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Title:
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Date:
2026-03-01

Citation:
Hill, A. O., Ruppanner, L., Armstrong, G., Lafferty, L., Bavinton, B., Gilmour, S., Bourne, A., Amos, N. & Kaneko, N. (2026). Social Correlates of Social Capital Access Among Gay and Bisexual Men in Japan. Japanese Journal of Sociology, 35 (1), https://doi.org/10.1111/ijjs.12183.

Persistent Link:
https://hdl.handle.net/11343/362758

Japanese Journal of Sociology

The Japan Sociological Society

ARTICLE OPEN ACCESS

Social Correlates of Social Capital Access Among Gay and Bisexual Men in Japan

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Received: 13 April 2025 | **Revised:** 14 April 2025 | **Accepted:** 16 April 2025

ABSTRACT

Significant health disparities exist between gay and bisexual men (GBM) and the general population in Japan and internationally. Social capital is recognized as a key factor for positive health and well-being outcomes, including HIV prevention behaviors, among GBM. However, limited research examines how the sexual orientation of alters (i.e., possessors of resources within social capital networks) impacts access to these resources. In this study, a cross-sectional online survey of 1564 gay and bisexual men in Tokyo was conducted to investigate how social capital access varies by GBM and heterosexual alters, independent of socioeconomic factors. Multivariable logistic regression indicated that access to heterosexual social capital was positively correlated with younger age, higher education, full-time employment, good self-rated health, and bisexual behavior. In contrast, gay social capital access was positively associated with being out to close friends, identifying as gay, and attending gay venues, and negatively associated with student status, living outside central Tokyo, bisexual behavior, and using gay mobile apps predominantly for sex. These findings highlight differences in the distribution and determinants of gay versus heterosexual social capital among GBM in Greater Tokyo. To close health disparities for Tokyo GBM, policy interventions should consider groups deprived of gay social capital, such as those who avoid gay venues, live outside central Tokyo, or engage in bisexual behaviors, as these individuals may benefit most from targeted support.

1 | Introduction

Globally, men who have sex with men (MSM) experience significant disparities in health and well-being compared to the general population. They have higher rates of mental illness, suicidal ideation, and attempts (Luo et al. 2017; Silenzio et al. 2007). Additionally, MSM are at an increased risk for acquiring HIV and other sexually transmitted infections (STIs) (Beyrer et al. 2012), and they engage more frequently in potentially health-adverse behaviors such as recreational drug use (Bourne 2012; Bourne and Weatherburn 2017) and elevated alcohol consumption (Roxburgh et al. 2016; Boyle et al. 2017; Keogh et al. 2009).

In Japan, MSM are disproportionately affected by a concentrated HIV epidemic. Although MSM comprise an estimated 2.6%–4.1% of the male population (Ezoe et al. 2012), they accounted for 78% of reported male HIV cases in 2019 (National Institute of Infectious Diseases 2020). Furthermore, Japanese MSM face discrimination in political contexts (Osaki 2018), from the media (Kazama and Kawaguchi 2010), and through verbal harassment in both public and private settings due to homophobic bias (Hidaka et al. 2005), which contributes to high levels of suicidal ideation (Hidaka and Operario 2006; Balakrishnan et al. 2022). In contrast, support through gay and heterosexual social networks may reduce some of the negative physical and

[Correction added on 15 May 2025, after first online publication: The affiliations of Noriyo Kaneko and Natalie Amos have been amended.]

mental health impacts from experiences of stigma and discrimination (Kelly et al. 2012; Axelsson et al. 2013). The broad characteristics of these social support systems and their interaction with individual behaviors are frequently encapsulated by the concept of social capital (Van Der Gaag and Webber 2008).

Social capital is linked to better mental and physical well-being and health outcomes (Kawachi et al. 2008). In the general population globally, high levels of social capital correlate with healthier living, increased use of preventive health services, and better self-rated health, emphasizing the significance of social networks and community engagement (Kawachi et al. 2008; Kawachi et al. 1999). This trend is also observed in Japan, where higher social capital is associated with better physical and mental health and lower suicidal ideation among the general population (Hamano et al. 2010; Fujisawa et al. 2009; Noguchi et al. 2017; Kuurdor et al. 2022).

For MSM, social capital provides emotional support, reduces isolation, and improves access to health information and services, mitigating the adverse effects of stigma and discrimination (Kelly et al. 2012; Axelsson et al. 2013; Lafferty, Treloar, Chambers, et al. 2016). Moreover, social capital has been found to enhance resilience and coping mechanisms among MSM. Strong social support networks offer crucial emotional support and practical assistance during times of stress (Fingerhut 2018) among gay men, and were observed to help MSM navigate challenges related to discrimination and minority stress by fostering a sense of belonging and mutual support (Kelly et al. 2012). Higher levels of social capital and cohesion are also linked to lower levels of suicidal ideation (Stahlman et al. 2016), as supportive environments buffer the negative impacts of stigma and promote well-being. Social capital has additionally been observed to facilitate better access to health services and resources, ensuring timely and appropriate care for MSM (Tsai 2019); an essential component in mitigating health disparities.

However, there is extensive variation in definitions of social capital (Van der Gaag and Snijders 2004). In this study, social capital refers to resources potentially accessed by individuals through their social networks (Van Der Gaag and Webber 2008; Van der Gaag and Snijders 2004) and consists of an ego (the individual accessing resources through their social networks), alters (possessors of the actual resources provided to the ego), and the resources themselves (ranging from emotional support to material support, such as a small cash loan). As opposed to community definitions of social capital, which regard social capital as equally distributed, an individual social capital definition considers the distribution of social capital in society as unequal (Bourdieu 1985), enabling the identification of correlates of individual social capital resource access. Previous research among the general population in Japan observed differing associations between mental health and social capital depending on who is the alter (the possessor of the actual resources provided to the ego) (Urakawa and Page 2014; Bae 2015). For example, only social capital provided through spouses, as opposed to other family members, was found to have a significant impact on men's mental health (Bae 2015). Separate analyses utilizing this data set using MSM and heterosexual social capital as predictor variables revealed significant differences among MSM in Japan. Specifically, 31% of MSM reported suicidal ideation in the past 2 weeks, but only those with high or medium access to gay social capital networks showed reduced ideation, with no significant effect associated with heterosexual social capital (Hill et al. 2020). Similarly, MSM with high gay social capital had over twice the rate of lifetime HIV testing, while heterosexual social capital had no significant association. Additionally, better self-rated health was associated with both social capital types, with heterosexual social capital being a stronger predictor (Hill et al. 2024). These findings demonstrate the need to distinguish between MSM and heterosexual social capital and understand how correlates of access to gay social capital resources in particular differ from heterosexual social capital resources.

Despite these important differences, there is a paucity of studies examining its distribution (Van Der Gaag and Webber 2008). MSM have unique lived experiences, face social discrimination, a population-specific HIV epidemic, and a variety of other factors that may lead to gay social capital network access distribution being unique compared to that of heterosexual networks. Despite the burden of this epidemic and health disparities disproportionately held by MSM, there is limited research addressing health gaps within the Japanese MSM population itself, and the majority of prior studies fail to describe which individual MSM have access to these health-beneficial resources and through which social capital networks (i.e., gay social networks or heterosexual social networks). This study addressed this research gap by identifying social capital access inequality and exploring how social capital is accessed differently through gay and heterosexual social capital networks among MSM in Japan. Examining how social capital is distributed among MSM is important for understanding a variety of health disparities (Van Der Gaag and Webber 2008; Kawachi et al. 2008; Hill et al. 2021, 2024) and may help provide effective interventions addressing health and well-being inequalities among this population. Findings from this research will identify how correlates of social capital networks vary according to alter sexual orientation and could help shape the development of social capital-driven health interventions to mitigate health disparities faced by MSM in Japan.

1.1 | Theoretical Framework

Social capital, a foundational concept in sociology, refers to the resources that individuals can access through their social networks (Bourdieu 1985; Coleman 1988). These resources include tangible support (e.g., financial assistance, access to services) and intangible support (e.g., emotional support, information sharing), which contribute to improved health, well-being, and social cohesion (Kawachi et al. 2008). In recent years, the study of social capital has gained prominence in understanding health disparities among marginalized populations, including MSM. However, relatively few studies have examined how the characteristics of alters (i.e., the possessors of resources within social capital networks) shape access to these resources among MSM. This study aims to address this gap by exploring how the sexual orientation of alters

influences access to social capital resources among MSM in Greater Tokyo, Japan.

1.2 | Homophily in Social Networks

One key concept in social network theory that is relevant to this study is homophily. Homophily refers to the tendency of individuals to form connections with others who are similar to themselves in terms of characteristics such as age, gender, socioeconomic status, and sexual orientation (McPherson et al. 2001). This concept suggests that people are more likely to build strong and trusting relationships with others who share similar traits and experiences. In the context of MSM, homophily plays a critical role in the formation of social networks, as individuals may be more likely to connect with others who share similar sexual identities and experiences of minority stress, discrimination, and stigma.

1.3 | Structural Holes and Network Diversity

Another important concept in the study of social capital is the notion of structural holes (Burt 1992). Structural holes refer to gaps in social networks where there are few or no connections between different groups of people. Individuals who bridge structural holes by connecting disparate groups can access a greater diversity of resources and information, as they serve as intermediaries between otherwise disconnected networks. This concept is particularly relevant for MSM who navigate both gay and heterosexual social networks.

In this study, we examine how MSM access resources embedded in gay and heterosexual social capital networks. MSM who maintain connections in both types of networks may bridge structural holes, enabling them to access a broader range of resources and support. For example, while gay social capital networks may provide emotional support and community belonging, heterosexual social capital networks may offer resources related to employment, housing, and other forms of institutional support. Understanding how MSM navigate these different networks and bridge structural holes can help illuminate the unique advantages and challenges faced by this population.

1.4 | The Importance of Alter Characteristics in Social Capital Access

In addition to homophily and structural holes, this study emphasizes the importance of alter characteristics in shaping access to social capital resources. Previous research has shown that social capital is not evenly distributed within society and that individuals' access to resources depends on the characteristics of the alters who possess these resources (Van der Gaag and Snijders 2004). In the context of MSM, the sexual orientation of alters is a particularly salient characteristic, as it influences the types of support and resources that are available.

For example, research has demonstrated that gay social capital networks are associated with higher rates of HIV testing and reduced suicidal ideation among MSM, while heterosexual social capital networks may be linked to safer sexual practices and better physical health (Hill et al. 2020, 2021, 2024). These differences suggest that the sexual orientation of alters plays a crucial role in determining the nature and effectiveness of social capital resources. By examining how gay and heterosexual social capital are accessed and utilized by MSM, this study contributes to a deeper understanding of how alter characteristics shape social capital distribution and its subsequent impact on health and well-being.

1.5 | Contribution to the Sociological Debate on Social Capital

This study makes a significant contribution to the sociological debate on social capital by highlighting the importance of alter characteristics, particularly sexual orientation, in shaping access to resources within social networks. While much of the existing literature on social capital focuses on the general population, this study extends the analysis to a marginalized group with unique social network dynamics. By examining the distribution and determinants of gay and heterosexual social capital among MSM in Greater Tokyo, this study provides new insights into the interplay between social network structure, alter characteristics, and access to resources.

Furthermore, this study advances sociological theories of social capital by demonstrating the importance of homophily and structural holes in shaping resource access among MSM. By grounding the analysis in these established theoretical frameworks, we move beyond a purely empirical examination of social capital and offer a theoretically informed understanding of how social capital operates within marginalized communities. This approach not only enhances the theoretical significance of the study but also provides a foundation for developing targeted interventions aimed at reducing health disparities and promoting well-being among MSM.

2 | Methods

Data for this study were derived from an anonymous, cross-sectional online survey of MSM in the Tokyo Metropolitan area. Ethical clearance was granted by the Ethics Review Board at the University of Melbourne, the host institution of the lead author at the time of data collection.

Eligible participants were individuals at least 18 years of age who self-identified as MSM (defined as either homosexual, gay, bisexual, or those with sexual experiences with other men) and who had given consent to partake in this study. The survey questionnaire was translated from English into Japanese by a native speaker and then back-translated into English by a different translator to ensure accuracy. Informed consent was obtained from all respondents, and MSM helplines and information services were available to all participants who accessed the survey link. Participants were offered the chance to enter a lottery for prizes of up to 10 000 yen (65 USD) in gift cards. A total of 1657 participants completed the survey. Duplicate IP addresses and email addresses were cross-checked and removed to prevent

multiple completions by the same participants. Additionally, checks were performed to eliminate incomplete responses, resulting in a final sample of 1564 participants for analysis, all of whom answered the survey and questions related to social capital.

It is important to note that the term men who have sex with men (MSM) is a behavioral category used in public health to encompass individuals who engage in sexual activity with other men, regardless of self-identified sexual orientation (e.g., gay, bisexual, or heterosexual) (Scheadler et al. 2024). In this study, eligibility was based on participants identifying as homosexual, gay, bisexual, or having had sexual experiences with other men, capturing diverse experiences within MSM networks. This distinction is crucial as many MSM may self-identify as heterosexual; a scoping review found that between on average, 1%–5% of MSM identified as heterosexual globally, but in certain settings, more than 25% identified as such despite same-sex behavior (Scheadler et al. 2024). Similarly, in Japan, cultural factors may lead MSM to avoid LGBTQ+ labels, necessitating a behavioral definition for inclusivity (DiStefano 2016). While MSM is not an identity category, it remains a valuable framework for examining shared health and social capital issues.

Participant recruitment strategies are detailed in previous publications from this dataset (Hill et al. 2018; Hill et al. 2019). Initially, recruitment was carried out through the geo-location services of gay-oriented mobile applications, drawing on recruitment techniques similar to those previously applied to Grindr users in the United States (Landovitz et al. 2013; Rice et al. 2012) recruiting a total of 215 participants. In January 2017, a splash screen advertisement was utilized on a geosocial networking application that redirected users to the survey for 1 week, recruiting an additional 1442 participants. This technique had been effectively implemented in prior US-based research (Rendina et al. 2014). In total, 1564 participants completed all necessary social capital inquiries and were considered for inclusion in the analysis.

Questions regarding socio-demographic aspects were derived and adapted from earlier studies within Japan (Urakawa and Page 2014) and covered a range of topics including age, gender identity, sexual orientation, marital status, place of birth, place of residence, self-rated health, educational background, employment status, and sex partner gender.

Engagement within the gay community was measured by ever having attended a gay bar/event, ever having attended a *hattenba* (gay bathhouse), participation in gay group activities over the previous half-year, and self-identification with the gay community. Responses to these questions were recorded as either 'yes' or 'no'.

Social capital was measured using the Resource Generator, a culturally adaptable and validated tool (Van Der Gaag and Snijders 2005) designed to assess individual social capital. This concept refers to the valuable resources that individuals can access through their social networks (Webber and Huxley 2007). The questions are designed to capture a range of resource types, from emotional support to practical assistance, through both gay and heterosexual social networks. The instrument consisted of 18 questions tailored to the Japanese context, assessing participants' access to specific resources within their networks (Van Der Gaag and Webber 2008; Van der Gaag and Snijders 2004). Example questions included, "Do you have access to an someone who can do the shopping for you if you were ill and unable to?" or "Do you have access to someone whom you trust very much?" Participants were given the option to categorize their responses as coming from MSM, heterosexual individuals, both MSM and heterosexual, or neither. The Resource Generator produced two separate scores: gay social capital and heterosexual social capital. For gay social capital, participants received one point for responses indicating either 'MSM' or 'both' (i.e., the resource was available through both MSM and heterosexual networks). For heterosexual social capital, participants received one point for responses indicating either 'heterosexual' or 'both' (i.e., the resource was available through both heterosexual and MSM networks). This distinction allowed us to capture the unique social capital resources derived from the respective social networks. The scores for each category ranged from 0 to 18 points, with higher scores indicating greater access to resources through the respective social capital network. For example, if a participant reported having access to someone they trust very much through both an MSM and a heterosexual network, they would receive one point for MSM social capital and one point for heterosexual social capital. This approach allowed us to account for overlapping sources of support while ensuring that each resource accessed was counted once for the relevant network type. By separating MSM and heterosexual social capital scores, the analysis was able to capture distinct dimensions of participants' social networks and the resources they provided. The reliability of the instrument was supported by high internal consistency for both MSM (Cronbach's alpha = 0.91) and heterosexual social capital (Cronbach's alpha = 0.91). Our use of the Resource Generator enables us to comprehensively assess the distribution of social capital across different network types, providing a nuanced understanding of social capital networks among MSM in Greater Tokyo.

2.1 | Study Setting

This study was conducted in the Greater Tokyo area, Japan's most populous urban center, due to research feasibility and its unique significance for understanding social capital among MSM. Tokyo is home to Japan's largest and most visible gay and bisexual communities, including well-known neighborhoods like Shinjuku Ni-chome, which serves as a major social and cultural hub for MSM in Japan (McLelland 2000). The Greater Tokyo area offers the highest concentration of LGBTQ+ resources, including bars, clubs, community organizations, health services, and social events that cater specifically to MSM in Japan (Hill 2015). These resources provide greater opportunities to build social capital and access support networks compared to other regions, where LGBTQ+ communities may be less organized or visible.

The decision to focus on the Greater Tokyo area was also influenced by the study's funding and scope limitations, as a more extensive nationwide study was not feasible. Nevertheless, insights gained from this urban context with high levels of gay

community visibility and resources can inform future research and interventions targeting MSM in other regions of Japan, particularly those with fewer resources for sexual minorities.

2.2 | Data Collection and Use of Gay Mobile Apps

In this study, data were collected via gay mobile applications, offering several advantages for understanding social capital among MSM. While this method may not be fully representative of all MSM in Japan, it effectively captures diverse social capital dynamics, including those not connected to traditional LGBTQ+ venues like bars or community organizations. Research has shown that gay mobile apps are increasingly used by MSM to find social connections, friendships, romantic partners, and sexual partners (Rice et al. 2012; Rendina et al. 2014; Holloway et al. 2014). Therefore, recruiting participants through these apps enables the study to reflect a broad range of experiences and forms of social capital.

By using gay mobile apps, this study captures a crucial aspect of modern social capital formation among MSM. Unlike traditional networks relying on in-person interactions, apps facilitate connections across geographic boundaries, allowing MSM to form ties based on shared interests and experiences rather than proximity (Phillips et al. 2014; Jayawardena et al. 2021). This aligns with the concept of structural holes, where bridging diverse networks provides access to a wider variety of resources (Burt 1992). Furthermore, focusing on app usage offers unique insights into how motivations—such as using apps for friendships, relationships, or sexual encounters—impact social capital.

Additionally, using gay mobile apps addresses key challenges in researching marginalized populations by offering anonymity, encouraging participation, and reducing social desirability bias (Kelly et al. 2013). This is particularly relevant in Japan, where cultural factors and concerns about discrimination may deter MSM from participating in traditional research methods (DiStefano 2016). Therefore, while this recruitment approach introduces some limitations, it provides theoretical advantages for understanding how digital platforms impact access to social capital resources in the digital age.

2.3 | Statistical Analysis

The analysis of the dataset was performed in IBM SPSS Statistics software for Macintosh, version 24, developed by IBM Corp. in Armonk, New York, USA. Multivariable linear regressions were performed to identify factors related to heterosexual and gay social capital. The selection process for inclusion in the multivariable models used the enter method, focusing on variables with p-values at or below 0.10. The examination of factors associated with heterosexual and gay social capital began with separate univariable linear regression analyses for various variables (such as socio-demographic characteristics or gay community identity). These served as the independent predictor variables, with heterosexual and gay social capital as the dependent outcomes. These analyses were then followed by multivariable linear regressions to evaluate the independent relationships between predictor and outcome variables, with adjustments made for other predictor variables. The selection of variables for inclusion in the multivariable models was guided by a p-value threshold ($p \leq 0.10$) during the univariable analysis. This approach was chosen to maintain consistency with three previous publications derived from this dataset, which examined outcomes such as self-rated health, HIV testing, condom use, and suicidal ideation using heterosexual and gay social capital networks as predictor variables (Hill et al. 2024; Hill et al. 2021; Hill et al. 2020). To ensure robustness, we conducted supplementary analyses to test the inclusion of theoretically important variables regardless of their statistical significance in the univariable analysis. However, none of these variables altered the significance of the predictors in the final multivariable models, supporting our decision to base variable selection on statistical criteria for this study. This approach provides a transparent and replicable method that balances theoretical considerations with statistical rigor, ensuring that the final models accurately capture the key predictors of social capital access among MSM in Tokyo while minimizing subjective bias. Adjusted odds ratios, their 95% confidence intervals, and p-values are provided as appropriate. Variables in the multivariable models showed no signs of multicollinearity, with all variance inflation factor (VIF) values below 2.00.

3 | Results

3.1 | Socio-Demographics

Socio-demographic characteristics are shown as follows in Table 1. The final sample consisted of 1564 MSM residing in Greater Tokyo, with the majority (53.6%) residing in central Tokyo. The median age of participants was 35 years, and two-thirds (68.2%) were employed full time. Most participants (91.2%) reported having only male sexual partners, and 8.8% had a lifetime history of both male and female sex partners. Notably, the data indicate that participants residing in central Tokyo reported higher levels of gay social capital (mean score: 11.5) than those living in Greater Tokyo (mean score: 9.5) or other prefectures (mean score: 8.8). This observation aligns with prior studies suggesting that urban centres like Tokyo often serve as hubs for MSM communities due to higher population density, greater anonymity, and the presence of LGBTQ+ venues and organizations (McLelland 2000; Hill 2015).

3.2 | Gay Community Participation and Identification

As shown in Table 2, participants reported varied reasons for using gay mobile apps, including meeting friends (75.5%), finding a serious relationship (53.6%), and seeking sexual partners (61.9%). A majority (56.7%) had attended a gay bar or event, while a smaller proportion (13.4%) participated in organized gay group activities within the past 6 months. Gay social capital was notably higher among those who had attended gay bars or events (mean score: 12.0) compared to those who had not (mean score: 8.5). Importantly, the highest gay social capital was reported by those who had participated in organized gay group activities in the past 6 months, suggesting that gay community centers and

TABLE 1 | Socio-demographic characteristics.

		n	%	Mean gay social capital	Mean heterosexual social capital
Current residence	Central Tokyo	833	53.6	11.5	9.1
	Greater Tokyo	524	33.7	9.5	8.5
	Other prefecture	196	12.6	8.8	8.4
Birthplace	Japan	1506	96.3	10.4	8.7
	Other	58	3.7	13.0	10.8
Age	18–25	302	19.4	9.6	10.0
	26–35	523	33.6	10.8	9.5
	36–40	478	30.7	10.6	8.0
	46+	254	16.3	10.7	7.6
Marital status	Single	1499	95.9	10.6	8.8
	Married	64	4.1	8.4	9.0
Employment	Full-time work	1065	68.2	10.7	8.8
	Part-time work	180	11.5	9.4	7.2
	Student	155	9.9	9.4	11.1
	Self-employed	95	6.1	12.1	9.8
	Unemployed	67	4.3	10.5	6.6
Education	High School or less	394	25.2	9.8	7.9
	2-year university	263	16.8	10.0	8.0
	University	756	48.3	10.9	9.3
	Graduate degree	151	9.7	10.8	10.3
Sex partner gender	Men	1408	91.2	10.7	8.6
	Men and women	136	8.8	8.5	11.1
Health	Healthy	990	63.4	10.9	9.6
	Fair or poor health	572	36.6	9.7	7.4

the services they provide work as important hubs for social networking among Japanese MSM.

3.3 | Social Capital

Table 3 shows that participants reported higher access to resources through gay social capital networks (mean score: 10.5) compared to heterosexual social capital networks (mean score: 8.8). The overall pattern suggests that MSM derive more varied resources from gay social capital networks, which may offer unique forms of support not readily available through heterosexual networks.

3.4 | Correlates of Heterosexual Social Capital

Multivariable regression analysis in Table 4 revealed that higher levels of heterosexual social capital were associated with younger age ($\beta = -0.33$, $p = 0.020$ for 36–45 years; $\beta = -0.37$, $p = 0.002$ for 46+ years), educational attainment ($\beta = 0.77$, $p = 0.014$ for university graduates; $\beta = 1.40$, $p = 0.003$ for graduate degrees), full-time employment ($\beta = -1.06$, $p = 0.009$ for part-time workers), good self-rated health ($\beta = 0.70$, $p = 0.010$), bisexual behavior ($\beta = 2.54$, $p < 0.001$), and being out to close friends ($\beta = 1.41$, $p < 0.001$). These results indicate that heterosexual social capital access is linked to traditional socioeconomic factors such as education and employment. This finding supports the homophily theory, which posits that social networks often form among individuals with similar socio-demographic traits (6,7).

3.5 | Multivariable Regression Results: Correlates of Gay Social Capital

In contrast, in Table 5, gay social capital was positively associated with being out to close friends ($\beta = 1.73$, $p < 0.001$), identifying as a member of the gay community ($\beta = 0.70$, $p = 0.028$), and attending gay bars or events ($\beta = 2.17$, $p < 0.001$). Gay social capital was negatively associated with student status ($\beta = -1.06$, $p = 0.026$), living outside of central Tokyo ($\beta = -0.99$, $p < 0.001$ for Greater Tokyo; $\beta = -1.53$, $p < 0.001$ for other prefectures),

TABLE 2 | Gay community participation and identification ($n = 1564$).

		n	%	Mean gay social capital	Mean heterosexual social capital
Use gay mobile apps to find sex	Neutral/disagree	594	38.1	10.8	8.9
	Agree	964	61.9	10.3	8.8
Use gay mobile apps to find friends	Neutral/disagree	379	24.5	10.3	8.8
	Agree	1171	75.5	10.6	8.8
Use gay mobile apps to avoid being identified as gay	Neutral/disagree	1421	92.0	10.6	8.8
	Agree	123	8.0	9.2	9.2
Use gay mobile apps to find a serious relationship	Neutral/disagree	719	46.4	10.8	8.5
	Agree	829	53.6	10.3	9.1
Ever attended gay bar or event	No	674	43.3	8.5	8.5
	Yes	884	56.7	12.0	9.1
Ever attended gay bathhouse	No	810	52.0	10.2	9.2
	Yes	748	48.0	10.8	8.4
Participated in gay group activity in past 6 months	No	1351	86.6	10.2	8.7
	Yes	209	13.4	12.5	9.9
Identify as a member of the gay community	Neutral/disagree	270	17.4	9.2	8.0
	Agree	1286	82.6	10.8	9.0
Out to close friends	No	653	39.5	8.7	7.4
	Yes	911	60.5	11.7	9.8

TABLE 3 | Social capital characteristics ($n = 1564$).

	N	Mean
Gay social capital	1564	10.5
Total Combined gay and heterosexual social capital	1564	12.6
Heterosexual social capital	1564	8.8

bisexual behavior ($\beta = -1.62$, $p < 0.001$), using gay mobile apps for sex ($\beta = -0.68$, $p = 0.005$), and using gay mobile apps for a serious relationship ($\beta = -0.87$, $p < 0.001$). These findings align with previous studies highlighting the importance of community involvement and openness about sexual identity in developing gay social capital networks (3,8).

4 | Discussion

This separation of alter sexual identity (possessors of actual resources embedded in social capital networks) reveals different correlates for access to resources embedded in gay and heterosexual social capital among MSM in Greater Tokyo. Heterosexual social capital access was positively associated with youth, educational attainment, full-time employment, health, being out to close friends, and having sex with both men and women. Gay social capital access was positively associated with being out to close friends, identifying as a member of the gay community, and ever attending a gay bar or event. Gay social capital access was negatively associated with being a student, living outside of central Tokyo, bisexual behavior, and using gay mobile apps for sex or for a serious relationship. These findings delineate a complex landscape where gay social capital is simultaneously diminished by certain educational and behavioral factors and augmented by social openness and gay community involvement.

Separate analyses from this data set, utilizing gay and heterosexual social capital as independent predictor variables, observed that in Japan, gay social capital networks provide critical resources for mental health and HIV testing (Hill et al. 2020, 2021). In comparison, heterosexual social capital networks contribute more to physical health and safer condom use practices (Hill et al. 2021, 2024). This study found that access to gay social capital networks is not associated with socio-demographic or socioeconomic variables but is instead linked to gay community participation and identification. This suggests that gay social capital networks provide critical resources to socioeconomically disadvantaged MSM, such as students and those not engaged in full-time employment, resources that may not be accessible through heterosexual social capital networks. These findings align with the two main theoretical mechanisms proposed to contribute to social capital access inequality: homophily and network diversity (van Tubergen and Volker 2014; McPherson et al. 2001), and the informal nature of gay social capital networks. However, it is important to note the bidirectional relationship between social capital and health that has been suggested

TABLE 4 | Multivariable linear regression for heterosexual social capital ($n = 1564$).

	Number of respondents (*n*)	Mean heterosexual social capital	Univariable coefficient (95% CI)	*p*	Multivariable coefficient (95% CI)	*p*
Age (years)						
18–25	302	10.0	REF			
26–35	523	9.5	−0.26 (−0.63 to 0.11)	0.173	−0.03 (−0.42 to 0.36)	0.871
36–45	478	8.0	−0.66 (−0.90 to −0.40)	0.000	−0.33 (−0.60 to −0.05)	0.020
46+	254	7.6	−0.59 (−0.81 to −0.37)	0.000	−0.37 (−0.61 to −0.14)	0.002
Place of Birth						
Japan	1506	8.7	REF			
Other	58	10.8	2.01 (0.60–3.14)	0.005	−0.34 (−1.63 to 0.95)	0.605
Education						
High School or less	394	7.9	REF			
2-year university	263	8.0	0.036 (−1.70 to 0.24)	0.731	0.02 (−0.16 to 0.21)	0.796
University	756	9.3	1.39 (0.74–2.03)	0.000	0.77 (0.15–1.38)	0.014
Graduate degree	151	10.3	2.41 (1.42–3.40)	0.000	1.40 (0.48–2.33)	0.003
Employment						
Full-time work	1065	8.8	REF			
Part-time work	180	7.2	−1.66 (−2.48 to −0.83)	0.000	−1.06 (−1.85 to −0.27)	0.009
Student	155	11.1	2.22 (1.33–3.10)	0.000	1.66 (0.70–2.62)	0.001
Self-employed	95	9.8	0.99 (−0.11 to 2.09)	0.076	0.92 (−0.08 to 1.92)	0.070
Unemployed	67	6.6	−2.26 (−3.55 to −0.97)	0.001	−1.15 (−2.35 to 0.06)	0.063
Current marital status						
Single	1499	8.8	REF			
Married	64	9.0	1.49 (0.83–2.16)	0.000	1.16 (−0.13 to 2.44)	0.078
Current residence						
Central Tokyo	833	9.1	REF			
Greater Tokyo	524	8.5	−0.55 (−1.13 to 0.33)	0.065	0.04 (−0.49 to 0.56)	0.893
Other prefecture	196	8.4	−0.68 (−1.51 to 0.15)	0.107	0.18 (−0.58 to 0.93)	0.644
Intercourse partner sex						
Only men	1408	8.6	REF			

(Continues)

TABLE 4 | (Continued)

	Number of respondents (*n*)	Mean heterosexual social capital	Univariable coefficient (95% CI)	*p*	Multivariable coefficient (95% CI)	*p*
Both men and women	136	11.1	2.54 (1.61–3.47)	0.000	2.54 (1.66–3.42)	0.000
Health						
Fair/poor health	572	7.4	REF			
Healthy	990	9.6	2.21 (1.67–2.75)	0.000	0.70 (0.16–1.23)	0.010
Out to close friends						
No	634	7.5	REF			
Yes	911	9.8	2.38 (1.85–2.90)	0.000	1.41 (0.89–1.93)	0.000
Identify as a member of the gay community						
No	270	8.0	REF			
Yes	1286	9.0	0.99 (0.29–1.69)	0.005	0.23 (−0.42 to 0.87)	0.490
Use gay mobile apps for sex						
No	594	8.9	REF			
Yes	964	8.8	−0.80 (−0.63 to 0.47)	0.773		
Use gay mobile apps to find friends						
No	379	8.8	REF			
Yes	1171	8.8	0.05 (−0.57 to 0.67)	0.874		
Use gay mobile apps to avoid being identified as gay						
No	1421	8.8	REF			
Yes	123	9.2	0.36 (−0.62 to 1.34)	0.472		
Use gay mobile apps to find a serious relationship						
No	719	8.5	REF			
Yes	829	9.1	0.62 (0.08–1.15)	0.022	0.55 (0.05–1.04)	0.029
Ever attended gay bar or event						
No	674	8.5	REF			
Yes	884	9.1	0.63 (0.92–1.16)	0.022	−0.29 (−0.83 to 0.25)	0.288
Participation in organized gay group or volunteer activities						
No	1351	8.7	REF			
Yes	209	9.9	1.20 (0.42–1.97)	0.002	0.20 (−0.52 to 0.92)	0.592
Gay bathhouse attendance						
No	810	9.2	REF			
Yes	748	8.4	−0.84 (−1.37 to 0.32)	0.002	−0.43 (−0.94 to 0.07)	0.092

TABLE 5 | Multivariable linear regression for gay social capital.

	Number of respondents (*n*)	Mean gay social capital	Univariable coefficient (95% CI)	*p*	Multivariable coefficient (95% CI)	*p*
Age (years)						
18–25	302	9.6	REF			
26–35	523	10.8	0.56 (0.19–0.93)	0.003	0.12 (−0.26 to 0.49)	0.550
36–45	478	10.6	0.31 (0.05–0.56)	0.017	0.16 (−0.10 to 0.43)	0.229
46+	254	10.7	0.26 (0.04–0.48)	0.020	0.16 (−0.06 to 0.39)	0.162
Place of Birth						
Japan	1506	10.4	REF			
Other	58	13.0	2.58 (1.18–3.98)	0.000	1.17 (−0.07 to 2.42)	0.065
Education						
High School or less	394	9.8	REF			
2year university	263	10.0	0.056 (−0.15 to 0.26)	0.597	−0.09 (−0.27 to 0.1)	0.355
University	756	10.9	1.13 (0.49–1.781)	0.001	0.13 (−0.47 to 0.72)	0.677
Graduate degree	151	10.8	0.975 (−0.21 to 1.97)	0.055	−0.51 (−1.41 to 0.39)	0.264
Employment						
Full-time work	1065	10.7	REF			
Part-time work	180	9.4	−1.23 (−2.07 to −0.40)	0.004	−0.11 (−0.87 to 0.66)	0.782
Student	155	9.4	−1.27 (−2.16 to −0.38)	0.005	−1.06 (−1.99 to −0.12)	0.026
Self-employed	95	12.1	1.38 (0.27–2.49)	0.015	0.52 (−0.44–1.49)	0.288
Unemployed	67	10.5	−0.163 (−1.47 to 1.15)	0.807	0.67 (−0.50 to 1.83)	0.262
Current marital status						
Single	1499	10.6	REF			
Married	64	8.4	−1.06 (−1.73 to −0.39)	0.003	−1.07 (−2.31 to 0.17)	0.092
Current residence						
Central Tokyo	833	11.5	REF			
Greater Tokyo	524	9.5	−1.90 (−2.47 to −1.33)	0.000	−0.99 (−1.50 to −0.48)	0.000
Other prefecture	196	8.8	−2.61 (−3.42 to −1.80)	0.000	−1.53 (−2.26 to −0.81)	0.000
Intercourse partner sex						
Only men	1408	10.7	REF			
Both men and women	136	8.5	−2.18 (−3.11 to −1.25)	0.000	−1.62 (−2.48 to −0.76)	0.000
Health						

(Continues)

TABLE 5 | (Continued)

	Number of respondents (*n*)	Mean gay social capital	Univariable coefficient (95% CI)	*p*	Multivariable coefficient (95% CI)	*p*
Fair/poor health	572	9.7	REF			
Healthy	990	10.9	1.19 (0.65–1.74)	0.000	−0.02 (−0.54 to 0.49)	0.929
Out to close friends						
No	634	8.7	REF			
Yes	911	11.7	2.99 (2.48–3.51)	0.000	1.73 (1.24–2.23)	0.000
Identify as a member of the gay community						
No	270	9.2	REF			
Yes	1286	10.8	1.61 (0.91–2.30)	0.000	0.70 (0.07–1.32)	0.028
Use gay mobile apps for sex						
No	594	10.8	REF			
Yes	964	10.3	−0.54 (−1.08 to 0.01)	0.053	−0.68 (−1.16 to −0.20)	0.005
Use gay mobile apps to find friends						
No	379	10.3	REF			
Yes	1171	10.6	0.32 (−0.30 to 0.93)	0.311		
Use gay mobile apps to avoid being identified as gay						
No	1421	10.6	REF			
Yes	123	9.2	−1.37 (−2.34 to −0.39)	0.006	−0.11 (−0.98 to 0.75)	0.798
Use gay mobile apps to find a serious relationship						
No	719	10.8	REF			
Yes	829	10.3	−0.46 (−0.99–0.71)	0.090	−0.87 (−1.34 to −0.39)	0.000
Ever attended gay bar or event						
No	674	8.5	REF			
Yes	884	12.0	3.56 (3.06–4.06)	0.000	2.17 (1.67–2.68)	0.000
Participation in organized gay group or volunteer activities						
No	1351	10.2	REF			
Yes	209	12.5	2.30 (1.53–3.07)	0.000	0.36 (−0.34–1.05)	0.313
Gay bathhouse attendance						
No	810	10.2	REF			
Yes	748	10.8	0.59 (0.65–1.12)	0.028	0.00 (−0.48 to 0.49)	0.988

in prior studies, where people with better health are more likely to engage in social activities, thereby increasing their social capital (Kawachi et al. 2008). Conversely, individuals with higher social capital are more likely to have better access to health resources, emotional support, and positive health behaviors, contributing to improved health outcomes (Hyyppä 2010; Ransome et al. 2017; Hamano et al. 2010). While this study provides important insights into these associations, further research using longitudinal or causal inference methodologies is needed to clarify the causal pathways between social capital and health among MSM in Japan.

The differences observed between gay and heterosexual social capital networks can be explained by various factors. One notable factor is the structural differences between these networks. Heterosexual social networks often consist largely of formal networks like co-workers, university friends, and biological family, which are more homogenous and segregated by age,

education, and occupation and in which network egos and alters have similar socio-demographic traits (van Tubergen and Volker 2014; Behtoui 2007). In contrast, gay social networks may exhibit greater variation in age, educational attainment, and occupation, with less of a tendency toward homophily—where network members share similar socio-demographic traits such as age, education, and occupation (McPherson et al. 2001; Holloway 2015)—resulting in a greater diversity of these characteristics among members.

Similar to findings among other isolated populations, such as individuals incarcerated in prisons (Lafferty, Treloar, Chambers, et al. 2016; Lafferty, Treloar, Butler, et al. 2016), the restricted networking options for MSM confine the formation of their social ties predominantly to gay venues and mobile apps (Rendina et al. 2014; Holloway 2015). The prominence of these venues and apps in gay social capital formation, particularly considering the diverse career and educational backgrounds of users and attendees, diminishes the importance of workplace or educational connections. Furthermore, the differences between heterosexual and gay mobile apps may further reduce social network homophily among MSM. Popular predominantly heterosexual dating apps like Tinder emphasize education, age, and occupation, prominently displaying these details. In contrast, gay apps such as 9Monsters in Japan prioritize attributes like sexual position, versatility, and proximity (9Monsters 2018). These factors suggest that participants might access a broader variety of social ties and social capital resources through informal MSM networks formed online and at gay venues, compared to those formed through educational, occupational, and familial institutions.

The association between heterosexual social capital access and age, educational attainment, and full-time employment coheres to the theorized effects of homophily (McPherson et al. 2001; Holloway 2015), and is consistent with previous studies examining social capital access distribution among general populations. For example, gender, education, age, full-time work, and local ethnicity were associated with social capital access in the Netherlands (van Tubergen and Volker 2014), and higher education level, work experience, and active membership in volunteer organizations were associated with social capital in Sweden (Behtoui 2007).

Participants reported access to a greater variety of total resources through MSM than heterosexual social capital networks, likely as a direct result of the network diversity available in gay social capital networks. Resource homogeneity is generally higher within a group of people than two different groups, and gay social networks tie individual MSM together because of their sexual behaviors, overriding the socio-demographic homophily that forms heterosexual social networks (McPherson et al. 2001; Holloway 2015). MSM belong to gay social networks while simultaneously belonging to more homogenous heterosexual social networks. MSM are therefore able to access resources through other MSM in different heterosexual social networks through structural holes, where network ties provide access to resources unavailable in an individual's regular networks (Burt 2004). Because access to the same resource through multiple sources leads to redundancy (Burt 2004), and access to a resource through one network tie is sufficient, network diversity provides access to a greater variety of resources, possibly resulting in greater access to more diverse resources among MSM social networks (Lin 1999).

Gay social capital access was higher among participants reporting central Tokyo residence, only having male partners, and ever having attended a gay bar or event. This is likely because central Tokyo has the highest MSM population and most gay venues in Japan, and because MSM with only male partners are likely to spend more time with other MSM. Although gay social capital access was positively associated with gay bar and gay event attendance, it was not associated with *Hattenba* (gay bathhouse) attendance. Similarly, participants who attended *Hattenba* and used gay mobile apps primarily for sex reported lower MSM social capital network access compared to those who did not, indicating it is not only frequency but also the purpose of gay mobile app use and gay community participation that influences the development of social capital networks. This relationship may be explained by the purpose and nature of engagement in these environments, which often prioritize short-term, casual sexual encounters over building deeper, trust-based social connections. While gay mobile apps and *Hattenba* provide opportunities for meeting new people, the interactions facilitated through these environments are often characterized by transience and anonymity, which may limit the potential for developing social capital (Kelly et al. 2013; Takahashi and Magalong 2008). In contrast, participation in community-oriented activities, such as attending gay bars, events, or organized group activities, is more strongly associated with higher levels of gay social capital. These environments offer greater opportunities for the development of trust, emotional support, and long-term social connections that are critical components of social capital (Branton 2021).

MSM who frequently use gay mobile apps for sexual purposes or participate in *Hattenba* may have fewer opportunities to build and maintain lasting relationships within the gay community. These findings suggest that it is not only the frequency of social engagement but also the nature and purpose of these interactions that influence the development of social capital networks. By distinguishing between different types of social engagement, our study underscores the importance of fostering spaces and activities that promote supportive and enduring social connections within the MSM community in Japan.

An important consideration is the unique positioning of bisexual men within both heterosexual and gay social networks. The results indicate that bisexual men may have greater access to heterosexual social capital, though potentially at the expense of integration within gay social capital networks. This suggests a potential benefit in fostering stronger connections between bisexual men and gay communities. Doing so may (1) enhance bisexual men's access to valuable social capital resources within gay networks, which is especially important given the higher rates of suicidality and psychological distress among bisexual men compared to their gay and lesbian peers (Greaves et al. 2019; King et al. 2008; Swannell et al. 2015), and (2) create opportunities for gay men seeking to establish heterosexual connections via their bisexual peers. However, bisexual men often experience partial exclusion from both heterosexual and gay communities due to historical bi-erasure and the prevailing emphasis on mono-sexism (Angelides 2001; Balsam and Mohr 2007; Persson

and Pfaus 2015). This exclusion, coupled with some bisexual men's potential reluctance to forgo heterosexual privileges, may lead them to lean toward heterosexual networks for long-term romantic relationships while maintaining more fluid connections with gay men for sexual and short-term relationships. If bisexual men primarily view gay community connections as limited to sexual encounters or short-term relationships, achieving deeper integration and access to the full benefits of gay social capital may be challenging.

Individuals who were open about their sexual orientation to their close friends experienced greater access to resources within both MSM and heterosexual networks. This could be because MSM individuals who are open about their sexuality are more likely to be social, with lower levels of internalized-homophobia. Additionally, there are two possible reasons for this phenomenon: Firstly, if MSM feel comfortable sharing their sexual orientation with a heterosexual friend in Japan, it suggests a pre-existing strong social connection that itself represents a form of social capital. Secondly, the act of 'coming out' may foster trust and strengthen the relationship (Bowring 2017) between the gay or bisexual man and their heterosexual friend, potentially leading to the availability of new resources that were not accessible before.

Considering the associated benefits of social capital for MSM in Japan, future social health interventions targeting MSM mental health and well-being in Greater Tokyo could focus on developing gay social capital among groups reporting low MSM social capital access such as MSM who are students, living outside of central Tokyo, who have male and female partners, and who use gay mobile apps primarily for sex. Efforts to foster gay social capital among these groups should include engaging them in community activities and NGOs, particularly the establishment of gay community centers or monthly community activities in rural areas and student groups, as these platforms effectively reinforce health-promoting norms and reduce poor health outcomes (Kaneko et al. 2021). Given the limited trust in government-provided information (Hill et al. 2019) and the importance of local activism (Campbell et al. 2013), expanding funding for these initiatives is crucial. Increasing participation in these community-driven activities is essential for building robust social capital and promoting well-being among Japanese MSM. However, it is important to note that half of the MSM in this study have never participated in any gay community events, bars, or *hattenba*. It is essential that in order to benefit these non-community-attached MSM the most, It is essential to work to reduce discrimination and violence, and increase acceptance of sexual minorities on a national level. This could include positive inclusivity messaging campaigns, increasing positive representations of gay and bisexual men in media, and implementation of stronger legal framework protections for sexual and gender minorities.

This study was subject to a variety of limitations. The results presented were collected from gay mobile apps and may not be representative of all MSM in Japan. However, the participant size was comparatively large and contained a large proportion of non-gay-venue attending MSM who may have been underrepresented using other methodologies. Responses were self-rated and may have been influenced by social desirability bias, resulting in participants downplaying behaviors they think are undesirable (C. Kelly et al. 2013), though being an online anonymous survey this effect was minimized. The resource generator is a validated and comparable tool that has been utilized previously in Japan (Urakawa and Page 2014; Rolander 2014). However, there is no universal agreement on the correct methodology for measuring social capital (Narayan and Cassidy 2001; Shortt 2004), which creates challenges for directly comparing it with other research. Additional studies on this topic would be valuable. International researchers could examine if these patterns of association are found in other MSM populations in both South-East Asia and Western countries.

5 | Conclusion

This study revealed important differences in prevalence and correlates of access to resources embedded in gay and heterosexual social capital among MSM in Greater Tokyo. Gay social capital access was associated with gay community participation and identification, disclosure of sexuality to close friends, only having male partners, using gay mobile apps for a purpose other than finding sex, and residing in central Tokyo. Heterosexual social capital access was associated with educational attainment, occupation, bisexual behavior, being healthy, and being out to close friends. These findings indicate that MSM social capital provides important resource access to socioeconomically and health-deprived MSM who would otherwise have difficulty accessing these resources through heterosexual social capital networks. Importantly, more resources were available to participants through gay social capital networks than heterosexual social capital networks. In order to close the health disparity between MSM and the general population and within the MSM population itself, policy interventions should focus more specifically on developing MSM social networks through lesbian, gay, bisexual, and transgender-focused (LGBT) community centers while simultaneously working to reduce discrimination and increase acceptance of sexual minorities.

Acknowledgements

Open access publishing facilitated by La Trobe University, as part of the Wiley - La Trobe University agreement via the Council of Australian University Librarians.

Data Availability Statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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