

Referral Contagion: Downstream Benefits of Customer Referrals *

Rachel Gershon

UC San Diego

Zhenling Jiang[†]

University of Pennsylvania

Abstract

Word-of-mouth (WOM) has proven a valuable marketing tool for acquiring new customers and companies frequently invest in referral reward programs to incentivize their current customers to spread word-of-mouth. Previous work has documented that referred customers are more valuable than those who join through other venues. We propose a new, and rather critical, advantage of encouraging referrals – referrals are contagious. Using field data from 41.2 million customers, two preregistered lab experiments, and one field experiment, we find that referred customers make more referrals than non-referred customers. The difference in referrals persists after controlling for the level of match between the customer and firm, individual-level differences, and social network effects. To explain how referral contagion arises, we find that it is partially driven by customers' perception that referring is more socially appropriate if they were originally referred to the same product. In a field experiment, we show that reminding customers that they joined through a referral boosts referral behavior by 20–27%. These results advance our understanding of the social and psychological motives that contribute to referral decisions and illustrate that promoting referrals is substantially more valuable than previously estimated.

Keywords: Referrals, Word-of-Mouth, Customer Value, Social Motives

*We are grateful to Referral Saasquatch and our mobile technology field partner for providing access to the data. The paper is the result of the authors' independent research and does not represent the views of the company. All errors are our own.

[†]rgershon@ucsd.edu, zhenling@wharton.upenn.edu.

1 Introduction

Word-of-mouth (WOM) has proven a valuable marketing tool for acquiring new customers, in part because people consider their friends and family to be trusted sources of information (Brown and Reingen (1987), Tuk et al. (2009)). Referral campaigns that incentivize the spread of WOM are attractive because they are found to be more effective than other acquisition methods in bringing in new customers (Trusov, Bucklin, and Pauwels (2009)). Furthermore, customers who joined through a referral are more valuable than customers who joined through other means, with prior literature showing that referred customers tend to have higher margins and greater loyalty than non-referred customers (Armellini, Barrot, and Becker (2015), Schmitt, Skiera, and Van den Bulte (2011), Villanueva, Yoo, and Hanssens (2008)). These studies compare the behavior of referred and non-referred customers through their own purchases or activities with the focal company, and suggest that firms should invest in referral programs to gain new customers with higher lifetime values. Referring has also been found to be beneficial because providing a recommendation increases customers' attitudinal and behavioral loyalty (Garnefeld et al. (2013)).

In this paper, we document an additional, and rather important, dimension of the value of referred customers – referred customers are more likely to *make referrals* compared to non-referred customers. By doing so, we broaden the view of the overall value of referred customers by considering not only their own purchases or activities, but also the new customers that they successfully recruit. Consistent with the idea that the total value of customers includes not only their own profitability with the firm but also their social value (Libai, Muller, and Peres (2013), Ascarza et al. (2017), Kumar, Petersen, and Leone (2007), Ho et al. (2012)), we show that generating more referrals constitutes a substantial portion of the total value of referred customers. Understanding this downstream effect will provide important managerial insights into the value of motivating customer referrals, such as determining whether and how much to invest in referral reward programs.

More specifically, we answer three research questions. Are customers who join through referrals (vs. other marketing tactics) more likely to refer other customers? After documenting that referred customers acquire more new customers through referrals, we seek to understand the mechanism. Why are referred customers more likely to refer? Prior literature has found several systematic differences between referred and non-referred customers. Beyond these factors, we propose the underlying role of appropriateness perceptions: customers who joined through a referral believe that referring a friend is more socially appropriate than those who joined through other means.

Knowing this, can we encourage even more referrals from referred customers? We demonstrate the effectiveness of an intervention leveraging this proposed mechanism in a field experiment.

We employ multiple research methodologies, including a large-scale field data, hypothetical studies, and a field experiment, to answer these research questions. We address the first question using field data from a large mobile technology company that provides cashback rebates to users for shopping at their partnering stores. Leveraging data from 41.2 million customers over a 10-year period, we find that, in addition to a greater number of purchases, referred customers also brought in more new customers through referrals compared to customers who joined through other means. The difference in referrals is economically meaningful: we find that not accounting for the higher number of referrals will underestimate about a third of the total difference in value for referred customers.

Why do referred customers make more referrals? Prior literature suggests several possible explanations: better matching between referred customers and the firm (Kornish and Li (2010), Schmitt, Skiera, and Van den Bulte (2011), Van den Bulte et al. (2018)); individual-level differences in referred customers, such as personality traits (Durukan and Bozaci (2012), Mooradian and Swan (2006)); and social enrichment or validation from the presence of a third party (Schmitt, Skiera, and Van den Bulte (2011), Van den Bulte and Wuyts (2007)). Through multiple studies, we demonstrate that referred customers make more referrals even after controlling for these factors. More specifically, using the field data we find that referred customers make more referrals compared to matched non-referred customers with the same number of purchases, which is used to represent the level of match with the firm. Furthermore, using two hypothetical studies, we find that customers are more likely to refer when they are randomly assigned to have joined through a referral compared to an advertisement. This effect operates both with and without referral rewards. Because of random assignment, the hypothetical studies can account for any potential systematic differences between referred and non-referred customers. Lastly, to account for the potential positive impact of having a close social tie with the firm, we compare referred customers with non-referred customers who also have a friend with the firm. We find that referred customers are still more likely to refer compared to non-referred customers with a close social tie at the firm.

We uncover an additional mechanism, *social appropriateness*, that contributes to referral contagion. It is well accepted that peer influence or social contagion can affect product adoption (Hill, Provost, and Volinsky (2006), Iyengar, Van den Bulte, and Valente (2011), Iyengar, Van den Bulte, and Lee (2015), Manchanda, Xie, and Youn (2008)). Previous work suggests that such contagion

stems in part from normative influence (Van den Bulte and Lilien (2001)), or the desire to conform to others' expectations about proper or appropriate behavior in social contexts (Cialdini and Trost (1998)). Just as normative influence engenders social contagion for product adoption, we propose that it also leads to referral contagion. We find evidence for this theory in a hypothetical study by showing that customers who joined through a referral believe that referring a friend is more socially appropriate than those who join through an advertisement, thereby increasing their own intent to refer. That is, joining through a referral sets a descriptive norm about what others will perceive as appropriate behavior in this setting (Cialdini, Reno, and Kallgren (1990)), which reduces consumers' concern about referring others. This mechanism is consistent with prior literature that finds social barriers leading to lower referral rates (Jin and Huang (2014), Tuk et al. (2009), Ryu and Feick (2007)).

Leveraging this mechanism, how can we encourage even more referrals from referred customers? We demonstrate the effectiveness of a simple messaging intervention in a field experiment with more than 10 million referred customers. Reminding customers that they initially joined through a referral ("You were referred in - now refer your friends!") further increases their referral rate by more than 20% compared to referred customers who received the control message ("Refer your friends!"). Such a reminder makes it more salient for referred customers that they initially joined through a referral, and in turn, they will believe referring is more appropriate than those who do not see such a reminder.

Our paper makes two main contributions. First, our results reveal an underappreciated advantage of referred customers: they are more likely to acquire new customers through referrals. This paper, therefore, offers important managerial implications to companies aiming to invest in referral reward programs and understand the value of referred customers. Not accounting for referral contagion will lead firms to significantly underestimate the total value of referrals. Second, our research uncovers a critical mechanism, referred customers' stronger belief that it is appropriate to refer others, which fosters subsequent referring behavior. Consistent with this mechanism, we find in a field experiment that companies can further increase the number of referrals by simply reminding referred customers that they initially joined through a referral.

Literature Review

Our paper provides insights into three streams of literature. First, this work contributes to the large literature documenting the value of referral programs. WOM has long been understood as

an important source of influence in consumers' purchase decisions, leading to higher compliance, and thus is effective in attracting new customers (Brown and Reingen (1987), Dichter (1966), Katz and Lazarsfeld (1955), Tuk et al. (2009), Trusov, Bucklin, and Pauwels (2009)). Referrals also tend to recruit more valuable customers than other marketing tactics (Schmitt, Skiera, and Van den Bulte (2011), Villanueva, Yoo, and Hanssens (2008)). Moreover, participating in referral programs can even increase the loyalty of current customers (Garnefeld et al. (2013)). We contribute to this literature by proposing another important source of value for referred customers, namely referred customers are more likely to refer.

This paper is also related to the literature on social barriers to referral. Given the low effort cost (Gao, Li, and Pavlou (2022); Gershon, Cryder, and John (2020)) and the potential for rewards (Biyalogorsky, Gerstner, and Libai (2001)), why do more customers not choose to refer? Previous research proposes that customer motivation for referring is not limited to financial or time costs and often includes social motives (Xiao, Tang, and Wirtz (2011)). That is, consumers are motivated to shape how others perceive them through what they say, share, and recommend (Berger and Milkman (2012), Chung and Darke (2006)). When offered a referral incentive, individuals may worry about social costs, such as being perceived as having ulterior motives beyond helping their friend make good product decisions (Jin and Huang (2014)). Prior work on referrals argues that "friendship" and "sales" relationships differ in the behaviors that are perceived as acceptable, such that the use of referral rewards introduces a 'sales' component that may be viewed as inappropriate for communication with friends (Tuk et al. (2009)). Even without a reward, consumers report discomfort when recommending a product to a friend due to a concern that their friend may have a negative experience and attribute their dissatisfaction to the recommendation (Ryu and Feick (2007)). We contribute to this literature by proposing a mechanism that lowers this barrier to referrals: social appropriateness. Increasing the perception that referring is appropriate is an important factor that explains the difference in propensity to refer between referred and non-referred customers.

Lastly, our paper contributes to the literature that proposes different interventions to encourage successful referrals. Some recommend incentivizing existing customers to refer, which appears especially effective for weaker social ties and weaker brands (Ryu and Feick (2007)). Others find that offering in-kind referral rewards instead of monetary incentives may reduce expected social costs and increase referrals (Jin and Huang (2014)). Disclosing incentives may make the act of referring appear more honest, cooperative, and communal, which also increases referral likelihood

(Xu, Yu, and Tu (2022)). Referral messaging that mentions the existence of referral rewards or the sender's purchase status prior to referral also influence follow-through for referred customers (Sun, Viswanathan, and Zheleva (2021)). Additional work concerns the design of referral reward programs (Biyalogorsky, Gerstner, and Libai (2001)). For example, offering a shared reward for both the referrer and recipient or only rewarding the referral recipient can reduce social signaling concerns and increase referral likelihood (Gershon, Cryder, and John (2020)). The size of rewards also matter for not only the number of referred customers but also the profitability (Wolters, Schulze, and Gedenk (2020)). We contribute to this literature by proposing a simple, costless intervention that reminds referred customers that they joined through a referral. Making the norm of referral in this context salient with this reminder makes referring feel more socially appropriate, and thus increases referred customers' interest in referring.

The rest of the paper is organized as follows. We start by quantifying the difference in referrals between referred and non-referred customers as well as the value of referrals in Section 2 using the field data. In Section 3, we seek to understand why referred customers are more likely to refer. We propose the mechanism of social appropriateness after accounting for several explanations suggested by prior literature. Leveraging the proposed mechanism, we demonstrate the effectiveness of an intervention that makes joining through a referral more salient using a field experiment in Section 4. Finally, Section 5 concludes the paper and offers general discussions and implications of the findings.

2 The Value of Referred Customers

In this section, we document the value of referred customers through not only their own purchases but also through a higher number of referrals. Using a large-scale field data of 41.2 million consumers, we first replicate findings from prior literature by documenting that referred customers are more valuable than non-referred customers (e.g., Schmitt, Skiera, and Van den Bulte (2011)). Without observing revenue or margin, we proxy the customer value by the number of purchases. This is a reasonable proxy in our context because the company earns commissions from partner retailers when customers make a purchase through the platform. Adding to prior literature, we find that referred customers are also more valuable because they make more referrals. We quantify the value of these referrals by the number of purchases made by referred customers. We find that not accounting for the contribution in terms of referral behavior will underestimate about a third

of the difference in total value between referred and non-referred customers.

2.1 Field Data Description

We obtained anonymized individual level field data from a large mobile technology company that provides cashback rebates to users for shopping at their partnering stores. Consumers need to create an account to use the service. Users can then earn cashback rebates when shopping at a large selection of partnering stores from a variety of categories, such as clothing, health and beauty, and grocery delivery. Consumers can use either the website or its app to interact with the company.

The company operates a referral program where existing customers can refer their friends. As is typical in practice, referrals are incentivized: the referring customer receives a bonus upon successful referrals.¹ Because of the incentives, the company does face some fraudulent referral activities. In the data shared with us, about 3.8% of the accounts are marked as fraudulent. Furthermore, the data also indicates whether the referred customer uses the same device as the referrer or not. In our analysis, we focus on referrals that are not marked as fraudulent and for which the referred customer uses a different device from the referrer.

The data contains all registered customers in a 10-year period. Importantly for our research question, we observe whether the customer joined through a referral or not. For customers joining through a referral, we also know the referring customer. For each customer, we also observe all of their purchase activities (i.e., using the service to shop at a partnering store) at the monthly level.

After removing the potentially fraudulent accounts, there are a total of 41.2 million customers who registered an account during the 10-year period from May 2012 to May 2022.² Table 1 column (1) shows that among these customers, 12.2 million (or close to 30%) joined through a referral, and the rest joined through other means (e.g., organic sources or advertising). The main variable of interest is the number of referrals. Column (2) of Table 1 shows that the average number of referrals is 0.24 across all customers. The number of referrals is higher, at 0.30, among referred customers than the 0.21 among non-referred customers. In column (3), we look at the probability of referrals, which is the proportion of customers who have made at least one referral. Similarly, the probability of referrals is higher among referred customers, at 11.9%, than the 7.6% among non-referred customers. Column (4) shows the number of purchases is also higher among referred

¹A successful referral is defined as when the referred friend has registered an account and made at least one purchase (i.e., redeemed an offer) through the platform. The exact value of the referral reward varies from time to time. Most recently, each successful referral is rewarded with \$10 for both the referrer and the referred customer.

²We also exclude about 3% of customers who registered from an affiliate account.

customers than non-referred customers.

Table 1: Summary Statistics

	Total number of customers (million)	Average number of referrals	Percentage of customers making a referral	Average number of purchases
Total	41.2	0.24	8.8%	25.1
Referred	12.2	0.30	11.9%	31.1
Non-referred	29.0	0.21	7.6%	22.5

Our data is unique not only because of the large sample of customers, but also the long panel observed since the start of the company. When evaluating the value of customers, we are able to rely on the observed customer values instead of modeled behaviors (e.g., by assuming a constant retention rate in a CLV model). Leveraging the long panel of customer activities, we document the difference in actual purchases between referred and non-referred customers over a time span of about 10 years.

2.2 Difference in Customer Value through *Purchases*

Prior literature finds that referred customers are more valuable than non-referred customers because of a higher contribution margin (e.g., [Schmitt, Skiera, and Van den Bulte \(2011\)](#)). We replicate these findings by documenting that referred customers make a higher number of purchases. The number of purchases is a good proxy for customer value in our context because the company earns commissions from partner retailers when customers make a purchase through the platform. The total number of purchases, however, will depend on the customer’s joining date. For example, a customer who joined the company 5 years ago will likely have a larger number of purchases than someone who just joined simply because of the difference in tenure.

We use a regression analysis to quantify the difference in the number of purchases between referred and non-referred customers while accounting for the impact of tenure. Using the whole sample, we run the following regression:

$$y_i = \alpha \cdot referred_i + joining_date_i + \epsilon_i \quad (1)$$

where y_i is the outcome of interest (e.g., the total number of purchases since joining the company). $referred_i$ is an indicator variable that equals 1 if customer i joined through a referral program and 0 otherwise. The main parameter of interest α represents the difference in the outcome for

Table 2: Number of Purchases

	Dependent Variable: Total number of purchases (1)
Referred customers	8.1086*** (0.0448)
Baseline (non-referred)	25.0529
Joining date FE	Yes
Observations	41,159,942
R^2	0.0133

*** indicates significance at $p = 0.01$; ** $p = 0.05$; * $p = 0.1$.

referred and non-referred customers. $joining_date_i$ denotes the dummy variables for each joining date (year-month-day), which controls the impact of tenure on the outcome of interest.

We compare the total number of purchases between referred and non-referred customers. Let y_i be the number of purchases that customer i makes since joining the company. Regression results are shown in Table 2. Referred customers have 8.11 more purchases on average. This represents a large, 32% increase relative to the baseline of 25.05 purchases from non-referred customers. This result is consistent with prior literature documenting that referred customers have a higher lifetime value in terms of their own purchases or activities with the firm. [Schmitt, Skiera, and Van den Bulte \(2011\)](#) find a referred customer is approximately 25-35% more valuable than a comparable non-referred customer using data from a German bank. Although the empirical context is very different, the magnitude is quite close to the 32% difference found in our paper.

2.3 Difference in Customer Value through *Referrals*

In addition to more purchases, in this paper, we propose that referred customers are also more valuable because they are more likely to refer other customers. We run another regression as in Equation 1 and let y_i be the number of referrals that customer i has made since joining the company. The key parameter of interest α represents the difference in referrals between referred and non-referred customers after accounting for the impact of tenure. Regression results are shown in Table 3 column (1). Referred customers have 0.078 more referrals than non-referred customers conditional on the same tenure. The difference is both statistically and economically significant. Relative to the baseline of an average of 0.213 referrals from non-referred customers, the 0.078 difference represents a large 36% increase (0.078/0.213) in the number of referrals.

Having established that referred customers are more likely to refer others, we then seek to quantify the value of these referrals. Referrals are valuable to the company because they grow the customer base and these referred customers contribute by making purchases. To quantify the value of referrals, we measure the number of purchases made by the referred customers. For example, if a customer has referred 3 customers, we count the total number of purchases made by these 3 referred customers as the value from referrals for the focal customer. If a customer has not made a referral, or the referred customer has not made any purchases, this value is 0. Note that we again proxy the value of customers by the number of purchases since we do not directly observe revenue or margin.

We run the same regression as in Equation 1 and let y_i be the number of purchases made by their referrals. Table 3 column (2) reports that the total number of purchases from their referrals is higher by 4.09 than non-referred customers. Relative to the baseline of 6.64 from non-referred customers, the difference represents a 61% increase in the number of purchases from referrals ($4.09/6.64$) for referred customers. Notice that the relative magnitude of difference is larger when comparing the number of purchases made by these referrals than the number of referrals. This suggests that the higher value from referrals for referred customers comes not only from them referring a higher number of customers but also from them referring more valuable customers.

So far, we have shown that referred customers are more valuable because they make more purchases (8.11 or 32%) than non-referred customers, which replicates findings from prior literature. We have also shown that referred customers are also make more referrals. We use the number of purchases made by their referral recipients to quantify the value, which is 4.09 or 61% higher among referred customers. Compared to the 8.11 more purchases, the difference of 4.09 purchases from their referrals is economically meaningful. Not accounting for the contribution in terms of their referrals will significantly underestimate the difference in total value between referred and non-referred customers. More specifically, the value from referrals represents a third of the total difference in values from the two groups ($\frac{4.09}{4.09+8.11} = 33\%$). In other words, when companies evaluate how much they should be willing to spend to attract a new referred customer vs. a customer from other marketing tactics, it is important to consider the contribution from referrals in addition to their own purchases.

Table 3: Referral Activities

	Dependent Variable:	
	Number of referrals	Total number of purchases from their referrals
	(1)	(2)
Referred customers	0.0777*** (0.0163)	4.0907*** (0.0875)
Baseline (non-referred)	0.2129	6.6401
Joining date FE	Yes	Yes
Observations	41,159,942	41,159,942
R^2	0.0003	0.0014

Note: Matched groups are based on the joining date.

*** indicates significance at $p = 0.01$; ** $p = 0.05$; * $p = 0.1$.

3 Why are Referred Customers More Likely to Refer?

We have shown that referrals are contagious, such that referred customers make more referrals. What are the mechanisms that can explain this effect? We start by noting several systematic differences between referred and non-referred customers drawing from insights from prior literature: 1) better matching between referred customers and the firm, 2) individual-level differences in referred customers, and 3) social enrichment and validation. In sections 3.1 and 3.2, we discuss why these factors might explain the difference in referrals from referred customers, and show that referred customers are still more likely to refer others even after controlling for these known factors. In section 3.3, we find evidence for an additional mechanism, referred customers believe that referring is *more appropriate*, and thus have a higher intent to make referrals. This mechanism can explain why referred customers generate more referrals beyond what is captured by the other factors.

3.1 Higher Referrals after Controlling for “Better Match”

One possible driver of referral contagion is that referred customers are often a better match with the firm than customers who joined through other means (Kornish and Li (2010)). This superior matching may be due to active factors – customers know their social networks well and screen for the best matches – or passive factors – consumers tend to form connections with similar others (McPherson, Smith-Lovin, and Cook (2001), Newman (2003)). Indeed, Van den Bulte et al. (2018) find that referred customers are likely to have a better match with the firm, which manifests through observables such as greater activity, a higher contribution margin, and a higher retention

rate (Schmitt, Skiera, and Van den Bulte (2011)). Therefore, it would be unsurprising for referred customers who use the product or service more to be more likely to refer others.

In our empirical context, to proxy for the level of match with the firm, we use the total number of purchases, which is indeed higher among referred customers (section 2.2). Is the higher referral propensity among referred customers entirely driven by their higher activity on the platform? To answer this question, we use another regression analysis:

$$y_i = \alpha \cdot referred_i + \beta \cdot purchases_i + joining_date_i + \epsilon_i. \quad (2)$$

The variables are defined the same as in Equation 1: $referred_i$ is an indicator variable that equals 1 for referred customers and $joining_date_i$ represents a list of dummies for the date they joined the platform (year-month-day). There is a new variable $purchase_i$ which controls for the impact of the number of purchases on the outcome. Let y_i be the number of referrals consumer i has made since joining the platform. We run the regression analysis as in Equation 2. One can interpret the main parameter of interest α to represent the difference in referrals between referred and non-referred customers after accounting for the influence of tenure (through $joining_date_i$) and the level of match with the platform (through the number of purchases, $purchase_i$).

Table 4: Number of Referrals Controlling for Purchases

	Dependent Variable:	
	Number of referrals	
	<i>main sample</i>	<i>robustness: matching</i>
	(1)	(2)
Referred customers	0.0480*** (0.0163)	0.0344*** (0.0038)
Number of purchases	0.0037*** (0.0001)	
Baseline (non-referred)	0.2129	0.1815
Joining date FE	Yes	No
Matched group FE	No	Yes
Observations	41,159,942	22,549,184
R^2	0.0003	0.5009

Note: Matched groups are based on the joining date and number of purchases.

*** indicates significance at $p = 0.01$; ** $p = 0.05$; * $p = 0.1$.

One potential caveat for the regression analysis in Equation 2 is that the impact of purchases on the number of referrals is assumed to be linear. As a robustness check, we control for the

impact of the number of purchases using a matching analysis where we match referred and non-referred customers based on their joining date as well as the number of purchases. The matching is done without replacement, and hence the number of matched pairs depends on the type with a smaller number of customers. For example, on 2022-03-02, there are 450 referred customers and 317 non-referred customers who joined that day and have made exactly 1 purchase after they joined. We match each of the 317 non-referred customers with a (randomly selected) referred customer, which leads to 317 referred customers as the matched counterpart. The remaining 133 non-referred customers will not be included in the matching analysis. Overall, we obtain 11.3 million matched pairs, each consisting of a referred customer and a non-referred customer who join on the same date and have made the same number of purchases.

We use a regression analysis with the matched sample:

$$y_i = \alpha \cdot referred_i + pair_i + \epsilon_i \quad (3)$$

where $pair_i$ denotes the dummy variables for the matched pairs. Since customers in the matched pair join at the same day and have made the same number of purchases, this set of dummy variables control for both the influence of customer's tenure and the level of match with the platform on referrals. One can interpret α as the difference in referrals between referred and non-referred customers *within* matched pairs. All other variables are defined the same as above.

Regression results using the main sample are shown in Table 4 column (1). Referred customers still make 0.048 more referrals than non-referred customers after accounting for the impact of the number of purchases. The difference represents a 22% increase relative to the baseline of 0.213 among non-referred customers (0.048/0.213). Column (2) reports the results for the matching analysis. Among the matched sample, the differences in the number of referrals becomes slightly smaller at 0.034 for referred customers, which represents a 19% increase relative to the baseline of 0.182 among non-referred customers (0.034/0.182). The R^2 becomes significantly higher with the large number of fixed effects (one for each matched group) in the matching analysis.

Recall that without controlling for the number of purchases (section 2.3), the number of referrals is higher by 36% among referred customers. The magnitude of the difference is significantly smaller, at 19 – 22%, after controlling for the number of purchases. The result suggests that indeed better matching with the firm can explain a portion of the difference in referrals between referred and non-referred customers. But the pattern of higher referrals from referred customers persists even

after controlling for the potential match with the platform, which is represented by the number of purchases.

3.2 Higher Referrals when Referred Customers are Randomly Assigned

Besides better matching with the firm, there are other individual-level differences in referred customers that are not reflected by the number of purchases. For example, homophily – the concept that similarity breeds and bolsters social connections – suggests that referred customers may have different characteristics from non-referred customers that make them more likely to participate in word-of-mouth behaviors. Therefore, the social networks of referred customers may differ in characteristics related to referral behavior, such that referred customers come from closer social networks or share traits (e.g., personality, interest in social interactions) that make them more likely to refer (Durukan and Bozaci (2012), Mooradian and Swan (2006)).

Beyond potential individual-level differences, referral contagion can arise from the social enrichment and social validation that come from joining through a referral. Van den Bulte et al. (2018) find that the relationship of a customer with the firm is enriched by the presence of a third party. A third party could also offer social validation. When referring, customers consider the risk that a referred friend will be dissatisfied with their purchase and potentially attribute that dissatisfaction to the recommender (Ryu and Feick (2007)). Joining through a referral may therefore increase confidence (and referrals) because it signals that at least one other friend vouches for the brand's strength or the product's quality.

In this section, we use a controlled, hypothetical experiment to account for these factors that are hard to address using the field data, and find that referred customers are still more likely to refer. More specifically, we randomize whether participants originally joined a service through a referral or through an advertisement. The random assignment ensures that there are no systematic differences between the two groups, including any potential individual-level differences (e.g., personality traits), network-level differences (e.g., closer social networks), or different levels of matching with the firm. To account for the potential social enrichment and social validation that come from having a social connection (the referrer) at the firm, we include a condition in which the non-referred customers have a friend who already uses the product.

Method

As outlined in our pre-registered research plan (https://aspredicted.org/TZN_3PY), we aimed to recruit 300 participants from Prolific and ended up with a sample of 327 participants. We excluded participants who failed the attention check ($n = 40$), leaving us with a sample of 287 ($M_{age} = 34.28$ years, 64.7% Female). Study materials and data for both hypothetical studies are publicly available at <https://bit.ly/3QToB7x>.

Participants were randomly assigned to one of three conditions based on how they joined the service. They were then asked to give the first name of two friends. All participants were asked to imagine the following, “Amazon has released a new, free loyalty program called Amazon BOLD that showcases new products to program members.” Those in the referral condition then read, “Your friend, [Friend 1’s name], referred you to Amazon BOLD. You joined the program through their referral.” Those in the ad condition read “You saw an advertisement for Amazon BOLD. You clicked on the ad and joined the program.” In an additional condition (ad-social), they read the same as the ad condition along with “You later learn that your friend, [Friend 1’s name] also uses Amazon BOLD.”

Participants read, “After joining Amazon BOLD through a [referral/advertisement], you have been using the service and think it is great. You receive an email from Amazon BOLD asking if you would like to refer a friend by sending them your referral code.” They also read, that Amazon BOLD has a promotion that will give them a \$10 Visa gift card if their friend joins the program. We then asked participants, “How likely are you to refer your friend, [Friend 2’s name], to use Amazon BOLD? A referral would involve sending them your referral code through either text or email” (1 = *Extremely unlikely* to 7 = *Extremely likely*). Finally, all participants responded to an attention check: “Which of the following is true? I joined Amazon BOLD through [an advertisement/a referral]”.

Results

Participants were more likely to refer a friend if they were originally referred to Amazon BOLD ($M_{Refer} = 5.94$, $SD = 1.32$) than if they joined through an advertisement ($M_{Ad} = 5.28$, $SD = 1.89$, $t(190) = -2.79$, $p = .006$, $d = .40$). Those in the referral condition were also more likely to refer than those who joined through an advertisement and were told that they have another friend who already uses the service ($M_{Ad-social} = 5.37$, $SD = 1.91$, $t(188) = -2.38$, $p = .018$, $d = .35$). There was

a non-significant difference between the two advertisement conditions ($t(190) = -.33, p=.328$).

We find support for our main effect – consumers are more likely to refer others if they initially joined through a referral rather than through other marketing means (e.g., an advertisement). Because of the random assignment, this controlled experiment allows us to account for any potential individual-level or network-level differences. Furthermore, the higher referral likelihood persists when comparing to the condition where non-referred customers have a another friend using the service, indicating that social enrichment and social validation alone is not driving the increase in the referred condition.

3.3 Proposed Mechanism: Referred Customers Believe Referring is More Appropriate

So far, we have established that referred customers are more likely to refer after controlling for various known factors. In this section, we test for additional mechanisms underlying referral contagion. We propose that joining through a referral gives customers the perception that referring is socially appropriate in the current context, thereby increasing their own intent to refer. We expect this increase in referral choice to emerge regardless of whether or not referred customers receive a reward, so in this study we manipulate both how customers joined (advertisement or referral) and whether or not there is a reward for referring.

Methods

As outlined in our pre-registered research plan (https://aspredicted.org/FLF_7LL), we aimed to recruit 600 participants from Amazon’s Mechanical Turk and ended up with a sample of 606 participants. We excluded participants who failed the attention check ($n = 75$), leaving us with a sample of 531 ($M_{age} = 40.85$ years, 56.06% Female). Participants were randomized into one of four conditions in a 2 (advertisement vs. referral) x 2 (no reward vs. reward) between-subjects design. In the reward condition, participants were told that they would receive a \$10 Visa card if their friend became a customer.

Participants were first asked to give the first name of two close friends. They were asked to imagine the same scenario about Amazon BOLD used in Study 2. Participants in the advertisement condition were again told that they saw an advertisement for Amazon BOLD and clicked on the ad to join the program. Participants in the referral condition saw that [Friend 1] referred them to Amazon BOLD and they joined through this referral. Participants then responded to the primary

dependent variable, “How likely are you to refer your friend, [Friend 2’s name] to use Amazon BOLD?” (1 = Extremely unlikely to 7 = Extremely likely). Across all conditions, we then measured perceptions of making the referral (all items counterbalanced). We measured appropriateness: “How appropriate would it feel to send [Friend 2’s name] this referral?”. We also measured perceived relationship impact using a 3-item scale ($\alpha = .91$): “How much would [Friend 2’s name] like you if you sent this referral?”, “Would [Friend 2’s name] think you were a worse or better friend if you sent this referral?” and, “Would [Friend 2’s name] view you more or less favorably if you sent this referral?” We tested psychological costs using a 3-item scale ($\alpha = .95$): “How would you feel if you made this referral?": Uncomfortable, Conflicted, and Uneasy. Finally, we measured product fit using a 2-item scale ($r=.90$): “To what extent do you believe that [Friend 2’s name] will like Amazon BOLD?” and “How confident are you that [Friend 2’s name] will like Amazon BOLD?”.

Results

Referrals A between-subjects ANOVA revealed the predicted significant main effect of joining through a referral, $F(1, 530) = 25.00, p < .001$, in addition to a non-significant main effect of referral reward, $F(1, 530) = .85, p = .36$, and non-significant two-way interaction, $F(1, 530) = .45, p = .50$. In the no reward condition, participants were more likely to refer if they joined through a referral ($M_{Refer} = 5.46, SD = 1.51$) than if they joined through an ad ($M_{Ad} = 4.55, SD = 2.01, t(249) = 4.08, p < .001, d = .51$). Similarly, in the referral reward condition, participants were more likely to refer if they joined through a referral ($M_{Refer} = 5.50, SD = 1.73$ vs. ($M_{Ad} = 4.80, SD = 2.12, t(278) = 3.04, p = .003, d = .36$; See Figure 1). We combine the reward conditions for the remaining items as outlined in our pre-registration.

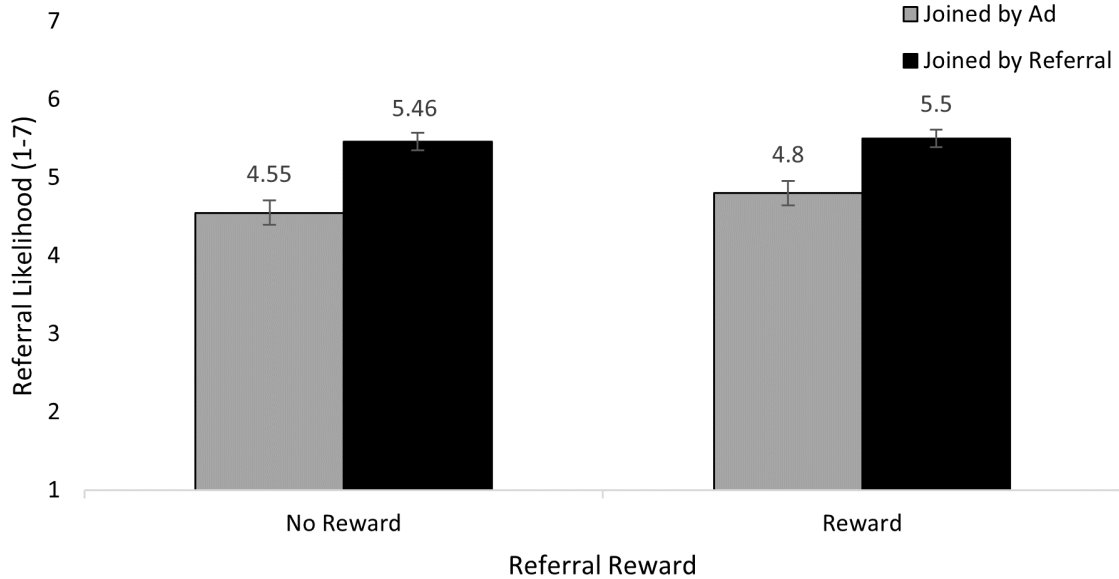
Appropriate Participants felt that referring was more appropriate if they joined through a referral ($M_{Refer} = 5.24, SD = 1.53$) than if they joined through an ad ($M_{Ad} = 4.76, SD = 1.85, t(529) = 3.25, p < .001, d = .28$).

Relationship impact Participants predicted marginally significantly more positive relationship impact if they joined through a referral ($M_{Refer} = 4.21, SD = .86$) than if they joined through an ad ($M_{Ad} = 4.07, SD = .91, t(529) = 1.84, p = .067, d = .16$).

Psychological costs Participants reported that they would feel lower psychological costs regarding referrals if they themselves joined through a referral ($M_{Refer} = 2.41, SD = 1.60$) than if they joined through an ad ($M_{Ad} = 2.71, SD = 1.86, t(529) = 1.97, p = .050, d = .17$).

Product fit Participants believed that the product would be a better fit (i.e., their friend would

Figure 1: Results



like the product more) if they originally joined through a referral ($M_{Refer} = 5.02$, $SD = 1.45$) than if they joined through an ad ($M_{Ad} = 4.72$, $SD = 1.57$, $t(529) = 2.28$, $p = .023$, $d = .21$).

Mediation analysis We conducted a mediation analysis to examine the role of all four mediation constructs (appropriateness, relationship impact, psychological costs, and product fit) on the effect of joining through a referral or advertisement on referral likelihood. This analysis (10,000 resamples) revealed that perceptions of appropriateness significantly mediated this relationship (indirect effect = .21, $SE = .08$, 95% $CI = [.08, .37]$). We also found significant, though smaller indirect effects of product fit (indirect effect = .13, $SE = .06$, 95% $CI = [.02, .25]$) and psychological costs (indirect effect = .05, $SE = .03$, 95% $CI = [.00, .12]$). There was a non-significant indirect effect of relationship impact (indirect effect = .003, $SE = .01$, 95% $CI = [-.02, .03]$).

Discussion

In this study, we replicate our primary effect – customers are more likely to refer when they originally joined through a referral than when they joined through an advertisement. We also find here that the referral contagion effect operated regardless of whether or not referrers were offered a reward. Although not our main focus, it is worth noting that receiving a reward did not lead

to a significant increase in referral choice compared to no reward in this scenario. This could be explained by past research showing that the effect of rewards on referrals may be weaker for strong ties (i.e., close friends as in this study; [Ryu and Feick \(2007\)](#)) or it is possible that the reward magnitude was not sufficiently large to motivate consumers in this context.

Importantly, we find evidence for our proposed mechanism – customers perceive the act of referring their friend to this service as more appropriate if they originally joined through a referral, and appropriateness perceptions mediate the choice to refer. This is in line with our theorizing that joining through a referral has the potential to reduce social barriers to referring. Customers often report social discomfort around referral behaviors, and observing someone else in their social network displaying a behavior (in this case, referring them to join the loyalty program) should make the behavior appear more appropriate.

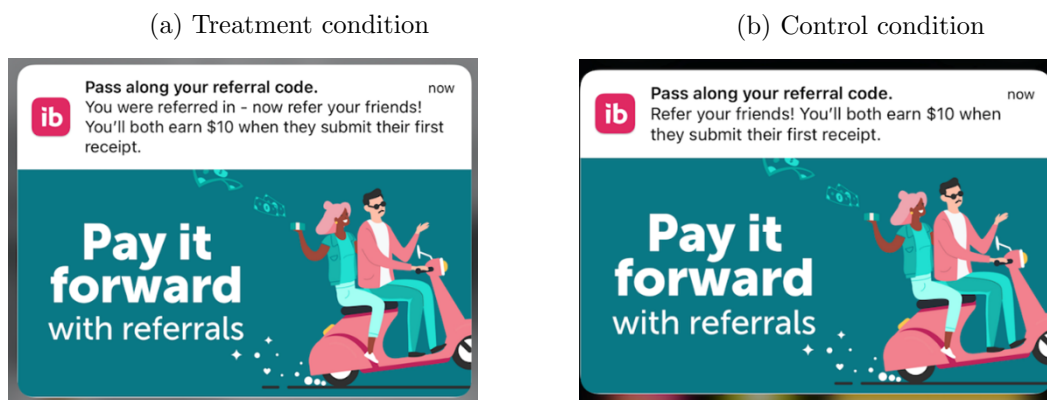
4 Increasing Referrals by Making Referring Feel More Appropriate

We have established that one of the mechanisms contributing to higher referrals among referred customers is that they believe referring is more appropriate than those who joined through other means. Leveraging this insight, we propose that one can increase the number of referrals with a simple change in messaging by *reminding customers that they joined through a referral*. Our hypothesis is that such a reminder will make it more salient that a customer was initially referred, and in turn, they will believe referring is more appropriate in the given context than other referred customers who do not see such a reminder. We implement this idea using a field experiment with the same field partner as described in section 2. We find that consistent with our hypothesis, the messaging reminding customers they were referred in leads to a higher number of referrals than the control messaging without such a reminder. The result suggests that the social cost of making a referral is a meaningful channel that lowers referral propensity. A simple intervention in messaging can substantially increase the number of referrals by making referrals feel more appropriate. Importantly, we also use this field experiment to demonstrate our primary effect - that referred customers are more likely to refer; we find that when shown the exact same referral messaging, non-referred (vs. referred) customers bring in fewer new customers.

4.1 Field Experiment Setup

The experiment was implemented with a push notification on the app inviting customers to refer their friends. For referred customers, 45% were randomly selected to be in the treatment condition and received the message “You were referred in – now refer your friends!” The remaining 55% of referred customers were in the control condition and received the message “Refer your friends!” Although not a key focus of the experiment, we also sent the message for the control group to the non-referred customers. The rest of the content in the push notification as well as the image are identical between the two messages. Figure 2 shows the screenshots of the two creatives used in the experiment. The push notification was sent out on April 15, 2022. Note that the referral incentives are the same as usual and do not differ between conditions. There were no changes in how much the referrer and the referred friend will receive for a successful referral prior to or after the experiment.

Figure 2: Push Notifications in Treatment and Control Conditions



4.2 Analysis

Since the intervention was done via push notifications, we remove customers who unsubscribed from push notifications (about 16%), because they would not see the messages. We are left with about 10 million referred consumers with 45% in the treatment condition and 55% in the control condition, and 24 million non-referred customers. Our main focus is to understand whether the subtle change in messaging in the treatment condition, which reminds customers that they were referred in, will increase referrals compared to the control condition. In addition, to confirm the main finding of the paper, we also compare the number of referrals between the referred control

group and the non-referred customers, who get the exact same push notifications.

We track the number of referrals among the three groups (referred customers in the treatment group, referred customers in the control group, and non-referred customers) for two days after the push notification was sent. The reason for the two days period is that we only observe the date that the recipients followed through by registering for an account, which may take some time after they received a referral invitation. We use a regression analysis to study whether the outcome variable, the number of referrals, is different among the three groups. More specifically, we set the baseline group to be the referred customers in the control group and compare it with the treatment group as well as the non-referred customers (who also received the control message). To confirm randomization among referred customers, we also compare the referral behavior during the two days prior to the intervention.

Table 5: Change in Referrals after Push Notification

	Dependent Variable:			
	Pre-period Referrals		Post-period Referrals	
	(1)	(2)	(3)	(4)
Non-referred customers	-0.000059*** (0.000006)	-0.000046*** (0.000006)	-0.000051*** (0.000006)	-0.000038*** (0.000006)
Treated referred customers	0.000010 (0.000008)	0.000002 (0.000008)	0.000031*** (0.000009)	0.000023*** (0.000009)
Number of purchases		0.000001*** (0.00000002)		0.000001*** (0.00000002)
Constant	0.000116*** (0.000005)		0.000107*** (0.000005)	
Joining date FE	No	Yes	No	Yes
Observations	35,571,675	35,571,675	35,571,675	35,571,675
R^2	0.000005	0.001967	0.000005	0.000838

*** indicates significance at $p = 0.01$; ** $p = 0.05$; * $p = 0.1$.

Results are reported in Table 5. We start by comparing the treatment and control group to assess the effectiveness of our intervention messaging. The parameter estimate for the “Treated referred customers” represents the difference in the number of referrals compared to the baseline, the referred customers in the control group. Columns (1) and (2) show the results in the pre-treatment period (two days prior to the push notifications). The non-significant parameter for the referred treatment group suggests that there is no significant difference in the number of referrals between these two groups in the pre-treatment period. This is to be expected with random assignment among referred customers. Column (3) shows the results in the post-treatment period (two days after the push notifications). The positive and significant parameter for the referred treatment group

suggests that the number of referrals is higher among the treatment group with our intervention messaging. Column (4) adds the control variable of the number of purchases and the date of account registration, and the results remain largely similar. Using our preferred specification from column (4), we see that the magnitude of increase is quite small in the absolute number, 0.000023. But relative to the baseline in the control condition, the increase is about 21% (0.000023 over 0.000107).

Although the main objective of the experiment is to compare referred customers in the treatment and control groups, it is worth pointing out that referred customers, even those in the control group, refer significantly more than non-referred customers. Unlike the “treated referred customers”, referred customers who are in the control group receive the same message as non-referred customers. Therefore, the number of referrals after receiving the message is directly comparable between the two groups. The estimates for “Non-referred customers” in Table 5 are negative and statistically significant across the different time periods and specifications. The results suggest that there is a consistent lower number of referrals among non-referred customers compared to the baseline referred control group after receiving the same push notification. This result confirms our main finding that referred customers make more referrals than non-referred customers.

4.3 Robustness Checks with Recent Customers

One of the reasons for the small magnitude of the treatment effect is that many customers may be inactive by the time of the experiment and no longer interact with the company. These customers may have removed the app from their phones and thus are not receiving push notifications. Although we do not observe the status of each consumer, which is common in a non-contractual setting (e.g., Fader, Hardie, and Shang (2010), Gopalakrishnan et al. (2021)), we proxy for active customers by those who engaged with the platform recently. More specifically, we consider a customer active if she registered the account or made a purchase within the past month.

We repeat the analysis among only likely active customers. Table 6 columns (1) and (2) show the post-treatment results for customers who have been active within 1 month. Among this active customer base, the treatment effect is 0.000630–0.00768 across the two specifications. Relative to the baseline control group, the increase is then 22–27%. Similarly, in columns (3) and (4), we report the results for customers who are active within the past 3 months (registered an account or have made a purchase in the past 3 months). The lift in referrals is 0.000359–0.000398, which is 20–22% compared to the baseline. The non-referred customers have consistently lower referral numbers compared to the referred customers in the control group, in support of the main finding

of the paper.

Table 6: Change in Referrals among Active Customers

	Dependent Variable:			
	Post-period Referrals			
	Active within 1 month		Active within 3 months	
	(1)	(2)	(3)	(4)
Non-referred customers	-0.000841*** (0.000185)	-0.000842*** (0.000187)	-0.000574*** (0.000118)	-0.000591*** (0.000120)
Treated referred customers	0.000768*** (0.000245)	0.000630** (0.000246)	0.000398** (0.000157)	0.000359** (0.000157)
Number of purchases		0.0000005*** (0.0000002)		0.000001*** (0.0000001)
Constant	0.002810*** (0.000156)		0.001787*** (0.000101)	
Joining date FE	No	Yes	No	Yes
Observations	938,418	938,418	604,109	604,109
R^2	0.000069	0.005228	0.000007	0.022076

*** indicates significance at $p = 0.01$; ** $p = 0.05$; * $p = 0.1$.

4.4 Discussion

Our field experiment result suggests that a simple intervention via a subtle change in messaging can improve the effectiveness of a referral invitation. Reminding customers that they were referred in increases their propensity to refer others. While past literature has looked at various costly approaches to encourage referrals, such as increasing the reward amount or reducing the product price (e.g., [Biyalogorsky, Gerstner, and Libai \(2001\)](#), [Jin and Huang \(2014\)](#), [Kornish and Li \(2010\)](#), [Wirtz and Chew \(2002\)](#), [Wolters, Schulze, and Gedenk \(2020\)](#)), this change in messaging can serve as an effective and costless intervention. It can also be used in conjunction with other aspects of the referral rewards program, such as choosing an optimal reward amount.

Besides offering practical implications, the results from the field experiment also lend support to our proposed mechanism found in the hypothetical study in section 3.3. The fact that this simple change in messaging can increase referrals suggests that the perceived social or psychological cost is a meaningful barrier of referrals. Moreover, we can effectively lower such barriers by just reminding referred customers that they were referred in. Why can such reminder lower the social cost? Joining through a referral appears to establish a norm for referred customers that referring is socially acceptable in this context, and thus increases their referral likelihood. Consistent with other research on norms ([Cialdini, Reno, and Kallgren \(1990\)](#), [Harvey and Enzle \(1981\)](#), [Kallgren,](#)

Reno, and Cialdini (2000)), our results suggest that the influence of joining through a referral is stronger when the norm is more salient (e.g., by seeing a reminder). It is also worth noting that we do not believe this is the only way to lower such barriers – rather, any intervention that may reduce the social cost of referrals will likely increase the propensity to refer.

Finally, these results provide further evidence for our primary effect. When referred and non-referred customers were offered the same incentive and messaging, referred customers were more likely to bring in new customers through referrals.

5 General Discussion and Conclusion

Companies have the opportunity to invest in referral reward programs, encouraging current customers to wield their social influence and bring in new customers. Previous work finds that these referral programs bring in more valuable customers in terms of their own purchases or activities with the focal company. We find that our understanding of the value of referred customers has overlooked a key feature – referrals are contagious. In the current research, we find converging evidence across a large-scale field data as well as preregistered lab experiments that referred customers are more likely to refer others than customers that join through other means. The difference in referrals is economically meaningful: we find that not accounting for the higher number of referrals will underestimate about a third of the total difference in value for referred customers.

Prior literature has pointed to several systematic differences between referred and non-referred customers, which can potentially explain in the differences in referrals: better matching between referred customers and the firm, individual-level or network-level differences in referred customers, and social enrichment and validation. Throughout our studies, we demonstrate that referred customers are more likely to refer others even when controlling for these other factors.

Why then do referred customers refer more? We show that customers who joined through a referral believe that referring is more appropriate than those who did not join through a referral. Joining through a referral therefore appears to establish a norm for referred customers that referring is socially acceptable, increasing the likelihood that they will refer as well. Leveraging this insight, we demonstrate that a simple messaging intervention which makes this norm more salient by reminding referred customers that they joined through a referral (“You were referred in – now refer your friends!”) can further boost referral likelihood compared to a control message (“Refer your friends!”).

Insights and Implications

This work expands our understanding of the motivations behind word-of-mouth and provides novel insights into customers' choice to refer. Several factors drive the desire to spread positive word-of-mouth, such as delight with a brand or referral incentives (Biyalogorsky, Gerstner, and Libai (2001), Kornish and Li (2010)). Product characteristics, such as usefulness, originality, interest, and public visibility have also been shown to increase WOM behaviors (Berger and Milkman (2012), Moldovan, Goldenberg, and Chattopadhyay (2011)). However, there are also social and psychological barriers deterring customers from encouraging their friends to try new products. Referring friends can evoke discomfort, due to concerns about impression management and the desire to maintain positive relationships (Berger (2014), Xiao, Tang, and Wirtz (2011)). To reduce social discomfort, individuals often use social norms to guide how they should act in their interpersonal relationships. We find that joining through a referral makes referring others appear more appropriate, and therefore increases the choice to refer. This is in line with previous research on norms showing that norms are constructed based on observing others' behavior in one's reference group (Kemper (1968)). We therefore provide further evidence for the psychological drivers of WOM and the significant influence of others' behavior on consumer judgments and decisions in social contexts.

We offer clear insights for marketers. First, encouraging referrals is even more valuable than researchers previously believed. Prior work finds that referred customers are more valuable on many dimensions (Schmitt, Skiera, and Van den Bulte (2011), Van den Bulte et al. (2018)). We document that these customers are also more likely to bring in other valuable customers through referrals. Our findings therefore suggest that marketers hoping to spread the word about their products should invest in referral reward campaigns to reap these downstream benefits. Further, marketers can increase the referral output of their current referred customers using a simple nudge. While an extensive literature suggests costly methods for increasing referrals by altering the reward size and structure of referral reward programs (Biyalogorsky, Gerstner, and Libai (2001), Garnefeld et al. (2013), Kornish and Li (2010), Jin and Huang (2014), Wirtz and Chew (2002), Wolters, Schulze, and Gedenk (2020)), we offer a cost-free method for boosting word-of-mouth specifically among these valuable referred customers. A subtle message reminding customers that they joined through a referral substantially increased successful referrals in our field experiment by 20 – 27%. This adds to the evidence that investing in, tracking, and nudging referral behaviors can greatly benefit firms.

Generalizability

We find that referred customers are more likely to refer others in a large field dataset and two hypothetical studies. These studies span two consumer contexts: an Amazon loyalty program and a mobile technology firm that offers cash rebates for purchases. While our theory suggests that referral contagion should occur in a wide variety of consumer contexts, we seek to empirically evaluate the generalizability by collecting additional data across a larger number of firms.

We collected this data in partnership with Referral Saasquatch, a platform that builds referral reward programs and tracks customer behavior for a wide variety of businesses and using an array of referral reward sizes and structures (i.e., who receives the reward and conditional on which behaviors). Referral Saasquatch provided us with referral data from a random sample of firms. Using the information from these firms, we compare the referral rate among referred and non-referred customers. Table 7 reports the data from 22 firms with at least 20,000 customers. These 22 firms come from a variety of industries. Columns (4) and (6) report the referral rate among non-referred customers and referred customers, respectively. Column (7) report the main variable of interest: the difference in referral rates between referred and non-referred customers. We see that across the 22 firms, 19 of them show a higher referral rate among referred customers compared to non-referred customers. The difference is statistically significant for 18 firms. The results suggest that the key finding of the paper will likely generalize to a variety of businesses.

Unlike the field data, we only observe the aggregate level referral information from the Referral Saasquatch data. We do not have individual-level data, such as number of purchases or tenure, to control for heterogeneity. While we find that the referral rate is significantly higher for referred customers in the majority of firms, for a clear outlier case (firm ID 21), Saasquatch provided important insight into the referral program. The program is configured such that employees of this company can refer end users into the service and earn rewards for doing so. In this case, the referral rate is significantly higher among non-referred individuals (the employees) than referred customers, however these groups of customers are not comparable.

Table 7: Generalizability: Referrals among Referred vs. Non-referred Customers

ID	Industry	<i>Non-referred Customers</i>		<i>Referred Customers</i>		Difference in referral rate (%)
		Number of customers	Referral rate (%)	Number of customers	Referral rate (%)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	Finance	7,558,189	2.07	433,731	3.64	1.57***
2	HR & Staffing	1,805,498	0.48	16,767	3.81	3.32***
3	Telephony & Wireless	880,272	2.41	37,091	5.65	3.25***
4	Software	670,844	0.52	7,308	12.14	11.62***
5	Insurance	648,512	1.37	13,885	6.14	4.78***
6	Manufacturing	522,873	0.01	20,399	0.02	0.01*
7	HR & Staffing	427,158	0.37	5,119	2.93	2.56***
8	Household Goods	299,624	1.30	5,954	2.13	0.83***
9	Retail	281,665	0.43	13,673	0.99	0.57***
*10	Publishing	206,715	0.06	9,908	0.27	0.21***
11	Finance	130,877	2.52	5,068	3.24	0.72***
12	Accounting Services	129,900	0.07	3,290	0.33	0.26***
13	Real Estate	122,170	0.07	462	6.28	6.21***
14	Finance	90,405	0.51	1,029	2.53	2.01***
15	Education	44,130	0.48	594	1.85	1.37***
16	Finance	42,583	0.55	5,096	1.14	0.59***
17	Software	37,029	1.71	8,014	8.15	6.43***
18	Management Consulting	28,818	0.62	2,675	0.22	-0.40**
19	HR & Staffing	28,638	0.30	86	2.33	2.02***
20	Software	25,954	0.31	490	6.12	5.81***
21	Software	25,909	48.24	20,500	2.64	-45.60***
22	Software	16,880	0.01	2,459	0.00	-0.01

*** indicates significance at $p = 0.01$; ** $p = 0.05$; * $p = 0.1$.

Limitations and Opportunities for Future Research

There are several limitations with the current research that would benefit from further follow-up studies. The observational data can tell us which customers (referred or non-referred) bring in the most new customers. However, as with most referral data, we do not actually observe the referral stage (i.e., how many customers choose to send a referral invitation), only the uptake stage (i.e., how many customers join through a referral using the original customer's code). This is common, as companies allow their customers to send invitations numerous ways (e.g., text, email, in-person, or on social media) and are unable to track all methods of communication. This limitation is addressed to some extent by the hypothetical studies where we ask about referral intentions. It would be valuable to document the finding with data on the referral invitation stage as well. Furthermore, without directly observing revenue or margin, we proxy the value of customers by the number

of purchases. While it is a reasonable proxy in our empirical context, it would be preferable to document the value of customers as well as the value of referrals by their actual contribution margin to the company.

Our field experiment demonstrates one intervention to boost referrals by referred customers. Specifically, in line with our proposed mechanism that referred customers feel referring is appropriate, we aimed to make this norm more salient by reminding referred customers that a friend originally referred them. We would also expect other interventions to be effective if they can credibly improve customers' beliefs about the appropriateness of referral behaviors. In particular, testing whether companies can use norm messaging to increase referrals by non-referred customer may prove fruitful. For example, a company might use an information norm to increase the perception that referring friends to their product is socially appropriate (e.g., "Thousands of customers have joined our service through a referral"). Using our findings, future research might produce additional interventions for increasing referrals by both referred and non-referred customers.

References

- Armellini, Guillermo, Christian Barrot, and Jan U Becker (2015), "Referral programs, customer value, and the relevance of dyadic characteristics," *International Journal of Research in Marketing*, 32 (4), 449–452.
- Ascarza, Eva, Peter Ebbes, Oded Netzer, and Matthew Danielson (2017), "Beyond the target customer: Social effects of customer relationship management campaigns," *Journal of Marketing Research*, 54 (3), 347–363.
- Berger, Jonah (2014), "Word of mouth and interpersonal communication: A review and directions for future research," *Journal of Consumer Psychology*, 24 (4), 586–607.
- Berger, Jonah and Katherine L Milkman (2012), "What makes online content viral?," *Journal of Marketing Research*, 49 (2), 192–205.
- Biyalogorsky, Eyal, Eitan Gerstner, and Barak Libai (2001), "Customer referral management: Optimal reward programs," *Marketing Science*, 20 (1), 82–95.
- Brown, Jacqueline Johnson and Peter H Reingen (1987), "Social ties and word-of-mouth referral behavior," *Journal of Consumer Research*, 14 (3), 350–362.
- Chung, Cindy MY and Peter R Darke (2006), "The consumer as advocate: Self-relevance, culture, and word-of-mouth," *Marketing Letters*, 17 (4), 269–279.
- Cialdini, Robert B, Raymond R Reno, and Carl A Kallgren (1990), "A focus theory of normative conduct: Recycling the concept of norms to reduce littering in public places," *Journal of Personality and Social Psychology*, 58 (6), 1015–1026.
- Cialdini, Robert B and Melanie R Trost (1998), "Social influence: Social norms, conformity and compliance.,".
- Dichter, Ernest (1966), "How word-of-mouth advertising works," *Harvard Business Review*, 44, 147–166.
- Durukan, Tulin and Ibrahim Bozaci (2012), "A survey on determinants of word of mouth in social media," *International Journal of Economics and Management Sciences*, 1 (7), 36–44.
- Fader, Peter S, Bruce GS Hardie, and Jen Shang (2010), "Customer-base analysis in a discrete-time non-contractual setting," *Marketing Science*, 29 (6), 1086–1108.
- Gao, Fei, Xitong Li, and Paul A. Pavlou (2022), "Reward your friends in online referrals: The effectiveness, motivation and boundaries of prosocial reward strategy," *MIS Quarterly*.
- Garnefeld, Ina, Andreas Eggert, Sabrina V Helm, and Stephen S Tax (2013), "Growing existing customers' revenue streams through customer referral programs," *Journal of Marketing*, 77 (4), 17–32.
- Gershon, Rachel, Cynthia Cryder, and Leslie K John (2020), "Why prosocial referral incentives work: The interplay of reputational benefits and action costs," *Journal of Marketing Research*, 57 (1), 156–172.

- Gopalakrishnan, Arun, Zhenling Jiang, Yulia Nevskaya, and Raphael Thomadsen (2021), “Can non-tiered customer loyalty programs be profitable?,” *Marketing Science*, 40 (3), 508–526.
- Harvey, Michael D and Michael E Enzle (1981), “A cognitive model of social norms for understanding the transgression–helping effect,” *Journal of Personality and Social Psychology*, 41 (5), 866–875.
- Hill, Shawndra, Foster Provost, and Chris Volinsky (2006), “Network-based marketing: Identifying likely adopters via consumer networks,” *Statistical Science*, 21 (2), 256–276.
- Ho, Teck-Hua, Shan Li, So-Eun Park, and Zuo-Jun Max Shen (2012), “Customer influence value and purchase acceleration in new product diffusion,” *Marketing Science*, 31 (2), 236–256.
- Iyengar, Raghuram, Christophe Van den Bulte, and Jae Young Lee (2015), “Social contagion in new product trial and repeat,” *Marketing Science*, 34 (3), 408–429.
- Iyengar, Raghuram, Christophe Van den Bulte, and Thomas W Valente (2011), “Opinion leadership and social contagion in new product diffusion,” *Marketing Science*, 30 (2), 195–212.
- Jin, Liyin and Yunhui Huang (2014), “When giving money does not work: The differential effects of monetary versus in-kind rewards in referral reward programs,” *International Journal of Research in Marketing*, 31 (1), 107–116.
- Kallgren, Carl A, Raymond R Reno, and Robert B Cialdini (2000), “A focus theory of normative conduct: When norms do and do not affect behavior,” *Personality and Social Psychology Bulletin*, 26 (8), 1002–1012.
- Katz, Elihu and Paul F. Lazarsfeld (1955), *Personal Influence: the part played by people in the flow of mass communications* Glencoe, IL: Free Press.
- Kemper, Theodore D (1968), “Reference groups, socialization and achievement,” *American Sociological Review*, pages 31–45.
- Kornish, Laura J and Qiuping Li (2010), “Optimal referral bonuses with asymmetric information: Firm-offered and interpersonal incentives,” *Marketing Science*, 29 (1), 108–121.
- Kumar, Viswanathan, J Andrew Petersen, and Robert P Leone (2007), “How valuable is word of mouth?,” *Harvard Business Review*, 85 (10), 139–144.
- Libai, Barak, Eitan Muller, and Renana Peres (2013), “Decomposing the value of word-of-mouth seeding programs: Acceleration versus expansion,” *Journal of Marketing Research*, 50 (2), 161–176.
- Manchanda, Puneet, Ying Xie, and Nara Youn (2008), “The role of targeted communication and contagion in product adoption,” *Marketing Science*, 27 (6), 961–976.
- McPherson, Miller, Lynn Smith-Lovin, and James M Cook (2001), “Birds of a feather: Homophily in social networks,” *Annual Review of Sociology*, 27 (1), 415–444.
- Moldovan, Sarit, Jacob Goldenberg, and Amitava Chattopadhyay (2011), “The different roles of product

- originality and usefulness in generating word-of-mouth,” *International Journal of Research in Marketing*, 28 (2), 109–119.
- Mooradian, Todd A and K Scott Swan (2006), “Personality-and-culture: The case of national extraversion and word-of-mouth,” *Journal of Business Research*, 59 (6), 778–785.
- Newman, Mark EJ (2003), “Mixing patterns in networks,” *Physical review E*, 67 (2), 026126.
- Ryu, Gangseog and Lawrence Feick (2007), “A penny for your thoughts: Referral reward programs and referral likelihood,” *Journal of Marketing*, 71 (1), 84–94.
- Schmitt, Philipp, Bernd Skiera, and Christophe Van den Bulte (2011), “Referral programs and customer value,” *Journal of Marketing*, 75 (1), 46–59.
- Sun, Tianshu, Siva Viswanathan, and Elena Zheleva (2021), “Creating social contagion through firm-mediated message design: Evidence from a randomized field experiment,” *Management Science*, 67 (2), 808–827.
- Trusov, Michael, Randolph Bucklin, and Koen Pauwels (2009), “Effects of word-of-mouth versus traditional marketing: Findings from an internet social networking site,” *Journal of Marketing*, 73, 90–102.
- Tuk, Mirjam A, Peeter WJ Verlegh, Ale Smidts, and Daniel HJ Wigboldus (2009), “Sales and sincerity: The role of relational framing in word-of-mouth marketing,” *Journal of Consumer Psychology*, 19 (1), 38–47.
- Van den Bulte, Christophe, Emanuel Bayer, Bernd Skiera, and Philipp Schmitt (2018), “How customer referral programs turn social capital into economic capital,” *Journal of Marketing Research*, 55 (1), 132–146.
- Van den Bulte, Christophe and Gary L Lilien (2001), “Medical innovation revisited: Social contagion versus marketing effort,” *American Journal of Sociology*, 106 (5), 1409–1435.
- Van den Bulte, Christophe and Stefan Wuyts (2007), *Social networks in marketing* Cambridge, MA: Marketing Science Institute.
- Villanueva, Julian, Shijin Yoo, and Dominique M Hanssens (2008), “The impact of marketing-induced versus word-of-mouth customer acquisition on customer equity growth,” *Journal of Marketing Research*, 45 (1), 48–59.
- Wirtz, Jochen and Patricia Chew (2002), “The effects of incentives, deal proneness, satisfaction and tie strength on word-of-mouth behaviour,” *International Journal of Service Industry Management*, 13 (2), 141–162.
- Wolters, Heike M, Christian Schulze, and Karen Gedenk (2020), “Referral reward size and new customer profitability,” *Marketing Science*, 39 (6), 1166–1180.
- Xiao, Ping, Christopher Tang, and Jochen Wirtz (2011), “Optimizing referral reward programs under impression management considerations,” *European Journal of Operational Research*, 215 (3), 730–739.

Xu, Minzhe, Max Yu, and Yanping Tu (2022), "I will get a reward, too: When disclosing referrer-reward increases referring," *Journal of Marketing Research*.