Jannik Meyners, Christian Barrot, Jan U. Becker, & Jacob Goldenberg

The Role of Mere Closeness: How Geographic Proximity Affects Social Influence

Geographic proximity has become increasingly relevant due to the growing number of marketing services that use consumers' geographic locations, thus increasing the importance of gaining insights from this information. In five studies (both field and experimental), the authors analyze the effect of geographic proximity on social influence and demonstrate that not only social proximity but also perceived homophily can trigger social influence. They find that this effect holds under alternative representations of geographic distance and is confirmed for a range of different services and even for physical goods. Furthermore, the authors show that geographic proximity has a relative effect because the social influence of a closer sender is stronger than that of a more distant sender, regardless of the absolute distances. They present managerially relevant conditions under which the influence of geographic proximity not only is comparable to other types of information such as age or gender but also provides sufficient informational value for customers to offset differences among alternatives (e.g., due to higher prices) in trade-off decisions.

Keywords: online reviews, recommendations, homophily, geographic proximity, social influence

Online Supplement: http://dx.doi.org/10.1509/jm.16.0057

The growing availability of consumer geographic information (Crandall et al. 2010; Takhteyev, Gruzd, and Wellman 2012) provides companies with ample opportunity to use this information for marketing purposes (Luo et al. 2013; Xu et al. 2011). Given that the likelihood of social influence has long been known to be higher with geographic proximity (Festinger, Schachter, and Black 1963; Hägerstrand 1967), obvious applications of geographic information would be to stimulate word of mouth and enhance social influence among consumers. Despite the large body of research on the indirect role of geographic proximity in the likelihood of social influence (Van den Bulte 2010) and the conditions for successful word of mouth (Libai et al. 2010), insights into how geographic proximity directly affects the strength—and, therefore, the success—of social influence remain sparse. Because messages from similar others exert greater influence on receivers (Brown and Reingen 1987; Forman, Ghose, and Wiesenfeld 2008), we propose that geographic information might provide signals that lead to perceived homophily. Thus, this article focuses on the relationship between geographic proximity and perceived homophily and investigates the conditions under which information about geographic proximity is sufficient to establish levels of perceived homophily that are high enough to produce a sizable social influence.

We contribute to marketing research and practice by demonstrating, for the first time, that not only actual homophily (or social proximity) but also perceived homophily can trigger social influence in a managerial context. In the experimental studies, we find that this effect holds under different representations of geographic distance, even when alternative indicators of homophily (such as age and gender) are considered. Furthermore, we show that geographic proximity has a relative effect because the social influence of a closer sender is stronger than that of a more distant sender, regardless of the absolute distances. We can derive concrete implications because the observed effect of perceived homophily is confirmed through a range of different services and physical goods. Most intriguing and novel is our finding that perceived homophily provides sufficient informational value for customers to offset the differences among alternatives (e.g., due to higher prices) in trade-off decisions.

Our findings indicate the economic relevance of geographic data and yield important insights to help companies manage social influences among consumers. We show that geographic information could be especially relevant in the context of electronic and mobile commerce (e.g., Luo et al. 2013) and derive managerial implications for increasing the efficiency of online customer reviews (OCRs), targeted advertising in social networks, and product recommendations among peers.

Jannik Meyners is Research Fellow, Kühne Logistics University and University of Hamburg (e-mail: jannik.meyners@the-klu.org). Christian Barrot is Associate Professor of Marketing and Innovation, Kühne Logistics University (e-mail: christian.barrot@the-klu.org). Jan U. Becker is Associate Professor of Marketing and Service Management, Kühne Logistics University (e-mail: jan.becker@the-klu.org). Jacob Goldenberg is Professor of Marketing, Arison School of Business, IDC Herzliya (e-mail: jgoldenberg@idc.ac.il). The authors thank Yael Shani Feinstein, Liat Levontin, Barak Libai, Moshik Miller, and Yonat Zwebner for helpful comments and discussions on previous versions of this article. The authors contributed equally to the research and are listed in random order. Michael Haenlein served as area editor for this article.

ISSN: 0022-2429 (print)
1547-7185 (electronic)

Journal of Marketing
Vol. 81 (September 2017), 49–66
DOI: 10.1509/jm.16.0057

Previous Research and Overview of the Current Set of Studies

The importance of geographic proximity to information dissemination—and, thus, to social contagion—has been acknowledged since the early stages of innovation adoption research (Rogers 2003), with seminal work dating to the 1960s (e.g., Hägerstrand 1967). In the digital age, research on the effects of geographic proximity redirected attention as new sources of large-scale data became available, and the rise of mobile communication channels triggered increasing interest in location-based services within managerial practice. Although some scholars predicted that distance would become meaningless in the digital age (Cairncross 2001), the continued importance of geographic proximity to social contagion has been proved repeatedly in marketing research despite the advent of Internet and mobile communication channels. This finding holds not only for interactions between consumers (Bell and Song 2007) but also for information transfer between firms (Agrawal, Kapur, and McHale 2008; Angst et al. 2010; Barrot et al. 2008; Bronnenberg and Mela 2004). Table 1 provides an overview of recent studies investigating geographic proximity and social influence. Beyond the research context, the studies show differences with respect to the data (particularly the availability of social network information), the level of analysis, the analysis of moderating and mediating effects, and the operationalization of geographic proximity. The literature generally refers to an indirect effect—geographic proximity increases the likelihood of social proximity, which, in turn, increases the likelihood of social influence. In this work, we are interested in the following direct effect: Does geographic proximity affect social influence even in the absence of social proximity?

One consequence of a lack of actual social network data is that the influence on consumers of geographic proximity cannot be distinguished from that of social proximity. Because social and geographic proximity are highly interlinked concepts, geographic proximity can be used in place of social proximity if network data are absent (Manchanda, Ying, and Youn 2008; Nam, Manchanda, and Chintagunta 2010; Van den Bulte 2010). However, this interdependency also implies that a lack of network data makes it difficult to determine whether geographic proximity actually affects social influence or whether mere social proximity leads to spatial diffusion patterns (Brown and Reingen 1987; Frenzen and Nakamoto 1993). In this article, we investigate the relationship between geographic proximity (in terms of the distance between customers) and social influence when controlling for social proximity by conducting a large-scale descriptive study with customer data (Study 1; see Figure 1).

Although Study 1 provides new insights into whether the social influence of geographically close people is not only more likely to occur but also stronger (apart from social proximity), Table 1 shows that there is little understanding of which psychological construct causes the effect or of which marketing-relevant variables might influence it. In a set of four experimental studies, we contribute to the literature by exploring moderating and mediating effects on the link between geographic proximity and social influence.

When considering the factors that typically affect the strength of social influence among consumers, previous research has identified dyadic network traits (i.e., traits that describe the relationship between two people)—for instance, tie strength, communication, and mutual trust (Gilly et al. 1998)—to be most important. In Studies 2–5, we propose that consumers use their geographic proximity to senders of social influence as a cue for their level of homophily with those senders (perceived homophily), which has been repeatedly shown to affect consumer decisions about which products to adopt (Nejad, Amini, and Babakus 2015). Generally, homophily explains the tendency of people in social networks to form ties with others who are similar to themselves; therefore, homophily refers to the degree of similarity between two people (Kossinets and Watts 2009; McPherson, Smith-Lovin, and Cook 2001). In this respect, there are two reasons that high degrees of homophily can explain concurrent adoption between two consumers. First, because homophily implies similar tastes, consumers with high levels of homophily are more likely to adopt the same products (Ma, Krishnan, and Montgomery 2014). Second—and more relevant to our research question— the degree of homophily determines the amount of influence that two people can exert on each other; thus, they are likely to adopt the same products because of stronger social influences (Rogers and Bhowmik 1970). Numerous studies have shown that the degree to which a recipient considers a sender of social influence to be similar to herself or himself is associated with how likely the recipient is to change his or her attitudes and act on the sender's recommendation (Brown and Reingen 1987; Feick and Higie 1992). Thus, we investigate the mediating role of perceived homophily on geographic proximity in Study 2.

As Table 1 shows, the existing research inconsistently operationalizes geographic proximity. Because consumer perceptions can differ with the operationalization, we use the commonly used measure colocation instead of distance in Study 3. To derive implications for marketing practice, we test the managerial strength of geographic proximity. Specifically, we compare the effect of geographic proximity with those of other strong marketing demographic characteristics, such as gender and age (see Study 4). Finally, in Study 5, we test the practically relevant moderating effect of price to assess the monetary value of the proposed dimension and to demonstrate its value to customers and importance for firms.

Overall, this article provides new insights relevant to marketing research and practice by using field data, including social network information, to investigate the importance of geographic proximity for social influence and its interdependency with social proximity. When social proximity is absent, we analyze the mediating role of perceived homophily on the relationship between geographic proximity and social influence. Unlike familiarity, a related construct, perceived homophily does not require previous interactions between individuals (Edmond and Brannon 2016; Hinds et al. 2000). In addition, we evaluate the moderating influence of geographic information relative to demographic characteristics and in trade-off decisions.

Geographic Proximity and Social Influence

Theoretical Background

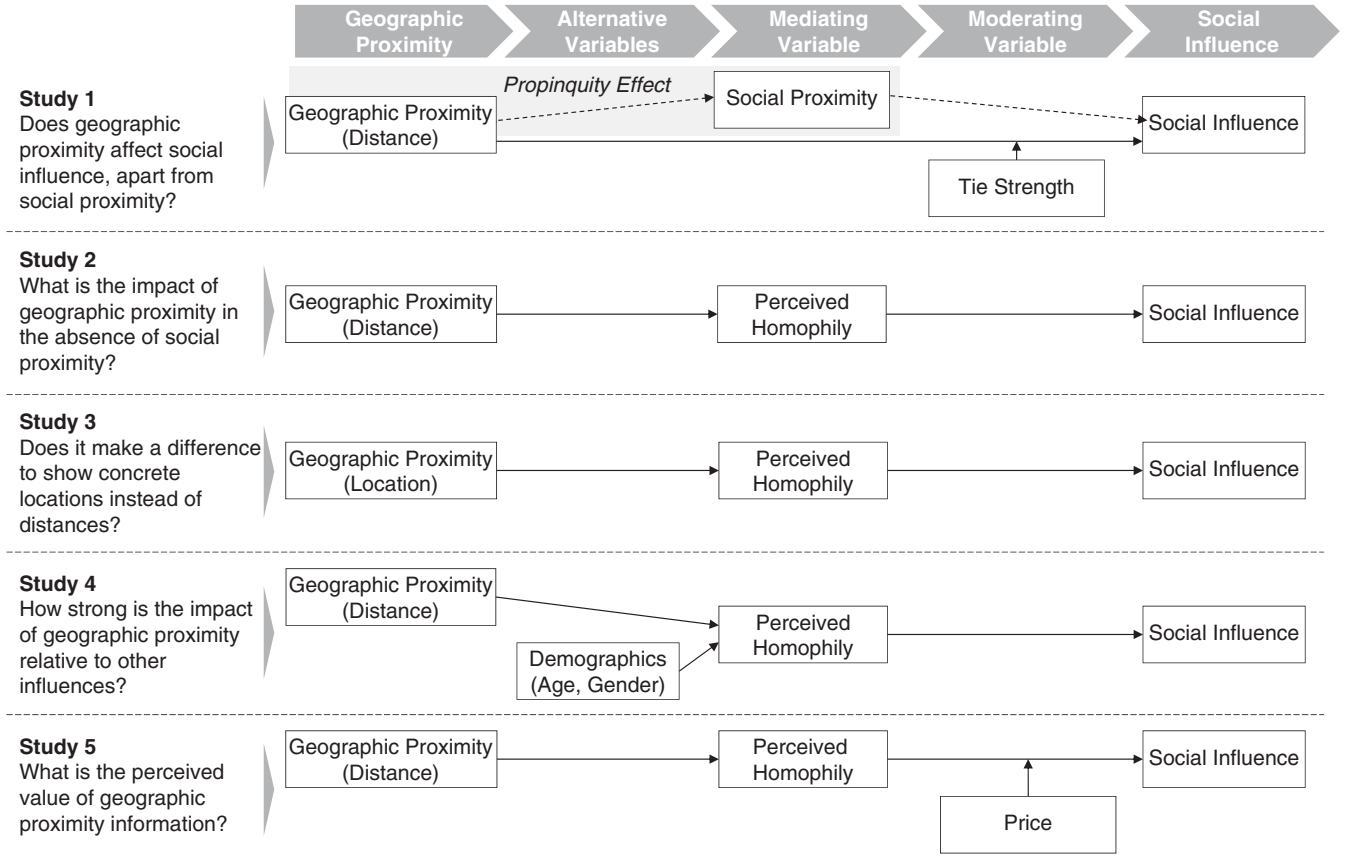
One reason it is difficult to determine whether geographic proximity actually affects social influence or whether social

TABLE 1
Review of Research Investigating Geographic Proximity and Social Influence in the Digital Age

Research	Study Context	Data Origin	Social Network Data	Level of Analysis	Moderators	Mediators	Geographic Proximity
This study	Adoption of telecommunication + review choice	Field data + experiments	Yes	Individual (customers)	Social proximity + price	Perceived homophily	Distance (in miles) + colocation
Agrawal, Kapur, and McHale (2008)	Citations of patents	Field data	No	Individual (patents)	Coethnicity[a]	—	Colocation[a]
Angst et al. (2010)	Adoptions of technological innovation	Field data	No	Individual (hospitals)	—	—	Distance (in miles)
Baptista (2000)	Adoptions of technological innovation	Field data	No	Individual (companies)	—	—	Colocation[a]
Barrot et al. (2008)	Adoptions of technological innovation	Field data	No	Individual (companies)	—	—	Distance (in kilometers) + colocation
Bell and Song (2007)	Adoption of online shopping	Field data	No	Region	—	—	Neighboring zip code areas[a]
Bronnenberg and Mela (2004)	Market entry of brands	Field data	No	Individual (supermarkets)	—	—	Adjacency of markets[a]
Choi, Hui, and Bell (2010)	Adoption of online shopping	Field data	No	Individual (customers)	—	—	Distance (in miles)
Forman, Ghose, and Wiesenfeld (2008)	Behavior in online shopping	Field data	No	State	—	—	Colocation[a]
Gimpel et al. (2008)	Candidate support in gubernatorial elections	Field data	No	County	—	—	Distance (in miles)
Lambiotte et al. (2008)	Diffusion of communication networks	Field data	Yes	Individual (customers)	—	—	Distance (in kilometers)
Lee, Scherngell, and Barber (2011)	Acquaintanceship in social networking site	Field data	Yes	University	—	—	Travel time + colocation[a]
Levy and Goldenberg (2014)	Social links in social networks	Field data	Yes	Individual (customers)	—	—	Distance (in kilometers)
Manchanda, Ying, and Youn (2008)	Adoption of pharmaceutical innovation	Field data	No	Individual (physicians)	—	—	Colocation[a]
Mok and Wellman (2007)	Communication behavior in social networks	Survey data	Yes	Individual (citizens)	—	—	Distance (in miles)
Mok, Wellman, and Carrasco (2010)	Communication behavior in social networks	Survey data	Yes	Individual (citizens)	Immigrant respondents	—	Distance (in miles)
Nam, Manchanda, and Chintagunta 2010	Adoption of video-on-demand service	Field data	No	Individual (customers)	Signal quality	—	Colocation
Preciado et al. (2012)	Development of friendships	Survey data	Yes	Individual (citizens)	Same school[a]	—	Distance (in kilometers)
Takhteyev, Gruzd, and Wellman 2012	Formation of ties on Twitter	Field data	Yes	Individual (customers)	—	—	Distance (in kilometers)

[a]Dichotomous variable (1/0).

FIGURE 1
Overview of Studies



proximity merely leads to spatial diffusion patterns is the so-called "propinquity effect," which can be defined as the higher likelihood of the formation, maintenance, and strength of social network ties in geographic proximity (Preciado et al. 2012). Multiple studies have shown that the likelihood of the formation and maintenance of social ties between people can be expressed as an inverse logarithmic function of the geographic distance between them (Levy and Goldenberg 2014). Although this relationship holds true for large distances (such as those between cities or regions; Lambiotte et al. 2008; Mok and Wellman 2007), it also applies to very small differences, such as the distance between rooms in student dormitories (Festinger et al. 1963). Interestingly, the emergence of new communication technologies whose financial costs are independent of geographic distance has not altered this relationship (Mok, Wellman, and Carrasco 2010). For instance, distributions of Twitter links, ties on social networking sites, and e-mail traffic remain a function of geographic distance that steeply declines beyond a few miles (Lee, Scherngell, and Barber 2011; Takhteyev, Gruzd, and Wellman 2012).

Thus, although it is well established in the literature that the frequency of interaction and communication depend on geographic proximity (the propinquity effect), it remains uncertain whether social influence from geographically close people is not only more likely to occur but also stronger—apart from mere propinquity and social closeness. To address this gap, we build on previous studies on social influence in geographic proximity (Bradner and Mark 2002; Latané 1981; Latané et al. 1995; Moon 1999) and on the effect of spatial distance on psychological distance (Fujita et al. 2006; Henderson et al. 2011; Trope and Liberman 2010) that do not incorporate social closeness or the propinquity effect. Thus, we examine the effect of geographic proximity on social influence and its interplay with social closeness, controlling for the propinquity effect in the following descriptive study.

Study 1: Empirical Evidence of the Relationship Between Geographic Proximity and Social Influence

Given that whether geographic proximity is merely a surrogate for social closeness, whether it increases social influence on its own, and how the two phenomena interact remain unclear, we conduct a descriptive study and examine the role of geographic proximity in social influence in a real-life setup by controlling for the propinquity effect (for detailed information on the data, the method, and the results, see the Web Appendix). Note that for this descriptive study, as well as the following experimental studies, we define geographic proximity as the distance between people based on their predominant location (living geographically close) and not necessarily on their current location (being geographically close), because temporal locations (i.e., when traveling) are less significant because they are not associated

with consumers' identities or choices. Using comprehensive social network data, we analyze how the effect of geographic proximity changes with the strength of the relationships between consumers. Specifically, we analyze how previous adopters of a mobile phone provider influence potential adopters within the same social network by incorporating information about the geographic distance between potential and previous adopters and by controlling for their social networks.

Data. The data set comprises 509,191 customers who signed up with the provider during our observation period, spanning more than 37 months from market launch. The customer data include individual-level information on the date of adoption, age, gender, zip code, and encrypted last name. In addition, we tracked the provider's call records for all customers using encoded phone numbers for the entire observation period. The call records include all calls and text messages made to the provider's other customers and to noncustomers. The duration and number of calls and messages are aggregated per dyad on a monthly level, resulting in information about more than 100 million phone connections. Having tracked all outgoing calls, the call records enable us to reconstruct each customer's social network—that is, all contacts that a customer has, including social ties (i.e., relationships or links) to existing customers and to the customers of other providers. Furthermore, these data enable us to compute network measures such as the strength of a customer's social ties. Mobile phone data have repeatedly been shown to be valid and highly representative proxies for the social relationships between individuals (Onnela et al. 2007; Shi, Yang, and Chiang 2009). Considering not only the 509,191 customers of the provider but also their social ties, we construct a social network of more than 14 million actors (i.e., individuals) and ties. In addition to these individual-level data, we recorded the provider's monthly advertising spending, another important influence on customer behavior. The data include total monthly spending and spending on specific media, such as newspapers, television, radio, and Internet. By matching the advertising data with the geographic reach of each print medium, we can obtain the advertising spending per month at the zip code level to control for regional heterogeneity as a potential reason for spatial contagion. For national media (the smallest share of the company's advertising activities), we allocated spending evenly across all zip codes. To further control for regional attributes, we obtained additional data, such as the purchasing power in each zip code. A zip code refers to an area of 10,000 inhabitants on average, the smallest possible aggregation level with respect to the available spatial data.

Method. We use comprehensive data on the dates on which each customer adopted the product and multiple sources of influence on each potential customer to develop an empirical model of the effect of each driver of the adoption decision. Specifically, we examine the extent to which social contagion affects the decision to adopt the provider by analyzing geographic proximity among consumers and controlling for numerous sources of influence and social network traits. Given the dynamic nature of the data, we estimate a semiparametric Cox regression model that includes time-varying covariates. The model includes covariates and estimates the effect of each on the hazard to adopt by using both time-varying covariates and time-invariant predictors. The full model including all variables can be written as follows:

$$
\begin{aligned}
(1)\quad h_i(t|X_{it}) = f\,(&\text{Exposure}_{it}, \text{GeographicProximity}_{it},\\
&\text{NetworkOverlap}_{it}, \text{Household}_{it}, \text{TieStrength}_{it},\\
&\text{Age}_i, \text{Gender}_i, \text{NetworkDegree}_i,\\
&\text{LocalPenetration}_{it}, \text{PurchasingPower}_i,\\
&\text{Advertising}_{it}).
\end{aligned}
$$

Table 2 provides an overview of the operationalization of all the variables. The descriptive measures and correlations appear in Appendix A.

Results. Table 3 presents the results from the hazard regression estimated with 509,191 cases. The hazard ratios are interpreted such that an increase in the variable of one unit increases the hazard of adoption by 1 hazard ratio percent. The model has high explanatory power, as indicated by the chi-square test, and the signs of the focal variables and the control variables are in line with both our expectations and traditional adoption theory.

The results show a strong effect of geographic proximity ($\exp(\beta_2) = 1.057$, $p < .01$) on adoption. The coefficients are interpreted as an increase of one standard deviation (i.e., .63) that accelerates the time to adoption by 5.7%. We use the inverse of the distance, so an increase of one unit represents approximately 1.6 km (or 1 mile). The social influence of previous adopters living close to the subsequent adopter is significantly stronger than that of those living farther away. We find this significant influence of geographic proximity even though the model incorporates three control variables for the propinquity effect (i.e., $\text{NetworkOverlap}_{it}$, TieStrength_{it}, and Household_{it}), all of which are significant and explain a

TABLE 2
Operationalization of Variables

Variable	Operationalization
1. Exposure_{it}	Σ previous adopters j in i's social network up to month t
2. $\text{GeographicProximity}_{it}$	Σ_j (1/1 + distance in km between i and j)
3. $\text{NetworkOverlap}_{it}$	Σ_j (# joint social ties of ij/# social ties of i + # social ties of j)
4. TieStrength_{it}	Σ_j (communication volume ij/communication volume i)
5. Household_{it}	1 = i and j share same zip code and same last name
6. Age_i	Prospect i's age in years
7. Gender_i	Prospect i's gender (1 = female)
8. NetworkDegree_i	Number of social ties in i's social network
9. $\text{LocalPenetration}_{it}$	Σ previous adopters in i's zip code per 1,000 inhabitants up to month t
10. PurchasingPower_i	Purchasing power (in €) in i's zip code
11. Advertising_{it}	Provider's advertising spend (in €) in i's zip code in month t

TABLE 3
Hazard Regression Results on the Strength of Adoption Drivers

		Hazard Ratio	SE	Z-Score
$Exposure_{it}$	β_1	1.121	.0018	69.36
$GeographicProximity_{it}$[a]	β_2	1.057	.0017	35.27
$NetworkOverlap_{it}$[a]	β_3	1.023	.0010	22.70
$TieStrength_{it}$[a]	β_4	1.089	.0014	67.97
$Household_{it}$	β_5	1.258	.0072	40.40
Age_i[a]	β_6	1.054	.0015	37.64
$Gender_i$	β_7	.963	.0027	−13.13
$NetworkDegree_i$[a]	β_8	1.061	.0004	162.57
$LocalPenetration_{it}$[a]	β_9	1.014	.0008	17.02
$PurchasingPower_i$[a]	β_{10}	1.016	.0014	11.40
$Advertising_{it}$[a]	β_{11}	1.021	.0032	6.65
$GeographicProximity_{it} \times TieStrength_i$	β_{12}	.979	.0004	−51.35
Likelihood-ratio χ^2			47,006	
Log-likelihood			−6,216,943	

[a]Variables are standardized to have mean of 0 and standard deviation of 1.
Notes: N = 509,191.

considerable part of adoption behavior. Yet the increase in adoption hazard of 5.7% caused by a mere 1.6 km difference shows that, over larger distances (e.g., between cities), differences in geographic proximity yield substantial differences in the strength of social influence. It is important to recall the nonlinearity of the effect: whereas a difference of approximately 1.6 km will have a large impact on consumers who live closer to each other (e.g., 1 km vs. 3 km), the effect becomes smaller as distances increase (e.g., 150 km vs. 152 km). Here, an additional distance of 1 km is less relevant, but differences of, for instance, 50 km will have a strong influence on whether a recommendation by a previous adopter is followed.

Interestingly, the interaction between geographic proximity and tie strength indicates that the effect of geographic proximity is negatively affected by tie strength ($\exp(\beta_{12}) = .979$, $p < .01$). This finding is remarkable in two ways: First, the negative sign of the interaction shows that the effect of geographic proximity is not merely a result of the propinquity effect but that geographic proximity leads to a stronger social influence independent of the propinquity effect. Second, this finding shows that the effect of geographic proximity increases with decreasing tie strength to previous adopters. In particular, we find that if consumers receive word of a specific product or its features by an adopter whom they do not know well (e.g., more remote acquaintances), consumers look for cues about the adopter that they can use to assess the recommendation about the product's suitability to their personal needs and tastes.

Discussion. The findings indicate that geographic proximity exhibits the expected effect on the strength of social influence—even after controlling for the propinquity effect. Most importantly, the results also indicate that the effect of geographic proximity becomes stronger with decreasing tie strength between the previous adopter and the subsequent adopter. This result suggests that people with high tie strength do not need to use distance as a cue for homophily to assess the credibility or helpfulness of a recommendation; however, geographic proximity may work as a cue when ties are weaker because of the absence of other information. This fact has two important practical implications. First, geographic data beyond social network information are valuable to companies, and thus, geographic proximity is not merely a proxy for social proximity but can be used as an independent construct. Second, the results indicate that geographic information is especially useful when social ties are unknown or nonexistent—for example, in electronic or mobile commerce environments such as OCRs.

Naturally, this descriptive study cannot support the hypothesized mediation of perceived homophily, and it cannot reveal the value of this information to the consumer and the firm. The next sections address these two questions. In the following, we theorize that perceived homophily indeed serves as a mediator for geographic proximity, and we test this relationship experimentally.

Relationship Between Geographic Proximity and Perceived Homophily

Theoretical Background

Because homophily is a highly multidimensional construct, there are various dimensions on which two people can either be actually similar or merely perceive themselves to be similar (Lazarsfeld and Merton 1954). These dimensions can be objective (e.g., age, gender, income) or subjective (e.g., lifestyles, values, beliefs, attitudes; McPherson, Smith-Lovin, and Cook 2001; Rogers and Bhowmik 1970). Multiple studies have demonstrated that both objective demographic homophily (Brown and Reingen 1987; Nitzan and Libai 2011; Risselada, Verhoef, and Bijmolt 2014) and subjective homophily strongly affect word of mouth and the strength of social influence (Gilly et al. 1998). A higher level of homophily increases the likelihood that a recommendation will be perceived as credible, helpful, and relevant to the receiver's needs. This positive perception of the recommendation reduces the uncertainty

that customers face before making a purchase (Gilly et al. 1998; Schmitt, Skiera, and Van den Bulte 2011). Moreover, interpersonal similarity has been shown to decrease the psychological distance such that actions from similar individuals are construed at more concrete levels, increasing individuals' influence on one another's decisions (Liviatan, Trope, and Liberman 2008; Zhao and Xie 2011).

However, what if people know one another only a little or not at all and are thus unable to rely on homophily? For instance, a consumer receiving a product recommendation from a remote acquaintance cannot validly assess whether the recommender is actually similar to him or her. In many contexts of online peer influence (e.g., OCRs on shopping websites), an OCR reader does not know the reviewer at all and faces uncertainty concerning whether a recommendation should be followed. In that circumstance, consumers must use cues that allow them to derive the level of (perceived) homophily to the recommendation sender. These cues can take the form of the sender's available personal information or take more subtle forms, such as the sender's style of communication (Berger and Iyengar 2013; Moon 1999).

We propose that consumers use geographic proximity to senders of social influence as a cue for their level of homophily with those senders. To support this proposition, different theoretical streams can be used to argue for the proposed relationship between geographic proximity and perceived homophily. First, geographic space can be considered a source of homophily because neighborhoods are often homogeneously formed with respect to social, economic, or educational attributes (Hipp, Faris, and Boessen 2012; McPherson, Smith-Lovin, and Cook 2001). As a result, deriving homophily on the basis of a shared geographic location can be reasonable—though in reality, the relationship refers only to a limited geographic area (i.e., a neighborhood). Second, according to construal level theory (Trope and Liberman 2010), both the degree of homophily and the spatial proximity determine the psychological distance (Fujita et al. 2006; Henderson et al. 2011; Liviatan, Trope, and Liberman 2008); that is, events are construed and information is processed similarly for spatial distance and for the level of homophily. Thus, we argue that in the absence of information about the actual level of homophily, consumers might use spatial proximity as a proxy for the level of homophily to construe and process recommendations. Furthermore, to increase a consumer's feeling of similarity to another because of geographic proximity, the geographic area in question (e.g., the consumer's neighborhood, city, region, or state) must serve as an indicator of specific traits that people are expected to share. In this respect, social identity theory (Turner and Tajfel 1986) might serve to explain more general relationships among geographic proximity, homophily, and social influence. According to social identity theory, a geographic area can be considered part of one's social identity, which might lead consumers to perceive geographically close people to be more similar to them (Huddy and Khatib 2007; Turner and Tajfel 1986). As a result, we propose that the level of perceived homophily is higher, which is why geographic proximity increases the strength of the social influence that a recommendation has on people. In Study 2, we examine the role of geographic proximity on social influence in the absence of actual social interaction and test the mediation of perceived homophily using a discrete choice experiment.

Study 2: Effects of Geographic Proximity and Homophily

To examine the causal effect of geographic proximity on social influence and the mediation of perceived homophily, we conduct a controlled experiment. We choose online ratings, a special form of OCR, as our experimental scenario because they not only have the advantage of possessing significant managerial relevance (Chevalier and Mayzlin 2006; Godes and Mayzlin 2004; Naylor, Lamberton, and Norton 2011) but also provide a setting that can experimentally exclude potential confounds.[1] Reviewers and OCR receivers typically do not know one another, which is why other social network traits, such as actual homophily or tie strength, play no role in the customer's decision of whether to follow a review. Furthermore, there is neither direct communication between the reviewer and the OCR receiver nor a (reasonable) chance of future communication that could increase the trustworthiness of a recommendation (Bradner and Mark 2002). For this reason, geographic proximity can become important to indicate potential homophily. In this case, testing a scenario can be credible because of its high resemblance to the day-to-day experiences of the people in the study.

Procedure. To test the causal relationship between geographic proximity and social influence, we conducted a discrete choice experiment that very closely resembled a real-life setting and customer experience. Specifically, participants were presented a fictitious scenario involving a smartphone application called surprise-vacations.com, which they browsed to book hotels for their vacations. Next, we introduced blind booking as a special feature of the app in which the customer can book an unknown hotel at his or her desired destination in exchange for a large discount (analogous to Hotwire.com). The participants were shown OCRs and had to decide on a hotel. The blind-booking scenario has the advantage of excluding the qualitative, written content of a review as a confounder while maintaining a realistic scenario (we told the participants that all materials that could contain information about the exact hotel were excluded). The participants were shown a screenshot of the mock app that displayed three hotels and their OCRs in a visually similar design to other apps of this type. The participants had to choose one of these hotels for their next vacation at a destination of their choice (see the full scenario in Appendix B).

For each hotel, we displayed star ratings for multiple relevant criteria, a generic reviewer user name, and the date that the review was posted. The last element did not vary but was included to provide a more realistic setting. Most importantly, we displayed the exact distance to the (fictitious) reviewers using five distances (1.2 miles, 5.6 miles, 48 miles, 110 miles, and 890 miles). The distances were set such that the analysis covered different geographic areas, such as neighborhoods, regions, or states. Appendix C shows an example of the choice set in the fictitious app.

[1]In previous research, both online ratings and reviews were subsumed under the term OCR. Because ratings only provide a more structured way to review products or services, we use rating/review and rater/reviewer correspondently.

Among the three OCRs shown, two were equal with respect to their star ratings (dominant options) but were ostensibly written by users at different geographic distances. Among the participants, we used all possible combinations of two distances from among the five distances enumerated previously. The third OCR provided a lower star rating (dominated option) and was displayed to serve as a manipulation check and to create a more realistic setting in which the choice between the hotels is not driven by the distance. The distance for the dominated option was randomly assigned, but the option never exhibited the shortest distance. In addition, we varied the user name, the hotel name (A, B, or C), and the order in which the hotels were shown. After choosing the desired hotel, the participants were asked to indicate on a multi-item seven-point scale their perceived homophily to two of the reviewers (Gershoff, Mukherjee, and Mukhopadhyay 2007).

Participants. Our sample consisted of 606 participants[2] from the United States recruited online through Amazon Mechanical Turk (MTurk). We chose the number of participants on the basis of 20 experimental conditions altering geographic proximity and order of hotel presentation, as well as our aim of obtaining 30 participants per condition. The mean age was 31 years, and 44% of our participants were female. The distribution of U.S. zip codes in our sample was well matched to the actual distribution of the population (see the descriptive statistics in Table 4).

Results. The manipulation in which the star ratings created dominant and dominated options seemed to work well, as only 1% of respondents chose the dominated option. Using only the two dominant options, we estimated a conditional logit model with hotel choice as the dependent variable and geographic proximity as the choice predictor. The results in Table 5 also reveal a significant effect of geographic proximity on hotel choice ($\beta = .97$; $z = 10.59$, $p < .01$), with a model fit of pseudo-$R^2 = .15$. Furthermore, if the choice of hotel did not depend on geographic proximity to the reviewer, we would expect a random choice of a 50% share for each of the two dominant options. However, an analysis of all of the choices independent of the specific combination of distances reveals that 72% of the participants picked the hotel reviewed by the user that was geographically closer. Thus, the actual choice is significantly different from being equally split between the close and the distant reviewers ($F(1, 605) = 151.26$, $p < .01$). A binomial test for the share of the close hotel also yields a significant difference ($p < .01$) from .5. In addition, we test how the choice of the geographically close review is affected by response latency by using a one-standard-deviation difference from the mean to indicate low and high outliers (Ratcliff 1993). In this respect, the results are robust to outliers because excluding outliers only slightly alters the share of those who chose the hotel with a geographically closer reviewer (excluding outliers = 74% vs. including outliers = 72%).

[2]The deviation from the exact number of participants we aimed for is because some MTurk users took the survey but failed to confirm the completed task. For this reason, in Studies 2–3, we have a few more participants than intended.

Analyzing the possible combinations of distances between the two dominant options separately shows that the effect is, surprisingly, independent of the actual combination of distances displayed. It is sufficient that one reviewer lives geographically closer than does the other reviewer. Thus, the effect of geographic proximity seems to be relative and is not limited to a specific area or range of miles.

Because geographic proximity has also been shown to affect the strength of social influence in OCRs, we test how the role of geographic proximity relates to perceived homophily (Judd, Kenny, and McClelland 2001). Using a seven-point scale in a postexperiment survey, we indeed find a significant difference ($F(1, 605) = 96.23$, $p < .01$) between perceived homophily with the geographically closer user ($M = 4.86$, $SD = 1.03$) and perceived homophily with the more distant reviewer ($M = 4.45$, $SD = 1.05$). This finding holds for each combination of two distances when measured separately. Estimating the conditional logit model with geographic proximity and homophily as choice predictors allows us to statistically test the mediation effect of homophily between geographic proximity and hotel choice (Sobel 1982). The analysis indicates significant mediation ($z = 5.05$, $p < .01$) of homophily between geographic proximity and hotel choice. In addition, we test the mediation by conducting a bootstrap analysis (1,000 samples), which also yields a significant indirect effect of proximity on choice through homophily ($\beta = .15$, $SE = .036$; 95% confidence interval = [.084, .222]).

Robustness checks. Considering that in real life, consumers can choose to abort a buying decision if they do not feel confident making a decision on the basis of the information provided, it is possible that consumers prefer not to choose any of the presented options when distances have no information value. Therefore, we replicated Study 2 with an additional option allowing the participants to choose neither of the presented hotels (for details, see Study 2b in Table 4). Interestingly, the results indicate that providing a no-choice option does not significantly alter the participants' choices (only 3% chose not to pick any hotel option). Given that the ratios among the close (68%), far (28%), and dominated (2%) alternatives equaled those in Study 2, it is unsurprising that we also found the results concerning the relationship between geographic proximity and perceived homophily to be very similar.

To assess whether the relationship found holds in other product categories, we conducted three analogous experiments using different services (i.e., cloud services and online banking) and physical products (i.e., smartphones). Unlike hotels, in which the evaluation depends on consumers' specific tastes, these products can be assessed on the basis of objective features. Furthermore, all of these services are location-independent and, thus, avoid potential confounders that might arise in a tourism or travel context. In terms of the choices and perceived homophily, the results from Studies 2c–e (see Table 4) are very similar, if not more pronounced, to the results of the hotel setting; between 85% (smartphone) and 87% (online banking) of participants chose the closer of the two dominant options. Similarly, we find for all three additional settings a significant difference between perceived homophily with the geographically closer user ($M = 4.83$–4.87, $SD = 1.04$–1.08) and perceived homophily with the

TABLE 4
Descriptive Statistics for the Experimental Studies

	Study 2		Study 2b		Study 2c		Study 2d		Study 2e		Study 3		Study 4		Study 5	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Dependent Variables																
Choice of …	Hotel (1 = close)		Hotel (1 = close)		Cloud service (1 = close)		Online banking (1 = close)		Smartphone (1 = close)		Hotel (1 = close)		Option (1 = close)		Hotel (1 = expensive)	
Choice: close	72%		68%		86%		87%		85%		78%		—		78%	
Choice: far	27%		28%		12%		11%		13%		21%		—		21%	
Choice: dominated	1%		2%		2%		2%		2%		<1%		—		<1%	
No choice	—		3%		—		—		—		—		—		—	
Independent Variables																
Perceived homophily[a]																
Close choice	4.86	1.03	4.91	1.09	4.85	1.06	4.87	1.08	4.83	1.04	4.86	1.06				
Far choice	4.45	1.05	4.09	1.09	4.28	1.10	4.26	1.20	4.43	1.07	4.31	1.09				
Geographic distance[b]													204.09	336.55		
Age[c]													12.53	8.60		
Gender[d]													.49	.50		
Price difference[e]															−7.14	5.92
Homophily difference[e]															−.55	1.14
Price × Homophily															−.04	5.93
N	606		702		701		711		743		636		702		405	

[a]Based on a seven-point rating scale.
[b]Distance between reviewer and participant (in miles).
[c]Difference in age between reviewer and participant (in years).
[d]Match in gender between reviewer and participant (1 = yes).
[e]Difference in price/homophily between close and far hotel.

TABLE 5
Conditional Logit Model on the Influence of Geographic Proximity (Study 2)

	Model A			Model B		
	Coefficient	SE	Z-Score	Coefficient	SE	Z-Score
Geographic proximity	.97	.09	10.59	.75	.10	7.58
Perceived homophily				.94	.13	7.46
Pseudo-R^2		.15			.24	

Notes: N = 606.

more distant reviewer (M = 4.26–4.43, SD = 1.07–1.20). In conclusion, we can show that the findings from Study 2 are generalizable across product categories and hold for both services and physical goods.

Discussion. Study 2 demonstrates that if two people are geographically closer to one another, their social influence on one another is stronger than with more geographically distant people, regardless of the geographic distances used in the analysis. Short distances, for example, can refer to a neighborhood or city, whereas longer distances can indicate a region or state; the results, however, do not change with respect to which two distances are compared. Furthermore, the results indicate that the greater influence of geographically close reviews is mediated by perceived homophily. That is, geographically close people are believed to be more similar, leading those people to have a stronger social influence on the subject. This result is supported for a range of services and physical goods. These findings corroborate and extend the results from Study 1 by replicating the role of geographic proximity on strangers and by demonstrating the mediation of perceived homophily. Next, we explore the conditions under which this effect exists.

Testing Conditions for the Influence of Geographic Proximity

Study 2 establishes the relationship between geographic proximity and perceived homophily. Although the results demonstrate a mediating effect of perceived homophily for the influence of geographic proximity on consumer choice, it is necessary to investigate the conditions under which information about geographic proximity can establish levels of perceived homophily that result in sizable social influence. Considering the multitude of conditions that can affect the influence of geographic proximity, we limit ourselves to variations that are of managerial relevance. Specifically, we investigate (1) whether the mediating effect of perceived homophily changes with the presentation of geographic proximity (location instead of distance); (2) how information on geographic proximity compares with other types of information used by companies, such as age and gender; and (3) whether and to what degree the availability of information on the geographic proximity of a reviewer affects the willingness of prospective customers to accept higher prices in trade-off decisions.

Study 3: Location Versus Distance

In the preceding studies, we use a direct measure of geographic proximity either derived from the actual distance in kilometers between consumers (Study 1) or displayed as the distance in miles to an online reviewer (Study 2). However, in cases in which information on the exact locations and distances of both parties is unavailable, most OCR-based websites (e.g., Expedia, TripAdvisor, Yelp, Amazon) provide information about the actual location of the reviewer. Thus, we test whether the findings hold when concrete locations (instead of distances) are displayed to ensure their robustness and managerial applicability. With this design, and in order to increase the validity of this phenomenon, Study 3 aims to replicate Forman, Ghose, and Wiesenfeld's (2008) research, which has shown that colocation at the state level influences customer behavior but has simultaneously shown that this effect is not just a state-level effect but exists at all scales. Finally, the purpose of this study is to establish the link to perceived homophily as a general mechanism that works on all scales (including at the state level).

Procedure. We altered the experiment from Study 2 by showing the U.S. state in which the reviewer lived instead of the distance from the reviewer in miles (for an example, see Appendix D). After the participants were asked to provide their demographics and indicate the state in which they lived, they were shown a blind-booking scenario similar to that in Study 2. One OCR was ostensibly written by a user living in the same state as the participant, and the two other OCRs were ostensibly written by users from two (randomly chosen) different states. Again, two hotels had equal star ratings (dominant options), and one hotel had an inferior star rating.

Participants. The sample consisted of 511 participants recruited from the United States with the help of MTurk. The mean age of participants was 33 years, and 36% were female. The participants were from various U.S. regions, and the distribution of the participants' states corresponded to the actual distribution of the population (for details on the variables, see Table 4).

Results. Overall, the results are very similar to those found in Study 2 in which the geographically close option received a 72% share. Specifically, in this setting, 78.3% chose the hotel reviewed by a user from the same state, and only 21.1% picked the hotel reviewed by a user from a distant state. As before, we analyzed the effect of geographic proximity by estimating a conditional logit model (see Table 6). The results indicate a significant influence of geographic location ($\beta = .83$; $z = 6.71$, $p < .01$) on the choice between the same-state OCR and the

TABLE 6
Conditional Logit Model on the Influence of Geographic (Same-State) Location (Study 3)

	Coefficient	SE	Z-Score
Geographic proximity	.83	.12	6.71
Homophily	1.02	.14	7.24
Pseudo-R^2		.37	

Notes: N = 636.

distant-state OCR (again, we used only the two dominant options). With respect to perceived homophily with the reviewers, we find a positive influence ($\beta = 1.02$; $z = 7.24$, $p < .01$) that is significantly higher ($F(1, 510) = 213.24$, $p < .01$) for users from the home state ($M = 4.91$, $SD = 1.09$) than for users from a distant state ($M = 4.09$, $SD = 1.09$). The results replicate the findings from Studies 1 and 2; moreover, we find that the role of geographic proximity holds regardless of whether the distance or an actual location is displayed.

This result emphasizes not only the robustness but also the managerial applicability of our findings. Even when firms have rather nonspecific information about the geographic locations of their reviewers (such as their home state), this information can be used to improve the selection of OCRs displayed in search results.

Study 4: Geographic Versus Demographic Information

Geographic proximity is not the only type of information that influences perceived homophily. For example, information on the reviewers' age and gender has been found to influence perceived homophily (Brown and Reingen 1987; Nitzan and Libai 2011; Risselada, Verhoef, and Bijmolt 2014) and is also frequently used by companies (e.g., TripAdvisor). If companies had information on geographic proximity, age, and gender available and wanted to present prospective customers with OCRs sorted on the basis of one type of information, they would not know which to choose. In other words, given that age and gender are typically considered most important for social influence, we test whether geographic proximity adds value beyond these strong drivers. If so, it should be added as a sorting criterion in practice. To understand the importance of this effect, we want to compare these three factors on their respective relative effects on social influence. Given the importance of default settings (e.g., Johnson, Bellman, and Lohse 2002), knowing which sorting criterion exerts the greatest influence is of high interest to companies, because OCRs that are sorted in the most influential fashion can considerably increase the conversion probability of prospective customers.

Procedure. To test the relative influence of distance on age and gender, we conducted an experimental study with a blind-booking scenario similar to those in Studies 2 and 3 in which we asked the participants to choose among three hotels. Each of the three hotel options was presented with an OCR that indicated the age and gender of the reviewer and her distance from the participant. Unlike in Studies 2 and 3, all options showed equal star ratings for the hotels. After choosing one hotel, the participants indicated their own age and gender. To analyze the relative influence of geographic proximity, age, and gender on the choice of each option shown, we estimated a conditional logit model. In line with the assumption that these variables induce perceived homophily, we used demographic similarity and distance as explanatory measures for hotel choice. For each presented hotel option, we computed a similarity score for age by subtracting the participant's age from the age shown in the review. Analogously, for gender, we created a dichotomous variable that indicated whether the gender of reviewer and participant matched (for details, see Table 4). Note that we used standardized variables in the analysis to compare the coefficients.

TABLE 7
Conditional Logit Model on the Relative Influence of Geographic Proximity, Age, and Gender (Study 4)

	Coefficient	SE	Z-Score
Geographic distance	–.38	.06	–6.84
Age	–.47	.06	–8.27
Gender	.14	.05	2.88
Pseudo-R^2		.09	

Notes: Variables are standardized to have mean of 0 and standard deviation of 1. N = 702. Interaction effects were not significant.

Participants. In total, 702 respondents from the United States (average age = 34 years; 34% female) were recruited with help from MTurk. Again, the distribution of participants' states matched the actual distribution of the overall population.

Results. The results in Table 7 demonstrate significant influences of distance, age, and gender on the hotel choice. In line with our expectations, we find that the smaller the age difference or the better the gender fit between participant and reviewer, the more likely the participants are to choose the hotel. Interestingly, the influence exerted by distance ($\beta = -.38$; $z = 6.84$, $p < .01$) is comparable to that exerted by age ($\beta = -.47$; $z = 8.27$, $p < .01$) and substantially greater than that exerted by gender ($\beta = .14$; $z = 2.88$, $p < .01$). Furthermore, the perceived homophily with the reviewer of the chosen hotel ($M = 4.95$, $SD = 1.07$; $p < .01$) is significantly greater ($t(701) = 18.56$, $p < .01$) than with reviewers of the discarded hotel options ($M = 4.24$, $SD = 1.02$; $p < .01$). These results not only confirm the relationship between geographic proximity and perceived homophily but also demonstrate that distance information is as potent as demographic information. Although age is already used as a key variable for targeting and segmentation in all fields of marketing, we find that geographic location is equally powerful. This finding is of special importance for the practice of marketing because it places distance in the same league with central marketing parameters such as age and gender. Considering that companies can acquire information on location much more easily and cheaply than on demographics for anonymous website users (Crandall et al. 2010; Takhteyev, Gruzd, and Wellman 2012), this result not only implies effective default sorting mechanisms for OCR-based websites but also provides a strong, measurable marketing variable. Given the considerable effort that online retailers typically exert to increase conversion by only a few percentage points, the strong effect of a factor that is usually available and known by the company can considerably affect the business of online retailers and review websites.

Study 5: Value of Geographic Proximity

As the previous studies show, stronger social influence results from higher perceived homophily with geographically close consumers. Feeling more similar to recommenders increases the recipients' trust that the reviewed product meets their needs and that they will be satisfied with their choice (Schmitt, Skiera, and Van den Bulte 2011). Thus, a geographically close

recommendation helps consumers reduce uncertainty in their purchase-decision process (Murray 1991). In the previous studies, the uncertainty was equal for the (dominant) alternatives, and we manipulated only information concerning the reviewer (i.e., geographic proximity, age, and gender). In reality, alternatives are rarely equal, which leads customers to make trade-offs and, thus, raises the question of whether information about geographic proximity can offset differences in uncertainty concerning alternatives (e.g., uncertainty induced by different prices). This question is highly relevant from a managerial perspective because such an effect would enable managers to display the geographic information of OCRs to influence consumer choices directly. For example, a consumer might choose a more expensive hotel offering over an equally rated alternative if the author of the respective OCR is perceived to be more similar than the one reviewing a cheaper hotel based on only geographic distance. Furthermore, the availability of geographically close reviews for a specific product could even be used as an input parameter for the dynamic pricing algorithms that many online retailers use. As more close reviews become available, companies could charge that user a higher price for the product. At the same time, such trade-off decisions reveal how much value a customer assigns to the displayed review from a closer source (compared with a more distant source) and, thus, provide a measurable estimation of the value of geographic distance.

Procedure. To examine whether information about geographic proximity can offset differences in uncertainty concerning alternatives, we altered the choice experiment from Study 2 by adding prices to the hotels in the surprise-vacations.com mobile app display. We retained the previous experimental setting to make the results comparable. Considering the results from Study 2, which showed that the effect of geographic proximity was independent of the concrete combination of distances, we varied the distances on only two options (i.e., close vs. distant). Specifically, participants observed a choice set of hotels at the same destination, with one hotel ostensibly reviewed by a user living 1.2 miles away (close review) and another hotel (with the same star ratings) ostensibly reviewed by a user living 890 miles away (distant review). Again, as a manipulation check, we included a dominated option with worse ratings than the two dominant options.

To test whether participants would still choose the geographically close option despite a higher price, we added price tags to the hotels. Although we varied the price of the hotel reviewed by a geographically distant user between $79 and $99, the prices for the hotel with the OCR in geographic proximity ($99) and the dominated option ($109) were constant. Specifically, we tested prices of $79, $89, and $91–$99 (in increments of two dollars) and varied the generic username and the order of the hotels. Thus, each participant picked a hotel from the choice set and, as in Study 2, indicated the perceived similarity of the reviewers.

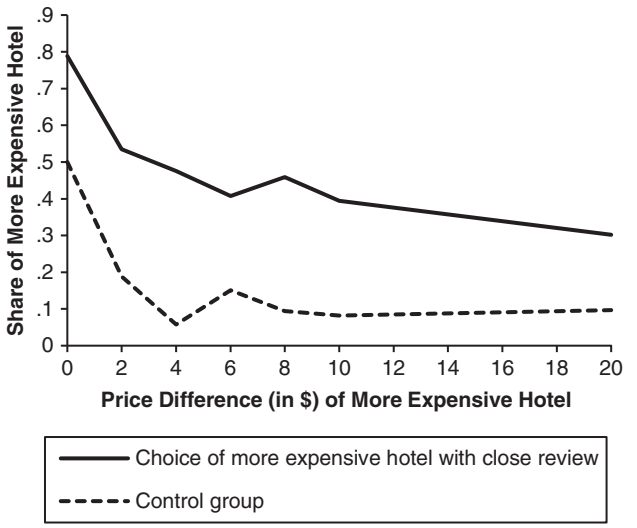
In addition, we measured the effect of the price in a control group in which the price difference between the two dominant options varied but no information about the location of the reviewer was displayed. This approach allowed us to compare how many participants chose the more expensive hotel in the cases of both knowing (experimental group) and not knowing (control group) the reviewer's location. Given that participants must make trade-off lower prices against reviews from someone close to them, the experimental setup enables us to examine the extent to which consumers value the product feature of a close review.

Participants. We conducted the experiment on MTurk using 817 participants from the United States. The number of participants was again based on 27 different conditions with respect to prices and the order of hotels, and we aimed to collect at least 30 participants per condition. The mean age of our sample was 34 years, and 42% of the participants were female. Details on the variables used in the analyses appear in Table 4.

Results. The condition with equal prices in which both the hotel with a close review and the hotel with a distant review cost $99 replicates the findings from Study 2; 78% of the participants chose the hotel with the close review compared with 21% who chose the distant review. Thus, the close review received a significantly higher share than did the distant review ($F(1, 51) = 25.44$, $p < .01$). Again, less than 1% of participants chose the dominated hotel. Moreover, perceived homophily is significantly higher ($F(1, 51) = 10.29$, $p < .01$) for the geographically close user ($M = 4.56$, $SD = 1.19$) than for the distant one ($M = 3.99$, $SD = 1.12$). Most importantly, the finding of greater homophily with the geographically close user holds across all price conditions.

With respect to the share of the more expensive hotel, we predict a clear pattern if there is no information about the reviewers' locations. Although respondents shown equal prices should be indifferent between the options, we expect that all those who experience price differences prefer the less expensive hotel. As one would intuit, the dashed line in Figure 2 declines

FIGURE 2
Choice of More Expensive Hotel With and Without Close Review Depending on Price Difference



Notes: The control group was the choice of the more expensive hotel without reviewers' locations.

steeply with differences of a few dollars and remains at a low level of approximately 10%, showing that respondents in the control group presented with equal prices (i.e., price difference = 0) were indeed indifferent between the options (i.e., share = .5). For respondents presented with price differences in the range of $2–$20, 80%–90% chose the less expensive option. Because the respondents in the control group acted as expected, we can exclude confounding factors.

The solid line in Figure 2, however, shows how the share for the more expensive hotel changes with the inclusion of a review written by someone who is geographically close. Specifically, the share of participants who chose the more expensive hotel with a geographically close review does not decline as steeply as that of the control group. That is, a substantial difference between the two lines shows the uplift caused by a geographically close review. The difference not only demonstrates that information on geographic proximity offsets the higher uncertainty of an alternative but can also be interpreted as the willingness to pay (WTP) for a hotel recommended by someone geographically close. Up to an 8% price difference ($8), the share of the close review remains approximately 50%. Surprisingly, even at price differences of 10%, a substantial share of participants would rather choose a hotel reviewed by someone living geographically close an equally rated, cheaper option. At a 20% difference ($20), the share received by the distant review is equivalent to the share received by the close review in the equal price condition (approximately 70%). Thus, the social influence resulting merely from geographic proximity is so strong that consumers are willing to accept higher prices to decrease their uncertainty.

To relate the findings to our theoretical argument, we also examined how this effect develops conditional on the level of perceived homophily. To do so, we estimated a logit regression of the price difference for the expensive hotel with a distant review together with the difference in homophily between the close and the distant reviewers on the choice of the more expensive hotel. The results displayed in Table 8 indicate that a price difference has a negative effect ($\beta = -.09$; $z = -4.37$, $p < .01$) and that the difference in homophily positively affects the choice of the more expensive hotel ($\beta = .81$; $z = 6.34$, $p < .01$). More interestingly, we also find a significant positive interaction between price and homophily ($\beta = .05$; $z = 1.99$, $p < .05$), which shows that the negative effect of price is weaker because perceived homophily with the close reviewer increases compared with the distant reviewer. Thus, in line with our theoretical argumentation, appreciation for a close review increases with the effect of geographic proximity on perceived homophily. This result further supports the previous results concerning the role of homophily as a mediator between geographic proximity and the strength of social influence. The results not only hold across all price levels but also show that perceived homophily exerts social influence, which also explains why consumers are willing to accept higher prices. Given that consumers accept higher prices for a product reviewed by a geographically close customer, the results from Study 5 emphasize that the social influence induced by geographic proximity and perceived homophily found in Studies 1–4 produces highly relevant managerial implications.

General Discussion

Drawing on the findings of a series of studies, this research contributes to marketing theory and practice by providing several important insights into how geographic proximity, perceived homophily, and social influence are interconnected. Specifically, the results of five studies demonstrate that not only actual homophily (or social proximity) but also perceived homophily triggers social influence. In experimental studies, we find that this effect holds under different representations of geographic distance and even when alternative indicators of homophily (such as age and gender) are presented. Furthermore, we show that geographic proximity has a relative effect because the social influence from a closer sender is stronger than that of a more distant sender regardless of the absolute distances and that geographic proximity provides sufficient informational value for customers to offset differences between alternatives (e.g., higher prices) in trade-off decisions. We can derive concrete implications because the observed effect of perceived homophily is confirmed for a range of services and physical goods.

Managerial Implications

Because the availability of consumers' geographic information is growing (Crandall et al. 2010; Takhteyev, Gruzd, and Wellman 2012), geo-marketing is becoming increasingly important (Luo et al. 2013; Xu et al. 2011). The results of our studies yield important insights to help companies actively manage social influence between consumers using geographic information and, thus, affect customer behavior.

The finding with the most basic practical relevance is likely that geographic proximity offsets obvious differences among alternative offers. Geographic proximity is not the only type of information to induce perceived homophily and, consequently, social influence (as well as age and gender; see the comparison

TABLE 8
Logit Model on the Influence of Price and Homophily (Study 5)

	Model 1			Model 2		
	Coefficient	SE	Z-Score	Coefficient	SE	Z-Score
Price	−.09	.02	−4.37	−.12	.03	−4.56
Homophily	.81	.13	6.34	.49	.19	2.62
Price × Homophily				.05	.02	1.99
Intercept	.89	.18	.49	.26	.20	1.32
Pseudo-R^2		.13			.14	

Notes: N = 405.

in Study 4), but it appears to be another valuable dimension that can be used. The results from Study 5 demonstrate the importance of reducing consumers' uncertainty in the purchase process. Increasing perceived homophily by providing information about the reviewers (e.g., their location) can outweigh obvious differences in offerings and increase the conversion rates of online shops or websites. We show that the dimension of geographic distance is stronger than gender and comparable in strength to age, a key variable for targeting and segmentation in all fields of marketing. Considering that it is much easier for companies to acquire information on the location than on the demographic characteristics of anonymous website users (Crandall et al. 2010; Takhteyev, Gruzd, and Wellman 2012), this finding provides a strong, measurable marketing variable.

Our finding that geographic proximity leads to stronger social influence has its most obvious application in the context of electronic and mobile commerce. Given that consumers seem to rely more heavily on geographically close consumers and consider their recommendations more helpful, companies could sort OCRs so that those from geographically close users are displayed first. Unlike age and gender information, which must be provided or disclosed by users, the geographic locations of online and mobile prospects can be easily and objectively tracked (e.g., through cookies or global positioning system tracking on smartphones). Therefore, customized sorting based on geographic proximity could easily be implemented on a technical level and would lead to more helpful recommendations. In this case, OCRs would not be displayed in the same order for every user (e.g., first listing those rated most helpful by other users); instead, helpfulness would be considered individually depending on geographic location. By implementing such an individually tailored order, companies can improve conversion, and customers will be better able to find products that suit their needs. If additional demographic information were available, a combination of geographic location and variables such as age or gender would result in an even more powerful sorting mechanism.

Beyond the obvious context of online shopping, the findings might be applicable in the fast-growing industry of social network advertising to increase the effectiveness of ads. In online social networks, such as Facebook, Google+, or Twitter, users' geographic locations are typically available and can be used to target social ads (i.e., ads that show Internet users products or services that their contacts like, follow, or use). Our results imply that advertising based on contacts that live in geographic proximity to the user (e.g., "John Doe likes Company XYZ") would be more influential than advertising based on someone who is geographically distant. In this context, that the higher influence of geographic proximity works in both the presence and absence of actual social ties is highly relevant. In other words, companies that use location-based services need not possess a large amount of information about the actual relationship or tie strength between two consumers, which is often unavailable to companies. Instead, geographic proximity can be used to induce feelings of homophily between consumers, a particularly interesting phenomenon with respect to the increasing number of location-based services and smartphone applications that extensively use geographic data but do not possess direct social network information about consumers.

Theoretical Implications

The findings in this article also yield several contributions to the marketing literature. First, this article extends previous studies on the effect of geographic proximity (e.g., Barrot et al. 2008; Bell and Song 2007; Garber et al. 2004; Strang and Tuma 1993) by explicitly incorporating social network data into the analysis (Study 1) and by conducting individual controlled experiments (Studies 2–5). In doing so, we not only show that geographic proximity actually matters to the strength of social influence but also examine the social network mechanisms that explain when and why geographic proximity matters. Specifically, this study demonstrates that the influence of geographic proximity is not merely a result of propinquity (Festinger et al. 1963; Mok, Wellman, and Carrasco 2010; Preciado et al. 2012). We contribute to the literature by showing that the effect of geographic proximity holds independent of the propinquity effect; indeed, the effect of geographic proximity increases as ties weaken.

We further contribute to the literature by showing that geographic proximity increases the strength of social influence even in the complete absence of social ties and that the reason behind this strength is a perceived homophily mechanism. Our findings experimentally demonstrate that geographic proximity leads to higher perceived homophily that, in turn, leads to stronger social influence. That is, consumers use geographic proximity as a signal of homophily to assess whether they should follow a recommendation. As we show, this effect is sufficiently strong that consumers are willing to accept higher prices for the uncertainty reduction of geographic proximity. These findings are not only relevant to the literature on geographic proximity but also extend the literature on homophily by including a geographic dimension and presenting the relationship between homophily and geographic location as part of consumers' social identity.

Furthermore, the results show that the effect of geographic proximity can be considered a relative one. That is, social influence is stronger when a sender is geographically closer than when the sender is geographically distant—regardless of the absolute distances or geographic ranges of the two senders. This effect is an important extension of existing studies of the effect of geographic proximity on social influence and word of mouth. Thus far, research has primarily considered the importance of individuals living close to one another, which indirectly facilitates the probability of a social influence between them (because of the likelihood of communication). However, the absolute level of geographic proximity is not the only one that matters; as we show, relatively proximate consumers also have a stronger social influence (a direct effect). In absolute terms, people living very close to one another can experience a dual, reinforcing effect through the higher likelihood and strength of social influence between them.

Finally, we analyze the conditions under which the effect of geographic proximity becomes larger or smaller. Specifically, we show that decreasing tie strength leads to an increasing effect of geographic proximity, which emphasizes that geographic proximity itself is employed to evaluate and assess a recommendation and determine whether it should be followed. In addition, we find that the results hold in spite of varying measures of geographic proximity, indicating that a customer

not only infers geographic proximity from distances but also develops perceived homophily from actual locations.

Limitations and Avenues for Further Research

Our research is not without limitations that yield promising avenues for further research. First, the data used in the descriptive Study 1 had limits. Similar to previous studies (e.g., Nitzan and Libai 2011; Onnela et al. 2007), we had to assume that the customers' social networks are stable before and after adoption. In addition, we did not have information on either the valence of the signals from the social network or the location of nonadopters. Therefore, we were not able to account for them in the hazard model.

Second, we examine the effect of geographic proximity and the mediation of homophily using a set of experimental studies. Although the results of Study 1 point in the same direction, future research studies based on field data could extend our findings to even more product categories.

Third, Studies 2–5 show that online reviews written by geographically close users are more influential and that customers are willing to accept higher prices for these reviewed products. In our analyses, we use experimental designs to demonstrate the effect of geographic proximity on social influence by excluding potential confounders to ensure high internal validity. Given that the reviewer's location is a driver of social influence on others, analyzing the importance of geographic proximity relative to other drivers of social influence (other than age and gender) and the interplay of geographic proximity with review traits, such as review content or photos, could be a worthwhile topic for future studies. Considering traits in addition to mere distance could also help rule out potential demand effects that might be created by the design of our experiments.

Fourth, in Study 5, we analyze the trade-off between prices and geographically close OCRs. Although the results show that consumers are indeed willing to accept higher prices for reduced uncertainty with the help of an OCR by someone geographically close, the experimental setup does not allow us to derive a generalizable WTP or to determine whether this WTP is an absolute or a relative amount compared with a cheaper product being rated by someone geographically distant.

Fifth, we chose an experimental design that enabled us to identify the influence of geographic information while controlling for confounding effects. Although the results demonstrate the influence of geographic proximity for a realistic case of individual-level customer ratings, a multitude of setups for OCRs exist in reality for which the results might differ. Although the validity of the results should remain unchanged, investigating the role of geographic information in different settings, for instance, with reviews containing textual information or multiple layers of sorting (aggregated ratings first, then individual-level reviews), would be worthwhile.

Finally, we study the effect of geographic proximity in two countries (a large European country and the United States) that differ with respect to the average spatial distances between cities or regions but are culturally relatively similar (Hofstede 2001). Thus, a valuable avenue for further research could be to study how the role of geographic proximity differs across countries for either geographic or cultural reasons.

APPENDIX A
Descriptive Measures and Correlations

Variable	M	SD	Mdn	Min	Max	VIF	1	2	3	4	5	6	7	8	9	10
1. $Exposure_{it}$	.50	.84	0	0	60	3.76	1.00									
2. $GeographicProximity_{it}$	.31	.63	0	0	15	3.98	.80	1.00								
3. $NetworkOverlap_{it}$	.04	.11	0	0	3.42	1.95	.68	.63	1.00							
4. $TieStrength_{it}$	.07	.18	0	0	1	1.64	.53	.48	.38	1.00						
5. $Household_{it}$	.13	.34	0	0	1	1.87	.48	.66	.41	.38	1.00					
6. Age_i	41.37	13.73	42	11	108	1.06	−.07	−.03	−.02	.02	.04	1.00				
7. $Gender_i$	.42	.49	0	0	1	1.01	.07	.06	.05	.08	.05	−.04	1.00			
8. $NetworkDegree_i$	29.45	32.99	21	0	1924	1.14	.16	.06	.05	−.07	−.02	−.20	−.02	1.00		
9. $LocalPenetration_{it}$	3.59	3.12	3.37	.17	284.77	1.04	.10	.08	.06	.06	.03	−.04	.01	−.12	1.00	
10. $PurchasingPower_i$	16.74	2.62	16.68	8.95	36.47	1.00	−.03	−.03	−.02	−.02	−.01	.03	.01	.00	−.01	1.00
11. $Advertising_{it}$	7.20	5.27	5.48	1.49	56.99	1.01	.01	.00	.00	−.01	−.01	.00	−.01	.01	−.01	.02

Note: VIF = variance inflation factor. N = 509,191. Time-varying variables are measured at time of adoption.

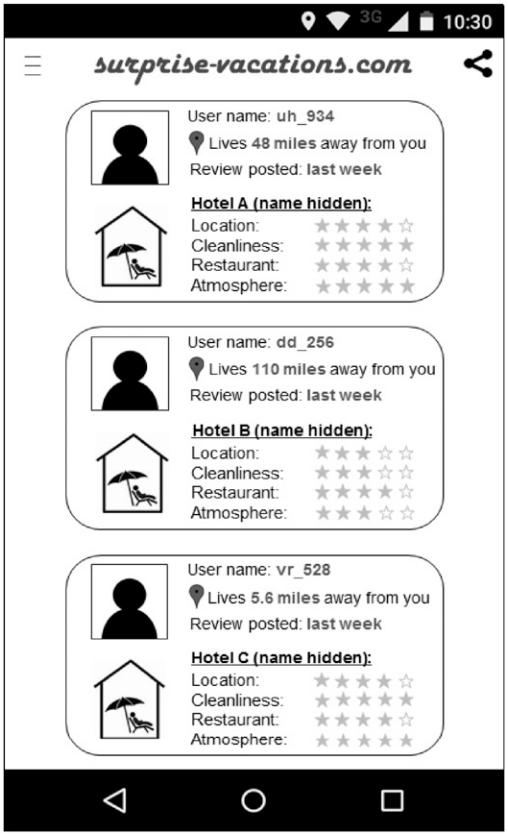
Appendix B: Scenario Details of Studies 2–6

Imagine that you are browsing on your smartphone to book hotels for your next vacation at a destination of your choice. For this, you are using a mobile app that is called surprise-vacations.com. The app offers hotels via "blind booking" (similar to hotwire.com). This means that you do not know the name of the hotel before booking, but you receive high discounts on your hotel stay.

Imagine that in the booking process you have indicated a category (e.g., 4 stars) and your desired destination. Afterward, the app shows you a set of different hotels that you can choose from. All information are hidden that would allow you to infer the name of the hotel.

In the following, you are shown the set of hotels and you are asked to indicate which hotel you would most likely choose for your next vacations.

APPENDIX C
Example of Choice Set in Blind Booking Mobile App



APPENDIX D
Example of Choice Set for Study 3

Hotel A	Hotel B	Hotel C
Review by user: uh_934 from Tennessee	Review by user: dd_256 from California	Review by user: vr_528 from Maryland
Location: ★★★★☆	Location: ★★★★☆	Location: ★★☆☆☆
Cleanliness: ★★★★★	Cleanliness: ★★★★★	Cleanliness: ★★☆☆☆
Restaurant: ★★★★☆	Restaurant: ★★★★☆	Restaurant: ★★★★☆
Atmosphere: ★★★★★	Atmosphere: ★★★★★	Atmosphere: ★★☆☆☆

REFERENCES

Agrawal, Ajay, Devesh Kapur, and John McHale (2008), "How Do Spatial and Social Proximity Influence Knowledge Flows? Evidence from Patent Data," *Journal of Urban Economics*, 64 (2), 258–69.

Angst, Corey M., Ritu Agarwal, Vallabh Sambamurthy, and Ken Kelley (2010), "Social Contagion and Information Technology Diffusion: The Adoption of Electronic Medical Records in US Hospitals," *Management Science*, 56 (8), 1219–41.

Baptista, Rui (2000), "Do Innovations Diffuse Faster Within Geographical Clusters?" *International Journal of Industrial Organization*, 18 (3), 515–35.

Barrot, Christian, Arvind Rangaswamy, Sönke Albers, and Nazrul I. Shaikh (2008), "The Role of Spatial Proximity in the Adoption of a Digital Product," working paper, University of Kiel.

Bell, David R., and Sangyoung Song (2007), "Neighborhood Effects and Trial on the Internet: Evidence from Online Grocery Retailing," *Quantitative Marketing and Economics*, 5 (4), 361–400.

Berger, Jonah, and Raghuram Iyengar (2013), "Communication Channels and Word of Mouth: How the Medium Shapes the Message," *Journal of Consumer Research*, 40 (3), 567–79.

Bradner, Erin, and Gloria Mark (2002), "Why Distance Matters: Effects on Cooperation, Persuasion and Deception," in *Proceedings of the 2002 ACM Conference on Computer Supported Cooperative Work*. New York: Association for Computing Machinery, 226–35.

Bronnenberg, Bart J., and Carl F. Mela (2004), "Market Roll-Out and Retailer Adoption for New Brands," *Marketing Science*, 23 (4), 500–18.

Brown, Jacqueline Johnson, and Peter H. Reingen (1987), "Social Ties and Word-of-Mouth Referral Behavior," *Journal of Consumer Research*, 14 (3), 350–62.

Cairncross, Frances (2001), *The Death of Distance: How the Communications Revolution Is Changing Our Lives*, 2nd ed. Boston: Harvard Business School Press.

Chevalier, Judith, and Dina Mayzlin (2006), "The Effect of Word of Mouth on Sales: Online Book Reviews," *Journal of Marketing Research*, 43 (August), 345–54.

Choi, Jeonghye, Sam K. Hui, and David R. Bell (2010), "Spatiotemporal Analysis of Imitation Behavior Across New Buyers at an Online Grocery Retailer," *Journal of Marketing Research*, 47 (February), 75–89.

Crandall, David J., Lars Backstrom, Dan Cosley, Siddharth Suri, Daniel Huttenlocher, and Jon Kleinberg (2010), "Inferring Social Ties from Geographic Coincidences," *Proceedings of the National Academy of Sciences of the United States of America*, 107 (52), 22436–41.

Edmond, Verona P., and David L. Brannon (2016), "The Choice of New Venture Partner: The Role of Trust and Familiarity," *Academy of Entrepreneurship Journal*, 22 (1), 65–86.

Feick, Lawrence, and Robin A. Higie (1992), "The Effects of Preference Heterogeneity and Source Characteristics on Ad Processing and Judgements About Endorsers," *Journal of Advertising*, 21 (2), 9–24.

Festinger, Leon, Stanley Schachter, and Kurt Black (1963), *Social Pressures in Informal Groups: A Study of Human Factors in Housing*. Stanford, CA: Stanford University Press.

Forman, Chris, Anindya Ghose, and Batia Wiesenfeld (2008), "Examining the Relationship Between Reviews and Sales: The Role of Reviewer Identity Disclosure in Electronic Markets," *Information Systems Research*, 19 (3), 291–313.

Frenzen, Jonathan, and Kent Nakamoto (1993), "Structure, Cooperation, and the Flow of Market Information," *Journal of Consumer Research*, 20 (3), 360–75.

Fujita, Kentaro, Marlone D. Henderson, Juliana Eng, Yaacov Trope, and Nira Liberman (2006), "Spatial Distance and Mental Construal of Social Events," *Psychological Science*, 17 (4), 278–82.

Garber, Tal, Jacob Goldenberg, Barak Libai, and Eitan Muller (2004), "From Density to Destiny: Using Spatial Dimension of Sales Data for Early Prediction of New Product Success," *Marketing Science*, 23 (3), 419–28.

Gershoff, Andrew D., Ashesh Mukherjee, and Anirban Mukhopadhyay (2007), "Few Ways to Love, but Many Ways to Hate: Attribute Ambiguity and the Positivity Effect in Agent Evaluation," *Journal of Consumer Research*, 33 (4), 499–505.

Gilly, Mary C., John L. Graham, Mary Finley Wolfinbarger, and Laura J. Yale (1998), "A Dyadic Study of Interpersonal Information Search," *Journal of the Academy of Marketing Science*, 26 (2), 83–100.

Gimpel, James G., Kimberly A. Karnes, John McTague, and Shanna Pearson-Merkowitz (2008), "Distance-Decay in the Political Geography of Friends-and-Neighbors Voting," *Political Geography*, 27 (2), 231–52.

Godes, David, and Dina Mayzlin (2004), "Using Online Conversations to Study Word-of-Mouth Communication," *Marketing Science*, 23 (4), 545–60.

Hägerstrand, Torsten (1967), *Innovation Diffusion as a Spatial Process*. Chicago: University of Chicago Press.

Hofstede, Geert (2001), *Culture's Consequences: Comparing Values, Behaviors, Institutions and Organizations Across Nations*. Thousand Oaks, CA: Sage Publications.

Henderson, Marlone D, Cheryl J. Wakslak, Kentaro Fujita, and John Rohrbach (2011), "Construal Level Theory and Spatial Distance," *Social Psychology*, 42 (3), 165–73.

Hinds, Pamela J., Kathleen M. Carley, David Krackhardt, and Doug Wholey (2000), "Choosing Work Group Members: Balancing Similarity, Competence, and Familiarity," *Organizational Behavior and Human Decision Processes*, 81 (2), 226–51.

Hipp, John R., Robert W. Faris, and Adam Boessen (2012), "Measuring 'Neighborhood': Constructing Network Neighborhoods," *Social Networks*, 34 (1), 128–40.

Huddy, Leonie, and Nadia Khatib (2007), "American Patriotism, National Identity, and Political Involvement," *American Journal of Political Science*, 51 (1), 63–77.

Johnson, Eric J., Steven Bellman, and Gerald L. Lohse (2002), "Defaults, Framing and Privacy: Why Opting In-Opting Out?" *Marketing Letters*, 13 (1), 5–15.

Judd, Charles M., David A. Kenny, and Gary H. McClelland (2001), "Estimating and Testing Mediation and Moderation in Within-Subject Designs," *Psychological Methods*, 6 (2), 115–34.

Kossinets, Gueorgi and Duncan J. Watts (2009), "Origins of Homophily in an Evolving Social Network," *American Journal of Sociology*, 115 (2), 405–50.

Lambiotte, Renaud, Vincent D. Blondel, Cristobald De Kerchove, Etienne Huens, Christophe Prieur, Zbigniew Smoreda, et al. (2008), "Geographical dispersal of mobile communication networks," *Physica A*, 387, 5317–25.

Latané, Bibb (1981), "The Psychology of Social Impact," *American Psychologist*, 36 (4), 343–56.

Latané, Bibb, James H. Liu, Andrzej Nowak, Michael Bonevento, and Long Zheng (1995), "Distance Matters: Physical Space and Social Impact," *Personality and Social Psychology Bulletin*, 21 (8), 795–805.

Lazarsfeld, Paul F., and Robert K. Merton (1954), "Friendship as a Social Process: A Substantive and Methodological Analysis," *Freedom and Control in Modern Society*, 18 (1), 18–66.

Lee, Conrad, Thomas Scherngell, and Michael J. Barber (2011), "Investigating an Online Social Network Using Spatial Interaction Models," *Social Networks*, 33 (2), 129–33.

Levy, Moshe, and Jacob Goldenberg (2014), "The Gravitational Law of Social Interaction," *Physica A*, 393, 418–26.

Libai, Barak, Ruth Bolton, Marnix S. Bügel, Ko de Ruyter, Oliver Götz, Hans Risselada, et al. (2010), "Customer-to-Customer Interactions: Broadening the Scope of Word of Mouth Research," *Journal of Service Research*, 13 (3), 267–82.

Liviatan, Ido, Yaacov Trope, and Nira Liberman (2008), "Interpersonal Similarity as a Social Distance Dimension: Implications for Perception of Others' Actions," *Journal of Experimental Social Psychology*, 44 (5), 1256–69.

Luo, Xueming, Michelle Andrews, Zheng Fang, and Chee Wei Phang (2013), "Mobile Targeting," *Management Science*, 60 (7), 1738–56.

Ma, Liye, Ramayya Krishnan, and Alan L. Montgomery (2014), "Latent Homophily or Social Influence? An Empirical Analysis of Purchase Within a Social Network," *Management Science*, 61 (2), 454–73.

Manchanda, Puneet, Xie Ying, and Nara Youn (2008), "The Role of Targeted Communication and Contagion in Product Adoption," *Marketing Science*, 27 (6), 961–76.

McPherson, Miller, Lynn Smith-Lovin, and James M. Cook (2001), "Birds of a Feather: Homophily in Social Networks," *Annual Review of Sociology*, 27 (1), 415–44.

Mok, Diana, and Barry Wellman (2007), "Did Distance Matter Before the Internet?: Interpersonal Contact and Support in the 1970s," *Social Networks*, 29 (3), 430–61.

Mok, Diana, Barry Wellman, and Juan Carrasco (2010), "Does Distance Matter in the Age of the Internet?" *Urban Studies (Edinburgh, Scotland)*, 47 (13), 2747–83.

Moon, Youngme (1999), "The Effects of Physical Distance and Response Latency on Persuasion in Computer-Mediated Communication and Human–Computer Communication," *Journal of Experimental Psychology. Applied*, 5 (4), 379–92.

Murray, Keith B. (1991), "A Test of Services Marketing Theory: Consumer Information Acquisition Activities," *Journal of Marketing*, 55 (January), 10–25.

Nam, Sungjoon, Puneet Manchanda, and Pradeep K. Chintagunta (2010), "The Effect of Signal Quality and Contiguous Word of Mouth on Customer Acquisition for a Video-on-Demand Service," *Marketing Science*, 29 (4), 690–700.

Naylor, Rebecca Walker, Cait Poynor Lamberton, and David A. Norton (2011), "Seeing Ourselves in Others: Reviewer Ambiguity, Egocentric Anchoring, and Persuasion," *Journal of Marketing Research*, 48 (June), 617–31.

Nejad, Mohammad G., Mehdi Amini, and Emin Babakus (2015), "Success Factors in Product Seeding: The Role of Homophily," *Journal of Retailing*, 91 (1), 68–88.

Nitzan, Irit, and Barak Libai (2011), "Social Effects on Customer Retention," *Journal of Marketing*, 75 (July), 24–38.

Onnela, J.-P., J. Saramäki, J. Hyvönen, G. Szabó, D. Lazer, K. Kaski, et al. (2007), "Structure and Tie Strengths in Mobile Communication Networks," *Proceedings of the National Academy of Sciences of the United States of America*, 104 (18), 7332–36.

Preciado, Paulina, Tom A.B. Snijders, William J. Burk, Håkan Stattin, and Margaret Kerr (2012), "Does Proximity Matter? Distance Dependence of Adolescent Friendships," *Social Networks*, 34 (1), 18–31.

Ratcliff, Roger (1993), "Methods for Dealing with Reaction Time Outliers," *Psychological Bulletin*, 114 (3), 510–32.

Risselada, Hans, Peter C. Verhoef, and Tammo H.A. Bijmolt (2014), "Dynamic Effects of Social Influence and Direct Marketing on the Adoption of High-Technology Products," *Journal of Marketing*, 78 (March), 52–68.

Rogers, Everett M. (2003), *Diffusion of Innovations*, 5th ed. New York: The Free Press.

Rogers, Everett M., and Dilip K. Bhowmik (1970), "Homophily-Heterophily: Relational Concepts for Communication Research," *Public Opinion Quarterly*, 34 (4), 523–38.

Schmitt, Philipp, Bernd Skiera, and Christophe Van den Bulte (2011), "Referral Programs and Customer Value," *Journal of Marketing*, 75 (January), 46–59.

Shi, Mengze, Botao Yang, and Jeongwen Chiang (2009), "A Dyad Model of Calling Behaviour with Tie Strength Dynamics," working paper, Net Institute.

Sobel, Michael E. (1982), "Asymptotic Confidence Intervals for Indirect Effects in Structural Equation Models," *Sociological Methodology*, 13, 290–312.

Strang, David, and Nancy Brandon Tuma (1993), "Spatial and Temporal Heterogeneity in Diffusion," *American Journal of Sociology*, 99 (3), 614–39.

Takhteyev, Yuri, Anatoliy Gruzd, and Barry Wellman (2012), "Geography of Twitter Networks," *Social Networks*, 34 (1), 73–81.

Trope, Yaacov, and Nira Liberman (2010), "Construal-Level Theory of Psychological Distance," *Psychological Review*, 117 (2), 440–63.

Turner, John C., and Henri Tajfel (1986), "The Social Identity Theory of Intergroup Behavior," in *Psychology of Intergroup Relations*, William G. Austin and Stephen Worchel, eds. Chicago: Nelson-Hall.

Van den Bulte, Christophe (2010), "Opportunities and Challenges in Studying Customer Networks," in *The Connected Customer: The Changing Nature of Consumer and Business Markets*, Stefan Wuyts, Marnik G. Dekimpe, Els Gijsbrechts, and Rik Pieters, eds. London: Routledge, 7–36.

Xu, Heng, Xin Robert Luo, John M. Carroll, and Mary Beth Rosson (2011), "The Personalization Privacy Paradox: An Exploratory Study of Decision Making Process for Location-Aware Marketing," *Decision Support Systems*, 51 (1), 42–52.

Zhao, Min, and Jinhong Xie (2011), "Effects of Social and Temporal Distance on Consumers' Responses to Peer Recommendations," *Journal of Marketing Research*, 48 (June), 486–96.