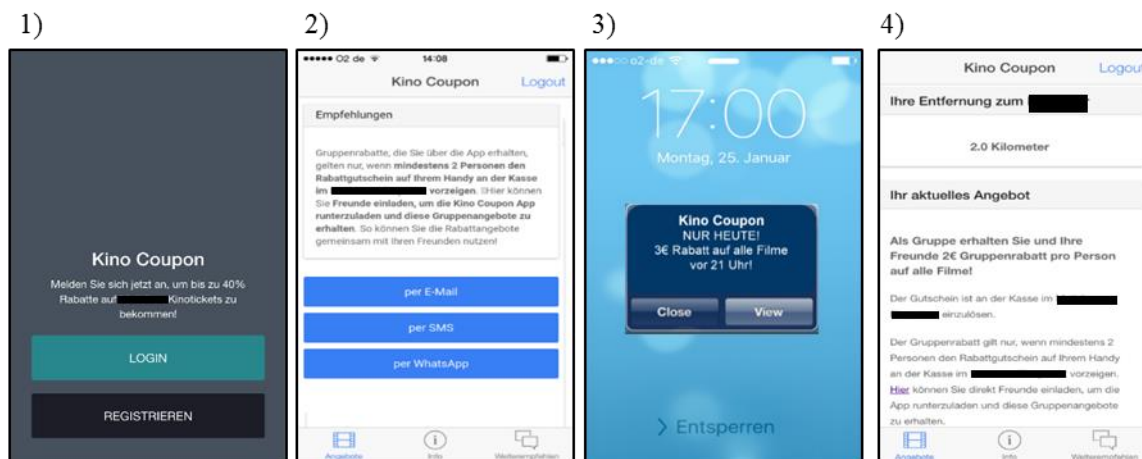


Figure 2. Experimental Mobile App

### 3.3 Summary Statistics and Descriptive Results

Over 83,000 newsletter subscribers were invited to download the experimental app. 748 of them proceeded to create a user account, which corresponds to a conversion rate of 0.9%. 44 further people joined the experiment as a result of referrals, resulting in a total of 792 unique users and a social network composed of 44 dyads. 191 users were assigned to treatment group 1, 204 to group 2, 187 to group 3, and 210 to group 4. Randomization checks did not yield any significant differences between the treatment groups with respect to age, gender, mobile device type, and time of registration. Over the course of the experiment, users logged in to the app 3,851 times whereas multiple logins within a span of five minutes are counted as one. In total, 7,557 m-coupons were distributed and 26 were redeemed, which equals a redemption rate of 0.34%.

Recall, our objective is to identify the effect of a user's momentary physical and social context on her m-coupon redemption behaviour. Therefore, we are only interested in studying the effect of a user's context when she is facing an m-coupon redemption decision. For our analysis, we process the data set as follows: First, we remove all logins without location data, since we cannot determine these users' distances from the movie theatre. One login that resulted in an m-coupon redemption is removed this way. This likely happened, because the user could not acquire a GPS signal at the time of her login. Second, we remove all logins that did not take place during one of the ten four-hour time slots when valid m-coupons were available, as they cannot be utilized for our analysis. Third, we remove all logins that occurred more than 16.32 km far away from the movie theatre, as we deem these inappropriate for answering our research question. If a user is too far away, it is out of the question for her to take advantage of a same-day discount irrespective of her context and preferences (for instance, we observed logins from as far away as Moscow, Paris, and London). These logins may bias our results and need to be removed, such that the question becomes which distance to choose as a cut-off. Our choice is twice the distance of the farthest login from the movie theatre that resulted in an m-coupon redemption. This distance is also beyond the bypass highway around the city, which is the approximate boundary of the

city's commuter belt. Therefore, we argue that it is a reasonable choice. The cut-off is shown by the outer solid black line around the city in the map on the left-hand side of Figure 3 (Kahle and Wickham, 2013). Fourth, users mostly log in to the app multiple times during the validity period of an m-coupon. We only keep a user's first login during each of the four-hour timeslots in order to measure the effect of her context at the time of her initially processing information about the m-coupon. This leaves us with 768 logins by 338 unique users as the basis for our analyses. Summary statistics are found in Table 3. The unit of our analysis is an individual user login matched with the m-coupon redemption outcome on the user-m-coupon-level, which we henceforth refer to as an individual observation.

VARIABLES	Mean	SD	Min	Max
M-Coupon Redeemed (DV)	0.03	0.18	0	1
Distance in km	5.71	3.72	0.01	16.32
M-Coupon Type: Social (DV)	0.49	0.50	0	1
M-Coupon Type: Single-Person (DV)	0.51	0.50	0	1
Provide Distance Info.: Yes (DV)	0.49	0.50	0	1
Provide Distance Info.: No (DV)	0.51	0.50	0	1
Discount in Euro	2.30	0.78	1	3
Push Notification: Allowed (DV)	0.99	0.11	0	1
Device: iOS (DV)	0.57	0.50	0	1
Device: Android (DV)	0.43	0.50	0	1
Days since Registration	15.14	11.53	0	42
Week: 1 (DV)	0.40	0.49	0	1
Week: 2 (DV)	0.21	0.41	0	1
Week: 3 (DV)	0.15	0.36	0	1
Week: 4 (DV)	0.06	0.24	0	1
Week: 5 (DV)	0.13	0.34	0	1
Week: 6 (DV)	0.06	0.23	0	1

N=768. SD: Standard Deviation. DV: Dummy Variable.

Table 3. Summary Statistics

We plot the locations of the 768 observations on the left-hand side of Figure 3. The location of the movie theatre is in the centre of the map. The outer solid black line near the edges of the map represents the cut-off distance from the movie theatre. Grey dots mark observations that did not lead to conversions, while black dots mark observations that eventually resulted in the redemption of an m-coupon. The farthest redemption (i.e., black dot) is located at a distance of 8.16 km from the movie theatre. Regardless of the outcome, most observations occurred in close proximity to the movie theatre. 371 or over 48% of observations are located at a distance of at most 5 km from the movie theatre (inner solid black line) within an area that covers less than 10% of what we consider in total (at most 16.32 km from the movie theatre).

The right-hand side of Figure 3 (Wickham, 2009) shows the evolution of the number of logins and the redemption rate from m-coupon to m-coupon over the course the field experiment. The number of logins was highest for the first m-coupon and decreased nearly monotonically over time. The high level of activity at the beginning may have been driven by curiosity due to the novelty of the m-coupons. Based on anecdotal evidence from a follow-up survey, interest likely waned as users learned that all m-coupons would have the same short validity which made it difficult to redeem them. In contrast, the average m-coupon redemption rate increases from the first half of the field experiment to the second half. This may also be driven by the users' learning about the m-coupons' short validity. This may explain why those users open the app to get more information after receiving the push notification who can, in principle, redeem the m-coupon. Furthermore, the redemption rate varies between m-coupons, which may be



driven by users’ movie tastes. The movie theatre’s programme changes weekly and may become more or less attractive to users over time.

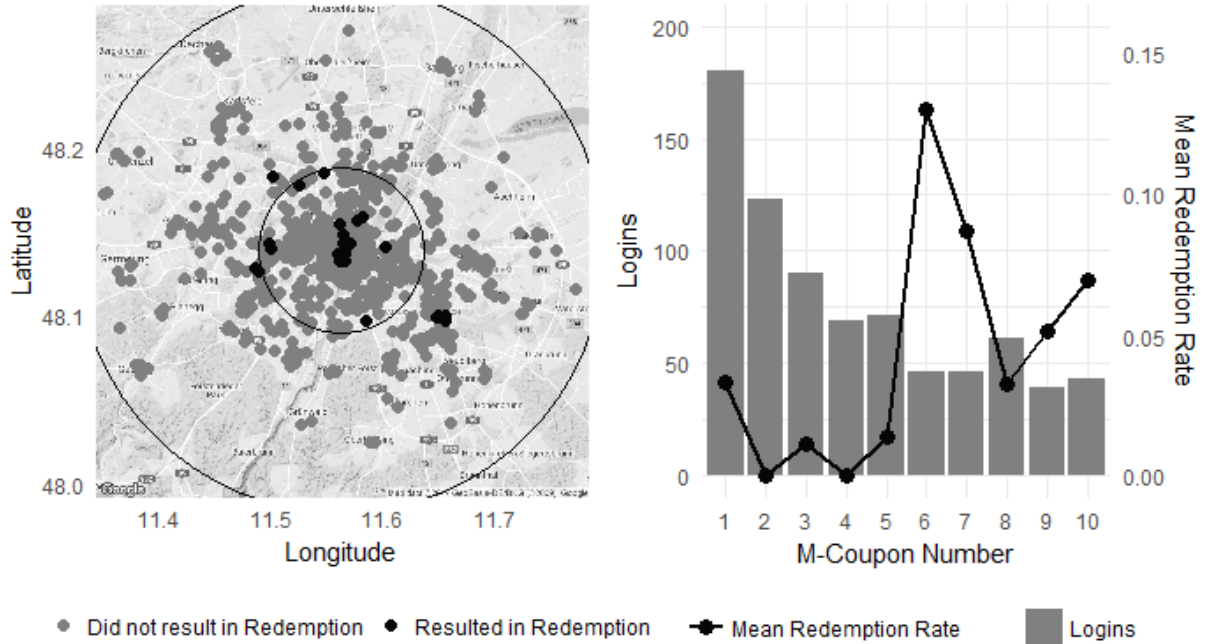


Figure 3. Geographic Distribution of Logins (left). Temporal Evolution of Usage (right).

## 4 Econometric Model and Results

We begin this section by describing the choice model that we use to identify the effect of geographic distance and the m-coupons’ characteristics on a user’s redemption decision. Then, we discuss our results and present some robustness checks.

### 4.1 Model

We estimate a discrete choice model assuming that users reveal their underlying preferences with their m-coupon redemption decisions, which maximize their utility in the random utility framework (Train, 2003). User  $i$ ’s latent utility gained from redeeming m-coupon  $j$  is given by

$$U_{ij} = v_{ij} + \varepsilon_{ij}, \quad (1)$$

where  $v_{ij}$  is the systematic and  $\varepsilon_{ij}$  the non-systematic, stochastic part of the utility. The response variable  $y_{ij}$  represents user  $i$ ’s direct response to m-coupon  $j$ . It equals unity, if the m-coupon is redeemed; otherwise it is zero. When users face an m-coupon redemption decision, they redeem an m-coupon if and only if the utility they gain from their choice is greater than zero, such that

$$y_{ij} = \begin{cases} 1, & \text{if } U_{ij} > 0 \\ 0, & \text{otherwise} \end{cases}. \quad (2)$$

We estimate a pooled logit model with clustered standard errors to analyse the joint effect of users’ geographic distance from the movie theatre, the two experimental treatment conditions (provision of distance information, social m-coupons), and the discount on redemptions. Clustering is necessary for two reasons: First, observations for any single user are correlated across multiple m-coupons. Second, observations for two different users in the SOCIAL condition who are connected with each other in a dyad are also correlated for the same m-coupon. Ignoring the correlations of the error terms can lead to misleadingly low p-values (Cameron and Miller, 2015). Clustering enables robust inference where data are clustered with correlation of observations within the same cluster and independence across clusters. As the error term  $\varepsilon_{ij}$  is not identically and independently distributed, we cluster it for all observations

belonging to a dyad. For observations by users in the SINGLE\_PERSON condition, we cluster the error term on the user level. Furthermore, we include user-level time-invariant control variables to address user-level heterogeneity; though, field experiments with individual-level randomization are less prone to unobserved heterogeneity and endogeneity (Goldfarb and Tucker, 2011). Last, we include temporal control variables to address changes in the movie theatre's attractiveness to customers as older movies rotate out of the programme and newer movies get picked up. The probability that user  $i$  redeems m-coupon  $j$  is given by

$$Pr_{ij} = \frac{\exp(v_{ij})}{1 + \exp(v_{ij})}, \quad (3)$$

where the user's utility function satisfies

$$U_{ij} = \beta_0 + \beta_1 * d_{ij} + \beta_2 * C_{ij} + \beta_3 * C_{ij} * d_{ij} + \beta_4 * W_{ij} + \beta_5 * T_j + \varepsilon_{ij}. \quad (4)$$

$d$  is a user's distance from the movie theatre,  $C$  is a vector of three m-coupon-level variables (distance information dummy, m-coupon type dummy, and discount),  $W$  is a vector of three user-level control variables (push notification dummy, device dummy, and days since registration), and  $T$  is a vector of the five weekly dummy variables (first week as baseline).

## 4.2 Results

The estimation results are displayed in Table 4. In addition to direct effects, the model includes three two-way interactions between the distance  $d$  and the m-coupon-level vector  $C$ , specifically, the distance information dummy, the m-coupon-type dummy, and the discount variable. To increase the interpretability of the regression coefficients, we choose to estimate the models using the mean-centred distance and the mean-centred discount (Irwin and McClelland, 2001). Mean-centring changes the estimates for the respective other variable involved in an interaction with the mean-centred variables. For instance, in our model, the m-coupon-type dummy's coefficient quantifies the variable's main effect, namely, the difference between the two experimental treatment conditions SINGLE\_PERSON and SOCIAL at the sample mean of the distance.

Consistent with previous research (Luo et al., 2014; Danaher et al., 2015; Molitor et al., 2016; Molitor et al., 2017), we find that the distance from the offline point of sale has a negative effect on m-coupon redemptions.

Next, we discuss the effect of the m-coupon's characteristics. Users are more likely to redeem m-coupons in the SOCIAL condition. In this case, their social environment relevant to the m-coupon redemption decision is different than in the SINGLE\_PERSON condition. Users have to make a joint consumption decision with their friends in order to get the discount. On one hand, this adds coordination costs. On the other hand, it facilitates peer influence (Hartmann, 2010; Yang et al., 2010; Park and Manchanda, 2015). The positive effect on redemptions may be due to additional utility users receive from the social interactions involved with doing things together with their friends: trying a novel mobile app, saving on movie tickets, and going to the movie theatre (Ramanathan and McGill, 2007). We do not find any direct effect of the other two m-coupon-level variables, distance information dummy and discount, on redemptions.

However, all three m-coupon characteristics moderate the effect of distance on the redemption likelihood. Providing users with real-time distance information makes them more sensitive to distance. Users may generally underestimate their distance from the movie theatre and the associated costs of getting there to redeem an m-coupon, such that revealing their exact distance reduces the likelihood of redemptions. Furthermore, providing users with distance information in the app may make them more sensitive to distance even if they are fully aware. By making distance more salient and top of mind, users may weight this information more when making their redemption decisions than otherwise (Kahneman, 2003). This, in turn, may still further strengthen the negative impact of distance on the choice to redeem an m-coupon.

VARIABLES	Coef.	SE
Distance in km (MC)	-0.46**	(0.20)
M-Coupon Type: SOCIAL (DV)	1.90**	(0.88)
Provide Distance Info.: Yes (DV)	-0.99	(0.61)
Discount in Euro (MC)	0.15	(0.44)
M-Coupon Type: SOCIAL (DV) * Distance in km (MC)	0.41**	(0.21)
Provide Distance Info.: Yes (DV) * Distance in km (MC)	-0.29**	(0.14)
Discount in Euro (MC) * Distance in km (MC)	0.21*	(0.11)
Push Notifications: Allowed (DV)	-1.24	(1.00)
Device: iOS (DV)	-0.09	(0.50)
Days Since Registration	-0.14***	(0.03)
Week: 2 (DV)	-0.64	(1.33)
Week: 3 (DV)	2.82***	(0.78)
Week: 4 (DV)	3.83***	(0.70)
Week: 5 (DV)	3.31***	(0.85)
Week: 6 (DV)	5.60***	(1.27)
Constant	-3.41***	(0.94)
Observations	768	
Clusters	321	
Chi2	91.29	
P-Value	0.00	
McFadden's R2	0.29	

Estimates are based on a pooled logit model. DV: Dummy variable. MC: Mean-centred. Cluster-robust standard errors in parentheses: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

Table 4. Estimation Results

Opposed to this, users' sensitivity to their distance from the movie theatre is lower in the SOCIAL condition compared with the SINGLE\_PERSON condition. We find the same relationship between distance and discount: the higher the discount, the weaker the effect of distance. Social m-coupons reduce users' sensitivity to their distance by approximately the same amount as increasing the discount by 2€. Though, the interaction term between m-coupon discount and distance is only significant at the ten percent level and should be interpreted with caution. The moderating effect of m-coupon type and discount on the relationship between distance and redemptions can be interpreted as follows: On one hand, users are less sensitive to distance when they must process more information in total due to their need to additionally evaluate their social interactions in the joint consumption setting; and on the other hand, users are less sensitive to distance when receiving a comparatively higher utility from the m-coupon itself. Reasons for this may be threefold (Kahneman, 2003; Guhl et al., 2017): First, users may choose to weight distance less in their decisions. The weighting of influences must add up to unity, such that users must weight some influences less, if they additionally need to account for social interactions in their decisions, as is the case for social m-coupons. Second, distance from the movie theatre may become less salient to users either due to the availability of more information in total or other comparatively more important information that needs to be considered in their redemption decisions. Third, additional information may also increase choice complexity for users who operate under bounded rationality and often simplify decisions. This may result in the underweighting or even completely ignoring of distance.

### **4.3 Robustness Checks**

In order to test the robustness of our results, we estimate some alternative models. First, we include user age and gender as further covariates. Since we do not have these data on all users, we have to reduce our data set to 716 total observations. The results remain qualitatively similar, the additional covariates are not significant. Second, we test an alternative specification for the discount, including dummy variables for each of the three levels. Again, the results remain qualitatively unchanged. The direct effects of the discount are not significant. Compared with the baseline 1€ discount, the interaction of distance with 2€ discount is not significant; however, the interaction with 3€ discount is positive and significant. Third, we test alternative cut-off distances ranging from 10 km to no cut-off distance with no qualitative change to our results. Fourth, we additionally include weekday dummies into our models. The results are robust to these changes and stay qualitatively the same. We do not report this model due to the high level collinearity and instability of some coefficients introduced by the weekday dummies; however, these issues do not affect any of our focal variables, such that our findings are corroborated. Fifth, we estimate pooled probit models and again find that the results stay qualitatively unchanged<sup>4</sup>.

## **5 Discussion**

Proximity-based geotargeted m-coupons have become a valuable part of the marketing mix for companies with an offline POS. They provide an efficient means to generate incremental sales from proximal consumers. However, since the redemption likelihood for m-coupons decreases with a consumer's distance from the offline POS, the addressable pool of consumers is limited in size. Widening the proverbial net to non-proximal consumers remains a challenge. We propose a novel solution to overcoming this limitation by harnessing m-coupon characteristics to influence a consumer's (perceived) context in which she must make the m-coupon redemption decision. In a randomized field experiment, we test the effect of social m-coupons, the provision of exact real-time distance information, and the discount on the m-coupon redemption likelihood.

Our main insights are the following: A user's distance from the movie theatre negatively affects her likelihood to redeem an m-coupon. However, the strength of this relationship is moderated by several m-coupon characteristics. On one hand, providing a user with her exact real-time distance from the movie theatre increases her sensitivity to distance. On the other hand, her sensitivity to distance is reduced when receiving a social m-coupon compared with a single-person m-coupon and when receiving a higher discount. Social m-coupons also have a positive direct effect on m-coupon redemptions; while neither the provision of distance information, nor the discount directly affect redemptions.

These findings have some important managerial implications. Most approaches to improve the effectiveness of geotargeted m-coupons involve the use of additional contextual data to create more fine-grained targeting strategies and personalized m-coupons. However, collecting this data is not always straightforward and may aggravate users due to growing privacy concerns. Also, marketers must acquire increasingly specialized IT capabilities to implement complex real-time strategies. Social m-coupons require neither of the above. They improve the effectiveness of m-coupons by making each redemption a joint consumption decision encouraging social interactions that lead to peer influence between users and may provide additional utility. They also provide the added benefit of reducing the need to personalize m-coupons, which some consumers may object to on the basis of fairness (Feinberg et al., 2002; Darke and Dahl, 2003). Our paper also contributes to the literature on contextual marketing by testing the interactions between a consumer's physical and social context. Influences associated with these two dimensions of context are ubiquitous and inevitably affect consumers, regardless of whether they face decisions online or offline. Therefore, it is important to understand their joint effect in order to further improve mobile marketing practices.

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<sup>4</sup> Robustness checks are available upon request from the authors.

The results also provide some avenues for future research. We have deliberately chosen to focus on a product that is commonly consumed together with others, namely, movie theatre tickets. Therefore, investigating the effect of social m-coupons that provide discounts on products without a comparable social element would be of interest. This may help to further disentangle the behavioural mechanisms driving the effect as well as pinpoint which part of the social interactions triggered through joint consumption are responsible for the uplift in redemptions. Furthermore, future research in design science may investigate how social m-coupons can be designed in a less restrictive manner than in our field experiment while still achieving the desired outcome by changing a consumer's relevant social context. Our work also has some limitations. By opting for a field experiment we choose to trade off some control over the data generating process for a more natural environment compared with the laboratory (Harrison and List, 2004). First, referred users are assigned to the same treatment group as the invitation's sender in order to assure that each dyad is exposed to the same influences. Second, we cannot exogenously vary the users' distances from the movie theatre. Instead, we randomize the days on which m-coupons' are delivered to prohibit users from planning ahead, which accomplishes a similar outcome. Still, we refrain from interpreting the effect of distance on redemptions as being causal. Third, we observe users' distance from the movie theatre when they open the app, not when they receive a push notification announcing an m-coupon. Fourth, we cannot control for individual users' movie tastes or weekly time schedules.

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