



Understanding the quality–quantity conundrum of customer referral programs: effects of contribution margin, extraversion, and opinion leadership

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Abstract

Firms can substantially profit from customer referrals, but they must understand the different stages of the referral process to determine what drives the number of referrals (first stage), conversion (second stage), and average contribution margin per referral (third stage). Applying a framework that integrates perceptual and behavioral drivers, this study uses a financial services company's customer survey and transaction data to investigate how the effect of contribution margins of referring customers at all three stages depends on their perceived extraversion and opinion leadership. Extreme extraversion and opinion leadership diminish the positive effect of the contribution margins of referring customers on the number of referrals; their effect on the number of successful referrals is insignificant. In terms of the contribution margin of successful referrals, extraversion has a negative and opinion leadership a positive moderating effect.

Keywords Referral programs · Customer influence · Extraversion · Opinion leadership · Customer value

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Introduction

Customer referrals are a specific form of positive, stimulated word of mouth recommendations from an existing (referring) customer to a prospect (referred customer) (Schmitt et al. 2011). Many firms implement customer referral programs to encourage such recommendations, rewarding referring customers with monetary or nonmonetary incentives (e.g., gifts, vouchers) (Ryu and Feick 2007). Customer referral programs are particularly useful in service sectors whose credence offerings drive consumers to seek information from others who have experienced these services (Wentzel et al. 2014). These programs can be an efficient and effective means of acquiring new customers with higher contribution margins, retention (or loyalty), and customer value (Armellini et al. 2015; Schmitt et al. 2011). However, past studies have found that contribution margins vary across referrals, and referral intentions do not always result in referrals or successful referrals. According to Kumar et al. (2007), 68% of respondents in a study of the financial services industry express intentions to refer, but only 33% do so, and only 14% of those actual referrals lead to new customers, of which only 11% ultimately are profitable. To improve the effectiveness of customer referral programs, managers need to understand what drives the number of referrals

but also what leads to their conversion (success) and produces profits. In our study, we aim to shed light on these questions.

Since referral programs generally leverage customers' social connections (Schmitt et al. 2011), the question arises whether valuable referrers are more likely to generate valuable referrals. In this study, we define valuable customers based on their contribution margin. In the context of customer referral programs, previous studies have used the homophily principle (McPherson et al. 2001) to suggest that existing customers have an above-average chance of being a good match with their company, and indeed found that their referrals lead to valuable customers (Armellini et al. 2015; Haenlein 2011; Schmitt et al. 2011). In this regard, it would be fruitful to learn whether customers who are more valuable to the company, are even better matches and therefore generate more referrals, more successful referrals, and more valuable referrals. Van den Bulte et al. (2018) provide initial evidence to answer this question. By drawing on the homophily principle, they find a systematic variation of contribution margins in dyads of referring and referred customers.

Companies can rather easily derive the economic value of their customers from their databases and thus seek their participation in customer referral programs (Haenlein and Libai 2017). Nevertheless, there might exist other factors outside the control of the company that affect the outcomes of customer referral programs. For example, the importance of customers who exhibit a disproportional effect on others has received attention in previous studies on word-of-mouth (WOM) and customer referral programs (e.g., Godes and Mayzlin 2009; Haenlein and Libai 2017). In a study on the value of referrals, Kumar et al. (2010b) find that higher value customers are not necessarily those who generate the most profitable referrals. Kumar et al. (2010a) therefore suggest opinion leadership as an additional dimension to evaluate customers in referral programs. Godes and Mayzlin (2009) find that opinion leaders generate more WOM and that this effect increases with higher levels of customer loyalty. In the context of their study, the authors suggest extraversion as a measure worthy of further investigation. Like opinion leadership, extraversion is frequently associated with the concept of social influence (e.g., Anderson et al. 2001). Extraverted customers are talkative, sociable, outgoing, and enthusiastic (Costa and MacCrae 1992; John et al. 2008). They are likely to have larger social networks and interact more frequently with other people (Mooradian and Swan 2006; Van Hove and Lievens 2009). Therefore, extraverted customers' WOM is likely to reach a larger audience and thus exhibits a larger influence on other people. Consistent with this line of thought, Hennig-Thurau et al. (2004) identify extraversion as a driver of electronic WOM.

Following this line of argument, we focus on the contribution margin of referring customers as a key driver of referral program outcomes. We consider the number of referrals and the number of successful referrals (both reflecting referral quantity), and the contribution margins of referred customers

(i.e., referral quality) as referral program outcomes. We measure customers' perceived extraversion and opinion leadership as important aspects of customers' influence on others and investigate their interactions with referring customers' contribution margin. In the following section we explain, how extraversion and opinion leadership might contribute to a better understanding of referral program outcomes.

There is emerging consensus that the personality domain is best described by the Big Five factors of neuroticism, extraversion, openness, agreeableness, and conscientiousness (Mooradian and Olver 1997). Since extraversion appears to directly determine both the extent and the quality of social interaction (McCrae 1989), it is likely to serve as a fundamental driver of referral behavior. Extraverted people have a friendly, intimate style of interaction, have a desire to be with other people (i.e., are sociable), relish sheer quantity of social stimulation, easily take charge, and make up their own minds (McCrae and Costa 2003). Therefore, extraversion is an important psychological determinant of social-network composition. In this regard, Feiler and Kleinbaum (2015) find that extraverts accumulate more social connections and are more likely to connect with other extraverts.

Extraverted customers might be an attractive target segment for referral programs because of the size of their social network. Nevertheless, since extraversion is presumed to be on the top-most level of the personality hierarchy, it may offer only a limited explanation of behavior in a specific context (Paunonen and Ashton 2001). Opinion leadership as a more specific measure of personal influence, may add to our understanding of referring customers' behavior in these programs. Opinion leadership occurs when individuals seek to influence the purchasing behavior of other customers in specific product categories and when they are very likely to communicate with others by virtue of their involvement in the product category (Flynn et al. 1996). In contrast to extraversion, opinion leadership is a domain-specific measure since opinion leaders exert their influence with regard to a clearly defined product or product category (Gnambs and Batinic 2012). Accordingly, opinion leadership represents an important measure for market segmentation and targeting influential customers (e.g., Flynn et al. 1996; Gnambs and Batinic 2012).

While extraversion is likely to explain the quantity of referrals, opinion leadership is likely to explain the quality of referrals. This is because opinion leaders generally possess higher product knowledge and involvement, which they share in their communications with potential customers. Thus, we consider both, extraversion and opinion leadership, as important and alternative measures of influence in the context of customer referral programs. To date, with the notable exception of Gnambs and Batinic (2012), we are not aware of any study that has investigated extraversion and opinion leadership together.

Similarly, empirical studies of the drivers of referrals are rare; and the few that exist investigate only certain stages or drivers (e.g., De Bruyn and Lilien 2008; Kumar et al. 2010b). The referral process comprises three stages: (1) Customers

decide to refer others to the firm, (2) some of these referred prospects become customers, and (3) some of the successfully referred customers allow the firm to earn profits. We therefore investigate three research questions:

- Does the contribution margin of referring customers positively influence the referral process in all three stages?
- Is the effect of contribution margin on referral program outcomes influenced by perceived opinion leadership and extraversion?
- Who should companies target in their referral programs?

To address these questions, we propose a framework that includes all three steps of the customer referral process: motivating current customers to refer (first stage), encouraging successful referrals (second stage), and generating valuable new customer relationships from referrals (third stage). To investigate the program outcomes, we use objective information about the number of referrals, the number of successful referrals, and the contribution margins of new clients acquired by referrals. We also include several covariates investigated in prior research in our framework. Our study data combine behavioral measures acquired from a focal firm's database and perceptual information garnered from a customer survey. We provide details about the novel estimation techniques we used for this analysis, which might also inform future studies. In presenting our core findings, we offer several implications for theory and practice, as well as promising avenues for additional research.

Customer referral process framework

Since only a few studies have investigated customer referral programs, we also included WOM studies in our literature review (see Table 1). We are unaware of empirical studies that address all three stages of the referral process at the individual customer level. Furthermore, most studies rely on self-reported WOM or referral behavior, which may differ from actual behavior (Sun and Morwitz 2010). Similarly, only a few studies focus on actual behavior (e.g., service and product usage or cross-buying behavior) when investigating antecedents, while the majority of studies uses drivers that are solely based on perceptions (e.g., perceived satisfaction and extraversion). Notably, only three of the twenty-four studies we reviewed consider perceptual and behavior-based antecedents together (Bowman and Narayandas 2001; Brown et al. 2005; Verhoef et al. 2002).

With regard to perceptual antecedents, several studies examine drivers related to the customer's relationship with the firm, such as customer satisfaction and involvement (e.g., Richins and Root-Shaffer 1988; Verhoef et al. 2002). Moreover, various studies reveal the importance of personality traits, such as extraversion (Ferguson et al. 2010; Hennig-Thurau et al. 2004; Mooradian and Olver 1997), opinion

leadership (Godes and Mayzlin 2009; Richins and Root-Shaffer 1988; Sun et al. 2006), the sender's expertise (Bansal and Voyer 2000; von Wangenheim and Bayón 2007), and market mavenism (Ryu and Feick 2007), as antecedents of the referral process.

With regard to behavior-based antecedents, only five studies account for the customer acquisition mode, differentiating between customers acquired by referrals or not (Armellini et al. 2015; Schmitt et al. 2011; Trusov et al. 2009; Van den Bulte et al. 2018; Villanueva et al. 2008). This distinction is highly relevant though; previous results show that customers acquired by referral are of greater value to the firm (Schmitt et al. 2011; Villanueva et al. 2008), have a higher contribution margin and retention rate (Schmitt et al. 2011), exhibit longer carryover effects and higher response elasticities (Trusov et al. 2009), and are less likely to churn (Armellini et al. 2015) than are non-referred customers. Five studies also investigate select exchange characteristics, such as cross-buying and complaints, as further behavior-based antecedents (Bowman and Narayandas 2001; Brown et al. 2005; Kumar et al. 2010b; Verhoef et al. 2002; Villanueva et al. 2008). Because most studies only consider one or two stages of the referral process and focus on self-reported measures, this might lead to biased inferences.

In our model, we rely on perceptual and behavior-based measures as antecedents and outcomes of referral programs. The perceptual antecedents include well-established measures such as perceived extraversion and opinion leadership, while the behavior-based antecedent that measures customer value is the referring customers' contribution margin. In this study we examine how customer contribution margin and characteristics such as extraversion and opinion leadership influence referral program outcomes. We also examine how these two customer characteristics moderate the effect of referring customers' contribution margins on referral program outcomes. Figure 1 provides an overview of our conceptual framework.

Building on previous research, we complement our focal model with perceptual and behavior-based control variables derived from theoretical and empirical literature on WOM and referral studies, as well as discussions with industry experts and firm representatives. The behavior-based control variables can be categorized into customer-initiated contacts and relationship characteristics (see Fig. 1). We provide an overview of all the variables and their expected effects in Table 2.

Drivers of the customer referral process

Referring customers' contribution margin

Firms often use existing customers' contribution margins to measure their worth (Schmitt et al. 2011). Firms generally earn higher margins from customers who are engaged with the firm's product and service offerings. These customers are

Table 1 Review of selected literature

Author(s) / Year	WOM (W) / Referral (R)	Study Focus	Considered Stages of the Referral Process			Antecedents		Key Results
			Stage 1	Stage 2	Stage 3	Perceptual	Behavior-based	
Richins and Root-Shaffer (1988)	W	Role of opinion leadership and involvement in WOM behavior	No. of WOM comments	–	–	Opinion leadership and involvement	–	Involvement influences opinion leadership, which enhances WOM communication
Mooradian and Oliver (1997)	R	Impact of personality and emotion on postpurchase processes	Recommendation likelihood	–	–	Extraversion, neuroticism, and satisfaction	–	Extraversion predicts positive consumption-based emotions, which influence satisfaction and thus recommendations, complaints, and repeat purchase intentions
Anderson (1998)	W	Relationship between customer satisfaction and WOM communication	No. of persons to whom experiences with brand were communicated	–	–	Satisfaction	–	Dissatisfied customers engage in greater WOM than satisfied ones
Mangold et al. (1999)	W	Stimulus and content categorization of WOM communication in the service marketplace	WOM incident characteristics	–	–	Satisfaction	–	WOM is more likely to be initiated by receivers' felt need for information than by senders' satisfaction
Bansal and Voyer (2000)	W	Effects of noninterpersonal and interpersonal forces on the influence of WOM on service purchase decisions	Extent to which receivers actively seek WOM	Influence of sender's WOM on receiver's purchase decision	–	Sender's expertise	–	Tie strength between sender and receiver, as well as sender's expertise, significantly affects the influence of the sender's WOM on the receiver's purchase decision
Bowman and Narayandas (2001)	W	Management of customer-initiated contacts with manufacturers	No. of persons to whom experiences with brand were communicated	–	–	Satisfaction	High customer loyalty, heavy user, customer contacts, and complaints	Customer's satisfaction with manufacturer contacts influences WOM activity
Verhoef et al. (2002)	R	Effect of relational constructs on customer referrals and number of services purchased	WOM tendency	–	–	Satisfaction and commitment	No. of purchases and relationship age	Trust, affective commitment, satisfaction, and payment equity enhance customer referrals
Hennig-Thurau et al. (2004)	W	Motives for electronic WOM via customer-opinion platforms	No. of comments on opinion platforms*	–	–	Extraversion	–	Extraversion enhances platform visit frequency and comment writing
Hogan et al. (2004)	W	Assessment of advertising effectiveness, taking postpurchase WOM sales effects into account	–	Conversion by WOM	Customer lifetime value	–	–	WOM generated after an advertising-motivated purchase constitutes a considerable economic value
Brown et al. (2005)	R	Antecedents of customers' positive WOM intentions and behaviors	WOM intention and behaviors	–	–	Satisfaction, commitment, and identification	Current product usage	Satisfaction, commitment, and identification influence positive WOM intentions and behaviors

Table 1 (continued)

Author(s) / Year	WOM (W) / Referral (R)	Study Focus	Considered Stages of the Referral Process			Antecedents		Key Results	
			Stage 1	Stage 2	Stage 3	Perceptual	Behavior-based		
Sun et al. (2006)	W	Antecedents and consequences of online WOM	Online forwarding and chatting behavior	–	–	Opinion leadership	–	Opinion leadership drives online forwarding and online chatting	
Ryu and Feick (2007)	R	Referral likelihood based on reward programs	Referral likelihood	–	–	Satisfaction, involvement, and market mavericism	–	Offering a reward, satisfaction, involvement, and market mavericism increase referral likelihood	
von Wangenheim and Bayón (2007)	R	Linkage between customer satisfaction, referrals, and new customer acquisition	No. of referrals	No. of provider switching / conversion rate due to WOM*	–	Satisfaction, involvement, and sender's expertise	–	Customer satisfaction affects referral making (moderated by involvement), which in turn affects new customer acquisition (moderated by sender's expertise)	
De Bruyn and Lilien (2008)	R	Role of WOM during different stages of viral marketing recipients' decision making	No. of referrals*	Website visit and completion of a survey*	–	Sender's expertise	–	Characteristics of the social tie influence receivers' behavior; whereas sender's expertise is insignificant	
De Matos and Rossi (2008)	W	Review of antecedents and moderators of WOM activity	WOM intention or behavior ^(a)	–	–	Satisfaction and commitment	–	Antecedents (e.g., satisfaction, commitment) have significant effects on WOM activity, and WOM valence has a moderating role	
Villanueva et al. (2008)	R	Comparison of marketing-induced and WOM customer acquisition effects on customer equity growth	–	No. of new registrations through WOM channels	No. of site log-ins as proxy for firm's success*	–	Acquired by referral, service usage (no. of web logins)	Customers acquired by WOM add almost twice as much long-term value to the firm than marketing-induced ones	
Godes and Mayzlin (2009)	W	Effectiveness of a company's proactive management of WOM communication	No. of persons to whom WOM communication was directed	–	Effect of WOM on sales*	Opinion leadership	–	Exogenously created WOM is useful and opinion leading; very loyal customers are potentially effective spreaders of WOM	
Trusov et al. (2009)	W	Comparison of WOM marketing and traditional marketing effects on member growth	No. of referrals*	No. of sign-ups*	–	–	Acquired by referral	Referrals have longer carryover effects and produce higher response elasticities than traditional marketing actions	
Ferguson et al. (2010)	R	Antecedents of positive WOM intentions	Positive WOM intentions	–	–	Extraversion and agreeableness	–	Personality traits influence the strength of positive WOM intentions	
Kumar et al. (2010b)	R	Components of the total customer engagement value	–	–	Customer lifetime value and customer referral value*	–	Cross-buying, past referral, product returns, and monetary value	A customer's engagement value comprises customer lifetime value, referral value, influencer value, and knowledge value	
Schmitt et al. (2011)	R	Value of referred and non-referred customers in the context of referral programs	–	–	Customer value and average contribution margin*	–	Acquired by referral	Referred customers have a higher contribution margin, higher retention rate and are more valuable	

Table 1 (continued)

Author(s) / Year	WOM (W) / Referral (R)	Study Focus	Considered Stages of the Referral Process			Antecedents		Key Results	
			Stage 1	Stage 2	Stage 3	Perceptual	Behavior-based		
Verlegh et al. (2013)	R	Receiver responses to rewarded referrals	–	–	Purchase intention	–	–	Providing a reward for a referral adversely affects a receiver's response, so rewarding both sender and receiver or providing symbolic rewards is recommended	
Arnelini et al. (2015) (replication of Schmitt et al. (2011))	R	Customer lifetime value and the relevance of dyadic characteristics in the context of referral programs	–	–	Customer lifetime value*	–	Acquired by referral	Rewarded referrals reduce the risk of customer churn, but referred customers are not necessarily more valuable	
Van den Bulte et al. (2018)	R	Dyads of referring and referred customers	–	–	Customer contribution margin*	–	Contribution margin, relationship duration, acquired by referral, churn	Contribution margins of referring and referred customers vary systematically, relationship duration positively influences referral margins (especially after the referral), referred customers churn less as long as their referrer did not churn	
Our Study	R		Number of referrals*	Number of successful referrals*	Contribution margin*	Extraversion, opinion leadership, satisfaction, attitude towards referral programs, and involvement	Contribution margin, relationship duration, cross-buying behavior, acquired by referral, number of past referrals, calls and emails to customer center, web logins	Referrers' contribution margin positively influences the number and profitability of referrals. Extraversion positively influences the number of (successful) referrals. Extraversion and opinion leadership diminish the positive effect of contribution margins on the number of referrals. Extraversion has a negative and opinion leadership a positive moderating effect on the effect of referrers' contribution margin.	

*Objectively reported (instead of self-reported) measures

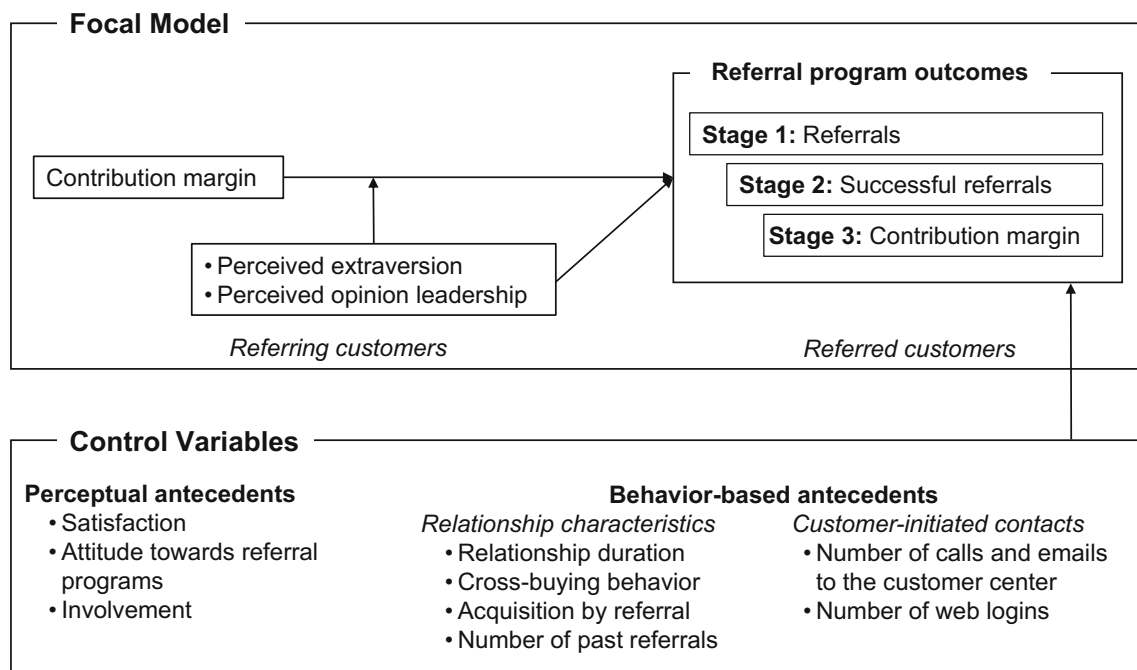


Fig. 1 Conceptual framework

invaluable in terms of their direct impact on the firm's bottom line and their indirect impact through WOM and referral behaviors (Kumar et al. 2010a). Such customers reward firms with more positive WOM (Berry and Mirabito 2005) (first stage of referral process).

Referral rewards might have a weaker motivating influence on high-value customers (Schmitt et al. 2011), whereas relationship outcomes, such as triadic closure, might be more effective. Triadic closure refers to the tendency of “friends of friends” to become friends themselves (Granovetter

Table 2 Variables used as drivers of referral program outcomes

Variable	Operationalization	Expected Effect at Stage			
		1	2	3	
<i>Control Variables</i>					
Satisfaction	Construct based on Mano and Oliver (1993) and Westbrook and Oliver (1981) (see Appendix 1)	curvilinear			
Attitude towards referral programs	New construct, analogous to “deal proneness” in Chandon et al. (2000) and Lichtenstein et al. (1995) (see Appendix 1)	+	0	0	
Involvement	Construct based on Ganesh et al. (2000) and Keaveney and Parthasarathy (2001) (see Appendix 1)	+	+	+	
Relationship duration	Tenure of relationship (in years)	–	–	+	
Cross-buying behavior	Number of products bought	+	+	+	
Acquisition by referral	Dummy variable (1 = acquisition by referral; 0 = other channel)	+	+	+	
Number of past referrals	Number of all past referrals	+	+	–	
Number of calls and emails to the customer center	Number of calls and emails to the customer center in the last 12 months	+	+	+	
Number of web logins	Number of logins in the last 12 months	+	+	+	
<i>Focal Variables</i>					
Contribution margin of (H1a-c)	Contribution margin in the last 12 months (in EUR)	+	+	+	
Extraversion (H2a-c)	Construct based on Costa and MacCrae (1992) (see Appendix 1)	+	+	–	
Opinion leadership (H3a-c)	Construct based on Flynn et al. (1996)	+	+	+	
Extraversion × Contribution margin (H4a-c)	See related measures above	+	+	–	
Opinion leadership × Contribution margin (H5a-c)	See related measures above	+	+	+	

1973). Kossinets and Watts (2006) find that triadic closure occurs when mutual acquaintances have strong relationships with other parties. Customers with high contribution margins exhibit strong relationships with the firm and likely provide referrals to other people with whom they also have strong relationships. In turn, those referred customers probably develop a strong, triadic relationship with the firm themselves. When customers have high contribution margins and are highly engaged with the firm's offerings, they probably know those offerings well. This expertise enhances the likelihood of a successful referral (von Wangenheim and Bayón 2007), so we predict that experience and product knowledge serve as signals that encourage the referred person to become a customer. Therefore, customers with higher contribution margins should provide more successful referrals (second stage).

Haenlein and Libai (2013) find that encouraging highly profitable customers to generate referrals is more effective also because of their greater social value. These authors define social value as the long-term monetary value people generate by affecting others, and they predict that higher social value of profitable customers is an effect of network assortativity i.e. in social networks, people tend to connect with others who are like them (McPherson et al. 2001; Newman 2003). Thus, high value customers are more likely to have other high value customers in their social network (Haenlein 2011; Haenlein and Libai 2013). Schmitt et al. (2011) also consider homophily in referral contexts and suggest that valuable referrers are more likely to generate valuable referrals. For 1799 referrer-referral dyads, Van den Bulte et al. (2018) find a dyadic-specific variation of contribution margins, thereby finding initial evidence that the homophily principle is relevant for referral programs. We therefore expect that more valuable customers i.e., customers with higher contribution margins, will provide more valuable referrals (third stage). Thus:

H1: Customers with higher contribution margins (a) refer more often, (b) refer successfully more often, and (c) generate referrals with a higher average contribution margin.

Extraversion

Customers' personality traits can affect a wide array of behaviors (Ajzen 1987), including customer referral behavior (Kumar et al. 2010a). Among the Big Five personality traits, extraversion is important for marketing communication since extraverted customers are talkative, outgoing, and enthusiastic (Costa and MacCrae 1992; John et al. 2008), all of which likely influence referral volume. Extraverts accumulate more social connections (Feiler and Kleinbaum 2015) and are likely to have a larger social network. Prior studies confirm the positive

influence of extraversion on WOM intentions (Ferguson et al. 2010) and WOM behavior (Hennig-Thurau et al. 2004). Extraverts also convey more positive emotions (Costa and MacCrae 1992), which might lead to more positive WOM. Mooradian and Olver (1997) find that extraversion enhances positive consumption-based emotions, which increase product satisfaction and recommendations. We therefore expect extraverted customers to provide more referrals (first stage) and more successful referrals (second stage). While extraverted customers' positive and enthusiastic communications might convince a substantial number of people to become customers, the referred customers might realize post-consumption that the firm's services fall short of their expectations. Furthermore, since extraverts interact with more people than introverts, the quality of their referrals might deteriorate. Similarly, Schmitt et al. (2011) posit that the quality of acquired customers deteriorates when existing customers refer more new customers. Therefore, we expect that new customers acquired by extraverts will generate lower average contribution margins (third stage). Thus:

H2: Extraverted customers (a) refer more often and (b) refer successfully more often but (c) generate referrals with a lower average contribution margin.

Opinion leadership

Opinion leaders exert substantial personal influence on other customers' decisions (Gilly et al. 1998; Rogers and Cartano 1962). Richins and Root-Shaffer (1988) and Sun et al. (2006) confirm the positive relationship between opinion leadership and WOM behavior. Customers frequently seek and accept advice from opinion leaders recognized as credible experts with high product involvement (Jacoby and Hoyer 1981). In the financial services, opinion leaders provide valuable inputs since these services can be evaluated only post-consumption (Schmitt et al. 2011). Therefore, we expect opinion leaders to provide more referrals, and more successful referrals (first and second stage). As Flynn et al. (1996) point out, opinion leaders cannot exist without opinion seekers. Opinion leaders are perceived as experts of the product category under consideration and therefore, attract prospects who actually have a demand for the product and seek credible information. In other words, we expect a "pull effect" from opinion leaders, because prospects seek their advice. This is contrary to extraverts, for whom we expect a "push effect", because their referrals rather result from their seeking of social interaction with others. Accordingly, we expect that the

positive effect of opinion leadership on the number of (successful) referrals is smaller than the effect of extraversion and that the average contribution margin of more successful referrals is much less likely to decline. Rather, we expect that opinion leaders provide more valuable referrals (third stage). Thus:

H3: Customers who are opinion leaders (a) refer more often, (b) refer successfully more often, and (c) generate referrals with a higher average contribution margin.

The moderating effects of extraversion and opinion leadership on contribution margin

As postulated in H1, customers with a high contribution margin are more engaged with the firm's products and services, and this results in more referrals. Extraverted customers are expected to recommend products and services to a broader audience, because they are socially active. We therefore posit that extraversion reinforces the positive effect of referring customers' contribution margins on the number of referrals (first stage).

Brown and Reingen (1987) find that information from strong ties is more influential than that from weak ties; so referrals to family and close friends likely are more successful. However, extraverted customers refer not only their strong ties but also their weak ties. We therefore postulate that the combined effect of strong ties and a large social network results in a higher number of successful referrals (second stage).

Family members and friends tend to share similar values and attitudes, and this homophily influences their decision making (Brown and Reingen 1987). Extraverted customers are generally more outgoing and enthusiastic; therefore, they tend to recommend even to weak ties who do not match well with the company. Some customers might refer products they do not regularly consume or refer people outside of their close social network. Consequently, the effect of network assortativity would diminish (Haenlein and Libai 2013). We expect that this deterioration is particularly pronounced for extraverted customers, who are more likely to communicate with people outside their social network. The positive effect of referring customers' contribution margins on the referred customers' average contribution margins thus might diminish when referring customers are more extraverted (third stage). In summary:

H4: The positive impact of referring customers' contribution margin on the number of (a) referrals and (b) successful referrals is reinforced, while the impact on (c) referred new customers' average contribution margins is reduced, when the referring customers are extraverted.

Valuable customers tend to be more engaged with the firm's products and services and hence may refer more often. This effect is reinforced when the referring customers are also opinion leaders who are sought frequently for their expertise and knowledge (first stage). Highly valuable opinion leaders would have substantial experience in financial services; hence, their peers might regard their recommendations as particularly credible and trustworthy and follow their advice, resulting in a higher number of successful referrals (second stage). Members of social peer groups also often share characteristics and form strong ties, suggesting that referring customers' peer groups engage in similar behavioral patterns and promise similar contribution margins. We also expect that opinion leaders refer prospects who they believe are in need for the products or services of the referred company. Therefore, referred customers' average contribution margins should be higher when valuable opinion leaders refer them (third stage). We therefore hypothesize:

H5: The positive impact of referring customers' contribution margin on (a) the number of referrals, (b) successful referrals, and (c) referred new customers' average contribution margin is reinforced, when the referring customers are opinion leaders.

Control variables

Satisfaction Satisfaction is an important antecedent of WOM (e.g., see a meta analytic review by de Matos and Rossi 2008) and referrals (e.g., Biyalogorsky et al. 2001; Wirtz et al. 2013). A product or service that exceeds customers' expectations might motivate them to tell others about their positive experience, but if it fails to reach expectations, customers might have a greater motivation to engage in negative WOM to reduce their anxiety, warn others, or seek vengeance. Accordingly, Anderson (1998) and Bowman and Narayandas (2001) find asymmetric, U-shaped, functional forms between satisfaction and WOM. In our referral context, we similarly expect curvilinear relationships between satisfaction and the number of (successful) referrals (first and second stage). Similarly, the effect of satisfaction on referred customers' average contribution margin may reveal a nonlinear shape, because the marginal return on contribution margin is likely to decrease at higher levels of satisfaction (third stage).

Attitude towards referral programs The widespread expansion of referral programs in recent years suggests that consumers may have developed a positive attitude toward such marketing programs. However, Wirtz et al. (2013) find that many respondents perceive referral programs negatively,

questioning their motivation and positing that high quality companies would not need referral programs. They cite incentives as a reason for customers' skepticism toward referral programs. Analogous to measures of overall attitudes toward deals (e.g., Chandon et al. 2000; Lichtenstein et al. 1995; Mittal 1990), we develop a new scale for customers' attitude towards referral programs (see Appendix 1). We expect that a positive attitude towards referral programs will increase the number of referrals (first stage). Because referred customers "close the deal" themselves, we do not expect an incremental effect in the second stage. Nor are successful referrals due to referral program proneness, on average, necessarily any more valuable for the firm (third stage); those who refer due to their liking of referral programs may pay more attention to the program's reward benefit than to the referral recipient's needs.

Involvement Highly involved customers search for more information about the focal product, are more receptive to information, and are quite knowledgeable. Therefore, they are likely to talk about a product more than other customers (von Wangenheim and Bayón 2007). Dichter (1966) claims that product usage cannot relieve the tension that results from high involvement and instead needs to be resolved through WOM to restore the cognitive balance. Kumar et al. (2010a) propose that involvement enhances the effectiveness of customer referral behavior. We therefore predict that involvement has a positive effect in the first stage. In the second stage, we anticipate that referrers with higher levels of involvement yield more successful referrals, because the referred prospects perceive them as more authentic and credible. With their authentic descriptions of the valuable services the firm provides, the involvement of the referring customers should also unfold a positive impact on the average contribution margin per referral in the third stage.

Relationship duration Von Wangenheim and Bayón (2007) associate shorter tenure with higher situational involvement and, thus, with more referrals. Accordingly, we expect longer relationship duration to result in lower number of referrals (first stage) and subsequently, lower number of successful referrals (second stage). Van den Bulte et al. (2018) argue that customers with a long relationship with the company have a better understanding of the firm's offerings and generate better referrals. We therefore expect a positive effect of relationship duration on the average contribution margin of referrals (third stage).

Cross-buying behavior Viswanathan et al. (2017) find that customers who buy more from a firm have greater expertise with a firm's products, and are hence viewed as more credible by others. Hence, they are able to exert greater influence on other new customers and aid the firm's customer acquisition

efforts (first and second stage). Furthermore, referring customers with greater breadth of service experience may influence newly referred customers to buy more, leading to higher average contribution margin per successful referral.

Acquisition by referral Customers acquired by WOM also engage in more WOM (Villanueva et al. 2008). Accordingly, we expect that customers acquired by referrals generate more first-stage referrals themselves. These customers may also have a better understanding of new prospects' decision processes and hence should be more successful at converting prospects in the second stage. Armelini et al. (2015) and Schmitt et al. (2011) find that customers acquired by referrals generally provide higher contribution margins, retention, and customer value. Therefore, we expect a positive effect on average contribution margin (third-stage) as well.

Number of past referrals Kumar et al. (2010b) reveal that customers who have demonstrated their ability and willingness to refer new customers are likely to continue doing so. Therefore, the number of past referrals should be positively associated with the number of referrals (first stage). Customers with referral experience should be more successful at converting referrals in the second stage too. With a history of more referrals in the past, only individuals on the fringe with a poor match for the firm's offerings should remain (Schmitt et al. 2011). In contrast, a history of making fewer referrals implies that a larger network of promising prospects remains, which might be exploited for future referrals. Therefore, we expect a larger number of past referrals to result in a lower average contribution margin (third stage).

Number of calls and emails to the customer center Bowman and Narayandas (2001) find that most customers initiating contact with a manufacturer are highly loyal. In our study, we propose that customers who make more contact through telephone calls and emails to the customer center have a better understanding of the firm's products and services and thus makes their referrals more credible. Therefore, we expect a positive effect on the number of referrals, successful referrals, and higher average referral contribution margins (first to third stage).

Number of web logins Accessing the firm's website reflects customer interest and effort and is found to drive purchase decisions (e.g., Ferguson et al. 2010; Hennig-Thurau et al. 2004). Analogously, we assume that heavier users of the firm's web services are more loyal. Such customers should therefore generate more (successful) referrals and referrals with a higher average contribution margin (first to third stage).

Methodology

Data collection

We cooperated with a firm in the financial sector that uses referral programs frequently. To avoid data collection biases, we devised a three-year data collection strategy. First, we pretested the questionnaire with a sample of 100 randomly selected customers and refined it according to insights from research and industry experts. Second, from a database of 1.5 million customers, the firm generated a random sample of 5000 customers who received a mail survey with our perceptual antecedents. From the 884 returned surveys, we eliminated 79 responses due to missing information and another 9 who had terminated their relationship with the firm prior to the end of the second observation phase. Accordingly, the final sample comprised of 796 respondents, yielding an effective response rate of 15.92%.

Third, to test for potential response bias, we followed Armstrong and Overton (1977) and analyzed each item to check for differences between early and late respondents. The results offered no evidence of a nonresponse bias. The firm also verified that the sample was representative of the firm's customer database, with a mean age of 38 years (spanning from 17 to 70 years), and men constituting approximately 80% of all account holders. The percentage of customers acquired by referral in our sample is consistent with the proportion of new customers acquired by the referral program. The firm's customer base has grown continuously, so the average relationship duration of 3.48 years is also representative. At the end of the questionnaire phase, the firm used its database to provide behavioral information for each respondent in the sample for the previous 52 weeks.

Dependent variables

All the dependent variables are obtained from the firm's database, and hence we are able to avoid common method bias. The dependent variables for all stages of the referral process are observed only after we had collected information on the perceptual and behavioral drivers.

The first dependent variable represents each customer's total number of referrals over a span of 52 weeks after the survey. We obtained this number from the customer referral database, which summarizes and tracks all referrals in the referral program. Each customer referral is entered online, by email, or through a call to the customer center; the referring customer and referral recipient are therefore both known to the firm.

Of the 796 customers in the sample, 251 made at least one referral during the 52-week observation period: 136 (54.18%) made one referral, 50 (19.92%) made two referrals, and 65 (25.90%) made at least three referrals. Table 3 displays the frequency distribution of the number of referrals in our sample.

An individual customer's number of successful referrals over the observation period is the second dependent variable in this study. To operationalize it, we note that when recipients respond to the referral, they receive an information package. They can open an account to sign up with the financial firm, which constitutes a successful referral. A successful referral earns the referring customer a reward of EUR 25. Of the 251 referring customers in the study sample, 95 customers (37.85%) did not generate any successful outcome, 113 customers (72.44%) generated one new account, 26 customers (16.67%) provided two successful referrals, and 10 customers (6.41%) generated three successful referrals. Only 7 customers (4.49%) helped the firm acquire more than three new accounts. Table 3 shows the frequency distribution of the number of successful referrals.

Profitability measured as the average contribution margin of a successful referral is our third dependent variable. In particular, the firm tracks each successful referral in our sample for 52 weeks following the day the individual signs up, computes the contribution margin from all services ordered during that time, and then subtracts EUR 50 to reflect the cost for the incentive (EUR 25) and the initial processing cost for account opening (EUR 25). The immediate and full subtraction of the acquisition cost mirrors firm policy, which treats them as expenses, with the rationale that the firm does not know how long these relationships might endure. In the case of two or more successful referrals, we average the contribution margins per successfully referring customer. Thus, we avoid confounding the quality and quantity of referrals, because the sum of contribution margins across all referrals per customer may be linked to the number of successful referrals. On average, referring customers helped the firm earn contribution margins of EUR 54.98 from each successful referral. However, we also find substantial variation in this measure as the standard deviation is 119.97. The sample includes 21 referrers whose referrals are making losses on average. The minimum average contribution margin is EUR -139.10, and the maximum value is EUR 788.20. Table 3 provides an overview of the average contribution margin for the number of (successful) referrals. We observe a substantial correlation between the first stage i.e., number of referrals and the second stage i.e., number of successful referrals of .735 ($p < .01$). However, the correlation between the first stage and

Table 3 Frequency distribution of number of total and successful referrals

Number of Referrals	Frequency (Total)	Percent (Total)	Average Contribution Margin (Total)	Frequency (Successful)	Percent (Successful)	Average Contribution Margin (Successful)
1	136	54.18	78.96	113	72.44	70.47
2	50	19.92	58.71	26	16.67	37.39
3	31	12.35	43.90	10	6.41	23.76
4	14	5.58	28.27	3	1.92	41.47
5	9	3.59	9.87	2	1.28	33.00
6	3	1.20	26.23	1	.64	25.40
7	5	1.99	21.78	—	—	—
8	—	—	—	—	—	—
9	1	.40	−2.80	1	.64	8.40
10	1	.40	—	—	—	—
11	—	—	—	—	—	—
12	1	.40	8.40	—	—	—
Total	251	100.00		156	100.00	

third stage i.e., average contribution margin of a referral, is $-.165$ ($p < .05$), while the correlation between the second stage and the third stage is $-.114$ (n.s.).

Independent variables

Perceptual antecedents We incorporated five established measures as perceptual drivers: extraversion, opinion leadership, involvement, attitude toward referral programs, and customer satisfaction. We pretested the item pool, refining it as needed. Appendix 1 shows detailed information about the items, their loadings, Cronbach's alphas, and sources. All the factor loadings are greater than .65, and the coefficient alpha values are greater than .77, indicating sufficient internal consistency. With the exception of the involvement construct (.48), the average variances extracted for each construct are above the critical value of .5. The item reliabilities are well above the recommended value of .7. We used the criterion proposed by Fornell and Larcker (1981) to check for discriminant validity and found that all constructs met it. In sum, our constructs are sufficiently unidimensional and reliable. We use the average value of each construct's items for our calculations.

Behavior-based antecedents The behavioral drivers stem from the financial services firm's customer database, reflecting the 52 weeks prior to the beginning of the observation period of the dependent variables. The focal behavioral variable is the standardized contribution margin of the referring customer, measured as revenue less direct costs. Notably, the correlation between the contribution margin of customers who provide successful referrals and the average contribution margin of referred customers is .211 ($p < .01$). Table 4 provides an overview of the means, standard deviations, and

minimum and maximum values of all our independent variables. The descriptive statistics indicate reasonably stable means across all the stages. The satisfaction scores are rather high, reflecting the cooperating firm's strong relationship with its customers. We also found that most of the bivariate correlations were low (Table 5), which helps alleviate concerns about multicollinearity.

Estimation methodology

We used an inflated bivariate Poisson model to jointly estimate the focal independent variables' effects on the first two stages of the referral process. Bivariate Poisson models are appropriate for modeling paired count data that exhibit correlation. We use the approach developed by Karlis and Ntzoufras (2005) to model correlated count data. For example, if the random variables X_k , $k = 1, 2, 3$ follow independent Poisson distributions with parameters λ_k , the random variables $X = X_1 + X_3$ and $Y = X_2 + X_3$ also follow a bivariate Poisson distribution, $BP(\lambda_1, \lambda_2, \lambda_3)$ with the following joint probability function:

$$f_{BP}(x, y | \lambda_1, \lambda_2, \lambda_3) = e^{-(\lambda_1 + \lambda_2 + \lambda_3)} \frac{\lambda_1^x \lambda_2^y}{x! y!} \sum_{i=0}^{\min(x, y)} \binom{x}{i} \binom{y}{i} i! \left(\frac{\lambda_3}{\lambda_1 \lambda_2} \right)^i. \quad (1)$$

This bivariate distribution allows for positive dependence between the two random variables. Marginally, each random variable follows a Poisson distribution with $E(X) = \lambda_1 + \lambda_3$ and $E(Y) = \lambda_2 + \lambda_3$. $COV(X, Y) = \lambda_3$ measures the dependence between the two outcomes and when zero, suggests that the two outcomes are independent. The bivariate Poisson distribution reduces to the product of two independent Poisson distributions. We model λ_1 and λ_2 using covariates, and specify the bivariate Poisson regression model as follows:

Table 4 Descriptive statistics

Variable	Sample (<i>N</i> = 796)				Referring Customers (<i>N</i> = 251)				Customers with Successful Referrals (<i>N</i> = 156)			
	Mean	SD	Min	Max	Mean	SD	Min	Max	Mean	SD	Min	Max
<i>Control Variables</i>												
Customer satisfaction	4.513	1.000	0.000	6.000	4.678	0.922	1.250	6.000	4.604	0.917	1.500	6.000
Customer satisfaction ²	21.367	7.937	0.000	36.000	22.733	7.838	1.563	36.000	22.033	7.636	2.250	36.000
Attitude towards referral programs	3.634	1.563	0.000	6.000	3.959	1.469	0.000	6.000	4.018	1.437	0.000	6.000
Involvement	4.361	1.150	0.000	6.000	4.540	1.152	0.000	6.000	4.473	1.138	0.750	6.000
Relationship duration	1.729	8.279	0.000	139.100	3.311	14.640	0.000	139.100	4.719	18.450	0.000	139.100
Cross-buying behavior	2.384	1.000	0.000	5.107	2.645	0.993	0.851	5.107	2.701	1.010	0.851	5.107
Acquired by referral	0.224	.417	0.000	1.000	0.199	0.400	0.000	1.000	0.205	0.405	0.000	1.000
Number of past referrals	1.927	2.355	0.000	22.000	2.287	2.666	0.000	20.000	2.231	2.723	0.000	20.000
Number of calls and emails to customer center	5.049	15.355	0.000	273.000	6.363	16.916	0.000	195.000	6.654	19.761	0.000	195.000
Number of web logins	0.776	1.000	0.000	6.786	0.996	1.168	0.000	6.276	0.821	0.959	0.000	5.759
<i>Focal Variables</i>												
Contribution margin of referrer	370.156	1004.000	−130.540	15,321.03	450.324	934.918	−62.630	6277.860	325.351	645.351	−62.630	5291.110
Extraversion	3.314	1.085	0.000	5.333	3.493	1.065	0.167	5.333	3.510	1.019	0.167	5.333
Opinion leadership	3.046	1.526	0.000	6.000	3.333	1.541	0.000	6.000	3.401	1.596	0.000	6.000

$$\begin{aligned}
 (X_i, Y_i) &\sim BP(\lambda_{1i}, \lambda_{2i}, \lambda_{3i}) \\
 \log(\lambda_{1i}) &= \omega_1 + \delta_k \mathbf{X}_{ki} + \gamma_m \mathbf{Z}_{mi} \\
 \log(\lambda_{2i}) &= \omega_2 + \delta_k \mathbf{X}_{ki} + \gamma_m \mathbf{Z}_{mi} \\
 \log(\lambda_{3i}) &= \omega_3
 \end{aligned} \quad (2)$$

where $i = 1, \dots, n$, denotes the observation number, \mathbf{X} is a vector of k focal independent variables and \mathbf{Z} is a vector of m control variables, and we describe them in greater detail below; ω is the intercept, γ and δ are vectors of coefficients corresponding to variables in \mathbf{X} and \mathbf{Z} respectively. However, the simple bivariate Poisson model has two limitations. First, it can only model data with positive correlations. Second, the probabilities of certain values under consideration (e.g., zero) could be inflated. Using an approach similar to a univariate zero inflated Poisson model, Karlis and Ntzoufras (2005) formulate a diagonally ‘inflated bivariate Poisson (IBP)’ model as

$$f_{IBP}(x, y) = \begin{cases} (1-p)f_{BP}(x, y|\lambda_1, \lambda_2, \lambda_3), & x \neq y \\ (1-p)f_{BP}(x, y|\lambda_1, \lambda_2, \lambda_3) + pfD(x|\theta), & x = y \end{cases} \quad (3)$$

where $D(x|\theta)$ follows a Poisson distribution and p is the mixing proportion. If $p = 0$, then the above expression

reduces to a bivariate Poisson model; and $\theta = 0$ indicates that only the (0, 0) component of the diagonal is inflated i.e., there is a greater proportion of outcomes where the number of referrals and the number of successful referrals are both equal to 0. We refer the reader to Karlis and Ntzoufras (2005) for more details on the estimation approach.

To model the third stage of the referral process, we start with a log-transformation of the average contribution margin values since they are right skewed (Mosteller and Tukey 1977). The log-transformation symmetrizes the distributions, reduces the influence of outliers, and stabilizes their variance. The third stage comprises of only successful referrals and we must hence account for potential sample selection biases. We therefore use the Heckman (1979) two-step estimation approach. The focal or primary equation with the average contribution margin of referrals as the dependent variable can be expressed as

$$\log(\text{AverageProfitability}_i) = \alpha + \beta_k \mathbf{X}_{ki} + \gamma_m \mathbf{Z}_{mi} + \varepsilon_i, \quad (4)$$

where \mathbf{X} is a matrix of $k = 1, 2, \dots, 5$ variables that reflect the three main effects of extraversion, opinion leadership, and contribution margin and the two interaction effects of

Table 5 Bivariate correlation table

	1	2	3	4	5	6	7	8	9	10	11
1. Extraversion											
2. Opinion leadership	.205***										
3. Involvement	.155***	.378***									
4. Attitude towards referral program	.201***	.386***	.235***								
5. Customer satisfaction	.065	.146***	.284***	.165***							
6. Cross-buying behavior	-.014	.105***	.099*	.062	.142***						
7. Relationship duration	-.098*	.053	.099*	-.159***	.006	.032					
8. Acquired by referral	.089*	.015	-.029	.022	.007	-.022	-.036				
9. Number of calls	.059	.081*	.090*	.027	.091*	.035	.071*	-.043			
10. Number of web logins	-.017	.134***	.120***	-.016	.088*	.182***	.266***	.003	.066		
11. Number of past referrals	.045	.226***	.108***	.181***	.055	.088*	.273***	-.014	.087***	.185***	
12. Contribution margin	-.066	.069	.042	-.087*	.011	.034	.252***	-.035	.218***	.410***	.127***

* $p < .05$; ** $p < .01$; *** $p < .001$ (two-sided)

extraversion \times contribution margin and opinion leadership \times contribution margin, β is a vector of $k = 1, 2, \dots, 5$ coefficients corresponding to each of these effects, \mathbf{Z} is a matrix of $m = 10$ control variables, and γ is the corresponding vector of 10 coefficients. The first nine variables are involvement, attitude toward the firm, satisfaction and its squared value, relationship duration, number of calls and emails to the customer center, number of web logins, number of past referrals, and whether the referring customer was acquired by a referral. The tenth variable requires some discussion. As mentioned previously, the average contribution margin of 21 successful referrals is negative, but there is no logarithm of a negative number. Simply eliminating these observations from the analysis would prevent us from understanding the factors that drive losses and even lead to biased results. An alternative approach is to rescale the variable's value by adding the maximum loss observed in the sample plus a small number, usually 1. This manipulation can, however, change the nature of the error structure. We therefore follow the procedure suggested by Bos and Koetter (2011). The approach left censors the dependent variable but captures the information using an additional explanatory variable termed as the Negative Profit Indicator (NPI). Specifically, for observations where the profitability of referred customers has a value less than zero, NPI is first assigned a value corresponding to the absolute value of the dependent variable, and the dependent variable is then reassigned a value of zero. For observations where the profitability of referred customers has a value greater than zero, the NPI variable is assigned a value of 1 and the dependent variable is left untouched. Given these transformations, the

dependent variable now has a range of $[0, \max(\text{profitability})]$ and the independent variable NPI has a range of $[1, \max(\text{profitability})]$. We then add a small value of 0.01 before carrying out the logarithmic transformation of the dependent variable. The new independent variable NPI is the eleventh variable in the matrix \mathbf{Z} and we expect NPI to have a negative effect on the dependent variable.

The other step of the Heckman approach involves the selection equation, which can be expressed as

$$\text{Successfully Referred} = \begin{cases} 1 & \text{if } \mu + \beta_k X_{ki} + \gamma_{m-1} Z_{(m-1)i} + \delta W + \varepsilon_2 > 0 \\ 0 & \text{if } \mu + \beta_k X_{ki} + \gamma_{m-1} Z_{(m-1)i} + \delta W + \varepsilon_2 \leq 0 \end{cases} \quad (5)$$

We use the number of products invested in by the referring customer (i.e., cross-buying behavior) as the instrumental variable W . This variable fulfills the exclusion restriction criteria since it has a significant effect in the selection equation but an insignificant effect in the focal equation. The cross-buying behavior of the referring customer thus exerts a significant positive effect on the probability of acquiring a new customer but unfolds no effect on the new customer's average contribution margin. The selection equation also includes all k variables from the vector of variables \mathbf{X} and the first nine (or $m - 1$) variables from the vector \mathbf{Z} ; for this step, we exclude NPI because it was specifically created to handle logarithmic transformations of negative values of the average contribution margin. Consistent with Heckman (1979), this procedure considers a sample selection bias such that Eq. 5 conditional on $\text{Successfully Referred} = 1$, can be rewritten as

$$\log(\text{AverageProfitability}_i) = \alpha + \beta_k \mathbf{X}_{ki} + \gamma_m \mathbf{Z}_{mi} + \sigma \lambda (\mu + \beta_k \mathbf{X}_{ki} + \gamma_{m-1} \mathbf{Z}_{(m-1)i} + \delta W) + \xi. \quad (6)$$

If the inverse Mills ratio $\lambda \neq 0$, then failing to account for sample selection bias would result in biased estimates.

Robustness tests

We evaluated several other two-way interactions between the additional perceptual and behavioral variables, such as customer satisfaction and the referring customer's contribution margin. We also checked the effects of a three-way interaction of extraversion, opinion leadership, and the contribution margin. All these interactions were insignificant and failed to improve model fit. Demographic variables did not play a significant role in either model, so we excluded them in the interest of parsimony.

Similar to the approach adopted by Kumar et al. (2013), we checked for the presence of unobserved heterogeneity by estimating three latent class regression models, one for each stage of the referral process. We found only one-cluster solutions for the number of successful referrals and the contribution margin of the referred customers. This indicates that the additional variance explained by grouping customers into multiple clusters is outweighed by the reduction in parsimony from the use of too many parameters (Kumar et al. 2013). However, as we find a two-cluster solution for the number of referrals, we compared the coefficients of both clusters. Only one coefficient (namely, the interaction of opinion leadership and contribution margin) differed significantly across clusters ($p = .028$). Therefore, we argue that the additional costs incurred from explicitly considering unobserved heterogeneity (i.e., complexity in the estimation methodology as well as theoretical development) far exceed any benefit gained from estimating additional parameters and suggest a one-segment solution to be appropriate for all three stages of the referral process. For details of the latent class regression analysis, see [Appendix 2](#).

Results

We first report the goodness of fit statistics for the two models and then present the results for the focal and control variables. We conducted a chi-square test to determine if adding variables to the bivariate Poisson model improved model fit. The log-likelihood score of the intercept-only model was -1135.72 while that of the model with only survey variables was -1113.02 . The chi-square test reveals that the change in the log-likelihood scores is significant ($p < .01$) since the chi-square value for 12 degrees of freedom was less than twice the difference in the log-likelihood scores.

Similarly, the log-likelihood score of a model with survey and transactional measures was -1092.51 , and a chi-square test (14 degrees of freedom) suggests that it is significantly better than the model with only survey measures ($p < .01$). The full model with interaction effects achieved a log-likelihood score of -1086.01 , and a chi-square test (4 degrees of freedom) again confirms that the full model has significantly better fit than a model without interaction effects ($p < .01$). The full model is also significantly different from the null model as the fit statistics in Table 6 indicate. The estimated value $\lambda_{3i} = -.553$ ($p < .01$) underlines the need for a model that accounts for dependence between the two dependent variables (i.e., number of referrals and number of successful referrals). The mixing proportion parameter $p = 0.646$ ($p < .01$) suggests the need for a model that accounts for inflation in the diagonal elements. The results also reveal that the estimate for θ is not significantly different from zero, suggesting that only outcomes with (0, 0) outcomes are inflated.

For the third stage estimation using the Heckman approach, we find that the inverse Mills ratio ($\lambda = -.924$, $p > .05$) is insignificant thus allaying fears of sample selection. A chi-square test reveals that the full model significantly outperforms a null model ($\chi^2(15) = 40.49$, $p < .01$). The results of the bivariate Poisson model for the first two stages of the referral program and of the Heckman two-step regression model for the third stage of the referral program are reported in Tables 6 and 7.

Regarding the effect of referring customers' contribution margins on referral program outcomes, we find support for H1a ($\beta_{CM, I} = 0.672$, $p < .001$) and H1c ($\beta_{CM, III} = 2.495$, $p < .05$), but we cannot confirm H1b ($\beta_{CM, II} = -0.435$, $p > .05$). In other words, the contribution margin reveals a positive effect on the number of referrals and on the average contribution margin of referred customers, but it does not affect the number of successful referrals. We conducted a sensitivity analysis to evaluate the net effect of the contribution margin across its range in our data, while keeping the remaining variables constant at their mean. Referrers with a higher contribution margin refer others who also are highly valuable (Web Appendix, Fig. 1). On an average, the contribution margin of the successful referral increases by 1.2% when the contribution margin of the referring customer increases by 10%.

With respect to extraversion, we confirm H2a and H2b and find the expected positive effects on the number of (successful) referrals ($\beta_{EX, I} = 0.238$, $p < .001$; $\beta_{EX, II} = 1.011$, $p < .001$). We also find a significant effect for H2c and thus confirm that extraversion negatively affects the average contribution margin of referred customers ($\beta_{EX, III} = -0.364$, $p < .05$).

Table 6 Results from bivariate poisson model for referrals and successful referrals

Variable	# Referrals			# Successful Referrals		
	Estimate	SE	z-stat	Estimate	SE	z-stat
Intercept	−1.680 ***	.402	−4.18	−11.276 ***	2.160	−5.22
<i>Control Variables</i>						
Customer satisfaction	−0.739 ***	0.166	−4.46	−2.488 ***	0.492	−5.06
Customer satisfaction ²	0.086 ***	0.021	4.16	0.245 ***	0.067	3.64
Attitude towards referral programs	0.217 ***	0.027	7.89	1.344 ***	0.268	5.01
Involvement	0.186 ***	0.041	4.51	0.355	0.223	1.59
Relationship duration	−0.077 ***	0.013	−5.79	−0.169 *	0.074	−2.29
Cross-buying behavior	0.205 ***	0.039	5.24	0.686 **	0.207	3.32
Number of calls and emails to customer center	0.005 **	0.002	2.74	−0.086 **	0.038	−2.29
Number of web logins	0.132 **	0.040	3.31	0.109	0.261	0.42
Number of past referrals	0.065 ***	0.015	4.33	0.311 ***	0.047	6.65
Acquired by referral	0.121	0.078	1.54	1.382 ***	0.320	4.32
<i>Focal Variables</i>						
Contribution margin of referrer (H1a-b)	0.672 ***	0.055	12.16	−0.435	1.836	−0.24
Extraversion (H2a-b)	0.238 ***	0.039	6.11	1.011 ***	0.296	3.42
Opinion leadership (H3a-b)	0.012	0.036	0.32	−0.104	0.138	−0.76
Extraversion x Contribution margin of referrer (H4a-b)	−0.109 ***	0.020	−5.41	0.379	0.462	0.82
Opinion leadership x Contribution margin of referrer (H5a-b)	−0.082 **	0.030	−2.77	−0.093	0.164	−0.57
<i>Additional Parameters from IBP</i>						
λ_3	−0.553 ***	0.053	−10.30			
p	0.646 **	.015	42.49			
θ	0.085	0.884	0.10			

* $p < .05$; ** $p < .01$; *** $p < .001$ (two-sided);

Log-likelihood (intercepts only model): −1135.72; Log-likelihood (full model): −1086.01; $\chi^2(30) = 99.44$, $p < .01$

We do not find any significant direct (main) effects of opinion leadership on referral program outcomes and therefore cannot confirm H3a ($\beta_{OL, I} = 0.012$, $p > .05$), H3b ($\beta_{OL, II} = -0.104$, $p > .05$), or H3c ($\beta_{OL, III} = 0.037$, $p > .05$).

We predicted that extraversion would reinforce the effect of the contribution margin on the number of (successful) referrals (H4a and H4b), while it would diminish the effect on the average contribution margin of referred customers (H4c). Contrary to our hypothesis, we find a negative significant effect for H4a ($\beta_{EX \times CM, I} = -0.109$, $p < .001$). If customers are highly extraverted, the positive effect of the contribution margin on the number of referrals thus diminishes. A sensitivity analysis again helps us understand how the effect (Web Appendix: Fig. 2, Panel A) of contribution margin on the number of referrals is affected by the extraversion of the referring customer. We provide possible explanations of the effect in the discussion section.

We do not find any support for H4b ($\beta_{EX \times CM, II} = 0.379$, $p > .05$), but our results confirm H4c ($\beta_{EX \times CM, III} = -0.885$, $p < .01$). To understand the extent of the

effect of extraversion on the average contribution margin of referred customers, we conducted a sensitivity analysis in which we evaluated the net effect of extraversion across the range of values in the data, while keeping other variables at their mean. From the results in Table 7, we deduce that as extraversion increases, the average contribution margin of the referred customer decreases. The sensitivity analysis suggests that people with a very low level of extraversion refer customers who provide average contribution margins that are approximately seven times higher than those referred by customers with a very high level of extraversion. We found that the average contribution margin of successful referrals decreases by 28% for every unit increase in the referring customer's extraversion.

We expected the moderating effect of opinion leadership on the contribution margin's effect on referral program outcomes to have a positive influence at all stages of the referral process. Contrary to H5a though, we find that opinion leadership diminishes the positive effect of contribution margin on the number of referrals ($\beta_{OL \times CM, I} = -0.082$, $p < .01$). If customers score high on perceived opinion leadership, the

Table 7 Heckman model on the average contribution margins of successful referrals

Variable	Successfully Referred (Yes/No)			Average Contribution Margin		
	Estimate	SE	z-stat	Estimate	SE	z-stat
Intercept	−1.342**	0.167	−8.010	3.029	3.018	1.000
Negative profitability indicator (NPI)	–	–	–	−0.028**	0.008	−3.670
<i>Control Variables</i>						
Customer satisfaction	−0.024	0.069	−0.350	1.332	1.034	1.290
Customer satisfaction ²	−0.032	0.037	−0.860	−0.163	0.124	−1.320
Attitude towards referral programs	0.063	0.040	1.610	−0.151	0.133	−1.130
Involvement	−0.028	0.053	−0.540	0.105	0.159	0.660
Relationship duration	−0.015	0.018	−0.800	0.014	0.056	0.260
Cross-buying behavior	0.176**	0.046	3.800	–	–	–
Number of calls and emails to customer center	0.003	0.003	1.020	−0.006	0.009	−0.660
Number of web logins	0.001	0.002	0.360	−0.092	0.199	−0.460
Number of past referrals	0.019	0.023	0.810	−0.118	0.063	−1.890
Acquired by referral	−0.089	0.128	−0.690	0.214	0.383	0.560
<i>Focal Variables</i>						
Contribution margin of referrer (H1c)	−0.089	0.091	−0.970	2.495*	1.238	2.020
Extraversion (H2c)	0.109*	0.053	2.060	−0.364*	0.170	−2.140
Opinion leadership (H3c)	0.060	0.040	1.490	0.037	0.118	0.310
Extraversion × Contribution margin of referrer (H4c)	0.132	0.095	1.390	−0.885**	0.332	−2.670
Opinion leadership × Contribution margin of referrer (H5c)	−0.023	0.046	−0.500	0.489**	0.179	2.740
Inverse Mills ratio (λ)	–	–	–	−0.924	0.975	−0.950

* $p < .05$; ** $p < .01$; $\chi^2(15) = 40.49$, $p < .01$

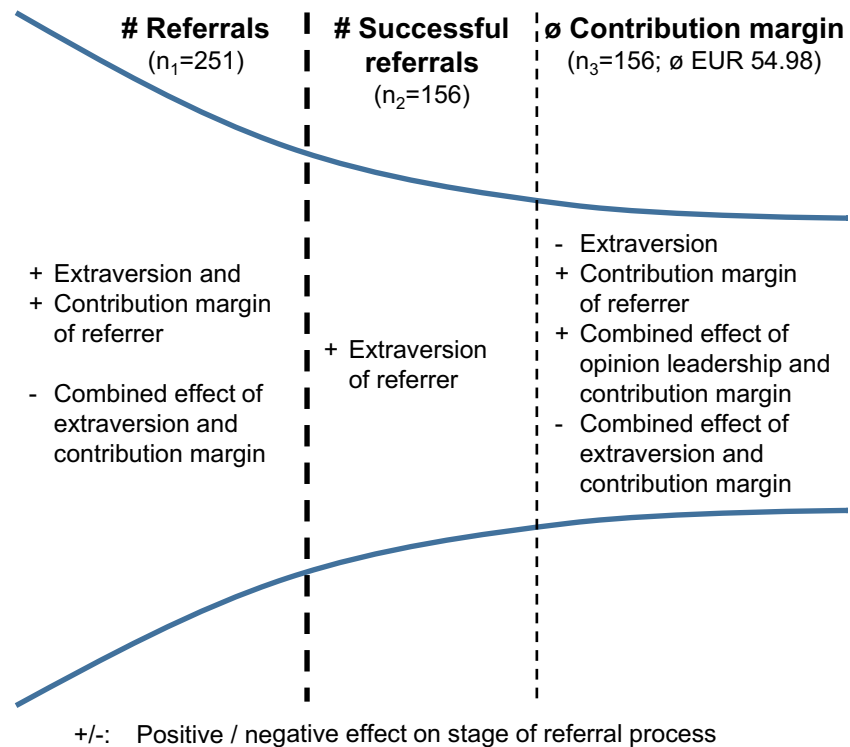
positive effect of the contribution margin on the number of referrals thus diminishes. We conducted a sensitivity analysis by examining how the effect of contribution margin at varying levels i.e., low ($CM = -0.5$), medium ($CM = 0$), and high ($CM = 0.5$), on the number of referrals is influenced by the perceived opinion leadership of the referring customer (Web Appendix: Fig. 2, Panel B). We provide more details in the discussion section.

In terms of their effect on the number of successful referrals (H5b), the interaction effect of opinion leadership and contributions is not significant ($\beta_{OL \times CM, II} = -0.093$, $p > .05$). However, we find strong support for H5c ($\beta_{OL \times CM, III} = 0.489$, $p < .01$). Thus, contribution margin's effect on the average contribution margin of new customers is stronger for referring customers who exhibit higher levels of opinion leadership. With another sensitivity analysis, we computed the net effect of opinion leadership across the range of values in the data (Web Appendix: Fig. 3). We find that referrals of customers who are pronounced opinion leaders generate referrals with about 1.5 times higher contribution margins than referrals from customers who are not opinion leaders. We also used the sensitivity analysis to compute the semi-elasticity for opinion leadership and found that the contribution margin of a successful referral on average increases by 7% for every unit

increase in the extent of opinion leadership of the referring customer. In Figure 2, we summarize significant effects of focal variables across the three stages of the referral process. The funnel shape of Figure 2 mirrors that a large number of referrals is needed to generate a rather limited number of successful referrals. Additionally, in 21 out of 156 instances, the average profitability of new customers acquired through referrals was even negative.

Regarding the control variables, we find that satisfaction exerts a nonlinear U-shape effect on number of (successful) referrals. This nonlinear relationship might be explained as follows: Customers might try the referral program once for curiosity's sake but focus more on the incentive when they engage in more than one referral. Lower satisfaction scores may be associated with more successful referrals since customers with high satisfaction scores are possibly overly enthusiastic and their referrals hence might be less successful.

As expected, attitudes toward referral programs have positive effects on the number of referrals. We find that every unit increase in positive attitude towards the referral program increases the expected number of referrals by 24%. For the number of successful referrals, we uncover a positive, significant effect that is higher than

Fig. 2 Significant effects of focal variables across referral process

the effects of extraversion or opinion leadership. Every unit increase in involvement increases the number of referrals by 20%. However, the variable has no effect on referred customers' contribution margin.

The number of past referrals has the expected positive effects on the number of (successful) referrals but not on referred customers' average contribution margin. Regarding the customer-initiated contacts (i.e., number of calls and emails to the customer center and number of web logins), we find the expected positive effects for the number of referrals. However, for the number of successful referrals, web logins did not have any effect. Contrary to our expectations, the number of calls and emails to the customer center revealed a significant negative effect. This is possibly due to the nature of the conversation that customers initiate, ranging from complaints to questions about products and services.

Relationship duration had the expected negative effect on the number of (successful) referrals but had no effect on referred customers' average contribution margins. Our results show that cross-buying has the proposed positive effects on the outcomes of all three stages of the referral process. Being acquired by a referral reveals a positive significant effect only on the number of successful referrals.

In the third stage of the process, the effect of the NPI is negative and significant. We also observe that

the number of significant variables keeps decreasing as we move through each subsequent stage. This indicates that the firm might focus on many factors that influence the number of referrals, but faces a challenge pinpointing the few factors that influence the number of successful referrals, and then identifying an even smaller set of variables that affect the acquisition of valuable referrals. This study makes an important contribution in this regard, which we detail in the discussion section.

Discussion

Research implications

The objective of this research is to address the gap in our understanding of the core antecedents of customer referral behavior at different stages of the referral process. The findings for the focal variables of the study on all three stages of the referral process are summarized in Fig. 2. We find that extraversion positively influences the number of (successful) referrals, but opinion leadership does not reveal significant direct effects. We also find a positive effect of contribution margin on the number of referrals. However, this effect diminishes at high levels of extraversion and opinion leadership. Our sensitivity analyses reveals that higher levels of

extraversion lead to higher number of referrals, irrespective of the referrers' contribution margin. Moreover, the effect of contribution margin is weaker for higher levels of extraversion and stronger for lower levels of extraversion. A similar pattern can also be observed for opinion leadership where the effect of contribution margin is weaker for higher levels of opinion leadership and vice versa. Therefore, for pronounced perceptions of extraversion and opinion leadership, we observe weaker interaction effects with contribution margin of the referring customer.

We speculate that there are three main reasons to explain these unexpected findings. First, we argue that referrers with a low contribution margin perceive the monetary reward for successful referrals as more valuable than high margin customers. Consequently, these referrers are also more prone to seek referral rewards. Because only customers with extreme extraversion and opinion leadership dispose at traits as well as recognition by others to generate substantial referrals, the negative moderation effect can only be observed for low-value customers with pronounced extraversion and opinion leadership. Second, low contribution margin customers might feel inferior to high value customers. Hence, they make use of their extraversion and/or opinion leadership to compensate for their perceived inferiority by generating substantial numbers of referrals. One could argue that a large number of referrals might help the referring customers to increase their self-esteem. Third, Schmitt et al. (2011) suggest that receiving a reward in a referral program may make customers feel obliged to bring in valuable new customers. Adapting this concept of reciprocity to the negative moderating effects of extraversion and opinion leadership in our study, we argue that low value customers might especially feel obliged to make more referrals.

To the best of our knowledge, no previous single study has considered all the stages of a referral program, and only a few have examined the drivers of profitability of referred customers (e.g., Kumar et al. 2010b; Schmitt et al. 2011). We therefore make three important contributions to ongoing research on customer referral programs. First, our unique data set comprises both perceptual and behavior-based antecedents of referral program outcomes. In addition, we are able to control for a host of other factors that could influence the outcomes of the referral process' three different stages. Thus, we are not only able to examine the antecedents of referral program outcomes, but also alleviate fears of omitted variables bias.

Second, this study makes an important contribution by revealing that perceptual antecedents exert distinct

effects. Extraverted customers can help the firm acquire new customers successfully, but these new customers may be less valuable. Opinion leadership and the contribution margin of referring customers drive the average contribution margins of new customers to a far greater extent. Previous studies of referral programs emphasize attitudinal, non-purchase behavioral aspects; our study shows that perceptual and purchase-related behavior interact. Combined, our results reveal the complex mechanisms through which customers make referrals and affect firm outcomes. Firms need to find ways to balance the different direct and interaction effects of referring customers' extraversion, opinion leadership, and contribution margins, because these antecedents exert divergent, even contrary effects at different referral process stages.

Third, we use novel estimation techniques to model referral program outcomes. We estimate the first two stages of the referral process using a bivariate Poisson model. This approach is appropriate, because the outcomes for the first two stages are operationalized as count variables and likely to be correlated. To our knowledge, this is a novel 'systems of equations approach' to estimate count outcomes. The outcome for the third stage of the referral process, which is measured a year later, is modeled separately. We cannot estimate the third stage of the referral process jointly with the first two stages since the firm has information on the profitability of referrals only if they were successfully converted. Therefore, it seems relevant that a model that examines the drivers of profitability of new referrals accounts for sample selection bias. Accordingly, we use a two-step Heckman approach that accounts for sample selection bias if any, to estimate the effects of the independent variables on this outcome. In this model, we use a novel technique developed by Bos and Koetter (2011) to carry out logarithmic transformations of outcomes that are negative such as losses. We believe this is an important contribution to the marketing literature considering the prevalence of loss-making firms, brands, and consumers in marketing studies.

Managerial implications

Managers can leverage the results of our framework to improve their referral programs. Currently, most referral programs fail to link incentives to the economic value of the referrals. Referrals are comparatively inexpensive, so many managers tend to not engage in deeper analyses of differentiated customer value, such that they attempt only to increase the number of successful referrals—probably because they lack a comprehensive framework that can describe the value-generating

referral process and its drivers. This study provides both a theoretical framework and an analytical tool to generate the information needed to manage referral programs profitably.

Most firms measure their customers' profitability and linking this information to referral outcomes offers a promising approach (e.g., Kumar et al. 2010b). Kumar et al. (2010a) also claim that customers who are well connected with prospects and likely to be opinion leaders represent promising targets for referral programs; they might generate substantial value through their referral behavior, even if they are not profitable themselves. Firms could therefore base their referral program strategy on their customers' connectedness (related to extraversion), opinion leadership, and contribution margin. Based on these considerations, we provide an approach to help managers target the right customers. In Table 8, we calculated the outcomes of the referral process for different scenarios of extraversion and opinion leadership to understand the quantity-quality tradeoff better. Specifically, we compared the effects of low and high values of extraversion and opinion leadership on the number of referrals and the average contribution margin from successful referrals.

We find that customers with the highest level of extraversion provide four times more referrals than customers with the lowest level of extraversion. However, we also assumed that extraverted referrers are likely to refer more people, many of whom are perhaps not particularly interested in the services of that firm. Accordingly, the contribution margin of customers referred by least extraverted customers (€121.99) is almost seven times that of those referred by customers with the highest level of extraversion (€17.46). Hence, while customers who have much higher (lower) levels of extraversion provide more (fewer) referrals, the average contribution margin expected from these referrals would be substantially smaller (greater). Altogether,

low extraverted customers are expected to yield new customers with contribution margins (€22.19) almost twice as much provided by their more extraverted counterparts (€13.25).

Changes in the level of opinion leadership do not affect the number of referrals. However, customers with a high level of opinion leadership attract new customers with higher average contribution margins (€51.64) compared to customers with low levels of opinion leadership (€34.43). This difference is also reflected in the total expected contribution margins. Customers with the lowest level of opinion leadership are expected to provide €13.29 in total contribution margins from referrals, while customers with a high level of opinion leadership provide €21.42. To summarize, customers with high (low) levels of opinion leadership provide new customers to the firm with much higher (lower) average contribution margins. Consequently, the total expected contribution margins from referrals with high levels of opinion leadership is much higher than that obtained from low levels of opinion leadership. The results clearly imply that managers need to weigh the advantages and disadvantages of the number of new customers generated by referrals (quantity) and the associated contribution margins (quality). The findings from our quality-quantity tradeoff in Table 8 can help them adapt their strategy accordingly.

If managers focus on increasing the *quantity of referrals*, they should solicit extraverted customers. This strategy could be effective for products and firms striving for growth. Since high initial acquisition costs could lead to a loss in the first-year, managers could rear-load the incentive structure of the referral program by linking rewards to the mid- and long-term profits of referred new customers. This strategy may also be appropriate for viral marketing campaigns whose objective often is to raise consumers' awareness and spread word

Table 8 The quality–quantity trade-off

	Low Extraversion	High Extraversion
Number of Referrals	.40	1.68
Number of Successful Referrals	.18	.76
Average Contribution Margin of Referred Customers	€121.99	€17.46
Total Contribution Margin	€22.19	€13.25
	Low Opinion Leadership	High Opinion Leadership
Number of Referrals	.86	.92
Number of Successful Referrals	.39	.41
Average Contribution Margin of Referred Customers	€34.43	€51.64
Total Contribution Margin	€13.29	€21.42

Numbers are based on an average contribution margin (€370.16) and conversion rate (45.14%)

of mouth, and customer profitability not being paramount (Haenlein and Libai 2013).

If managers' primary goal is increasing the *quality of referrals*, they should focus on high value customers. Customers who are characterized as opinion leaders or have a low degree of extraversion are especially attractive as referrers. Despite the high average contribution margins per successful referral, this strategy will probably yield relatively few referrals. For mature brands or in markets where profitability prevails over market share, this approach seems relevant. To generate valuable referrals, the firm could identify opinion leaders among its customers and elaborate a relevant communication strategy. Furthermore, firms can encourage their highly valuable customers to become opinion leaders and advocate the services of the firm. For example, BNP Paribas uses the Consorsbank brand to provide its highly valuable customers with additional information, seminars, or expert advice, and grants a special status to those who become opinion leaders.

Managers may also want to adopt a *balanced strategy* to achieve both, a growth in customer base and a continuously profitable program. One recommendation could be that in addition to offering incentives for new referrals, managers could offer incentives that induce less valuable customers to increase their cross-buying and stay with the firm for a longer period of time. Managers can also provide relevant information on services offered, including benefits for becoming a customer (e.g., advantages over competitors). Current customers can then develop knowledge and expertise of the firm's services and products and subsequently convince others more easily.

In summary, our findings can help managers design referral programs and corresponding marketing activities that target different customer segments and thus achieve desired outcomes.

Limitations and further research

In our study, a successful referral prompts a uniform EUR 25 reward for the recommender. Verlegh et al. (2013) find that referral responses depend on the reward scheme (reward for the recommender only vs. for both the recommender and the receiver) and reward type (e.g., monetary vs. non-monetary). Furthermore, Jin and Huang (2014) suggest that monetary rewards in referral programs are associated with more significant social costs (e.g., referred customers believe the referring customer is taking advantage of the situation) than non-monetary rewards are. In referral programs without monetary rewards, extraversion and opinion leadership

might exert even more substantial effects, because the associated social costs are lower than those in the referral program we studied. Further research should investigate how extraversion or opinion leadership affect referral responses across different reward types or schemes.

In our study, we rely on information about customers' individual contribution margins, provided by our partnering firm. Akin to this study, previous studies on referral programs have focused on aggregated measures of customer profitability (e.g., Armelini et al. 2015; Kumar et al. 2010b; Schmitt et al. 2011; Van den Bulte et al. 2018). Future research might examine how the components of the contribution margin (e.g., cost drivers, usage fees) differ for referred versus otherwise acquired customers, as well as how referring customer characteristics might affect them.

Referral programs also affect two sides of the dyad: the sender and the receiver. In our study, we focused on the characteristics of the referring customers, but the receivers' characteristics are also likely to affect a referral's success (e.g., Gilly et al. 1998). According to Van Hove and Lievens (2009), in a job referral context, extraverted people spend more time receiving positive WOM than non-extraverted people. Continued research might thus examine characteristics of both sides of the dyad simultaneously.

Noting the high-level nature of the extraversion and opinion leadership constructs in our study, firms might prefer to adopt proxy behavioral variables from their customer database that mirror these constructs. For example, additional detailed information on the usage intensity of a firm's products and services could serve as a behavioral proxy for opinion leadership. Extraversion might be signaled by the type and number of customers' preferred communication channels. We also suggest potential data augmentation procedures, such as running surveys with a limited customer sample. As Du et al. (2007) demonstrate, sophisticated imputation methods can be very useful tools to link subjective survey data with syndicated customer data—that is, to connect subjective, attitudinal variables with the objective, behavioral information available in customer relationship management systems. In summary, this study provides not only interesting insights for marketing managers and academics but also stepping stones for continued research on referral programs.

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Appendix 1

Measurement items

Constructs and Items (1 = “I do not agree at all” to 7 = “I fully agree”; r = reverse coded)	Loadings	Cronbach’s α
Extraversion (Costa and MacCrae 1992):		
I am rather communicative.	.87	.87
I am enthusiastic.	.82	
I often take center stage.	.77	
I am rather reserved. (r)	.77	
I am gregarious.	.75	
I am self-confident.	.69	
Opinion Leadership (Flynn et al. 1996):		
People that I know pick their direct bank based on what I have told them.	.87	.89
I often persuade other people to do business with a direct bank that I like.	.81	
I often influence people’s opinion about direct banks.	.83	
When they choose a direct bank other people often turn to me for advice.	.79	
Involvement (Ganesh et al. 2000; Keaveney and Parthasarathy 2001):		
I check multiple direct banks before I open an account with a direct bank.	.85	.77
I compare the prices and rates of several direct banks before I select a direct bank.	.79	
I am particularly engaged in the choice of a direct bank.	.69	
In general, I am very interested in direct banks.	.65	
Attitude Towards Referral Programs (Chandon et al. 2000; Lichtenstein et al. 1995)		
I wish there were more firms offering customer referral programs.	.89	.87
With customer referral programs, I do not feel like referring the firm. (r)	.85	
I like customer referral programs a lot.	.80	
Compared to other people, I am very likely to participate in customer referral programs.	.76	
Customer Satisfaction (Mano and Oliver 1993; Westbrook and Oliver 1981):		
XYZ-bank offers exactly what I need.	.86	.83
My choice to build up a relationship with XYZ-bank was a wise one.	.85	
I am very satisfied with the service and the individual customer support of XYZ-bank.	.80	
The products offered by XYZ-bank worked out as well as I thought they would.	.73	

Appendix 2

Latent Class Regression

We first checked for the presence of unobserved heterogeneity by estimating three latent class models, one for each stage of the referral process. Therefore, we compared the information criterion scores for each model to evaluate if the additional parameters estimated for each additional unobserved cluster

significantly improved model fit. Specifically, for each stage of the referral process, we estimated models with different latent segments (from 1 to 5 segments) and then compared the Bayesian Information Criterion (BIC) and Consistent Akaike’s Information Criterion (CAIC) values to determine the model that has the best balance of model fit and parsimony (Kumar et al. 2013). Overall, we found that estimating a model with more than one cluster did little to improve model fit. Below we report the information criterion values obtained from the latent class estimation for each stage and explain

Segments	Number of Referrals			Number of Successful Referrals			Average Contribution Margins of Successful Referrals		
	LL	BIC(LL)	CAIC(LL)	LL	BIC(LL)	CAIC(LL)	LL	BIC(LL)	CAIC(LL)
1	−914	1935	1951	−546	1200	1216	−305	702	720
2	−794	1808	1841	−504	1228	1261	−262	711	748
3	−773	1880	1930	−487	1308	1358	−228	739	795
4	−765	1977	2044	−475	1398	1465	−184	746	821
5	−758	2077	2161	−472	1505	1589	−159	792	886

Log-Likelihood (LL), Bayesian Information Criterion (BIC), Consistent Akaike’s Information Criterion (CAIC), Local/global minima are depicted in bold

our rationale for estimating a model with only one cluster in our study.

For the number of successful referrals and the average contribution margins of successful referrals, both the BIC and CAIC values suggest that a one-segment solution provides the best balance of model fit and parsimony. In other words, there is no benefit gained from segmenting customers into multiple latent clusters.

For the number of referrals the BIC and CAIC values suggest the presence of two segments. However, a comparison of the coefficients (using a Wald test) estimated from a two-segment model vis-à-vis a one-segment model

reveals that the coefficient of only one variable significantly differs for the two clusters solution. Specifically, only the interaction effect of opinion leadership and contribution margin differs significantly in the two clusters model ($p = .028$, see Table below). The additional costs incurred from explicitly considering unobserved heterogeneity (namely, complexity in the estimation methodology as well as theoretical development) far exceed any benefit gained from estimating additional parameters for two or more clusters. We therefore consider it reasonable to estimate a model that considers a one-segment solution for all outcomes of the referral process.

	Cluster 1			Cluster 2			Paired Comparison	
	Estimate	SE	z stat	Estimate	SE	z stat	Wald	<i>p</i> value
Intercept	−4.846	2.849	−1.701	−1.154	1.612	−.716	1.279	.260
Acquired by referral	−.506	.305	−1.659	.097	.159	.611	3.494	.062
Relationship duration	−.005	.040	−.116	−.094	.029	−3.245	3.040	.081
Cross buying behavior	.365	.114	3.205	.270	.070	3.846	.530	.470
Number of calls to service center	−.005	.010	−.498	.004	.003	1.059	.685	.410
Number of web logins	.225	.077	2.924	.233	.102	2.283	.004	.950
Number of past referrals	.061	.032	1.895	.038	.031	1.215	.291	.590
Customer satisfaction	.109	.946	.116	−.394	.616	−.640	.203	.650
Customer satisfaction ²	.014	.086	.159	.043	.059	.722	.080	.780
Involvement	.230	.150	1.534	.077	.070	1.099	.955	.330
Attitude to referral program	.089	.084	1.058	.185	.061	3.021	.867	.350
Contribution margin	.363	.282	1.289	−1.829	1.283	−1.425	2.792	.095
Opinion leadership	−.016	.106	−.152	.039	.068	.574	.189	.660
Extraversion	.094	.130	.723	.169	.067	2.544	.285	.590
Extraversion x Contrib. margin	.064	.046	.401	.016	.123	.131	.135	.710
Opinion leadership x Contribution margin	−.139	.051	−2.731	.305	.203	1.504	4.809	.028

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