

RESEARCH ARTICLE

# Development of a social capital scale for constructed families of gay, bisexual, and other men who have sex with men

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**Data Availability Statement:** These data are from the National HIV Behavioral Surveillance system in New Orleans LA and are considered to be HIV Surveillance data, which are owned by the Louisiana Department of Health Office of Public Health STD/HIV Program. Accordingly, these are protected and confidential data that may not be made freely and publicly available under state and federal law. A limited de-identified analytical data set, however, can be made available to researchers who submit a concept proposal to the New Orleans Office of Public Health for a formal research and

## Abstract

Despite previous empirical studies which have linked social capital to a number of health outcomes, few studies have investigated sub-group specific social capital among populations at increased risk for HIV infection such as gay, bisexual and other men who have sex with men (GBM). Many GBM of color belong to constructed families in which friends refer to each other with kinship terms such as parents and children. No studies have measured social capital provisions within constructed family networks. This study developed a preliminary instrument for assessing social capital among constructed families. The network level social capital scale incorporated the following theoretical domains hypothesized to define social capital derived from network membership: social influence, multiplex ties, heterogeneity, social cohesion, trust, quality of support, and compositional quality. A cross-sectional survey administered an eight-item scale to 131 GBM who belonged to constructed families. The factor structure and confirmatory factor analysis were assessed. Reliability was evaluated using Cronbach's alpha to measure internal consistency. A final single factor solution was obtained which was comprised of six items with high factor loadings. The resulting measures were highly correlated with an alpha of 0.84 and each factor loading was well above 0.3. This study assessed the psychometric properties of a preliminary network level social capital instrument among GBM in constructed families. Future studies may utilize or adopt this scale to measure network-level social capital within other populations.

## Introduction

HIV continues to disproportionately impact specific populations despite public health approaches. Gay, bisexual and other men who have sex with men (GBM) are at elevated risk for HIV infection and account for more than half of all people living with HIV in the United States and approximately 70% of all new infections annually[1]. The disparities for GBM of color are striking: an estimated one in two black GBM and one in four Latino GBM will

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become infected with HIV in their lifetime if current rates persist[2]. Better strategies to engage GBM and GBM of color in HIV prevention are warranted.

One such avenue for network level intervention are constructed families of gay and bisexual men. Historically, constructed families are social connections that have served as important sources of identification and a foundation of support to LGBT persons[3]. Constructed families are comprised of biologically unrelated individuals, often GBM and transgender women, who refer to each other with kinship terms such as “parents” and “children” [3–7]. Membership in constructed family networks may buffer against stressors many LGBT people of color experience including multiple intersecting stigmas due to their sexual and racial identities and therefore may be important to leverage for HIV prevention and interventions.

The term constructed family encompasses membership in “gay families” as well as performance networks such as the house and ball community and pageant families [3–7]. Within the house ball community, “houses” refer to a family surname, often the same as well-known fashion designers, and members compete in performance categories at community thrown balls [8–12]. Pageant families are similar to houses because individual members may compete in gay pageant competitions; however, these competitions are not synonymous with balls and awards are judged using different beauty and talent categories. Pageant families may also share common identities by informally adopting a family surname. In comparison, gay families, while similar to both the house ball community and pageant families, are not always associated with performance or ball culture. Gay families frequently provide mentorship, social support, and resilience to LGBT people who experience adversity [13–17]. Gay families may also share a family surname but are not synonymous with performance culture. Researchers have argued that other forms of constructed families, including gay families, may be just as valid for HIV prevention interventions as membership in particular gay families can increase or decrease HIV risk[7,14,18].

While studies have examined HIV risk and prevention opportunities within the house and ball community in large cities, few studies have explored the larger context of constructed families, social connectivity to resources, and social capital [15]. While many studies have explored social support provided by constructed family membership[14,18,19], to date no studies have explored social capital attributed to membership in constructed families for gay, bisexual and other men who have sex with men. This study aims to develop a new measure of social capital among GBM who belong to constructed family networks.

The theory of social capital is predicated on the notion that social networks have value. A multivalent a construct, social capital has been applied to various physical and mental health outcomes and theorists have attempted to develop reliable and valid measurements at various levels[20,21]. Previous studies have investigated social capital as membership and participation in voluntary community organizations[22]; as collective norms, trust, reciprocity, and knowledge[23]; as social network ties, communication, and normative pressures that foster community resilience[24]; and as social support, social leverage, informal social control and neighborhood organization participation[25].

The last two decades have distilled two dominant social capital perspectives: the social network approach and the social cohesion approach [26]. These perspectives diverge in meaningful ways. First, the social cohesion approach refers to trust, reciprocity, and civic and social participation. In contrast, network approaches incorporate social network analysis methods to measure networks and the resources within them. Each approach shares an ecological perspective which acknowledges that social capital operates at multiple levels to influence individual-level health. The first perspective, influenced by Bourdieu, emphasizes the availability and access to resources for connected individuals within social networks [27]. Lin’s approach anchored social capital within social networks as a mechanism that allows individuals to attain

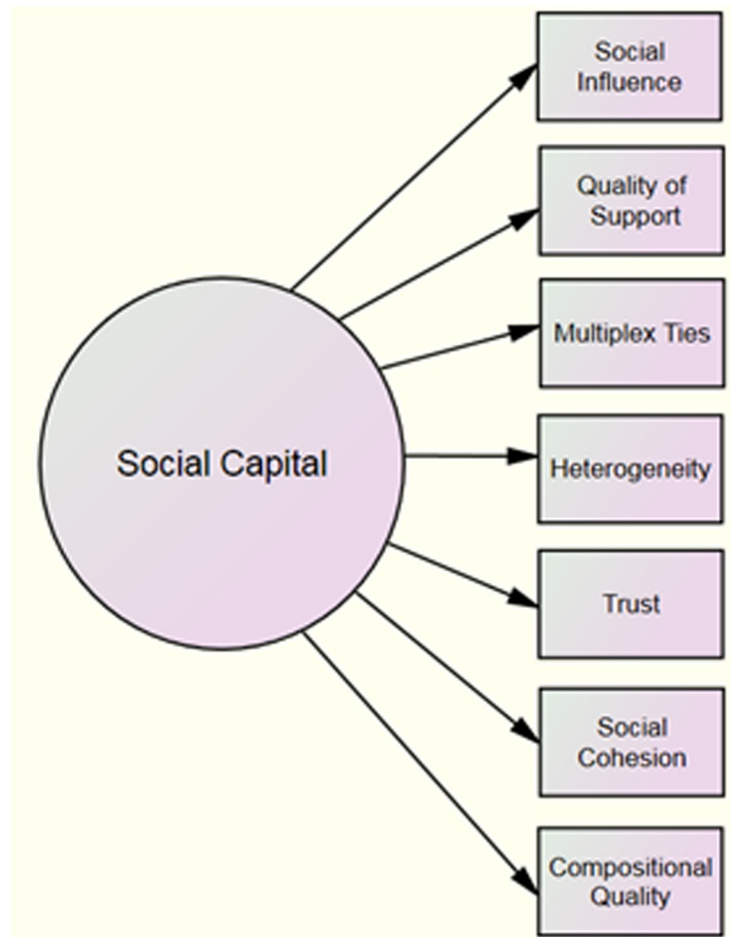
goals and access embedded resources they provide [28–30]. Patterns of relationships have also been explored within networks to measure network structures and the presence of specific peers (i.e. alters) who provide specific ties[30]. Examples include name, position, and resource generators whereby a participant lists social network members and describes their roles and positions, prestige or status levels, and other specific resources [29]. In contrast, Putnam's view, which popularized the social cohesion school, argues for measures of trust, norms, reciprocity, and sanctions[31,32]. Critics of Putnam's social capital often suggest that the definition is inconsistent by calling into question the validity of its measures through time and space [20,25,30,33]. Regardless of approach, each dominant social capital perspective situates social capital as resources nested within a social group and the potential access to resources through membership in social networks.

Social capital has been associated with HIV-related outcomes in previous empirical research. Within the injection drug use literature, studies have explored social capital as resources resulting from affiliation within particular social networks whose structures or norms encourage risky injection behavior that may increase HIV risk [34]. Researchers have hypothesized that social capital, (defined as collective norms, trust, reciprocity, and knowledge about safe injection practices) within drug use networks may influence risk or protective behaviors in different contexts[23]. Recent studies in the US have linked measures of social capital to adherence to medication to treat HIV infections[35], HIV diagnosis[36], and as a predictor of gonorrhea, syphilis, chlamydia and AIDS cases[37]. Some international studies have measured social capital in relation to reduced HIV risk behaviors[38] and a decline in HIV incidence attributed to social norms within networks [39] within the general population. Social capital measured in terms of membership to voluntary community organizations has also been correlated with HIV risk behaviors [22].

Despite the historical foundation of social capital as a relational construct, few studies have employed network measures and social cohesion to measure social capital. Indeed, some have argued that network measures of social capital have been “lost in translation” in public health [40]. A small number of social capital studies have focused on social networks and community participation, however very few such studies are among GBM. One US study found that social networks influenced health behavior related to HIV risk and that risk perceptions varied by network position among adolescent females [41]. Social capital measured as community group participation in rural Zimbabwe indicated that women in networks with higher levels of participation had lower incidences of new HIV infection and higher rates of protective behaviors [42]. Another study found that social network ties, communication, and normative pressures reduced drug-related HIV risk among young adults by creating community resiliency in Bushwick, New York[24]. One notable study among GBM in Swaziland found that social capital, measured as social participation and social cohesion, was associated with increased HIV testing [43]. The current study further contributes to these prior studies and expands current knowledge of how social capital among GBM operates within constructed families.

The dearth of studies which examine social capital among gay, bisexual and other men who have sex with men and the disproportionate impact of HIV among GBM justifies new conceptualizations of the theory. If social capital is a collective construct created through participation in social organizations, then the construct may be characterized by aspects of the constructed family networks of GBM. We argue that a blended approach of social cohesion and social network approaches may be a better way to conceptualize social capital for GBM. The *social embeddedness* of constructed families likely indicates some caliber of social capital because members of are bonded through kinship terminology and maintain social ties.

During the unpublished formative research phase for the National HIV Behavioral Surveillance (NHBS) in New Orleans in 2014, GBM described strength of ties (including hierarchy,



**Fig 1. Social capital measures for use within constructed families.**

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status), boundedness (names and group identity), and resources / social support (instrumental, emotional, and informational support) in relation to social group memberships in constructed families. The development of a scale for use among subgroups of GBMs supports the social-network based approach which reasons that social capital is at its core characterized by the boundedness of networks members[25]. From the perspective of the individual or ego, (i.e. the perspective of one individual within a social network), resources are exchanged and transactions occur through interaction with network alters (i.e. peers) [44,45]. Relatedly, boundedness refers to the degree to which networked members are defined on the basis of traditional group structures such as kinship, employment, or neighborhood. Constructed families of GBM represent each of these theoretical components of social capital as members provide resources from each other and are often bounded by a family name or identity.

Several network indicators were considered for the purpose of developing a measure of social capital within constructed families of GBM (see Fig 1). These measures were selected due to formative research in the community and upon close inspection of extant literature. *Social influence*, which measures the impact of network members on decisions made by ego, could be used to measure how individuals integrated within a family regulate behaviors of others. Evidence has shown that peer norms can influence health promoting behavior or activities that may be detrimental to health. In addition, forms of emotional, instrumental, or

informational support are indicative of *tie strength*[33]. Social ties, including the number, quality, and content of constructed family members may foster healthy or risky behaviors among GBM. *Quality of support* may signify closeness among members that enhances social support [46]. Strong ties can be used to measure social regulation through a network. Whereas weak ties may link people across social groups, strong ties may require high relational support or restrict constructed family members from external information and resources[33]. *Multiplex ties*, another indicator of tie strength, exist in two or more relational contexts[44]. Within families, members who have multiple qualities may provide higher social support to individuals within families. Multiplex ties enhance social capital because stronger ties may result from connections that are multi-purposed (i.e. a friend and a coworker). *Heterogeneity* a measure that refers to diversity within networks is determined by the similarity of attributes of group members[33]. Indicators typically include socio-demographic variables such as gender, age or race. Belonging to a diverse constructed family may enhance resources available to ego. *Trust*, while a problematic indicator of individual level social capital, may be appropriate when used as aggregate to measure the trustworthiness in a group[47]. Perceptions about trust within a constructed family may indicate high or low social capital. *Social cohesion* is related to trust and refers to a contextual effect networks have on individuals that creates a sense of belonging and inclusion[26,48]. Thus, socially cohesive families may be those with the absence of covert conflict and the existence of strong social bonds. Finally, the *compositional quality* of a social network is indicated by the number of members with characteristics or resources deemed important by ego[33]. Thus, forms of support garnered from constructed family members may be beneficial to ego. Compositional quality may be measured by asking which network members are rallied for personal problems, financial support, or emotional wellbeing[32]. Specific qualities of constructed families may indicate social capital including having friends who help ego with personal problems, financial support, or emotional wellbeing. Relatedly, various types of social support garnered from constructed family members may improve social capital.

The purpose of this study is to assess social capital among gay and bisexual men in constructed families by developing a novel scale. Since studies have shown that social networks may be protective against HIV risk and the theory of social capital is a critical mechanism which mediates risky and protective sexual behaviors, it is hypothesized that social ties such as constructed families may promote varying levels of social capital and thus differences in health outcomes for GBM. The significance of our focus on constructed families may benefit knowledge surrounding risk reduction and HIV prevention among younger GBM of color that experience multiple intersecting stigmas and experience the highest rates of HIV infection in the US. Moreover, this work contributes to the literature surrounding resilience and support cultivated among GBM despite the systemic oppression they may experience.

## Materials and methods

During the CDC's National HIV Behavioral Surveillance (NHBS) MSM4 cycle in 2014 in New Orleans, eight items measuring network domains of social capital were asked to GBM who self-reported being members of constructed families: "Please tell me whether you belong to any of the following groups. You can choose more than one option (Check all that apply)." The response categories included: gay family, pageant family, house ball community, faerie community, gay fraternity, bear community, leather community, other, and none. Anyone who reported belonging to a gay family, pageant family, or house ball community was considered a member of a constructed family. For the purposes of data collection, the term "gay family" was used throughout the interview because participants do not describe these relationships as "constructed families" and because participants frequently used the terms interchangeably (i.e.



referring to their house as their gay family). In addition, we distinguished between constructed families with and without names because families with names were typically associated with performance. In addition, it was hypothesized that this distinction recognized a level of boundedness, prestige, or formality that may result from sharing a family name which may be an important distinction when measuring social capital.

## Participants

In accordance with CDC protocol, eligibility included cisgender men (i.e. born and self-identified male), aged 18 and older, who had ever had sex with a man, residents of New Orleans, and who were able to take the survey in English. Out of the entire sample of 553 participants, 131 reported belonging to a constructed family (CF). In addition to the standard core NHBS questionnaire, participants who reported belonging to CF (either a gay family, pageant family or house ball community) were asked a subsequent series of questions about membership.

## Recruitment

Trained interviewers recruited respondents through venue-based time-space sampling (VBTS) methods[49,50]. Briefly, GBM were systematically approached and screened for eligibility at venues such as bars and clubs in the metropolitan area. Formative research including observations identified venues and established day-time periods for recruitment of participants. A monthly calendar was used to schedule days and times for the recruitment events at venues in a two-stage sampling design[50]. Once selected, participants were asked to partake in an anonymous survey and HIV testing to protect privacy and prevent harm to participants. Interviewers conducted surveys on handheld computers. Participation was incentivized with a \$25 cash-value gift card for the survey and an additional \$25 cash-value gift card for HIV testing. All NHBS interviewers were trained and certified under the standards of the Louisiana Office of Public Health to provide a brief counseling session and test results to participants and maintain respondent confidentiality. This research was approved by the Louisiana Department of Health and LSU Health Sciences Center's Institutional Review Board. All participants received relevant materials, information, and referrals to services or programs as needed following the interview.

## Measures

Age, a calculated variable, was categorized 18–29, 30–39, 40–49, and 50+. Race/Ethnicity was dichotomized as black, Latino, other and white. Household income in the past 12 months included four categories ranging from less than \$15,000 to more than \$50,000. Education level was categorized less than high school, high school equivalent, some college, and college graduate. Other questions from the NHBS core survey included, sexual identity (gay, straight, or bisexual), current health insurance, and self-reported HIV status.

The CF questions were preceded by the statement “*Now I'm going to ask you some questions about belonging to a gay family, pageant family, or house ball community. I will refer to membership in any of these groups as a 'gay family'.*” The CF questions explored participants' role in the family, number of years they were members, how many of their family members live in other states and how many live in New Orleans. This series questions also sought to understand the proportions of CF members who lived in New Orleans in terms of gender, race, health behaviors, and social capital. Social capital questions were specific to CF members who lived in New Orleans.

The social capital scale developed for this study was based on an extensive literature review to identify a framework for social capital within egocentric social networks. Rationale for the

measures included were based upon measures presented by Lakon, Godette and Hipp in the text *Social Capital and Health*[33] who proposed that researchers should consider measuring variations in resources allotted by the network structure from the perspective of ego. We established measures of constructed family-based social capital derived from common indicators of social cohesion and egocentric network properties. No cognitive testing or piloting was done on survey items; however, every effort was made to ask questions about terminology to participants in formative open-ended interviews and all members of the project team provided expert feedback on the final local questionnaire.

The questions primarily embody functional network measures that describe the roles and resources acquired through membership in a group. The eight measures of network properties which were operationalized as social capital for this instrument were derived from the following indicators of social capital: social influence, tie strength (multiplex ties and quality of support), heterogeneity, trust, social cohesion, and compositional quality (advice about general and sexual health). These series of questions were asked in reference to the number of people within each individual participant's constructed family. Each question began with the phrase, "Out of all your [constructed] family members who live in New Orleans, about how many. . ." followed by the indicators of interest. For example, social influence was measured by asking "Out of all your [constructed] family members who live in New Orleans, about how many have influenced important decisions you made in the past three months?" whereas trust was measured by asking "Out of all your [constructed] family members who live in New Orleans, about how many do you trust in general?" Thus, each participant provided a count in response to social capital items for the number of people in their individual CF. Using the number of each participants' CF members who live in New Orleans as the denominator, a series of proportions were assessed for each item. The proportions of CF members who fulfilled each measure of social capital for each participant were then averaged across the sample. Verbatim questions are listed in [Table 1](#).

## Analyses

Survey data were analyzed with SAS 9.3. Basic descriptive statistics of demographic variables and each of the items in the scale (i.e. frequencies, means and standard deviations) were derived using PROC FREQ and PROC MEANS. Bivariate associations between the final proportions for each item on the CF social capital scale and demographic variables were assessed using PROC GLM.

PROC CORR with ALPHA option was used to gauge the reliability of the social capital scale by the Pearson correlation coefficients. The correlation coefficient estimates the degrees of equivalence between all possible ways of splitting and comparing sets of questions for summary scales to ensure items consistently yield similar responses[51]. A priori it was decided that if the alpha for the overall scale increased after removing a particular item then it would be deleted, however if the alpha remained unchanged or decreased after removing an item, the item would be retained.

PROC FACTOR was used to assess the dimensionality of the scales. Initial factor analyses, followed by varimax rotation, were used to examine the following criteria for factors: eigenvalue, the scree test, and percent of variance extracted. The results of the factor analysis (i.e. the scree plot and eigenvalues) were used to interpret the number of factors and factor loadings to determine construct validity. The measure for social cohesion (whether or not network members would take advantage of a participant) was reverse scored to align all the measures in the same direction. Thus, the proportion presented in the results reflects the average number of CF members who would not take advantage of the participant if given the chance.

**Table 1. Eight indicators of social capital within constructed family networks of GBM.**

“Out of all your [constructed] family members who live in New Orleans, about how many...”	N	Average of Proportion	Std Dev
<b>Social Influence</b>	116	0.40	0.39
<i>have influenced important decisions you made in the past 3 months</i>			
<b>Tie strength (Multiplexity)</b>	117	0.36	0.39
<i>fulfill multiple roles in your life (for example, they are a member of your [constructed]family but also a co-worker, friend, or partner, etc.)</i>			
<b>Heterogeneity</b>	116	0.70	0.35
<i>are similar to you (in terms of race, gender, etc.)</i>			
<b>Trust</b>	117	0.62	0.39
<i>do you trust in general</i>			
<b>Tie strength (Quality of support)</b>	117	0.61	0.39
<i>offer you social support (for example you could talk to them about things that are very personal and private, go to them for advice, or borrow some money or something valuable if you needed it)</i>			
<b>Social Cohesion*</b>	113	0.85	0.31
<i>would not take advantage of you if they got the chance</i>			
<b>Compositional Quality</b>	115	0.65	0.38
<i>could you ask for advice or help about your health in general</i>			
<b>Compositional Quality</b>	116	0.60	0.41
<i>could you ask for advice or help about HIV or other STDs</i>			

\*This item was reverse scored.

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## Results and discussion

Each measure and item are shown in Table 1 with the average proportions of social capital responses by participants. On average, participants reported that 10 members of their constructed families had influenced important decisions in the past month and the average size of constructed families was approximately 20 individuals (not shown). Thus, respondents depended on approximately 40% of their CF members to help them make important life decisions. The multiplicity of social ties within families was also apparent: 36% of constructed families fulfilled multiple roles in a person’s life. There were high levels of heterogeneity such that 70% of CF members were similar to the participant in terms of race, gender or other factors. Participants also reportedly trusted the majority of their CF members on average (60%) and felt comfortable asking for help or advice about health issues (65%) and HIV or other STDs (60%). Thus, relatively high levels for each social capital measure were reported.

The measures were modestly correlated with one another (see Table 2), with the exception of heterogeneity and social cohesion. The Cronbach Coefficient Alpha for the correlation of the scale using all eight variables was 0.77. When heterogeneity was removed from the model, the alpha increased to .80. Upon removing both heterogeneity and the social cohesion variable from the correlation matrix the alpha increased to 0.84.

After assessing the correlation coefficient alpha to estimate the degrees of equivalence between all possible ways of comparing a summary scale to ensure similar responses are consistently obtained, a subsequent factor analysis of all eight measures led to the removal of social cohesion and heterogeneity. Table 3 shows the results of the factor analysis assessing all eight measures of social capital provided by constructed families.

The Eigenvalue of 3.39 for the first factor followed by 1.26 for the second factor in addition to the scree plot indicated a one factor solution. A confirmatory factor analysis excluded



**Table 2. Correlations between CF-provided social capital measures.**

Measure	1	2	3	4	5	6	7	8
Social Influence	1							
	116							
Multiplex Ties	<b>0.41***</b>	1						
	116	117						
Heterogeneity	0.035	0.08	1					
	115	116	116					
Trust	<b>0.34**</b>	<b>0.39***</b>	0.11	1				
	116	117	116	117				
Social Cohesion	-0.01	0.04	<b>0.19*</b>	<b>0.20*</b>	1			
	112	113	112	113	113			
Quality of Support	<b>0.42***</b>	<b>0.38***</b>	-0.03	<b>0.52***</b>	0.01	1		
	116	117	116	117	113	117		
Compositional Quality (Health)	<b>0.42***</b>	<b>0.46***</b>	0.13	<b>0.60***</b>	<b>0.27**</b>	<b>0.58***</b>	1	
	114	115	114	115	111	115	115	
Compositional Quality (HIV)	<b>0.28**</b>	<b>0.41***</b>	0.18	<b>0.66***</b>	<b>0.23*</b>	<b>0.45***</b>	<b>0.60***</b>	1
	115	116	115	116	112	116	114	116

\*P < .05.

\*\*P < .01.

\*\*\*P < .0001.

Note: Number of observations displayed below *r*

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heterogeneity and social cohesion. A final single factor solution was obtained which was comprised of social influence, multiplex ties, trust, tie strength, and two measures of compositional quality with high factor loadings. The final Eigenvalue after both measures were removed was 3.31 and no other measures had Eigenvalues above 1 in the final solution. The resulting measures were highly correlated with an alpha of 0.84 and each factor loading was well above 0.3.

The final scale was operationalized as a score by summing the average of the proportion for each measure and dividing by six (i.e. the final number of measures from factor analyses). The final score ranged from zero to one with one referring to a higher social capital and zero indicating a lower social capital score. The measure had a normal distribution with the highest observation of 1 and the lowest value at 0.009.

The bivariate associations with the final CF-provided social capital scores are shown in Table 4. In total, 131 GBM completed questions about social capital within their constructed

**Table 3. Factor loadings for eight CF-provided social capital measures.**

	Default		Varimax Rotation		Final Solution
	Factor 1	Factor 2	Factor 1	Factor 2	Factor 1
Social Influence	0.58	-0.37	0.66	-0.20	0.62
Multiplex Ties	0.64	-0.19	0.67	-0.01	0.66
Heterogeneity	0.18	0.66	-0.01	0.68	-
Trust	0.81	0.01	0.78	0.23	0.80
Quality of Support	0.74	-0.30	0.79	-0.09	0.75
Social Cohesion	0.28	0.72	0.07	0.77	-
Compositional Quality- Health	0.84	0.09	0.78	0.32	0.83
Compositional Quality- HIV	0.79	0.19	0.71	0.40	0.78

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Table 4. Bivariate associations with CF-provided social capital scores.

	N = 131	%	Mean	$\beta$	p-value
<b>Constructed Family</b>					<b>0.0284</b>
Named	73	56%	0.49	-0.12	
No Name*	58	44%	0.61		
<b>Age</b>					<b>0.6225</b>
18–29	67	51%	0.51	-0.07	
30–39	33	25%	0.55	-0.03	
40–49	9	7%	0.62	0.04	
50+*	22	17%	0.58		
<b>Race</b>					<b>0.1070</b>
White	54	41%	0.50	0.09	
Black, Latino, Other Race*	77	59%	0.59		
<b>Education</b>					<b>0.3058</b>
College Grad	42	32%	0.61	0.24	
Some College	49	37%	0.51	0.14	
High School Grad	37	28%	0.52	0.15	
Less High School*	3	2%	0.37		
<b>Income</b>					<b>0.2423</b>
Less than \$15,000	39	30%	0.54	-0.03	
\$15,000 - \$29,999	35	27%	0.58	0.01	
\$30,000 - \$49,999	20	16%	0.41	-0.16	
\$50,000 +*	35	27%	0.57		
<b>Sexual Identity</b>					0.3977
Gay	113	86%	0.54	-0.13	
Bisexual	15	12%	0.45	-0.23	
Heterosexual*	3	2%	0.68		
<b>Health Insurance</b>					<b>0.2683</b>
Yes	86	66%	0.56	0.06	
No*	45	34%	0.49		
<b>HIV Status</b>				<b>-0.07</b>	
Negative	100	76%	0.59		0.2535
Positive*	31	24%	0.52		

\*Denotes referent group

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families. The majority of participants were black, Latino, or other race (59%), under 30 years of age, and identified as gay. Sixty-six percent had health insurance and 76% were HIV negative at the time of the interview. Nearly half of the sample reported household incomes below \$30,000 annually. The majority of the sample (69%) had at least some college education. GBM who belonged to constructed families without family names had higher social capital than those in named families ( $p = 0.0284$ ). Thus, our hypothesis that members of constructed families with names might have higher social capital was not upheld. On average, GBM in named constructed families had a lower social capital score than those in unnamed families ( $\beta = -0.12$ ).

## Conclusions

The novel scale presented here includes six indicators of social capital at the network level to discern social capital attributed to membership in constructed families of GBM. No such tool

has previously been developed for this population in the US or internationally. Previous research among GBM in the US context has yet to examine social capital as it pertains to social group memberships, including constructed families. The only previous study which investigates social capital specific to GBM participation in subgroups took place in Swaziland[43]. Grover and colleagues employed a modified social cohesion scale among GBM in South Africa based upon previous work among female sex workers[52]. This scale measured participation using an index comprised of four questions regarding membership or attendance in church, clubs, cultural activities, and other community activities. Social cohesion was measured by asking GBM the degree to which they felt they could count on other GBM for resources, trust, social integration, and disagreements. Our study differs from previous approaches because it incorporates measures of egocentric network properties and social cohesion to measure social capital among CF of GBM.

This scale is a unique contribution to the social capital literature because we intertwine social cohesion within the context of constructed family networks of GBM and additionally may be relevant in other populations to examine both social and sexual network connections. The CF social capital scale may also be useful for regression analyses to demonstrate how different levels of social capital conferred by membership in certain networks influence health outcomes. Young GBM of color are frequently discussed in the public health literature as being “at risk” or “vulnerable” to poor health outcomes due to the resource-poor social contexts of their lives. The creation of this scale allows for the empirical documentation of endogenous forms of support fostered by young GBM in constructed families. For example, social cohesion could result in community empowerment among GBM which may improve HIV prevention and care for GBM. Future studies should investigate this scale in relation to HIV risk and prevention behaviors among GBM and other populations including transgender women.

Social capital measures may be used to study health outcomes and inform services and programs that seek to harness existing networks or policies designed to foster strength and resilience within marginalized LGBT populations. Such approaches are important to future research and interventions in both pragmatic and ethical terms. Interventions may be most effective and efficient when building on existing social connections, and this scale could be used to identify within- and across-group variations in social capital. Thus, this scale may aid in the development of strategies which access inherent opportunities to mobilize the LGBT community to promote healthy behaviors. Relatedly, the use of *intraventions*, (i.e. interventions formed by and within specific populations), have been described as critical opportunities for HIV prevention for GBM within the house and ball community[53]. Similar approaches may be useful for the wider inclusion of other forms of constructed families which are meaningful support systems in the lives of gay and bisexual men and transgender women.

Limitations of this study should be noted. First, the sample size for this study was constrained by membership in constructed families. Because GBM belong to a number of social or sexual networks, a larger contribution to the field will be to modify this scale for use within other social and sexual networks to assess whether the instrument exhibited the same factor structure. The results of this study are drawn from cross-sectional data from a single demographic surveillance site at one point in time and therefore do not include test-retest reliability. This scale has not been independently validated by a group of GBM who did not participate in the research. Therefore, this scale may be reliable but not valid. While this study analyzed network-level social capital among individuals, the use of individual-level questions asked about a network or group level property may be an additional limitation. Furthermore, these items have not been correlated with other social capital measures. Nevertheless, this newly developed

social capital scale increases the public health understanding of resources provided to GBM through membership in constructed families.

This study also contributes to literature surrounding the formation of families beyond traditional biological and legal ties, and broadens definitions of family among GBM, particularly GBM of color. We provide a new conceptualization of social capital derived from chosen kinship groups to which GBM belong. As the wider examination within social science literature surrounding social capital has illustrated, new conceptualizations of social capital should incorporate network properties. It has been argued that it is easier to measure the byproducts, outcomes, causes or consequences of social capital and a number of researchers have lost sight of what is being measured[54]. This social capital scale was shown to be a reliable measure of six dimensions of constructed family networks. This tool may be useful for conceptualizing social capital provided from families or other social organizations, or for use within interventions harnessing networks of GBM to encourage testing, treating, linking and retaining network members in HIV care.

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