Leadership networks in Catholic parishes: Implications for implementation research in health

Rosalyn Negrón[a,*], **Bryan Leyva**[b], **Jennifer Allen**[c], **Hosffman Ospino**[d], **Laura Tom**[e], and **Sarah Rustan**[f]

[a]Department of Anthropology, University of Massachusetts Boston, 100 Morrissey Blvd., Boston, MA 02125, United States

[b]Warren Alpert Medical School, Brown University, United States

[c]Community Health Program, Tufts University, United States

[d]School of Theology and Ministry, Boston College, United States

[e]Northwestern University, Feinberg School of Medicine, United States

[f]Gastón Institute for Latino Public Policy and Community Development, University of Massachusetts Boston, United States

Abstract

Through two case studies of Catholic parishes in Massachusetts, this study explores the implications of *leader-centered* versus *distributed* leadership in Catholic parishes for the implementation of evidence-based health interventions. The two parishes involved in the study differ from each other in several ways. In the first, parishioners are less engaged in leadership activities at the decision-making level in the parish. A small group of lay volunteers work with the parish priest and other ordained leaders on parish activities. In the second parish, a large and active lay volunteer leadership have forged an organizational structure that allows more independence from the pastor's direct oversight. In this parish, lay volunteer leaders are the prime drivers of organizational programs and events. In 2012–2013, three types of networks were assessed at each parish: discussion, collaboration, and outside-of-parish ties. The contrasts between each parish include differences in density of collaboration, in frequency of discussion, and network centrality of the respective parish priests. We further identified key actors in the network structures at each parish. We discuss the implications of these findings for understanding organizational capacity in the context of health program implementation.

Keywords

*Corresponding author. rosalyn.negron@umb.edu (R. Negrón).

Conflicts of interests
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1. Introduction

Faith-based organizations (FBOs) are effective settings for the delivery of health promotion programs for several reasons, including that they represent a community structure that is present in almost all locations. They afford access to diverse audiences, are composed of established social networks, and place a high value on altruism and volunteerism (Campbell et al., 2007; Klesges et al., 2005; Voorhees et al., 1996). Catholic parishes, in particular, may be important sites for outreach to Latinos since just under 60% of Latinos in the USA identify as Catholic (Ospino, 2014; Pew Research Center, 2014). Structurally, the Catholic Church is organized in a hierarchical order following leadership models inspired by religious convictions (e.g., ordination, consecration). However, this leadership structure is often complemented in local parishes by other forms of leadership that emerge in response to particular circumstances and needs. Leadership structures must be considered when designing and implementing health programs (Emmons et al., 2012). For example, necessary groundwork prior to the implementation of interventions in faith-based organizations ideally involves cultivation of relationships along a chain of authority, beginning with bishops and their staff at the diocesan level (Allen et al., submitted for publication). A parish must be understood in terms of the various ways in which overall traditional leadership structures are adapted according to local norms and characteristics of individual parishes. In understanding organizational characteristics for the development of faith-based health programs, program planners/practitioners must account for the specific dynamics of relationships among leaders of the parish.

Social network analysis (SNA) provides a useful model for understanding organizational structure. Rather than view an organization merely as a hierarchy of roles and positions, SNA attends to sets of relationships – cutting across roles and positions – which describe the actuality of actions and interactions in an organization. Networks can cut across formal leadership delineations and describe the various channels by which information, influence, responsibility, and support are mobilized in an organization. Networks can also reflect the formal structures in place, to the extent that these structures limit or facilitate interactions, social tie formation, and relationship-building.

Through the application of theory and methods in SNA, this study examines the network of relationships among formal and informal leaders in two parishes in the northeast USA. Leadership networks differ in how information circulates within, the extent to which they depend on key actors for implementing change, the density of contact among network members, or the extent to which tasks are distributed evenly among members (Hoppe and Reinelt, 2010). In this regard, we find that *leader-centered* versus *distributed* leadership frameworks are useful in understanding how characteristics of individual parish leaders interact with aspects of the organizational environment in which they operate.

Distributed leadership (DL) relates to the way that organizational leadership and management is accomplished by those in formal and informal roles alike (Gronn, 2002; Mehra et al., 2006; Spillane et al., 2004). The DL concept is particularly useful for understanding leadership processes in hierarchical organizations like Catholic parishes (Coopman and Meidlinger, 2000), whose predetermined organizational structures have

clearly delineated chains of authority. In these parishes, the pastor is ultimately responsible for all official decisions related to parish life (e.g., worship, administration, outreach). However, the DL framework calls attention to the parallel – sometimes informal – organizational structures that also exert significant influence on the day-today workings of the parish. Thus, within a given parish, individuals and teams, consisting predominantly of volunteers, lead at multiple levels. As we will show, the two parishes in this study vary in the extent to which members are encouraged and/or equipped to exercise initiative and leadership within their sphere of influence. Following the DL framework, our aim is to look beyond individual leaders and their roles or qualities, and foreground *interactions* among both formal and informal leaders (Hoppe and Reinelt, 2010).

Our application of theory and methods from the field of SNA looks at how an organization's network points to the *structural* significance – rather than, for example, role-based or symbolic leadership – of individual members. The organizational structure of Catholic parishes typically consists of ordained and lay leaders. Ordained leaders include the parish pastor, part-time priests, and deacons, all who provide worship leadership and pastoral care, among other duties. A lay leader is a baptized person who puts her/his gifts to the service of the faith community. Most lay leaders are volunteers. But some lay leaders are hired in parishes to oversee pastoral and administrative responsibilities. In what follows, we distinguish between formal and informal leaders. Formal leaders include ordained clergy and lay staff in paid positions. Informal leaders are lay members of the parish who provide leadership on a volunteer basis. Two Catholic parishes' organizational environments will be systematically examined using SNA to situate leaders' roles, positions, and influence within the parishes' broader leadership networks. SNA will also make it possible to identify individuals who play key roles as mediators, connectors, or opinion-leaders within church structures, making it possible to understand their potential influence for the adoption and implementation of EBIs for health promotion.

2. Methods

The study proceeded in three phases at two northeast USA Catholic parishes: Sacred Heart and Holy Cross. Pseudonyms have been used for all names to protect the identities of individual parishes and their leaders. Ethical approval for the study was obtained from the Institutional Review Board at the University of Massachusetts Boston. Each phase in the study was carried out separately at each parish at different points in time. Data collection at Sacred Heart took place in the summer of 2012 and at Holy Cross in the spring of 2013. In the first phase, ethnographic observations were conducted at leader meetings and during Mass to establish contacts at the two parishes. These two parishes were selected from a pool of parishes that, at the time of this study, were candidates to participate in a larger, parent study that aimed to understand the resources required by Latino churches to implement EBIs for cancer control. Building on this knowledge, the research team developed an organizational-level intervention enabling parish leaders to adopt, implement and sustain EBIs in their parish. Sacred Heart and Holy Cross were selected because of their shared neighborhood characteristics and contrasting histories. For example, preliminary observations at each parish revealed differences in the levels of leadership engagement

among parish leaders. Additionally, members of our research team had pre-existing contacts there, which facilitated initial entry to conduct this study.

In the second phase, a list of formal and informal leaders was compiled by reviewing personnel listings on parish websites, observations at parish events, and confirmatory interviews with key respondents who were highly active in and knowledgeable about their respective parishes. In addition to asking key respondents about other leaders at their parishes, we interviewed them about their definitions of leadership within the context of their work and about aspects of their parishes' organizational cultures and histories.

In the third and final phase, parish leaders were administered roster surveys (Borgatti and Molina, 2005). The roster surveys consisted of the list of leaders compiled in the second phase. Thus, leaders were asked to evaluate their ties to other leaders on a list that they themselves were on. For example, if an organization has 25 leaders, each of the 25 would indicate Yes/No if they have a relationship with each of the other 24 people on the roster. At Sacred Heart, 36 leaders appeared in the roster, with 23 at Holy Cross. The roster survey asked respondents to evaluate three types of relationships: 1) communication about parish matters: "Have you discussed parish matters with this person?" and if "Yes", "How often do you discuss parish matters with her/him". The response options were, "Daily", "Weekly", "Monthly", and "Annually"; 2) collaboration on parish projects and activities: "Have you worked with this person on parish events or programs?"; and 3) relationships outside of the parish: "Do you have a relationship with this person beyond parish-related activities?". Initially, we visited both parishes in person and approached parish leaders about participation in the survey. Leaders who we were unable to reach in person were contacted by email or phone. The key informants who participated in earlier phases of the research assisted in contacting parish leaders who had not responded to emails, calls, or visits.

Network statistics were calculated using Ucinet (Borgatti et al., 2002) and network visuals were generated with Visione (Brandes and Wagner, 2013).

3. Results

3.1. Case study 1: Sacred Heart

3.1.1. Ethnographic context—Sacred Heart sits in a large and highly diverse neighborhood with a total congregation of approximately 450 parishioners, 75% of whom participate in Spanish Masses. Established early in the twentieth century, for decades Sacred Heart remained strongly rooted in the spirituality of a religious order. Beginning in the 1970s, local demographic shifts led to an increasingly Spanish-speaking congregation. According to 2007–2011 Estimates from the American Community Survey (2011), today the parish serves a diverse community of which Latinos are approximately 24% of the total neighborhood population. Neighborhood names are withheld to anonymize the parishes. Consistent with its diverse history and engagement with local communities, themes of multiculturalism, inclusivity, and social justice run prominently through their mission statement.

In the early 2000s, Sacred Heart was under consideration for closure by diocesan church officials. Sacred Heart's parishioners, including several members of the lay informal leadership at the time of this study, mobilized intensely to prevent closure. The decision to close the parish was eventually reversed. However, the parish's long-term security remains uncertain. Along with this uncertainty, the parish has gone through periods in which they did not have a full-time priest. Father Garza, the pastor at Sacred Heart, had been with the parish for one year when this study took place in 2012. He was Sacred Heart's first diocesan priest and was also assigned to two other sister parishes. A "diocesan priest" is an ordained Catholic minister incardinated (i.e., within the jurisdiction) in a diocese under the direct oversight of a bishop. Diocesan priests differ from "vowed religious priests" insofar as the latter make public vows (poverty, chastity, and obedience) and are under the jurisdiction of the superior of a canonically recognized religious order or community. Not long after data collection for this study was completed, Father Garza was transferred to another parish.

While the parish had been without a permanent priest for several years, informal leaders at Sacred Heart were highly active in organizing parish initiatives and events – including liturgy, educational programs, and community outreach. In some respects, the efficacy of the parish's informal leadership in the face of decades of unstable structures of formal leadership, contributed to a level of flexibility vis-à-vis oversight from church officials. At the same time, the leadership style at the parish was seen as consistent with Sacred Heart's spiritual roots inspired by the order administering the parish. Oscar, an active leader in this parish, described it in the following terms:

> The leadership of a diocesan priest is different from the leadership that we used to have before. Before we used to have a [religious order's] leadership, which I think is a little bit more open to the idea of the [leadership] being the totality of people in the community. It's not just the priest making decisions, but taking into consideration the needs of all people and to listen to all the voices.

The lay volunteer leadership's strong identification with a social justice mission and its commitment to multiculturalism inspired many of the parish's activities and community engagement projects. Such activities often proceeded without the formal presence of a priest in charge.

3.2. Case study 2: Holy Cross

3.2.1. Ethnographic context—Holy Cross is located in the same neighborhood as Sacred Heart. Holy Cross has an approximate English Mass congregation size of 100 and an approximate Spanish Mass congregation size of 500. The parish holds only one Sunday worship service in English, compared to two Sunday as well as daily worship services in Spanish. In contrast to Sacred Heart's organizational experience, Holy Cross has enjoyed a more permanent and sustained presence of clergy in charge of the community. Between the 1960s and 1970s there were seven pastors leading the parish. Father Brody, who participated in this study, served as full-time pastor of the parish for more than two decades, starting in 1980. At the time of the study he was serving on a part-time basis.

Melvin, the key informant who was interviewed about Holy Cross, was familiar with Sacred Heart and had collaborated with some of its leaders on joint events. He described Holy Cross as less youthful and more traditional as compared with Sacred Heart. The participation of Holy Cross congregants centered primarily on worship rather than specific outreach initiatives, events, or programs. Melvin described limited engagement in volunteering opportunities by members of the parish. He expressed that Holy Cross' large Spanish-speaking immigrant population experienced significant barriers to participation. Despite, or because of, the significant size of the Spanish-speaking congregation, there was no designated Hispanic ministry coordinator on staff. Rather, as the leadership network analysis will show, the core group of formal and informal leaders at Holy Cross was primarily Hispanic and/or Spanish-speaking, reflecting the significant majority of Hispanic parishioners at Holy Cross.

3.3. Parish-wide characteristics

An analysis of organization-wide characteristics point to aspects of the overall structure that may impact organizational effectiveness in organizing health programs. Careful assessment of organizational network composition and structure suggests features that help or hinder the adoption and implementation of innovations, the dissemination of information, and the long-term maintenance of health programs by organizations like Catholic parishes. A distinction is made between *network composition* and *network structure* (Wasserman and Faust, 1994: 29). Network composition ' refers to the attributes of members of a network, and also includes attributes of specific ties. Through a compositional analysis one can, for example, calculate the percentage of a network that is male or female or the average frequency of contact between members of a network. Network structure, on the other hand, refers to the *patterns* that emerge from present and absent ties in a network. Network structural measures include density and centralization.

3.3.1. Study characteristics—At Sacred Heart, about 70% of the lay volunteer leaders who participated in the survey regularly attend worship services in English. This contrasted with leaders at Holy Cross, who primarily attend worship services in Spanish. At both parishes, women comprised the significant majority of the leadership networks (Table 1).

3.3.2. Network structure

3.3.2.1. Density: Among the most commonly used measures in network science, *density* can serve as a measure of organizational social capital by describing the extent of interconnection among leaders in an organization. Formally, density is the number of existing ties in a network as a proportion of all available ties. High levels of interconnectivity create an organizational environment where information can circulate among all members of the organizational network. In addition, it suggests multiple access points for participation, accountability, and control of organizational projects. High intra-organizational levels of interconnectivity can be leveraged in the implementation of an intervention (Valente, 2012).

To compute the density measures for the discussion networks at Holy Cross and Sacred Heart, tie values were dichotomized. Tie values corresponded to five levels of discussion

frequency (daily, weekly, monthly, annual, absent), which we dichotomized as "regular ties" (daily, weekly, or monthly) and "weak/absent ties" (annual or absent). In this study we presume that annual levels of discussion represent minimal levels of communication, with limited impact on information flow and interpersonal influence. The ties for the collaboration and outside-parish networks were already dichotomous.

Both parishes had comparable density levels in their discussion networks (Table 2). However, as shown below, more ties at Holy Cross were in contact on daily and weekly levels. It should be noted, then, that while existing ties at Holy Cross were more likely to be at the weekly and daily levels, Sacred Heart had more ties overall – at any level. The existence of more ties at Sacred Heart, despite a lower proportion of strong ties, helps to explain why density scores for both parishes are comparable. It is possible that leaders at Sacred Heart were more likely to report having any kind of interaction, even if it was weak, whereas for Holy Cross, ties that were more frequent were most salient, and thus most reportable.

More of a contrast emerges in the collaboration and outside-parish networks. Discussions with leaders at each parish and reviews of parish bulletins suggest that while both parishes engaged in similar levels of activities related to worship, religious ceremonies (e.g. baptisms), and religious education, leaders at Sacred Heart organized a range of additional activities, such as workshops, social justice events and community celebrations, that were minimal at Holy Cross. This is reflected in the results for the collaboration networks at each parish. As such, we found notable differences in the levels of collaboration at both parishes, with more leaders at Sacred Heart reporting more instances of having worked with other leaders in parish projects and events. In other words, any given parish project at Sacred Heart had multiple participants, with consistent levels of engagement from most members of leadership across a range of activities. In contrast, Holy Cross leaders reported working less with other leaders in parish activities. Figs. 1 and 2 represent the difference in the density measures of the collaboration networks at each parish. A density score of 0 would mean that no actors are connected in a network, while a score of 1 would mean that all actors are connected to each other. With a score of 0.96, Sacred Heart has a close to complete network, having a significant majority of leaders connected through collaborative efforts. Though less significant, there was a notable difference in the outside-parish networks of both parishes. At Holy Cross, leaders reported having more relationships with fellow leaders that went beyond parish-related events or activities (0.40 versus 0.28 at Sacred Heart).

3.3.2.2. Frequency of discussion: To measure tie strength, leaders were asked to indicate how frequently they discussed parish related matters with other parish leaders. There were marked differences between the two parishes with regard to the most frequent levels – and presumably strongest ties – of interaction: daily and weekly. At Holy Cross, 12% of discussion ties among leaders occurred at the daily level. For Sacred Heart, only 3% of discussion ties were daily. Whereas 74% of discussion ties at Holy Cross was weekly, only 44% was weekly at Sacred Heart. Overall, leaders at Holy Cross reported more frequent discussions with peers than leaders at Sacred Heart. Sacred Heart also had more weak ties (annual discussion), with 17% of all ties at this level, compared to 7% for Holy Cross. With a relatively small group charged with doing much of the work related to parish related

programs, it makes sense that leaders at Holy Cross would have more communication among each other. It is instructive to note these differences in light of overall density levels at each parish, which we turn to next.

3.3.2.3. Network centralization: Whereas density is a measure of network cohesiveness, centralization is a measure of the extent to which a network coheres around particular actors (Scott, 2000). Taking individual degree centrality scores – the number of ties a given actor has to other actors – a measure of overall degree centralization can be computed for the entire network. In a given network, a high degree central person is one who is connected to most or all other members of a network. If most or all *other* possible ties between network members are absent, such a network is labeled a "star network," with the "star" being that actor who is the focal point for the network. In organizational terms, a highly centralized organization would be one in which decisions are made by one person. Alternatively, a centralized organization may be one in which all information flows to and from a small number of individuals. Ucinet (Borgatti et al., 2002) computes centralization as a percentage, with high percentages corresponding to centralized networks and low percentages corresponding to decentralized networks or networks in which few individual leaders are significantly more central than others. Table 3 shows the centralization scores for each of the networks at Sacred Heart and Holy Cross.

There are moderate levels of centralization across the networks in both parishes, with Holy Cross having slightly higher levels of centralization in its collaboration and outside-parish networks. For both parishes, higher levels of centralization are observed in their outside-parish networks. In the outside-parish networks, particularly at Holy Cross, there is considerable variation in the levels of degree centrality of individual leaders. A few leaders were considerably more central than others.

3.3.2.4. Betweenness centralization and information flow: Betweenness centrality measures the extent to which a person is located between others in a network (Freeman, 1977). If a person lies between many of the shortest, or *geodesic*, paths between other people in a network, that person would have a high node betweenness score. For example, if a piece of information gets to Person C from Person A via Person B, Person B is on the shortest path between Person A and C. Flow betweenness centrality expands upon this concept by describing the extent to which a person lies along all possible paths, not just the shortest paths (Freeman et al., 1991). Because information can flow along a path of any length (with multiple intermediaries), and not just the shortest paths, the flow betweenness measure better describes how information flows in a network. As with degree centrality, betweenness centrality scores can be computed for a given actor (centrality) and for the network overall (centralization).

The mean flow betweenness centralization score is the mean difference between the centrality score of the most central actor and the scores of all other actors in a network (Freeman et al., 1991). For Sacred Heart's discussion network, the flow betweenness centralization score was 34.27 (SD = 9.8). For Holy Cross the mean score was 20.95 (SD = 9.9). Both mean scores are moderately low. Indeed, in the discussion networks in each parish, every leader was accessible to every other leader via some chain of intermediaries.

Given the relatively low standard deviation of flow centrality scores, no leader served an outsized role as a broker of information. Instead, the potential for information flow in both discussion networks is good.

3.4. Individual-level characteristics

While parish-wide characteristics can be used to understand a leadership network's structure, individual-level characteristics can be used to identify specific people who could be recruited to help in establishing and maintaining organization-wide health programs. Most of the network measures discussed in the previous section include a report showing the individual centrality scores for each member of the network.

Degree, betweenness, and *closeness* centrality are two, of several centrality metrics, which measure structural influence and power within a network. Degree centrality enables the identification of key *connectors;* individuals who are highly linked to others in a network and thus may have access to more social capital (e.g., information, social support). While degree centrality points to the advantages (and potential disadvantages) that come from broad connections, betweenness centrality relates to brokering positions within a network. Any given individual in a brokering position may or may not be highly connected to others. A *between central* actor is in a position to control the flow of information since s/he is between others who are unconnected but through her/him. Closeness centrality is the sum of all links – in the case of this study, geodesic path distances – between members of a network. People with low closeness scores are more directly accessible to others in a network. In other words, less intermediaries are needed to reach him/her. Information will tend to reach closeness central people sooner than others (Borgatti, 2005a, 2005b).

3.4.1. Individual leaders at Sacred Heart—The leaders with the top three scores for each of three most common measures of centrality are provided for the three networks at Sacred Heart. A total of 12 leaders (out of 36) held central positions within the parish's network. Here centrality is measured strictly in terms of relative position within each of the networks analyzed for the parish. Each of the leaders who appear in Table 4 are central – in at least one of three ways – within the structure of Sacred Heart's leadership. In Table 4 and later in Table 5, names are not listed in order according to their centrality scores. Rather, the names have been arranged and bolded so that leaders who appear multiple times can be more easily identified. Given their notable structural position, each leader could make ideal champions of an intervention, individually or as part of a group. Three leaders emerge as particularly central: Oscar, Sister Jane (Sister J), and Grace, marked in bold, because they stand out across multiple measures of centrality or influence. A possible reason for this is that these volunteer lay leaders were bilingual and thus more readily able to forge cross-cultural connections between the English-speaking and Spanish-speaking communities. Those marked in bold have especially advantageous positions within Sacred Heart's structure and their engagement in an intervention would be optimal.

At Sacred Heart the pastor does not appear as a dominant figure in the leadership network structure. Centrality here refers strictly to influential or advantageous positions within the

parish's leadership networks as treated in this analysis and not centrality along dimensions like spiritual life or symbolic authority.

3.4.2. Individual leaders at Holy Cross—The leaders with the top three scores for each of the measures of centrality are provided for the three networks at Holy Cross (Table 5). A total of 10 leaders (out of 23) held central positions within the parish's network. Five central leaders emerged: Father Brody (Father B), Mia, Josie, Deacon P, and Ana (highlighted in bold). All but Father Brody are Latino, who is European-American. At the time of this study, Father Brody served as a part-time pastor at Holy Cross, however, he had served as the parish's pastor for nearly 20 years. Mia is a volunteer lay leader at Holy Cross, considered a "go-to" person by the parish leadership, particularly around issues pertaining to the Spanish-speaking community. Ana is the parish's administrative assistant and worked closely with the parish priests. The significant centrality of formal leaders at Holy Cross, which includes the pastor, part-time priest, deacons, and the administrative assistant, stands in stark contrast to Sacred Heart. At Sacred Heart, formal leaders are few and their level of influence within Sacred Heart's leadership network is minimal.

In contrast to the Sacred Heart case, the pastor of Holy Cross, Father Francisco (Father F), has top centrality scores in the collaboration and discussion networks. Specifically, Father Francisco had the highest betweenness centrality score in the collaboration network and the third highest closeness centrality score in the discussion network. In terms of work with other leaders on parish events and activities, this means that Father Francisco was a key bridge in collaborative efforts at Holy Cross. While Father Garza, pastor of Sacred Heart, was not a prominent broker like Father Francisco, he is connected via collaborative efforts with 29 out of the 36 (81%) leaders in his parish compared to Father Francisco's 87% (20 out of 23). Because Father Francisco is connected to more leaders through work on parish related activities he is in a stronger position to broker between different parish groups within their respective parishes. Father Francisco's high closeness centrality score is an indication that he is likely among the first to learn about parish related matters discussed among the leadership. At the time of this study, Father Francisco had been with the parish for less than three months. His central position within the leadership networks at Holy Cross is notable given his brief tenure at the parish.

Figs. 3 and 4 show the three most between central leaders in each parish's collaboration networks.

4. Discussion

While prior research has documented that effective implementation of health interventions in community settings is driven by factors such as individual knowledge, skills, and self-efficacy (Damschroder et al., 2009), SNA considers an individual's social ties and the consequences of a person's relative position within the overall leadership structure in their organization, as a potential driver of effective implementation. In the proceeding discussion, we do not speculate on the success of EBI implementation at either parish, as protocols for the parent study did not allow for data on individual parishes to be disaggregated. Thus we cannot report how the compositional and structural characteristics of each parish related to

their EBI implementation outcomes. Instead, our aim is to identify areas for future research, particularly given the exponential growth in interventions designed to disseminate information through existing social networks (Glanz et al., 2008). In particular, as public health practitioners attempt to implement EBIs in Catholic parishes and other FBOs, we recommend *customized* implementation that takes into account the subtle differences among parishes in terms of organizational histories and networks that can affect the success of EBI adoption, implementation and reach.

At Sacred Heart, the greater density of collaboration ties versus discussion ties points to emphasis placed by the parish on creating a range of cultural, religious, and public service programs. The English and Spanish speaking communities were better integrated at Sacred Heart, particularly in terms of its leadership. The English speaking leadership was conscious of the importance of the Spanish speaking community for the parish's future, and a few of its lay volunteer leaders were English/Spanish bilingual. Furthermore, a collective narrative emphasizing grassroots leadership, social justice, and relative independence from direct church oversight reinforced Sacred Heart's leadership structure. Garnering support for health programs among leaders in such an organizational context could include: 1) making connections to social justice concerns by emphasizing health disparities addressed by a proposed intervention, 2) developing health interventions to integrate into existing programs and events, and 3) designing event-based interventions – a large event or a series of smaller events – to leverage the collaborative strengths of the leadership.

At Holy Cross, in the absence of a broader leadership ethos among parishioners, a relative small group of leaders took on a great share of the work in closer collaboration with formal leadership. Their organizational structure hewed more closely to traditional, hierarchical models of leadership, yet leadership tasks were distributed flexibly among a core group of volunteers. In contrast with Sacred Heart, more leaders at Holy Cross had relationships outside of the parish and a higher percentage of the leadership communicated on a daily basis. As in Sacred Heart, no one volunteer leader at Holy Cross played an outsized role as a broker of information. Taken together, these features of the leadership at Holy Cross suggest that while the smaller group of leaders is more limited in their capacity to organize a range of programs, the regular channels of communication and existence of ties outside of the parish suggest a robust structure for the dissemination of information. In this organizational context, health program implementation would benefit from:1) minimizing the number or scope of events, 2) investing in training of leaders on health messaging and other health information to be disseminated, and 3) assisting existing leaders to identify, engage, and train parishioners who can join the leadership and help with health programing.

Notable differences were found in the role of the pastor in each parish, with Sacred Heart having a more distributed, decentralized leadership network structure and Holy Cross having a more centralized, traditional leadership network structure. Such contrasts suggest some fundamental differences in the role that each priest would play when implementing EBIs. For instance, despite enjoying a certain level of independence vis-à-vis official leadership channels, a parish like Sacred Heart may be slower on projects that require approval of the pastor. Prior to EBI implementation, teams must consider how clergy participate in projects if priests do not dominate the overall network structure of the parish leadership. If the parish

requires involvement and approval of the clergy, a parish like Holy Cross has an advantage. This is particularly relevant as the number of Catholic parishes without a resident priest pastor grows throughout the USA (approximately 20% of all parishes) (Gray et al., 2013).

While findings from related research show that the involvement of the parish priest is key to the initial engagement of parishes in EBIs (Allen et al., submitted for publication), the findings of this study suggest that at parishes like Sacred Heart, volunteer lay leaders would be more engaged in the day-to-day EBI implementation process. This is consistent with research that points out that those with decision-making authority about whether nor not to adopt interventions are not necessarily those who will be involved in the implementation process (Weiner et al., 2009), a key factor often overlooked. On the other hand, EBI implementation at parishes like Holy Cross would count on more continuous involvement of the clergy and other formal leaders. Indeed, at Holy Cross formal leadership is in a more favorable position, structurally, to broker relationships and adoption of innovations. Father Francisco's central position within the leadership networks at Holy Cross is notable despite his brief tenure at the parish when this study was conducted. This may reflect the organizational culture at Holy Cross.

Prior research in faith-based settings confirms that pastors are influential drivers of implementation (Allen et al., 2014; Bopp and Fallon, 2013; DeHaven et al., 2004). However, SNA reveals that lay volunteer (informal) leaders within the larger organizational structure could serve as key players in the implementation of EBIs because of their central position within leadership networks. As demonstrated in the comparative analysis of these two case studies, these include highly reachable (closeness) and connected actors (degree), as well brokers (betweenness). Furthermore, official leadership in Catholic parishes is predominantly male. This study demonstrates that women play a radically relevant role in the leadership – albeit informal – of Catholic parishes. This observation is consistent with findings among other faith-based intervention studies (Yanek et al., 2001). Teams implementing health programs at Catholic parishes would benefit from being aware of the fundamentally gendered division of labor within church leadership. In the parishes studied here, formal leadership is male, while informal leadership is predominantly female. These gendered differences are more evident when identifying the formal, hierarchical structure of the parishes, but not as prominent in the networked relationships of the parishes. In terms of discussion and collaboration, there were no notable network patterns according to gender. This suggests that in the planning and implementation of health program interventions in Catholic parishes, implementation teams must look beyond the formal structures for organizational partners or champions, as well as for indicators of organizational capacity to establish EBIs.

We identified 22 (out of a total of 59) parish leaders who were in one or more particularly central positions within their respective parish leadership networks. These included individuals with: 1) high number of social ties; 2) a brokering or intermediary position; and/or 3) structural reachability. At Sacred Heart three leaders emerged as particularly influential, given their high scores across several centrality measures and network types. Holy Cross had five such leaders, despite the smaller size of their leadership network. It is also notable that at Holy Cross both formal and informal leaders held these top structural

positions. In contrast, Sacred Heart's most central leaders were lay leaders, all who worked with the parish on a volunteer basis. Both parishes have a core group of leaders to be cultivated for EBI implementation. One potentially fruitful approach may be to assemble an "implementation team" that consists of a small core group of highly central parish leaders, along with a broader set of influential leaders who play more formal or official roles within the leadership network and may therefore be in a position to address specific problems or needs at the decision-making level during the implementation process. For example, including at least one leader who is tied to a majority of leaders would be beneficial for ensuring that information about an EBI is disseminated as widely as possible and that there is widespread participation throughout the leadership network.

The process of carrying out a network analysis of FBO organizational networks is not complex, but success depends on the ability of researchers to gather complete or close to complete lists of formal and informal leaders (e.g. active volunteers) at the parish or church. This study suggests that the size of the parish does not necessarily determine the size of the leadership network. For example, Holy Cross has approximately 600 parishioners who regularly attend worship services, compared to Sacred Hearts' 445. Yet, Holy Cross' leadership network was considerably smaller. Depending on the size of the leadership and number of research staff, contacting and administering the roster survey to leaders can range between a few days to a couple of months. A network analysis could be effectively incorporated into an initial phase – after contact, clearance, and rapport has been established with parish gatekeepers – of organizational review and capacity assessment.

4.1. Limitations and strengths

This study cannot be generalized to other parishes and leadership network structures in other settings, denominations, and regions. The leadership at Sacred Heart in particular exhibited unique traits that would seem to limit generalizability. Yet as the number of priests diminishes (Gray et al., 2013), more Catholic parishes will resemble a style of leadership like the one at Sacred Heart. The case study approach allowed for a more nuanced understanding of the connections and interactions among parish leaders, and the historical and contextual forces shaping leadership network structures. This is the first ethnographic study to attempt to understand leadership network structure in Catholic parishes using SNA and its application to health research. While prior work has looked at the influence of social networks on a range of behaviors and outcomes, including health-seeking (Pescosolido et al., 1998), smoking (Alexander et al., 2001), obesity (Christakis and Fowler, 2007), physical activity (Gesell et al., 2012), substance abuse (Valente et al., 2004), and HIV/AIDS (Friedman et al., 1997; Kelly et al., 2006; Simoni et al., 2011), this study addresses a gap in the literature by examining the importance of networks in the implementation of EBIs in faith-based organizations.

Our use of SNA to better understand two organizations' capacity to implement EBIs was primarily for diagnostic rather than predictive purposes. Indeed, this study is limited in that we cannot relate network measures to specific EBI implementation outcomes at Holy Cross and Sacred Heart. Our analysis also says little about the core values or beliefs, which drive the communications and collaborations that sustain the two organizations. Instead, we show

how SNA provides insights not easily obtained by traditional organizational surveys. For example, SNA can be used to rapidly assess actual, rather than perceived, levels of interaction in an organization. In addition, it can be difficult for respondents to identify highly central people within a network. Degree centrality may be measured indirectly by asking: "who is the most connected person in the leadership at this parish?" However, people will generally answer based on perceptions and may be biased towards people perceived as especially outgoing or friendly. Other centrality measures like betweenness – "who is the leader that most people go to connect with leaders they don't know" – are highly abstract and thus more difficult to answer (and more difficult to phrase in a questionnaire). For such variables, network data is far superior.

4.2. Implications

SNA is a promising tool for future health research in FBOs. The implementation of EBIs in FBOs is often dependent on program champions, whose behaviors and actions hinge not only on their position within the formal and informal leadership networks, but also their ability to act as influential opinion leaders for the adoption of programs (Valente, 2012). Such leaders are more central to the network structure of the organization, interact with more members on average than other members do, and often act as linkages between members who do not know each other (Long et al., 2013). These individuals provide great potential for the dissemination of health messages (Valente, 1996). Understanding the roles of such players, and learning how to support and leverage their social influence for the implementation of EBIs should be a priority for future research.

SNA's centrality measures are important for identifying key players to recruit for delivering EBIs. With the increasing number of interventions that employ 'lay health workers', 'community outreach educators', or 'peer health advisors' (Allen et al., 2014; Resnicow et al., 2004; Williams et al., 2013), such an approach could help to identify individuals who could be most effective in reaching the widest number of individuals within a network. For example, an individual who is highly connected may be better able to diffuse health information throughout the organization for wider reach and greater credibility. In our study, this is exemplified by Father Brody at Holy Cross, who was connected to the most number of people in the discussion and collaboration networks, as well as outside of the parish. Father Brody enjoyed a unique position within the parish, having been Holy Cross' pastor for almost two decades but also retired for many years at the time of this study. Thus, Father Brody had both formal and informal roles and relationships.

At the group level, SNA can be used to measure the emergence of connectedness among parish leaders as a result of interventions designed to build community capacity or to mobilize communities. The methods can further be used to study the relationship between network composition and structure and implementation behaviors. For example, if there is strong support for program adoption among formal leaders, but few resources or will among those charged with implementation, the program is not likely to succeed (Weiner et al., 2011).

Thus, network level metrics, such as density, centralization, and network compositional attributes like tie strength indicate properties of the entire network that may be associated

with implementation outcomes (e.g. organizational readiness to adopt program, collective self-efficacy to implement intervention). An FBO such as Sacred Heart, with a highly distributed leadership, may be able to draw on a broader network of support and greater sharing of responsibility, with the ability to adapt to changing requirements for program implementation or success. An organization like Holy Cross, where formal leadership plays a central role in the routine activities of the parish, is most likely to require buy-in and commitment from the pastor.

In addition to understanding how and by whom interventions can best be implemented, SNA could be used as a tool to monitor group dynamics as a means to continuously improve program processes and procedures (e.g., 'mid-course corrections') (Gesell et al., 2013). For example, a social support intervention to increase screening behaviors in FBOs could use SNA to monitor the creation of new relationships, as well as social support provided during the intervention. In some interventions, intentionally building new social networks could improve desired outcomes. Monitoring such interactions could nudge social influences/ mechanisms and potentially augment intervention effects. Valente (2012) provides a more complete discussion of the various approaches and applications of network interventions for behavior change at both the individual and organizational levels. In other interventions, enhancing the social support provided to individual network members could potentially diminish barriers to program participation, health care utilization, and follow-up with medical recommendations (Resnicow et al., 2004). Finally, from an evaluation standpoint, the methods described in this paper could also enhance our ability to understand variability in program processes and outcomes across different settings, as leadership network characteristics may be potential drivers of implementation and associated outcomes.

5. Conclusion

The integration of EBIs in local practice settings, such as FBOs, is highly contingent upon the support, buy-in, and participation of the community and their organizational leaders. Through SNA and comparative case-study approach, our study shows that the leadership structure and networks in FBOs may have important implications for EBI adoption, implementation and maintenance. This study provides a framework for utilizing SNA to identify key decision-makers for adoption of new programs, program champions who can ensure widespread support, individuals and/or teams charged with program implementation, as well as key individuals capable of maximizing programmatic 'reach'.

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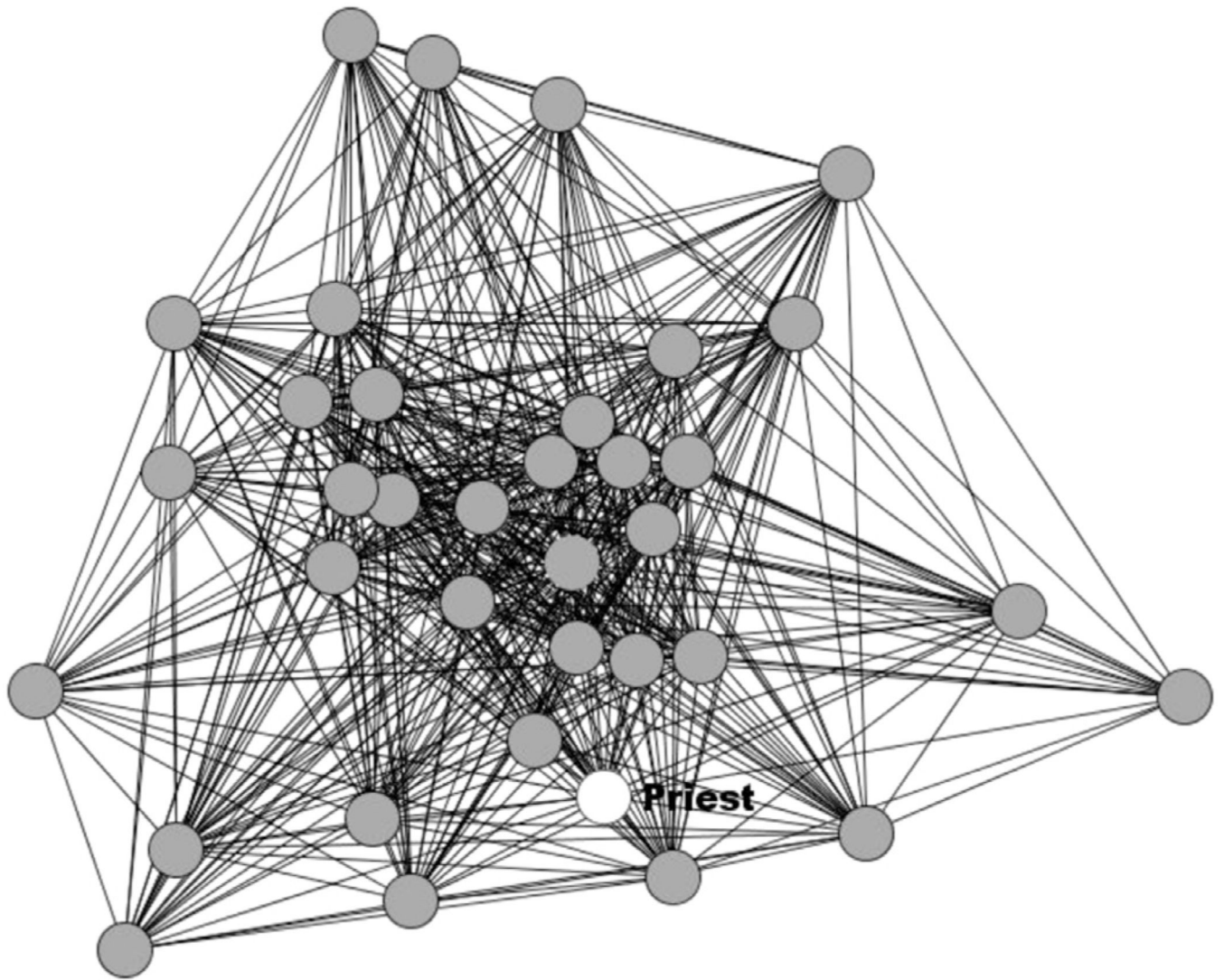
Fig. 1.
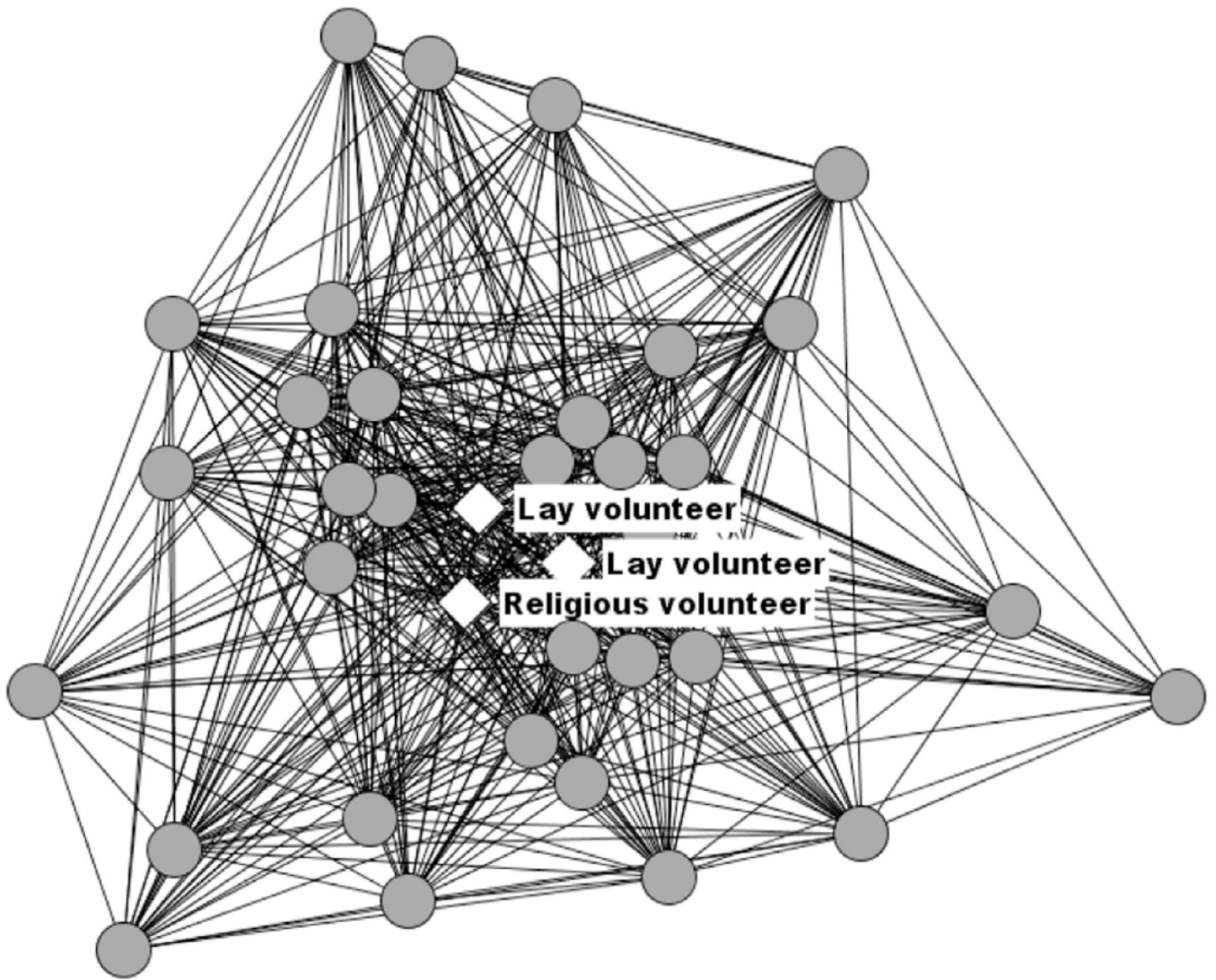Sacred Heart collaboration on parish events & activities, density = 0.96.
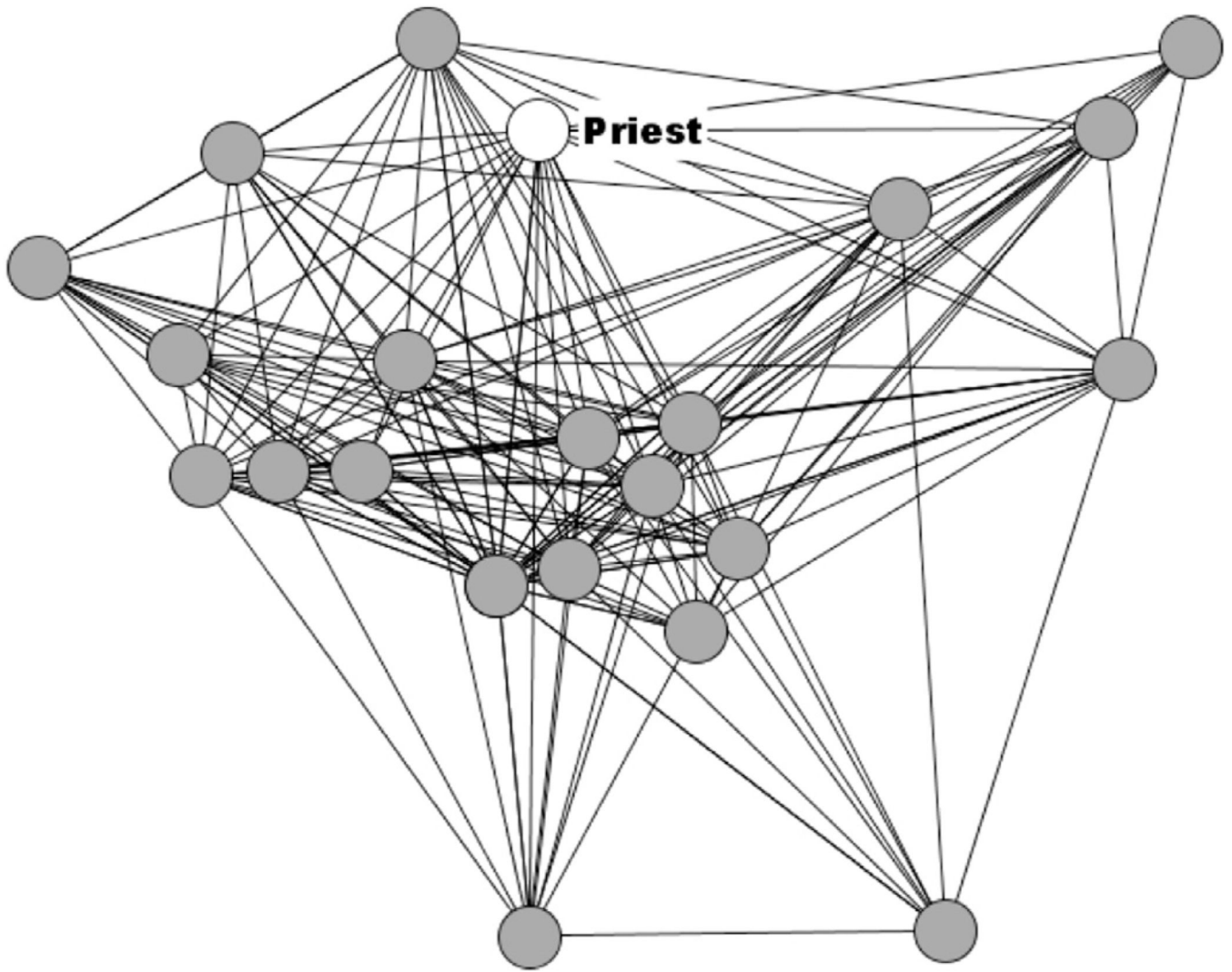
Fig. 2.
Holy Cross collaboration on parish events & activities, density = 0.65.

Fig. 3.
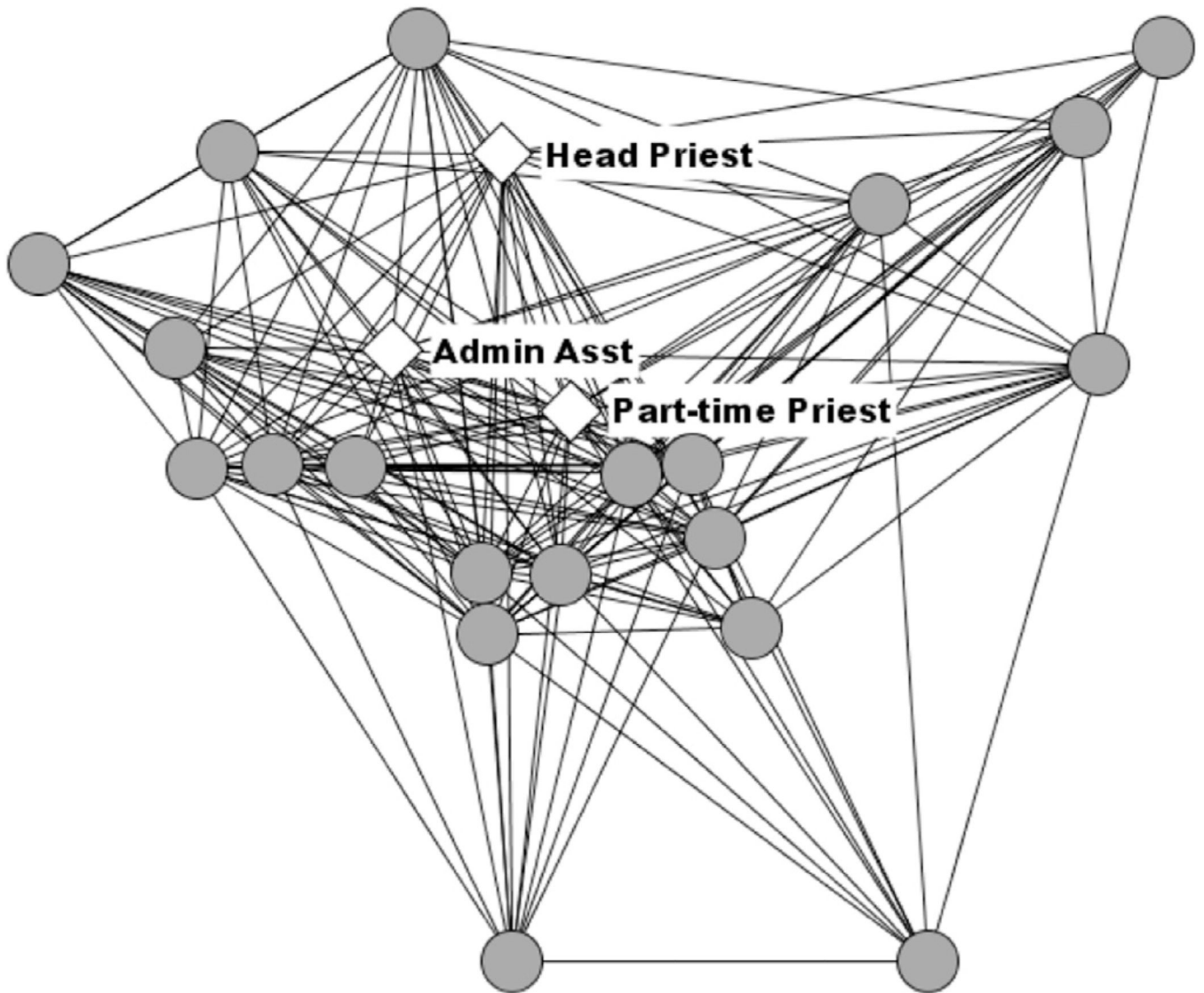Most between central leaders in Sacred Heart's collaboration network

Fig. 4.
Most between central leaders in Holy Cross' collaboration network.

Table 1

Leadership composition by parish.

Attribute	Sacred Heart (n = 36)		Holy Cross (n = 23)		Total (N = 59)	
	n	*%*	*n*	*%*	*n*	*%*
Female	28	78	14	61	42	71
Spanish Mass Participants	11	31	18	78	29	49

Table 2

Network density scores by parish.[a]

Network	Sacred Heart	Holy Cross
Discussion	0.68	0.66
Collaboration	0.96	0.65
Outside-parish	0.28	0.40

[a]The closer to 1 the score, the greater the density.

Table 3

Degree centralization scores by parish.

Network	Sacred Heart%	Holy Cross%
Discussion	25.4	28.6
Collaboration	17.3	25.8
Outside-parish	42.2	53

Table 4

Sacred Heart: Most network central leaders.

Degree			Betweenness			Closeness		
Discussion	Collaborate	Outside	Discussion	Collaborate	Outside	Discussion	Collaborate	Outside
Oscar	Oscar	Martha	Oscar	Emma	Oscar	Oscar	Oscar	Martín
Sister J	Sister J	Julia	Sister J	Sister J	Julia	Sister J	Moi	Sister J
Tom	Grace	Dana	Danacon L	Grace	Dana	Danacon L	Grace	Liz

Table 5

Holy Cross: Most network central leaders.

Degree			Betweenness			Closeness		
Discussion	**Collaborate**	**Outside**	**Discussion**	**Collaborate**	**Outside**	**Discussion**	**Collaborate**	**Outside**
Deacon L	Magda	**Mia**	Diego	Father F[a]	**Mia**	Father F[a]	**Mia**	**Mia**
Father B	**Father B**	**Father B**	**Father B**	**Father B**	**Father B**	**Deacon P**	**Deacon P**	**Deacon P**
Josie	**Josie**	**Josie**	**Ana**	**Ana**	**Josie**	**Ana**	**Ana**	David

[a]Pastor.