

سنجش اجتماع‌پذیری محیط شهری از طریق تطبیق نقشه‌های شناختی و نقشه‌های پیکره‌بندی فضایی

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چکیده

حضور و تعاملات اجتماعی مردم در فضاهای عمومی معماری و شهری، اجتماع‌پذیری فضاها را رقم می‌زند. در پژوهش حاضر، سنجش اجتماع‌پذیری فضاهای عمومی شهری موضوع بحث است. کیفیت اجتماع‌پذیری، خصلت جدایی‌ناپذیر فضاهای عمومی شهری است؛ اما در برخی از فضاهای عمومی شهری کمرنگ شده یا از بین رفته است. مقاله حاضر در راستای پاسخ به این پرسش که: سنجش اجتماع‌پذیری محیط با تمرکز بر دو رویکرد انسانی و محیطی چگونه و با چه اجزایی صورت می‌گیرد، شکل گرفت. بدین منظور، محله عودلاجان تهران به عنوان مورد مطالعاتی انتخاب و مورد بررسی قرار گرفت. بسترهای احتمالی شکل‌گیری تعاملات اجتماعی در این محله (از دو جنبه محیط‌محور و انسان‌محور) مورد ارزیابی واقع شد. در این پژوهش، ادبیات، مبانی نظری، شاخص‌های مورد بررسی و روش تحقیق مناسب با استناد به منابع دست اول جمع‌آوری و دسته‌بندی شدند. روش تحقیق مقاله حاضر، دو بخش شناختی و فضایی را شامل می‌شود. در بخش شناختی، با استفاده از اسناد و نقشه‌های موجود، نقشه محله تهیه شد که پس از بازدیدهای میدانی و مصاحبه با ساکنان محلی و غیرمحلی، یافته‌های شناختی گردآوری و به تولید نقشه‌های شناختی منجر شد. پیکره‌بندی فضایی محله نیز از طریق پارامترهای کمی روش چیدمان فضا مورد ارزیابی قرار گرفت. در نهایت از مقایسه داده‌های کمی و کیفی حاصله، به تحلیل اجتماع‌پذیری در محله عودلاجان اقدام شد. یافته‌های پژوهش حاکی از آن بود که اصل قرار دادن مدلسازی رایانه‌ای نحو فضا در سنجش مفاهیم اجتماعی، مفید بوده اما کافی نیست و به‌منظور اقدامات کالبدی در جهت بهبود وضعیت اجتماعی بافت‌های شهری، نیاز است که از روش‌های مکملی همچون نقشه‌های شناختی نیز بهره گرفته شود.

واژگان کلیدی: اجتماع‌پذیری، شناخت فضایی، نقشه شناختی، پیکره‌بندی فضایی.

۱. مقدمه

در محیط‌های اجتماع‌پذیر، فضای کالبدی براساس مشخصه‌های فضایی خود موجب تشکیل کانون‌های فعالیت و اشتیاق به فعالیت در قسمت‌هایی خاص از فضا می‌شود (Daneshgarmoghaddam, Bahrainy, & Einifar, 2011). فضاهای اجتماع‌پذیر، محل شکل‌گیری کنش‌ها و تعاملات اجتماعی در بین افراد هستند (Shojaee & Partovi, 2015) و با زندگی اجتماعی افراد ارتباط تنگاتنگی دارند (Mohammadi & Ayatollahi, 2015). به طوری که زمینه‌سازی بستر کالبدی- فضایی مطلوب، برای حضور و برقراری تعاملات اجتماعی، از اهداف شکل‌گیری فضاهای معماری و شهری اجتماع‌پذیر می‌باشد. حضور و ارتقای تعاملات اجتماعی شهروندان در محیط‌های شهری، ضمن برآوردن نیازهای اجتماعی آن‌ها، حس تعلق و روحیه تعاون آن‌ها را افزایش می‌دهد و موجبات پویایی و سرزندگی محیط را فراهم می‌آورد (Ghalambor Dezfuly & Naghizadeh, 2014; Karami & Mohamadhoseini, 2018; Daneshpour & Charkhchyan, 2007). اما در فضای عمومی محله‌ها کمتر به این موضوع پرداخته شده است. فضاهای عمومی می‌توانند با تقویت تعاملات اجتماعی شهروندان، زندگی اجتماعی را رونق بخشند (Montgomery, 2013) و در پایداری اجتماعی دخیل باشند (Harun, Zakariya, Mansor, & Zakariya, 2014). با در نظر گرفتن این مسئله، مقاله پیش رو با هدف سنجش اجتماع‌پذیری محیط از طریق مقایسه نقشه‌های شناختی و نقشه‌های پیکره‌بندی فضایی صورت گرفت. در جهت دستیابی به هدف نامبرده، محله عودلاجان از بافت قدیم تهران مورد کنکاش واقع شد. در پژوهش‌های صورت گرفته در این حوزه، تأثیر پیکره‌بندی فضایی محیط مصنوع بر رفتار انسان دیده شده است؛ اما شناخت فضایی که محصول رابطه متقابل انسان و محیط می‌باشد کمتر مورد توجه بوده است. پیکره‌بندی فضایی به روابط بین اجزای محیط (Hillier, Penn, Hanson, Grajewski, & Xu, 1993) اشاره دارد اما شناخت فضایی حاصل رابطه متقابل انسان و محیط (Hart & Moore, 1971) است، بنابراین موضوع این است که آیا شناخت فضایی مردم از محیط و پیکره‌بندی فضایی محیط، در شناسایی بستر حیات جمعی در فضاهای شهری وجه اشتراک دارند؟ اگر چنین است، در بستر مورد مطالعه یعنی محله قدیمی عودلاجان تهران، فضاهایی که از تحلیل نقشه‌های شناختی و نقشه‌های پیکره‌بندی فضایی به عنوان اجتماع‌پذیرترین فضاها معرفی شده‌اند، کدامند؟ و اگر نقشه‌های شناختی و پیکره‌بندی فضایی در شناسایی نقاط اجتماع‌پذیر وجه اشتراک ندارند، کدام یک از این دو نقشه می‌تواند ملاک عمل مسئولان و برنامه‌ریزان طرح‌های شهری، به منظور ارتقاء تعاملات اجتماعی افراد، در نظر گرفته شود؟

۲. ادبیات تحقیق

با تلاش‌های پروفسور بیل هیلیر^۱، نظریه چیدمان فضایی به منظور شناخت ساختار فضاهای شهری و پیش‌بینی رفتار و فعالیت‌های اجتماعی شهروندان مطرح و توسعه یافته است (Mollazadeh, Barani-Pesyan, & Khosrowzadeh, 2011). در دهه‌های اخیر و به دلایل زیر این رویکرد مورد توجه قرار گرفته است. گستره این رویکرد در طیف وسیعی از محیط‌های معماری و شهری، توسعه مهارت‌های نرم‌افزاری این رویکرد و فراهم آمدن امکان مقایسه عددی پیکره‌بندی‌های فضایی گوناگون و سازماندهی جهانی مباحث این رویکرد (Jafary Bahman & Khanian, 2013; Penn, 1998). اما انتقاداتی همانند فقدان پایه‌های اجتماعی و ناتوانی در مطالعه پیچیدگی‌های زندگی بر این نظریه وارد شده است (Jafary Bahman & Khanian, 2013) و به نظر می‌رسد که روش چیدمان فضا به تنهایی پاسخگوی رویدادهای اجتماعی نباشد و نیازمند روش‌های مکملی بوده که نتایج پژوهش‌هایی که رویدادهای اجتماعی بشر را از طریق مدل‌سازی‌های رایانه‌ای Space Syntax می‌سنجند، قابل اعتمادتر سازد. نقشه‌های شناختی یکی از این روش‌ها است. نظریه نقشه‌شناختی، نخستین بار به منظور بازنمایی‌های ذهنی از محیط فیزیکی به کار برده شد (Tolman, 1948)، فرض شده است که این نقشه‌ها به تدریج و با دریافت اطلاعات از عناصر محیط شکل می‌گیرند (Tversky, 1993). از تجمع شناخت ساختار محیط و ویژگی‌های معانی ذهنی محیط، نقشه‌های شناختی حاصل می‌شود (Sidanin, 2007). نقشه‌های شناختی از موضوعات کلیدی در مطالعات محیطی و از حوزه‌های مهم در طراحی شهری، معماری و معماری منظر تلقی می‌شوند و روش‌های مختلفی برای سنجش آن وجود دارد (Asadpour, Faizi, 2015; Mozaffar, & Behzadfar, 2015). در این قسمت به مرور برخی از پژوهش‌های صورت گرفته با رویکرد نقشه‌های شناختی پرداخته می‌شود. پورجعفر و همکاران (۱۳۹۰) در پژوهشی جایگاه نشانه‌های شهری را در نقشه‌های شناختی شهروندان یزد مورد ارزیابی قرار داده و بیان نمودند که نشانه‌های متمایز از بافت پیرامون، نزدیک شریان‌های اصلی، دارای ارزش تاریخی و با کاربری‌های مذهبی، فرهنگی، تجاری و امان شهری، در نزد شهروندان اهمیت بیشتری داشته‌اند (Pourjafar, Bemanian, Taghvaei, & Montazerolhojjah, 2011). ایمانی و همکاران (۱۳۹۱) به منظور مطالعه فرآیند مسیریابی افراد، بافت تاریخی محله سنگ‌سیاه در شیراز را بررسی نموده و به این نتیجه رسیدند که دانش شناختی افراد در قالب نقشه‌های شناختی، فرآیند مسیریابی را تسهیل می‌نماید (Imani, Taki, & Tabaeian, 2013).

همچنین اسدپور و همکاران (۱۳۹۴) در مطالعه خود، با ارزیابی و تحلیل داده‌های حاصل از نقشه‌های شناختی و تصاویر ذهنی، نشان دادند که گونه‌های مختلف مفاهیم

داوطلبانه انتخاب شدند، به طوری که نیمی از جامعه نمونه را ساکنان، و نیمی دیگر را غیربومیان (بازدیدکنندگان) تشکیل دادند. ابتدا وضع موجود محله مورد بررسی قرار گرفت، در ادامه و در تعامل با پاسخ‌دهندگان، نسخه‌ای از نقشه محله در اختیار آن‌ها قرار گرفت، توضیحاتی در مورد نحوه مشارکت آن‌ها در فرآیند پژوهش به آن‌ها ارائه شد و از آن‌ها خواسته شد که از نظر وقوع تعاملات اجتماعی، وضعیت مسیرها، گره‌ها و نشانه‌های محله را بر روی نقشه علامت‌گذاری (رده‌بندی) کنند. در قسمت دوم پژوهش، با اتکاء به شبیه‌سازی‌ها نحو فضا و بر اساس سیستم تحلیل محوری، به تحلیل وضعیت پیکره‌بندی فضایی محله اقدام شد. پارامترهای کمی نحو فضا در این بررسی عبارت‌اند از: اتصال^۲، هم‌پیوندی^۳، عمق^۴ و وضوح^۵ (خوانایی). به منظور تحلیل پارامترهای نامبرده، نقشه محوری^۶ محله عودلاجان در محیط برنامه Auto Cad تهیه و با پسوند Dxf ذخیره شد، سپس در محیط نرم‌افزارهای Arc GIS (به‌منظور همپوشانی نقشه‌های اتصال و هم‌پیوندی با وزن مساوی نیم برای هر یک) و UCL Depth Map، نقشه محوری محله مورد تحلیل قرار گرفت. در نقشه‌های خروجی نرم‌افزارها، ارزش پارامترهای محاسبه شده توسط طیف رنگی مشخص شد. در آخر نیز، از مقایسه نقشه‌های شناختی (که در آن‌ها عامل آشنایی با محیط مد نظر بود) و نقشه‌های پیکره‌بندی فضایی، به تحلیل اجتماع‌پذیری محله عودلاجان پرداخته شد.

۴. محدوده و قلمرو پژوهش

محله عودلاجان: این محله در منطقه ۲۱ شهرداری تهران واقع شده و مساحتی برابر با ۱۵۰ هکتار دارد. محدوده محله عودلاجان شامل خیابان پانزده‌خرداد در جنوب، خیابان ناصرخسرو در غرب، خیابان امیرکبیر در شمال و خیابان ری در شرق می‌باشد. امروزه این محله سه بخش اصلی دارد: محله امامزاده یحیی در شرق، محله پامنار در وسط و محله ناصرخسرو در غرب (Rezaei & Hanachee, 2015; Google Map, 2016) (شکل ۱).

شکل ۱: تصاویری از گره‌ها و معابر محله عودلاجان



۳. روش تحقیق

موجود در زمینه نقشه‌های ذهنی- ادراکی به دو دسته بازنمایی توپولوژیک و بازنمایی لفظی قابل تقسیم هستند، به علاوه روش‌شناسی اخذ تصاویر و نقشه‌های شناختی را نیز در دو دسته مدل‌های ترسیمی- طراحی (زایشی) و مدل‌های بازشناسی-ارزیابی (غیر زایشی) طبقه‌بندی نمودند (Asadpour et al., 2015). در پژوهشی دیگر نقدالاسلامی و بهنامی‌فرد (۱۳۹۱) با هدف شناخت ذهنیت مردم از مفهوم محله و قیاس آن با تعریف محله در مدیریت شهری، نشان دادند که محله‌های قراردادی که شهرداری‌ها آن‌ها را تعریف می‌کنند با ذهنیت مردم از محله (که حاصل برهم‌کنش مفاهیم اجتماعی و مکانی است) در تمایز است (Seqhat al-Islami & Behnamifard, 2012). با وجود مطالعاتی که اشاره شد، در کشور ایران، پژوهش‌های اندکی به همپوشانی داده‌های حاصل از ویژگی‌های شناختی و پیکره‌بندی فضایی محیط مبادرت ورزیده‌اند. این موضوع در برخی از مطالعات داخلی و خارجی مورد بررسی قرار گرفته است. در یکی از پژوهش‌هایی که به‌منظور بررسی روابط این دو روش شکل گرفته بود، دیده‌بان و همکاران (۱۳۹۲)، با هدف بررسی روابط بین شناخت فضایی و ساختار فضایی، محله‌هایی از شهر دزفول را با بهره‌گیری از نقشه‌پردازی شناختی (کیفی) و پیکره‌بندی فضایی (کمی) مورد مطالعه قرار دادند (Didehban, Purdeihimi, & Rismanchian, 2014). لانگ و همکاران (۲۰۰۷) نیز، به بررسی تأثیرات پیکره‌بندی فضایی در شناخت فضایی و خوانایی محیط شهری پرداختند. بدین منظور از روش‌های نحو فضا (جهت اندازه‌گیری پیکره‌بندی فضایی محله‌ها)، نقشه شناختی ذهنی و همچنین مصاحبه (برای اندازه‌گیری خوانایی محیط و شناخت فضایی انسان‌ها) استفاده شد (Long, Baran, & Moore, 2007). در مطالعه ژای و باران (۲۰۱۶) نیز، رابطه پیکره‌بندی فضایی پارک‌ها و رفتار پیاده‌روی شهروندان مورد بررسی قرار گرفت، پژوهشگران با ترسیم نقشه‌هایی، رفتار پیاده‌روی شهروندان را رده‌بندی نموده و با تکیه بر نحو فضا نیز، پیکره‌بندی فضایی پارک‌ها را ارزیابی کردند (Zhai & baran, 2016). در پژوهش‌هایی دیگر، لی و همکاران (۲۰۰۵)، کیم (۲۰۰۱)، علی‌تاجر و همکاران (۱۳۹۷) و شکوهی (۱۳۸۸)، روابط بین پیکره‌بندی فضایی، رفتار فضایی و شناخت فضایی را بررسی نمودند. با استناد به این پیشینه تجربی در این پژوهش، تحلیل و بررسی «اجتماع‌پذیری^۲»، از طریق مقایسه تطبیقی «نقشه‌های شناختی» و «نقشه‌های پیکره‌بندی فضایی» مورد بررسی قرار گرفت.

روش تحقیق مقاله حاضر شامل دو بخش بود. در قسمت اول، با روش نقشه شناختی، جامعه آماری پژوهش مورد سنجش قرار گرفتند. جامعه آماری پژوهش شامل دو دسته افراد می‌شوند: الف. ساکنان محله عودلاجان و ب. بازدیدکنندگان محله عودلاجان. از میان آن‌ها ۴۰ نفر به شیوه نمونه‌گیری

۵. مبانی نظری

۵-۱- چیدمان فضایی

مفهوم اصلی نحو فضا^۱ (چیدمان فضایی) بر اساس شناخت فضایی و رفتار فضایی بنا شده است. چیدمان فضا یک روش پژوهشی است که نقش پیکره‌بندی فضایی را به‌عنوان متغیری مستقل، در سیستم‌های اجتماعی بررسی می‌کند، تمرکز این رویکرد، بر توسعه بازنمایی و تحلیل ساختار فضایی (از مقیاس فضاهای داخلی تا سیستم‌های شهری بزرگ) مورد استفاده جامعه می‌باشد (Kim & Sohn, 2002). این نظریه، همگام با پیشرفت‌های نظری و توسعه تکنیک‌ها و روش‌های تحلیل رایانه‌ای، توجه معماران و شهرسازان را به خود جلب نموده است (Siadatian & Pourjafar, 2015). در این روش، به‌واسطه گراف‌ها، الگوی ارتباطات فضایی تحلیل و از طریق متغیرهای نحوی مورد بررسی قرار می‌گیرد. به کارگیری این ابزار در شناخت ساختار فضایی، از طریق تحلیل رابطه بین این متغیرها و کیفیت‌های اجتماعی (در بستر مورد نظر) صورت می‌گیرد و جنبه انفرادی این متغیرها فاقد ارزش می‌باشد (Hillier & Vaughan, 2007; Rismanchian & Bell, 2010). در این نظریه و روش، با استفاده از شاخص‌هایی نظیر هم‌پیوندی، عمق، اتصال، وضوح (خوانایی) و غیره، به تحلیل چیدمان فضایی پرداخته می‌شود (Long, Baran, & Moore, 2007; Hillier & Long, Baran, & Moore, 2007; Hillier & Vaughan, 2007; Bafina, 2003; Hanson, 1984). در واقع نحو فضا، به‌منظور توصیف نحوه پیکره‌بندی، پیوستگی و مفصل‌بندی مکان‌های ساخته شده (از جمله ساختمان‌ها و شبکه معابر) مطرح شده است. این تفسیر از پیکره‌بندی، به‌منظور توضیح ویژگی‌های مختلف روانشناسی محیطی مکان مورد مطالعه پیشنهاد شده است، ویژگی‌هایی نظیر: چگونگی تجربه محل از سوی مردم، ترجیح بستر حرکتی مردم در مکان و نحوه فهم و به یادآوری مکان (Montello, 2007).

همچنین، با توجه به نظریه «حرکت طبیعی»^۲ (Hillier et al., 1993)، توزیع جریان عابر پیاده، ناشی از پیکره‌بندی فضایی است (Zhai & Baran, 2016). اگر مردم، تمایل بیشتری به استفاده از بعضی مسیرها (نسبت به سایر مسیرها) نشان‌دهند (مانند معابری با مقدار هم‌پیوندی و اتصال بالا)، ممکن است فرض شود که برخی از عناصر فیزیکی (مانند نشانه‌ها و گره‌ها) که در این مسیرها وجود دارد، به وضوح در نقشه‌های شناختی آن‌ها منعکس شود. این فرآیند، به نوبه خود به فرآیند مسیریابی افراد کمک خواهد کرد (Long, Baran, & Moore, 2007). بدین ترتیب وضعیت پیکره‌بندی فضایی محله‌ها و نقشه‌های شناختی ساکنان می‌توانند با یکدیگر مرتبط باشند.

۵-۲- نقشه‌پردازی شناختی

هارت و مور (۱۹۷۱)، شناخت فضایی را به شکل بازنمایی‌های درونی و بازسازی فضا در ذهن تعریف نموده‌اند، به عبارت

دیگر از منظر آن‌ها، شناخت فضایی به صورت بازنمایی‌های شناختی مرتبط با ساختار، عوامل و روابط فضایی تعریف شده است (Hart & Moore, 1971).

در تعریف دونز و استی (۱۹۷۳)، مجموعه پیچیده‌ای از اطلاعاتی که در محیط‌های مختلف وجود دارد، فرآیند نقشه‌برداری شناختی را شکل می‌دهد، محصول نهایی این فرآیند ایجاد یک نقشه شناختی است (Downs & Stea, 1973). برنت (۱۹۷۸)، ادراک و شناخت رابطه انسان و محیط اطراف را، به عنوان یک فرآیند روانشناختی که به رفتار انسان مرتبط است تعریف کرد (Burnett, 1978). پنج عنصر کلیدی شامل مسیر، گره، لبه، حوزه و نشانه، توسط لینچ و سایر محققان این عرصه، به عنوان اجزا نقشه شناختی کاربران معرفی شده است (Lynch, 1960; Long, 2007). در این پژوهش با تمرکز بر ۳ عنصر مسیر، گره و نشانه به پیشبرد موضوع پژوهش اقدام شده است. به منظور استخراج نقشه‌های شناختی روش‌های متفاوتی به‌کار برده می‌شود که هر یک مورد استفاده خود را دارند. در تولید نقشه‌های شناختی، متغیرهایی نظیر ساده‌سازی و کیفیت ترسیم عناصر و جزئیات (Asadpour et al., 2015)، سبب تولید خطاهایی در استخراج اطلاعات صحیح می‌شود، از این‌رو در این پژوهش سعی شد روشی به‌کار گرفته شود که کاستی‌های موجود را تا حدودی بر طرف نماید، به همین دلیل پرسش‌شوندگان نقش زایشی و فعال در تولید نقشه‌های اطلاعاتی نداشته^۱ و نقش غیرزایشی در رده‌بندی مکان‌ها دارند. دلیل به‌کارگیری چنین روشی، استفاده از روش مکملی به منظور تحقق هدف پژوهش بود. در این پژوهش فرض شده بود که شهروندان در قسمت‌هایی از محله که ساختار فضایی مناسب‌تری دارد تمایل بیشتری به حضور و تعامل اجتماعی از خود نشان می‌دهند، اما آیا اکتفا به مدل‌سازی رایانه‌ای نحو فضا به‌منظور سنجش فعالیت‌های اجتماعی افراد بسنده است؟ مطالعات نشان داده که پیکره‌بندی فضایی و شناخت فضایی با یکدیگر ارتباط دارند (Kim, 2001). از این‌رو، در این پژوهش علاوه بر تکیه بر پارامترهای کمی روش چیدمان فضا از روش کیفی مکملی به نام نقشه‌های شناختی (نقشه‌ای که حاصل شناخت فضایی بهره‌برداران از محیط است)، در شناسایی بسترهای شکل‌گیری حیات جمعی استفاده شد، هدف از تطبیق این دو روش، این بود که بتوان نقاطی از ساختار فضایی محله که در هر دو روش نقش غیرقابل انکاری در جذب افراد به محیط و تعامل بین آن‌ها دارند شناسایی نمود و به میزان دقت یافته‌های حاصل از روش چیدمان فضا پی برد.

۶. تحلیل و بحث

۶-۱- تحلیل یافته‌های حاصل از ویژگی‌های شناختی

در این قسمت دو نقشه شناختی ارائه شده است، یکی از این نقشه‌ها، حاصل همپوشانی نقشه‌های شناختی ساکنین

۶-۲- تحلیل یافته‌های پیکره‌بندی فضایی

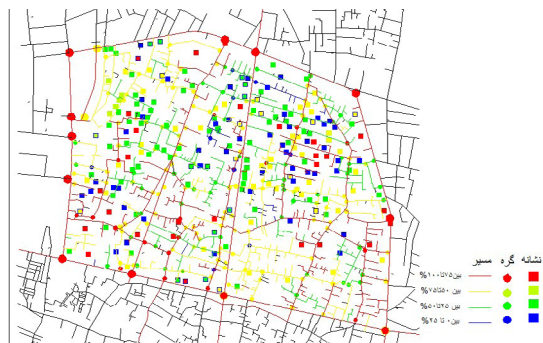
در جدول ۱، یافته‌های حاصل از تحلیل شاخصه‌های پیکره‌بندی فضایی در نقشه وضع موجود محله عودلاجان ارائه شده است، این یافته‌ها عبارت‌اند از: اتصال، همپیوندی، عمق، وضوح (خوانایی). در نقشه‌های ارائه شده، به‌منظور نمایش مقادیر، از طیف رنگی استفاده شده است، بدین صورت که در مکان‌هایی که مؤلفه از مقدار بیشتری برخوردار باشد نمودار به رنگ قرمز و در قسمت‌هایی که مؤلفه مقدار کمتری دارد نمودار به رنگ آبی نزدیک می‌شود (جدول ۱).

هم‌پیوندی مهم‌ترین عامل در چیدمان فضایی است، یعنی هرچه فضایی از هم‌پیوندی بالاتری برخوردار باشد انسجام بیشتری با فضاها و ساختار شهر دارد، همچنین فضاهای هم‌پیوندتر از دسترسی بالاتری نیز برخوردارند (Rismanchian & Bell, 2010). در مقابل مؤلفه هم‌پیوندی، مؤلفه عمق قرار دارد. عمق فضا بیانگر میزان ایزولگی و جدافتادگی است. در واقع، فضاهای عمیق، هم‌پیوندی پایین‌تری دارند. در تحلیل پیکره‌بندی فضایی محله عودلاجان، محور پامنار، مصطفی‌خمینی و ۱۵ خرداد که محصول خیابان‌کشی‌ها در محله تاریخی عودلاجان می‌باشد از سایر نقاط هم‌پیوندتر است (محورهای محیطی نیز از منظر این پارامتر وضعیت مطلوبی دارند)، به عبارتی محورهای ذکر شده یکپارچگی بیشتری با کلیت مجموعه داشته و دسترسی مناسب‌تری دارند، در محورها و نقاط هم‌پیوندتر به دلیل عمق کمتر و دسترسی بیشتر، احتمال حضور افراد بیشتر است، این حضور نیز، احتمال وقوع تعاملات اجتماعی در بین شهروندان را بیشتر می‌نماید. با ریزینی بیشتر در تحلیل نقشه‌های عمق و هم‌پیوندی محله عودلاجان می‌توان به نتایج دیگری نیز دست یافت: از جمله این‌که، هم‌پیوندترین نقاط در محل تلاقی خیابان‌کشی‌ها قرار دارد، همچنین، اکثر محورهای درون بافتی، به دلیل جدافتادگی از محورهای اصلی محله و عمق بیشتر، هم‌پیوندی پایینی داشته که نتیجه چنین جدافتادگی، ممکن است سبب ایجاد فضاهای ایزوله‌ای شود که معمولاً امنیت پایین‌تری (ناامنی با منشاء درون محلی) نسبت به سایر نقاط دارند و احتمال وقوع تعاملات اجتماعی را نیز کاهش می‌دهند. اتصال از مؤلفه‌های دیگر چیدمان فضاست، و تعداد دسترسی‌های منتهی به فضای مورد نظر را نشان می‌دهد (Long, Baran, & Moore, 2007). از تحلیل نقشه اتصال محله عودلاجان، می‌توان نتیجه گرفت که به ترتیب محورهای پانزده خرداد، مصطفی‌خمینی و پامنار از بیشترین مقدار مؤلفه اتصال برخوردارند و در رده‌های بعدی، خیابان‌های احاطه‌کننده و برخی از کوچه‌های کوتاه محلی قرار دارند. این موضوع، نشان می‌دهد که محورهای ذکر شده استخوان‌بندی اصلی محله را شکل داده و به دلیل اتصال بالاتر با سایر نقاط، بیشتر از سایر نقاط و محورها مورد استفاده شهروندان قرار

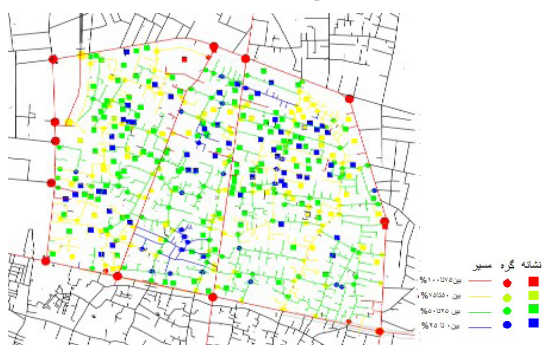
محل می‌باشد و دیگری از همپوشانی نقشه‌های شناختی رده‌بندی شده توسط افراد غیرمحلی ایجاد شده است (شکل‌های ۲ و ۳).

در نقشه شناختی ساکنان محلی، علاوه بر محورهای پامنار و مصطفی‌خمینی، محورهای محیطی نظیر ری، پانزده خرداد و ناصر خسرو و برخی از محورهای مواصلاقی، استخوان‌بندی‌های اصلی نامبرده نیز از مقبولیت مطلوبی در نزد شهروندان به‌منظور برقراری تعاملات اجتماعی برخوردار بوده، در حالی که در نقشه شناختی افراد غیر محلی، تأکید افراد بر محورهای اصلی نامبرده است و محورهای درونی بافت درجه اهمیت کمتری در بین آن‌ها داشته و از مقبولیت تقریبی ۲۵-۵۰ درصد در نزد افراد برخوردار است. تفاوت چشمگیر دیگر دو نقشه شناختی، در نشانه‌های شهری معرفی شده از سوی هر دو گروه پرسش‌شونده است. پرسش‌شوندگان محلی، به دلیل آشنایی دراز مدت، از توانایی بیشتری در شناخت نشانه‌های شهری برخوردار بوده اما پرسش‌شوندگان غیرمحلی در شناخت نشانه‌ها دچار مشکل بوده‌اند. در نهایت در مورد گره‌های فضایی، می‌توان بیان کرد که دو گروه پرسش‌شونده، در شناخت گره‌های محیطی که بر روی استخوان‌بندی‌های اصلی محله قرار دارند وجه اشتراک دارند اما در شناخت گره‌های درون بافتی تفاوت بارزی بین هر دو گروه وجود دارد که نشان از ناتوانی پرسش‌شوندگان غیرمحلی در شناخت گره‌های درون بافتی دارد.

شکل ۲: نقشه شناختی محله از دید ساکنین محلی



شکل ۳: نقشه شناختی محله از دید کسانی که محلی نبوده ولی از محله استفاده نموده و نسبت به آن آشنایی کمتری دارند.



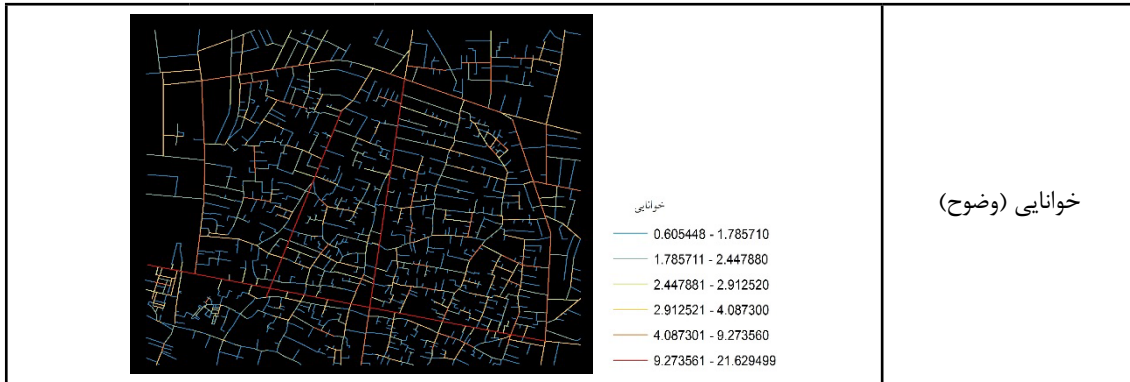
می‌گیرد که نشان از نفوذپذیری بالا در این بخش‌ها دارد. حضور ممکن است نتایجی نظیر ایمن‌تر بودن (با فرض نامنی درون محلی) را در پی داشته باشد. به عبارت دیگر، از منظر مؤلفه اتصال و عمق، برخی از محورهای داخلی محله که عمق بیشتری داشته و پیش‌بینی می‌شود که نفوذپذیری و تردد عبوری کمتری داشته باشند، با اتکا به دیدگاه هیلبر امنیت پایین‌تری داشته و احتمال وقوع تعاملات اجتماعی در آن‌ها کمتر است. با استناد به پیشینه تجربی موجود نیز، حضور افراد در فضا احتمال برقراری تعاملات اجتماعی (طیفی از نگاه کردن تا گفتگوی بین افراد را می‌توان در زیر مجموعه تعاملات اجتماعی قرار داد) را بیشتر می‌نماید (Daneshpour & Charkhchyan, 2007).

شاخص دیگری که در این پژوهش مورد بحث قرار گرفت، مؤلفه ترکیبی وضوح (خوانایی) بود که از همبستگی آماری بین هم‌پیوندی کلی و اتصال حاصل می‌شود (Hiller & Julienne, 1984; Long, Baran, & Moore, 2011; Tianxiang, Dony, & Shoubing, 2014).

از تحلیل نقشه خوانایی محله عودلاجان نیز نتیجه می‌شود که محورهای پامنار، پانزده‌خرداد، مصطفی‌خیمینی و محورهای محیطی محله، در این تحلیل نیز بیشترین مقدار را به خود اختصاص داده‌اند، همچنین نتایج، نشانگر خوانایی نسبتاً زیاد تعدادی از محورهای درون‌بافتی است.

جدول ۱: یافته‌های شاخص اتصال، هم‌پیوندی، عمق و خوانایی محله عودلاجان

مقدار	وضعیت محله بر مبنای تحلیل صورت گرفته	شاخص
۰	کمترین	اتصال
۲,۲۱	میانگین	
۲۴	بیشترین	
۰,۱	کمترین	هم‌پیوندی
۰,۶	میانگین	
۱,۱۶	بیشترین	
۱	کمترین	عمق
۱۴,۹۸	میانگین	
۲۸,۶۴	بیشترین	



۳-۶- نقد روش‌ها و بحث در مورد نقش یافته‌های شناختی - فضایی بر اجتماع‌پذیری فضا








در یک محیط مصنوع شهری، پیکره‌بندی فضایی شهر و شناخت فضایی که شهروندان از پیکره‌بندی فضایی شهر به‌دست می‌آورند رفتارهای اجتماعی آن‌ها را تحت تأثیر قرار می‌دهد. به همین دلیل مقایسه تطبیقی پیکره‌بندی فضایی شهر و شناخت فضایی شهروندان، به‌عنوان روشی ترکیبی در سنجش اجتماع‌پذیری شهروندان، در این پژوهش مورد استفاده قرار گرفت. به‌منظور این مقایسه تطبیقی و با هدف پاسخگویی به پرسش‌های مطرح شده در رابطه با اجتماع‌پذیری محله عودلاجان، با تکیه بر تکنیک روی‌هم‌گذاری نقشه‌ها، در مرحله اول نقشه شناختی ساکنین محلی بر نقشه‌های پیکره‌بندی فضایی محله و در مرحله دوم نقشه شناختی کاربران غیرمحلی بر روی نقشه‌های پیکره‌بندی فضایی محله منطبق شدند (جدول ۲).

از مقایسه تطبیقی نقشه‌های شناختی و پیکره‌بندی فضایی محله عودلاجان، می‌توان نتیجه گرفت که بین داده‌های کیفی حاصل از تحلیل نقشه‌های شناختی و داده‌های کمی حاصل از بررسی نقشه‌های پیکره‌بندی فضایی، تفاوت‌هایی مشاهده می‌شود. به عبارت دیگر، فضاهای جمعی مورد استقبال ساکنان، با بسترهایی که از طریق مدلسازی رایانه‌ای (یعنی از طریق روش چیدمان فضا) به‌عنوان محفل‌های احتمالی حضور افراد و برقراری تعاملات اجتماعی ارائه و پیش‌بینی می‌شوند، تفاوت‌های نسبی دارند که شاید به این دلیل باشد که تحلیل‌های نرم‌افزاری محورهای موجود محله (و روابط ریاضی بین آن‌ها) را که به‌صورت دو بعدی بوده تحلیل می‌نمایند و عناصر سه بعدی (مانند نشانه‌ها) را تشخیص نمی‌دهند. همچنین در این روش‌ها به استفاده‌کنندگان از فضا توجهی نمی‌شود. با ریزبینی بیشتر در تحلیل‌ها و تطبیق داده‌های کمی و کیفی به‌دست آمده، نتایج زیر حاصل شد: در تطبیق شناخت فضایی ساکنان محلی و نقشه اتصال، شاهد انطباق محورهای اصلی (۳ محور، به‌عنوان استخوان‌بندی اصلی) در هر دو نقشه بر روی یکدیگر بودیم، اما تفاوت‌هایی نیز در انطباق این دو نوع نقشه وجود

داشت، به‌طوری‌که در نقشه شناختی، علاوه بر ۳ محور اصلی، محورهای محیطی نیز از مقبولیت مطلوبی در نزد ساکنان به‌منظور برقراری تعاملات اجتماعی برخوردار بوده است، به علاوه در نقشه شناختی ساکنین (از نظر تعاملات اجتماعی) محورهای درون بافتی فراوانی دیده می‌شود که درجه بالای اهمیت (۷۵-۱۰۰ درصد) را به خود اختصاص داده‌اند، اما نقشه پیکره‌بندی فضایی در تشخیص این بخش‌ها دارای ضعف‌هایی است و این محورها، با مقدار اتصال کمتری نمایش داده شده‌اند، یعنی در شناخت فضایی ساکنان (نسبت به مدل‌سازی رایانه‌ای)، تعداد گره‌ها و مسیرهایی که ممکن است در جذب افراد به فضا و در نتیجه برقراری تعاملات اجتماعی مؤثر باشند بیشتر است، اما در نقشه شناختی که از طریق پرسش‌شوندگان غیرمحلی ترسیم شد، نقشه‌های پیکره‌بندی فضایی و شناختی انطباق بیشتری داشتند. نتایج انطباق نقشه‌های شناختی و نقشه هم‌پیوندی محله عودلاجان نشان داد که در بخش نسبتاً زیادی از محورهای درون بافتی محله شاهد مقدار هم‌پیوندی پایین و پیش‌بینی حرکت و حضور کمتر ساکنان هستیم، در حالی‌که برخی از این محورها در نقشه‌های شناختی ساکنان، از نظر تعاملات اجتماعی، بیشترین ضریب را دارا بودند. در رابطه با مؤلفه عمق نیز (که نشان از جدافتادگی بخش‌های محله از کلیت مجموعه دارد) از تطبیق نقشه‌های پیکره‌بندی و نقشه‌های شناختی نتیجه شد که مقدار مؤلفه عمق در محورهای اصلی (و انشعابات کوچک منتهی به محورهای اصلی) و محیطی کمترین مقدار را دارد که نتیجه‌ای دور از ذهن نیست زیرا این محورها بعد از خیابان‌کشی‌ها، بیش از سایر بخش‌ها در دسترس بوده و احتمال جذب، حضور، حرکت و برقراری تعاملات اجتماعی افراد در آن‌ها بیشتر است؛ زیرا درجه ایزوله بودن محورها کم است، این یافته منطبق با یافته‌های شناختی بود. برخی از محورهای درون بافتی منتهی به استخوان‌بندی اصلی، در نقشه عمق محله نیز، مقدار کمتری داشته و در دسترس‌تر برآورد شدند و حضور افراد و احتمال وقوع تعاملات اجتماعی در آن‌ها بیشتر به‌نظر می‌رسد. این یافته با نقشه شناختی ساکنان محلی بیشتر منطبق بود. از تطبیق نمودار وضوح (خوانایی) و

نقشه‌های شناختی ساکنین نیز، نتایج زیر حاصل می‌شود: انطباق نقشه‌های خوانایی و شناختی محله نیز نشان داد که استخوان‌بندی اصلی محله، از منظر مدل‌سازی رایانه‌ای نحو فضا وضوح بالاتری داشته‌اند، از منظر شناخت ساکنان محلی و غیرمحلی نیز، احتمال شکل‌گیری تعاملات اجتماعی در این بخش‌ها بیشتر بوده‌است. بنابراین مشاهده شد که در فضاهایی با مقدار وضوح بالاتر، احتمال برقراری تعاملات اجتماعی بیشتر بوده است.

جدول ۲: همپوشانی نقشه‌های شناختی و نقشه‌های پیکربندی فضایی

همپوشانی نقشه‌های شناختی کاربران غیر محلی بر روی نقشه‌های پیکره‌بندی فضایی	همپوشانی نقشه‌های شناختی ساکنان محلی بر روی نقشه‌های پیکره‌بندی فضایی	
		همپوشانی نقشه شناختی و اتصال
		همپوشانی نقشه همپوندی و شناختی
		همپوشانی نقشه عمق و نقشه شناختی
		همپوشانی نقشه خوانایی و نقشه شناختی

۷. نتیجه‌گیری

بود که علی‌رغم اشتراک نقشه شناختی ساکنان و نقشه پیکره‌بندی فضایی در شناخت بسترهای شکل‌گیری تعاملات اجتماعی، ریزبینی در عناصر جز محیطی، حاکی از ضعف روش چیدمان فضا در شناخت بسترهای تعامل اجتماعی است و به‌نظر می‌رسد یکی از دلایل این موضوع، تکیه روش نحو فضا بر تحلیل‌های دوبعدی و بی‌توجهی به عناصر سه بعدی از جمله نشانه‌های شهری است. به‌طور کلی، نتایج مطالعه حاضر نشان داد که اصل قرار دادن روش چیدمان فضا و مدل‌سازی رایانه‌ای این روش (که بر پایه علم ریاضیات شکل گرفته) در سنجش مفاهیم اجتماعی، مفید بوده اما کافی نیست و به منظور اقدامات کالبدی در جهت بهبود وضعیت اجتماعی بافت‌های شهری، نیاز به روش‌های مکملی همچون نقشه‌های شناختی حس می‌شود (در مطالعات پیشین نیز، بر لزوم توجه به روش‌های ترکیبی تأکید شده بود). در این رابطه، به مطالعات بیشتری در بافت‌های شهری مختلف نیاز است و پژوهشگران آتی می‌توانند تعمیم‌پذیری این موضوع را در ساعات مختلف شبانه‌روز و با روش‌های غیرزایشی (همچون رصد الکترونیکی الگوهای رفتاری)، که پاسخ‌دهنده نقشی در تولید اطلاعات ندارد و رفتار او به صورت غیرمحسوس ضبط می‌شود، ارزیابی کنند.

تأثیرات محیط بر رفتار اجتماعی شهروندان محور پژوهش حاضر را شکل داد. مطالعه حاضر به دنبال پاسخ به این پرسش بود که، ارتباطات فضایی، چگونه می‌تواند شهروندان را به حضور در فضا و برقراری تعاملات اجتماعی ترغیب نماید؟ و این فرآیند را چگونه می‌توان سنجید. در این پژوهش و به‌منظور جامعیت بیشتر، علاوه بر تحلیل پیکره‌بندی فضایی محیط از طریق پارامترهای کمی روش چیدمان فضا، شناخت فضایی شهروندان نیز در دستیابی به نتایجی فراگیرتر به کار بسته شد. به همین منظور و در بخش کیفی پژوهش، شهروندان در سنجش نقاط اجتماع‌پذیرتر محیط مشارکت داشتند، نظرات پرسش‌شوندگان که شامل دو گروه ساکنان محلی و کاربران غیرساکن در محله بودند در رتبه‌بندی ۳ جزء عنصر محیطی شامل مسیر، گره و نشانه که در حافظه ذهنی آن‌ها، نقش پررنگ‌تری در شکل‌دهی به تعاملات اجتماعی داشتند همپوشانی شد که محصول این انطباق، ایجاد دو نقشه شناختی بود. در مرحله بعد نقشه شناختی ساکنین و نقشه‌های پیکره‌بندی فضایی مورد مقایسه تطبیقی قرار گرفتند. نتایج تحلیل یافته‌ها حاکی از آن

پی‌نوشت

1. Bill Hiller

2. Sociopetality

۳. اتصال (Connectivity): «اتصال عبارت است از تعداد گره‌هایی که با یک گره ارتباط مستقیم دارد. یعنی، هرچه تعداد اتصالات بیشتر باشد، ارتباطات با دیگر فضاها بیشتر خواهد بود. مقدار عددی اتصال بیان‌کننده تعداد دسترسی‌های منتهی به فضای مورد نظر است» (Sajjadzadeh, Izadi & Haghi, 2017, p. 18). خیابان‌هایی که مقدار اتصال بالاتری دارند از جهات مختلف قابل دسترسی خواهند بود و به مردم امکان انتخاب بیشتر می‌دهند (Long, Baran & Moore, 2007).

۴. همپیوندی (Integration): «در نقشه خطی می‌توان گفت ارزش همپیوندی یک خط یا فضا عبارت است از میانگین تعداد خطوطی که بتوان توسط آن‌ها از یک خط به تمامی خطوط دیگر در کل سیستم دست پیدا کرد» (Rismanchian & Bell, 2010, p. 54). این شاخص گویای آن است که چگونه فرد به آسانی می‌تواند به بخش مشخصی از خیابان برسد، به عبارت دیگر گویای دسترسی است (Long, Baran, & Moore, 2007).

۵. عمق (Depth): «مبنای شکل‌گیری عمق براساس تعداد قدم‌هایی است که برای گذر از یک نقطه به نقاط دیگر باید طی شود. یک نقطه در صورتی عمیق خوانده می‌شود که قدم‌های (مراحل) متعددی بین آن و دیگر نقاط موجود باشد» (Jafary & Bahman & Khanian, 2013, p. 287).

۶. وضوح: نقشه وضوح، از طریق همپوشانی ریاضی به وزن نیم برای هر دو نقشه اتصال و هم‌پیوندی حاصل می‌شود (Mollazadeh, Barani-Pesyan, & Khosrowzadeh, 2011; Kim & Sohn, 2002). ارتباط بین اندازه‌گیری‌های نحو فضا و حرکت و جنبش مشاهده شده، در محیط‌هایی با وضوح پایین، ضعیف می‌شود (Hillier, 1996). اگر نقشه‌های شناختی از طریق حرکت توسعه یابند، آن‌گاه ارتباط بین بازنمایی‌های شناختی (به‌عنوان مثال، نشانه‌ها) و اندازه‌گیری‌های نحو فضا نیز در محیطی با وضوح پایین (ناخوانا) تضعیف می‌شود (Long, Baran, & Moore, 2007).

۷. نقشه‌های محوری یکی از خروجی‌های روش چیدمان فضایی است، این نقشه‌ها نمودار ساده شده‌ای از خیابان‌ها و فضاهای باز شهری هستند که در آن‌ها، طولانی‌ترین خط دید و دسترسی در یک محیط شهری توسط خطوط محوری نمایش داده می‌شود (Abbaszadegan, 2002).

8. Space Syntax

9. Natural Movement

۱۰. مدل‌سازی زایشی یعنی تولید اطلاعاتی که پیش از این وجود نداشت و از طریق نقش فعال پرسش‌شونده و بازنمایی شناخت او از محیط تولید می‌شوند (Asadpour et al., 2015).

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Evaluation of Sociability of Urban Environment Using “Cognitive Maps” and “Spatial Configuration Maps”

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ABSTRACT

The presence and social interaction of people in the public spaces of architecture and urbanism lead to the spaces' sociability. In the present research, the subject of discussion was the sociability of public spaces. The quality of sociability is the inseparable feature of the urban public spaces but, it has been faded or lost in some urban public spaces. The present study sought to answer this question: how and with what parts, the measurement of the environment sociability is performed with focus on the two human and environmental approaches? To do this, Oudlajan neighborhood of Tehran was selected and investigated as the case study. Possible platforms of social interactions' formation were investigated in this area (from two environment-based and human-based aspects). In this research, proper literature, theoretical foundations, the studied indexes, and research method were collected and classified using first hand resources. The present methodology included two cognitive and spatial sections. In the cognitive section, using available documents and maps, the area map was prepared. After field visits and interviewing with the local and nonlocal residents, cognitive findings were collected and cognitive maps were produced. The spatial configuration of the neighborhood was evaluated through quantitative parameters of the space syntax method. Finally, comparing qualitative and quantitative data, sociability of the Oudlajan neighborhood was analyzed. Findings of the research showed that it has been useful to consider the space syntax computer modelling as a principal in the evaluation of social concepts, although it was not enough. In order for somatic activities to improve social status of the urban tissues, it is required to use complementary methods such as cognitive maps.

Keywords: Sociability, Spatial Cognition, Cognitive Map, Spatial configuration.

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1. INTRODUCTION

In the sociable environments, somatic space based on its spatial features results in the formation of activity hubs and eagerness to activity in certain parts of the space (Daneshgarmoghaddam, Bahrainy, & Einifar, 2011). Sociable spaces are the place of forming social interactions and actions among individuals (Shojaee & Partovi, 2011) and have a close relation with the individuals' social life (Mohammadi & Ayatollahi, 2015), so that the planning of proper somatic-spatial bed for the presence and having social interactions is one of the purposes of the formation of the architectural and urban social spaces. Presence and promotion of the citizens' social interactions in the urban environments and supplying their social needs, increase their cooperation spirits and attachment and result in the mobility and vitality of the environment (Ghalambor Dezfuly & Naghizadeh, 2014; Karimi & Mohammadhoseini, 2018; Daneshpour & Charkhchian, 2007). But, this issue has been less investigated in public spaces of the neighborhood. Public spaces can promote social life through reinforcing social interactions of the citizens (Montgomery, 2013) and contributing to the social stability (Harun, Zakariya, Mansor, & Zakariya, 2014). By considering this issue, the present research was conducted with the purpose of assessing the environment sociability by comparing cognitive maps and spatial configuration maps. To reach the mentioned purpose, Oudlajan neighborhood from Tehran's old tissue was investigated. In the performed researches of this area, the effect of spatial configuration of the artificial environment on the human behavior has been observed but, spatial cognition which is the result of the analogous relationship of the human and environment, has been less interesting. Spatial configuration refers to the relations between the environmental details (Hillier, Penn, Hanson, Grajewski, & Xu, 1993) but, spatial cognition is the result of corresponding the relation of the human and environment (Hart & Moore, 1971). Hence, the question is that does spatial cognition of the people from the environment and spatial configuration of the environment have commonalities in the identification of cumulative life bed in urban spaces? If it is so, in the studied bed that is Oudlajan old neighborhood of Tehran, which spaces are the most sociable spaces according the analysis of cognitive maps and spatial configuration maps? And if cognitive maps and spatial configuration do not have commonalities in the identification of sociable places, which of these two maps can be considered as the action criterion of authorities and planners of the urban designs to promote the individuals' social interactions?

2. LITERATURE REVIEW

With the attempts of Professor Bill Hillier, the theory of spatial configuration has been designed and developed

to identify the organization of urban spaces and to predict the behavior and social activities of the citizens (Mollazadeh, Barani-Pesyany, & Khosrowzadeh, 2011). In recent decades and due to the following reasons, this approach has attracted many attentions: the expansion of this approach in a vast spectrum of urban and architectural environments, developing software skills of this approach and providing the possibility of numerical comparison of various spatial configurations and global organizing of discussions of this approach (Jafary Bahman & Khanian, 2013; Penn, Hillier, Banister, & Xu, 1998). But criticisms like the lack of social foundations and inability to study the complexities of life has been imported to this theory (Jafari Bahman & Khanian, 2013) and it seems that the spatial configuration method is not responsive of social events, alone and needs combinatorial methods to make the results of researches more reliable that can assess human social events through computer modellings of space syntax. Cognitive maps are one of these methods. Cognitive map theory was first used for mental representations of the physical environment (Tolman, 1948). It is assumed that these maps are formed gradually and by receiving information from the environmental elements (Tversky, 1993). Cognitive maps are formed by the collection of the identification of the environmental structure and features of mental meanings of the environment (Sidanin, 2007). Cognitive maps are of key subjects in the environmental studies and are considered to be of important areas in the urban designing, architecture, and architectural aspect and there are various methods to assess it (Asadpour, Faizi, Mozaffar, & Behzadfar, 2015). In this section, some of the performed researches with cognitive maps approach have been reviewed. Pourjafar et al., 2011 in a research evaluated the position of urban signs in the cognitive maps of Yazd citizens and stated that distinct signs from the around tissue according to the citizens' views has had more importance near main arteries that have historical value with religious, cultural, commercial, and urban element usages (Pourjafar, Bemanian, Taghvaei, & Montazerolhoggah, 2011). Imani et al., 2013 investigated historical tissue of the Sangsiah neighborhood in Shiraz to study the individuals' navigation process and concluded that people's cognitive knowledge in the form of cognitive maps facilitates the navigation process (Imani, Taki, & Tabaeian, 2013). Moreover, Asadpour et al. 2015, in their study evaluated and analyzed the data of cognitive maps and mental images and showed that different types of available concepts in the field of perceptual-mental maps can be divided into two types of "topologic representation" and "verbal representation". Further, methodology has classified the imitation of images and cognitive maps into two types of design-descriptive models (generative) and evaluation-recognition models (non-generative) (Asadpour et al., 2015). In another research, Seqhat

al-Islami and Behnamifard, 2012 with the purpose of knowing people's mentality of the concept of neighborhood and comparing it with the definition of neighborhood in the urban management showed that the conventional neighborhood defined by the municipality are distinct from people's mentality of neighborhood (which is the result of interaction of social and local concepts). Despite the studies mentioned, in Iran few researches have been performed about overlapping data of features of cognitive and spatial configuration of the environment. This issue has been investigated in some internal and external articles. In one of the researches that investigated the relations of these two methods, Didehban et al, 2014, studied some neighborhoods of Dezful to investigate the relations between spatial cognition and spatial structure using cognitive mapping (qualitative) and spatial configuration. Long et al., 2007 also, investigated the effects of spatial configuration in spatial cognition and legibility of the urban environment. To do so, they used the space syntax (to measure spatial configuration of the neighborhoods), mental cognitive map and also interview (to measure the environment legibility and spatial cognition of people) methods (Long, Baran, & Moore, 2007). In the Zhai and Baran's 2007 study, the relation of spatial configuration of parks and the behavior of the citizens' walking was investigated. Researchers classified the walking behavior of the citizens by drawing maps and evaluated spatial configuration of parks relying on the space syntax. Other researches like Lee et al., 2005; Kim, 2001; Ali Tajer et al., 2018; Shokouhi, 2009 investigated the relations of spatial configuration, spatial behavior and spatial cognition. According to this experimental literature, in this research, "sociability" was investigated through comparing "cognitive maps" and "spatial configuration maps".

3. RESEARCH METHODOLOGY

The present methodology included two parts. In the first part, the research's statistical population were evaluated using cognitive map method. The statistical population of the research included two types of people: 1. Oudlajan neighborhood residents 2. Oudlajan neighborhood visitors. Among them, 40 individuals were selected voluntarily using sampling method so that half of the population were residents and the other half were visitors (non-local). First, the available situation of the neighborhood was investigated. In the following and in the interaction with the respondents, a copy of the neighborhood map was put before them, descriptions were provided about their participation in the research process and they were asked to classify the situation of paths, nodes, and neighborhood signs according to the occurrence of social interactions. In the second part of the research, relying on the space syntax simulations and based on the axial analysis system, the spatial configuration of the neighborhood

was analyzed. Quantitative parameters of the space syntax in this research were: connectivity, integration, depth, and intelligibility. To analyze the mentioned parameters, axial map of Oudlajan neighborhood in the environment of the Auto Cad program was prepared and stored by Dxf suffix. Then, axial map of the neighborhood was analyzed in the environment of Arc gis software (to overlap connectivity and integration maps with equal amount of weight) and UCL Depth Map. In the output map of the software, the value of the calculated parameters was specified using color spectrums. Finally, by comparing cognitive maps (in which familiarity with the environment was taken into account) and the spatial configuration maps, sociability of the Oudlajan neighborhood was analyzed.

4. DOMAIN OF THE RESEARCH

Oudlajan neighborhood: This neighborhood is located in the 21th district of Tehran municipality and has a land of 150 hectares. The scope of Oudlajan neighborhood includes Panzdah Khordad street in the south, Naser Khosro street in the west, Amirkabir street in the north and Rey street in the east. Today, this neighborhood has three main parts: Imamzadeh Yahya in the east, Pamenar neighborhood in the middle, and Naser Khosro neighborhood in the west (Rezaei & Hannachee, 2015; Google Map, 2016) (Fig. 1).



Fig. 1. Images of the Nodes and Paths of the Oudlajan Neighborhood

5. THEORETICAL FOUNDATIONS

5.1. The Spatial Layout

The main concept of space syntax (spatial layout) is based on the spatial cognition and spatial behavior. space syntax is a research method that investigates spatial configuration role as an independent variable in social systems. The focus of this approach is on developing representation and analysis of the spatial structure (from the scale of internal spaces to the large

urban systems) used in society (Kim & Sohn, 2002). This theory along with theoretical developments and improving techniques and computer analysis methods has attracted the attention of architects and the urbanists (Siadatian & Pourjafar, 2015). In this method, the pattern of spatial communications is analyzed using graphs and is investigated through syntactic variables. Using these tools, the identifying spatial structure is performed through the analysis of the relation between these social variables and qualities, since individual aspect of these variables has not any value (Hillier & Vaughan, 2007; Rismanchian & Bell, 2010). In this theory and method, using indexes such as integration, depth, connectivity, intelligibility, etc., the spatial layout has been analyzed (Long, Baran, & Moore, 2007; Hillier & Hanson, 1984; Bafina, 2003). Actually, the space syntax is posed to describe configuration, connectivity, and articulation of the constructed places (including buildings and passages network). This interpretation of configuration is suggested to describe different psychological and environmental features of the studied area. Features include the experience of the neighborhood by people, preference of the movement base of people in the place and understanding and recalling the place (Montello, 2007). Moreover, according to the theory of "natural movement" (Hillier et al., 1993), distribution of the pedestrian flow is derived from spatial configuration (Zhani & Baran, 2016). If people show more willingness to use some paths (in relation to other paths) (like paths with high integration and connectivity), it may be assumed that some physical elements (such as signs and nodes) are in these paths that can be reflected explicitly in their cognitive maps. This process in turn will help to the individuals' navigation (Long, Baran, & Moore, 2007). So, the situation of spatial configuration of the neighborhoods and cognitive maps of the residents can be related to each other.

5.2. Cognitive Topography

Hart and Moore, 1971 have defined the spatial cognition in the form of internal representations and reconstruction of space in the mind. In other words, according to them, spatial cognition has been defined in the form of cognitive representations related to the structure, factors, and spatial relations. In the definition of Downs and Stea, 1973, the complex set of information that are in different environments, forms cognitive topography process. The final product of this process is creation of a cognitive map. Burnett, 1978, defined perception and recognition of the relation of human and the around environment as a psychological process that is related to the human behavior. Five key elements including path, node, edge, area, and sign are identified by Lynch and other researchers of this area as the users' cognitive map details (Lynch, 1960; Long, 2007). In this research, by

focusing on the elements of path, node, and sign, it is tried to progress the research subject. Different methods are used to extract cognitive maps and each of them has their own usage. In the production of cognitive maps, variables such as simplifying and quality of drawing the elements and details (Asadpour et al., 2015) result in the production of errors in the extraction of correct information. So, in this research, it was tried to use a method that can somehow remove available decreases. Hence, respondents do not have a generative and active role in the production of informational maps, rather they have a non-generative role in the classification of the spaces. The reason to use such a method was using a complementary method to reach the research purpose. In this research, it was assumed that citizens show more willingness to have presence and social interaction in parts of the neighborhood that have more appropriate spatial structure. However, is it enough to rely on the computer modelling of the space syntax to measure the individuals' social activities? Studies have shown that spatial configuration and spatial cognition have relations to each other (Kim, 2001). So, in this research, in addition to relying on the quantitative parameters of the space syntax method, a complementary qualitative method called cognitive maps (the map that is the result of spatial cognition of the environment users) was used in the identification of formation of beds of cumulative life. The purpose of adaptation of these two methods was to identify points of the neighborhood spatial structure that in the two methods have an undeniable role in the attraction of people to the environment and interaction between them and to understand the accuracy amount of the findings of the space syntax method.

6. ANALYSIS AND DISCUSSION OF THE FINDINGS

6.1. Analysis of Findings of the Cognitive Features

In this part, two cognitive maps have been provided. One of these maps was the result of overlapping cognitive maps of local residents and the other was formed by overlapping of the classified cognitive maps by non-local people (Figs. 2 & 3). In the cognitive map of local residents, in addition to Pamenar and Mostafa Khomeini axis, environmental axis such as Rey, Panzdah Khordad, and Naser Khosro and some union axis of the mentioned main frameworks were also of proper familiarity among citizens in order to establish social interactions. However, in the cognitive map of non-local people, the individual's emphasizes was on the mentioned main axis and the internal axis of the tissue had less importance among them and had an acceptability of 25-50% among individual . The other eminent difference of the two cognitive

maps, according to the two groups of respondents, was defined in the urban signs. Local respondents had more ability in the recognition of the urban signs due to the long familiarity but, non-local respondents had difficulty in the recognition of the signs. Finally, regarding the spatial nodes, it can be said that the two respondent groups had commonalities in the recognition of the environmental nodes that were placed on the main frameworks of the neighborhood but, the two groups were different in the recognition of internal nodes that showed inability of non-local respondents in the recognition of internal nodes.

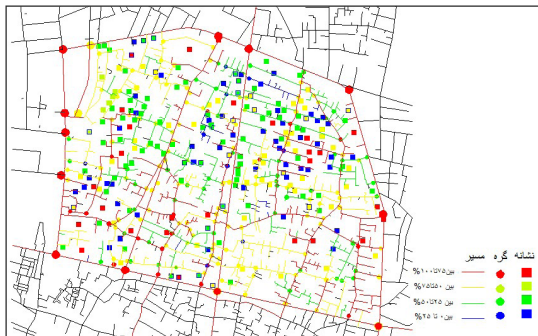


Fig. 2. Cognitive Map from Local Residents

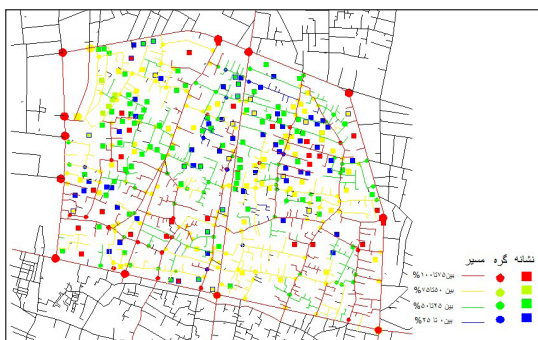


Fig. 3. Cognitive Map of the Neighborhood from the Point of View of those Who Are Not Local, But Who Use the Neighborhood and Less Familiar to Them

6.2. Analysis of the Findings of the Spatial Configuration

In the table 1, the findings of the analysis of the spatial configuration indexes have been presented in the map of the available situation of Oudlajan neighborhood. These findings included connectivity, integration, depth, and intelligibility. In the presented maps, the color spectrum was used to show values. So that in places that component had the most value, diagram was red and in places that had less amount of component, diagram was blue (Table 1).

Integration is the most important factor in spatial layout. In other words, to the extent that a space has a higher integration, it has more coherence with spaces and the city structure. Moreover, more integrated spaces have higher accessibility (Rismanchian &

Bill, 2010). In contrast to the integration component is the depth component. The space depth shows the amount of isolation and separation. Actually, deep spaces have lower integrations. To analyze spatial configuration of the Oudlajan neighborhood, the Pamemar axis, Mostafa Khomeini and Panzdah Khordad which were the results of building street in the historical neighborhood of Oudlajan, are were integrated than the other points (environmental axis has also a proper situation in this respect). In the other words, mentioned axis had more integrity with the set and had more accessibility. In the more integrated axis and points, due to less depth and more accessibility, the possibility of the presence of individuals was more. Also, this presence made the possibility of occurrence of social interactions among citizens more. By looking more at the analysis of the depth and integration maps of Oudlajan neighborhood, other results could also be achieved including that the most integrated points were in the convergence place of the streets. Also, most of the internal axis of the tissue had a low integration due to the separation from the main axis of the neighborhood and more depth. This separation could result in the creation of isolated spaces that usually had lower security (insecurity with local origin) in relation to other points and decreased the possibility of occurrence of social interactions. Connectivity is of the other components of the space syntax and shows the number of accesses to the required space (Long, Baran, & Moore, 2007). Having analyzed the connectivity map of the Oudlajan neighborhood, it was concluded that the axis of Panzdah Khordad, Mostafa Khomeini, and Pamemar had the most amount of the connectivity component, respectively and in the other classes were surrounded streets and some local short allies. This issue showed that the mentioned axis formed the main framework of the neighborhood and due to higher connection with other points, it was used more than other points by citizens showing high penetrability of these sections.





Moreover, this presence can have results such as being more secure (by assuming internal insecurity of the neighborhood). In other words, according to the connectivity and depth components, some of the internal axis of the neighborhood that had more depth and was predicted to have less penetrability and traffic, according to the Hillier view, had lower security and they had low possibility of having social interaction. According to the available experimental literature, the presence of individuals makes the possibility of social interactions more (a spectrum of looking to talking between individuals can be placed in the social interaction subset) (Daneshpour & Charkhchian, 2007).

Another index that has been discussed in this research was the complementary component of intelligibility which was achieved by the statistical correlation between "general integration" and "connectivity"

(Hillier & Jlienne, 1984; Long, Baran, & Moore, 2011; Tiangxiang, Dony & Shoubing, 2014). From the analysis of the intelligibility map of the Oudlajan neighborhood, it was concluded that the axis of

Panzdah Khordad, Mostafa Khomeini, and Pamenar and environmental axis of the neighborhood had the most amount of value. Also, results showed the intelligibility signs of many internal axis of the tissue.

Table 1. Finding of Connectivity, Integration, Depth and Intelligibility(Indicator) of the Oudlajan Neighborhood

The Amount of		Neighborhood Status Based on Analysis	Indicator
0	Min		Connectivity
2.21	Average		
24	Max		
0.1	Min		Integration
0.6	Average		
1.16	Max		
1	Min		Depth
14.98	Average		
28.64	Max		
			Intelligibility
		<p>تجزیاتی</p> <ul style="list-style-type: none"> — 0.605448 - 1.785710 — 1.785711 - 2.447880 — 2.447881 - 2.912520 — 2.912521 - 4.087300 — 4.087301 - 9.273560 — 9.273561 - 21.629499 	

6.3. Criticizing Methods and Discussion about the Role of Cognitive- Spatial Findings on the Space Sociability









In an urban artificial environment, the city spatial configuration and spatial cognition that citizens achieve from spatial configuration of the city, affect their social behaviors. So, comparative comparison of the city spatial configuration and spatial cognition of the citizens were used as a combinatorial method in the measurement of the citizens' sociability. For this comparative comparison and with the purpose of responding to the questions about the sociability of Oudlajan neighborhood and relying on the pooling of the maps, in the first stage the cognitive map of local residents on the spatial configuration maps of the neighborhood and in the second stage, the cognitive map of non-local users were adapted on the spatial configuration maps of the neighborhood (Table 2).

Having comparatively compared the cognitive and spatial configuration maps of the neighborhood, it can be concluded that there were differences between the qualitative data of analyzing cognitive maps and quantitative data of investigating the spatial configuration maps. In other words, cumulative spaces welcomed by the residents were relatively different from beds that were presented (predicted) through computer modelling (that is through the space syntax method) as the possible places of the individuals' presence and having social interactions which may be due to the fact that software analysis had analyzed available axis of the neighborhood (there are mathematical relations between them) which were two-dimensional and could not recognize 3D elements (like signs). Moreover, in these methods, the space users were not taken into account. With a more look at the analysis and comparing quantitative and qualitative data, following results were obtained:

In comparing the spatial cognition of local residents and connectivity map, it was observed that the main axis (3 axis of the main framework) in the two maps were lap on each other so that, in the cognitive map in addition to the main axis, environmental axis were also of adequate acceptability among residents in order to have social interactions. Moreover, in the cognitive map of the residents (from the social interaction aspect) several internal tissue axis had

a high degree of importance (75-100%). But, the spatial configuration map was weak in recognition of these parts and these axis were shown with a less amount of connectivity. In other words, in the spatial cognition of the residents (in relation to computer modelling), the number of nodes and paths that could be effective in the attraction of individuals and as a result could provide social interactions, were more. But in the cognitive map which was drawn by non-local residents, cognitive and spatial configuration maps had more adaptation. Results of comparing cognitive maps and integration map of the Oudlajan neighborhood showed that in a relatively large part of the internal axis of the neighborhood, low integration and movement prediction and less presence of residents could be observed, although some of these axis in the cognitive maps of the residents had the most coefficient from the social interaction aspect. The depth component also (that shows separation of the neighborhood parts from the whole set) was achieved by comparing configuration maps and cognitive maps that the amount of depth component in the main (and small extensions to the main axis) and environmental axis had the least amount which was a believable result because these axis after building the street were more accessible than the other parts and the possibility of attraction, presence, movement, and having social interaction of individuals was more in them due to the low isolation degree of the axis. This finding adapted to cognitive findings. Some of the internal axis as compared with the main framework, had a less amount in the depth of the neighborhood map and were more accessible. The presence of people and the possibility of occurrence of social interactions in them seems to be more. This finding was adapted more to the cognitive map of local people. Comparing the diagram of intelligibility and cognitive map of the residents, following results have been achieved: Adaptation of the intelligibility and cognitive maps of the neighborhood showed that the main framework of the neighborhood has had a higher intelligibility from the computer modelling aspect. According to the cognition of local and non-local residents also, the possibility of the occurrence of social interactions were more in these parts so, it was observed that in spaces with higher amount of intelligibility, the possibility of occurrence of social interactions were more.

Table 2. Overlapping Cognitive Maps and Spatial Configuration Maps

Overlapping Cognitive Maps of Non-Local Users on Spatial Configuration Maps	Overlapping Cognitive Maps of Local Residents on Spatial Configuration Maps	
		Overlapping Connectivity Map and Cognitive Map
		Overlapping Integration Map and Cognitive Map
		Overlapping Depth Map and Cognitive Map
		Overlapping Intelligibility Map and Cognitive Map

7. CONCLUSION

The effects of environment on the social behavior of the citizens formed the axis of the present research. The present study was looking for the answer to this question that how spatial relations can persuade citizens to be present in the space and have social interactions? And how this process can be measured? In this research in addition to analysis of spatial configuration of the environment through quantitative parameters of space syntax, the spatial cognition of the citizens was also used to reach more pervasive results. To do so and in the qualitative part of the research, citizens participated in the measurement of sociable points of the environment. Views of the respondents overlapped, which included two groups of local residents and non-local users in the classification of three environmental elements including path, node, and sign that in their mental memory had an important role in the formation of social interactions. The product of this adaptation was the creation of two cognitive maps. In the next stage, the residents' cognitive map and spatial configuration maps were compared. Results showed that despite the commonality of cognitive map of the residents

and spatial configuration map in the recognition of formation beds of social interactions, having a detailed look at the environmental elements would result from the weakness of the space syntax method in the recognition of social interaction beds. It seems that one of the reasons of this issue is the dependence of the space syntax method on the two-dimensional analysis and inattention to 3D elements including urban signs. Generally, results of the study showed that positing the space syntax method and computer modelling of this method (which is formed based on the math science) in the measurement of social concepts have been useful but not enough. In order to do somatic actions to improve social situation of urban tissues, complementary methods such as cognitive maps are needed (in the previous studies also the necessity of attention to complementary results was confirmed). In this relation, more studies are needed regarding the urban tissues and future researchers can evaluate the generalization of this subject with non-generative methods (such as electronic sight of behavioral patterns) so that respondent could have no role in the production of the information, rather his behavior is recorded, imperceptibly.

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Evaluation of Sociability of Urban Environment Using “Cognitive Maps” and “Spatial Configuration Maps”

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ABSTRACT

The presence and social interaction of people in the public spaces of architecture and urbanism lead to the spaces' sociability. In the present research, the subject of discussion was the sociability of public spaces. The quality of sociability is the inseparable feature of the urban public spaces but, it has been faded or lost in some urban public spaces. The present study sought to answer this question: how and with what parts, the measurement of the environment sociability is performed with focus on the two human and environmental approaches? To do this, Oudlajan neighborhood of Tehran was selected and investigated as the case study. Possible platforms of social interactions' formation were investigated in this area (from two environment-based and human-based aspects). In this research, proper literature, theoretical foundations, the studied indexes, and research method were collected and classified using first hand resources. The present methodology included two cognitive and spatial sections. In the cognitive section, using available documents and maps, the area map was prepared. After field visits and interviewing with the local and nonlocal residents, cognitive findings were collected and cognitive maps were produced. The spatial configuration of the neighborhood was evaluated through quantitative parameters of the space syntax method. Finally, comparing qualitative and quantitative data, sociability of the Oudlajan neighborhood was analyzed. Findings of the research showed that it has been useful to consider the space syntax computer modelling as a principal in the evaluation of social concepts, although it was not enough. In order for somatic activities to improve social status of the urban tissues, it is required to use complementary methods such as cognitive maps.

Keywords: Sociability, Spatial Cognition, Cognitive Map, Spatial configuration.

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1. INTRODUCTION

In the sociable environments, somatic space based on its spatial features results in the formation of activity hubs and eagerness to activity in certain parts of the space (Daneshgarmoghaddam, Bahrainy, & Einifar, 2011). Sociable spaces are the place of forming social interactions and actions among individuals (Shojaee & Partovi, 2011) and have a close relation with the individuals' social life (Mohammadi & Ayatollahi, 2015), so that the planning of proper somatic-spatial bed for the presence and having social interactions is one of the purposes of the formation of the architectural and urban social spaces. Presence and promotion of the citizens' social interactions in the urban environments and supplying their social needs, increase their cooperation spirits and attachment and result in the mobility and vitality of the environment (Ghalambor Dezfuly & Naghizadeh, 2014; Karimi & Mohammadhoseini, 2018; Daneshpour & Charkhchian, 2007). But, this issue has been less investigated in public spaces of the neighborhood. Public spaces can promote social life through reinforcing social interactions of the citizens (Montgomery, 2013) and contributing to the social stability (Harun, Zakariya, Mansor, & Zakariya, 2014). By considering this issue, the present research was conducted with the purpose of assessing the environment sociability by comparing cognitive maps and spatial configuration maps. To reach the mentioned purpose, Oudlajan neighborhood from Tehran's old tissue was investigated. In the performed researches of this area, the effect of spatial configuration of the artificial environment on the human behavior has been observed but, spatial cognition which is the result of the analogous relationship of the human and environment, has been less interesting. Spatial configuration refers to the relations between the environmental details (Hillier, Penn, Hanson, Grajewski, & Xu, 1993) but, spatial cognition is the result of corresponding the relation of the human and environment (Hart & Moore, 1971). Hence, the question is that does spatial cognition of the people from the environment and spatial configuration of the environment have commonalities in the identification of cumulative life bed in urban spaces? If it is so, in the studied bed that is Oudlajan old neighborhood of Tehran, which spaces are the most sociable spaces according the analysis of cognitive maps and spatial configuration maps? And if cognitive maps and spatial configuration do not have commonalities in the identification of sociable places, which of these two maps can be considered as the action criterion of authorities and planners of the urban designs to promote the individuals' social interactions?

2. LITERATURE REVIEW

With the attempts of Professor Bill Hillier, the theory of spatial configuration has been designed and developed

to identify the organization of urban spaces and to predict the behavior and social activities of the citizens (Mollazadeh, Barani-Pesyany, & Khosrowzadeh, 2011). In recent decades and due to the following reasons, this approach has attracted many attentions: the expansion of this approach in a vast spectrum of urban and architectural environments, developing software skills of this approach and providing the possibility of numerical comparison of various spatial configurations and global organizing of discussions of this approach (Jafary Bahman & Khanian, 2013; Penn, Hillier, Banister, & Xu, 1998). But criticisms like the lack of social foundations and inability to study the complexities of life has been imported to this theory (Jafari Bahman & Khanian, 2013) and it seems that the spatial configuration method is not responsive of social events, alone and needs combinatorial methods to make the results of researches more reliable that can assess human social events through computer modellings of space syntax. Cognitive maps are one of these methods. Cognitive map theory was first used for mental representations of the physical environment (Tolman, 1948). It is assumed that these maps are formed gradually and by receiving information from the environmental elements (Tversky, 1993). Cognitive maps are formed by the collection of the identification of the environmental structure and features of mental meanings of the environment (Sidanin, 2007). Cognitive maps are of key subjects in the environmental studies and are considered to be of important areas in the urban designing, architecture, and architectural aspect and there are various methods to assess it (Asadpour, Faizi, Mozaffar, & Behzadfar, 2015). In this section, some of the performed researches with cognitive maps approach have been reviewed. Pourjafar et al., 2011 in a research evaluated the position of urban signs in the cognitive maps of Yazd citizens and stated that distinct signs from the around tissue according to the citizens' views has had more importance near main arteries that have historical value with religious, cultural, commercial, and urban element usages (Pourjafar, Bemanian, Taghvaei, & Montazerolhoggah, 2011). Imani et al., 2013 investigated historical tissue of the Sangsiah neighborhood in Shiraz to study the individuals' navigation process and concluded that people's cognitive knowledge in the form of cognitive maps facilitates the navigation process (Imani, Taki, & Tabaeian, 2013). Moreover, Asadpour et al. 2015, in their study evaluated and analyzed the data of cognitive maps and mental images and showed that different types of available concepts in the field of perceptual-mental maps can be divided into two types of "topologic representation" and "verbal representation". Further, methodology has classified the imitation of images and cognitive maps into two types of design-descriptive models (generative) and evaluation-recognition models (non-generative) (Asadpour et al., 2015). In another research, Seqhat

al-Islami and Behnamifard, 2012 with the purpose of knowing people's mentality of the concept of neighborhood and comparing it with the definition of neighborhood in the urban management showed that the conventional neighborhood defined by the municipality are distinct from people's mentality of neighborhood (which is the result of interaction of social and local concepts). Despite the studies mentioned, in Iran few researches have been performed about overlapping data of features of cognitive and spatial configuration of the environment. This issue has been investigated in some internal and external articles. In one of the researches that investigated the relations of these two methods, Didehban et al, 2014, studied some neighborhoods of Dezful to investigate the relations between spatial cognition and spatial structure using cognitive mapping (qualitative) and spatial configuration. Long et al., 2007 also, investigated the effects of spatial configuration in spatial cognition and legibility of the urban environment. To do so, they used the space syntax (to measure spatial configuration of the neighborhoods), mental cognitive map and also interview (to measure the environment legibility and spatial cognition of people) methods (Long, Baran, & Moore, 2007). In the Zhai and Baran's 2007 study, the relation of spatial configuration of parks and the behavior of the citizens' walking was investigated. Researchers classified the walking behavior of the citizens by drawing maps and evaluated spatial configuration of parks relying on the space syntax. Other researches like Lee et al., 2005; Kim, 2001; Ali Tajer et al., 2018; Shokouhi, 2009 investigated the relations of spatial configuration, spatial behavior and spatial cognition. According to this experimental literature, in this research, "sociability" was investigated through comparing "cognitive maps" and "spatial configuration maps".

3. RESEARCH METHODOLOGY

The present methodology included two parts. In the first part, the research's statistical population were evaluated using cognitive map method. The statistical population of the research included two types of people: 1. Oudlajan neighborhood residents 2. Oudlajan neighborhood visitors. Among them, 40 individuals were selected voluntarily using sampling method so that half of the population were residents and the other half were visitors (non-local). First, the available situation of the neighborhood was investigated. In the following and in the interaction with the respondents, a copy of the neighborhood map was put before them, descriptions were provided about their participation in the research process and they were asked to classify the situation of paths, nodes, and neighborhood signs according to the occurrence of social interactions. In the second part of the research, relying on the space syntax simulations and based on the axial analysis system, the spatial configuration of the neighborhood

was analyzed. Quantitative parameters of the space syntax in this research were: connectivity, integration, depth, and intelligibility. To analyze the mentioned parameters, axial map of Oudlajan neighborhood in the environment of the Auto Cad program was prepared and stored by Dxf suffix. Then, axial map of the neighborhood was analyzed in the environment of Arc gis software (to overlap connectivity and integration maps with equal amount of weight) and UCL Depth Map. In the output map of the software, the value of the calculated parameters was specified using color spectrums. Finally, by comparing cognitive maps (in which familiarity with the environment was taken into account) and the spatial configuration maps, sociability of the Oudlajan neighborhood was analyzed.

4. DOMAIN OF THE RESEARCH

Oudlajan neighborhood: This neighborhood is located in the 21th district of Tehran municipality and has a land of 150 hectares. The scope of Oudlajan neighborhood includes Panzdah Khordad street in the south, Naser Khosro street in the west, Amirkabir street in the north and Rey street in the east. Today, this neighborhood has three main parts: Imamzadeh Yahya in the east, Pamenar neighborhood in the middle, and Naser Khosro neighborhood in the west (Rezaei & Hannachee, 2015; Google Map, 2016) (Fig. 1).



Fig. 1. Images of the Nodes and Paths of the Oudlajan Neighborhood

5. THEORETICAL FOUNDATIONS

5.1. The Spatial Layout

The main concept of space syntax (spatial layout) is based on the spatial cognition and spatial behavior. space syntax is a research method that investigates spatial configuration role as an independent variable in social systems. The focus of this approach is on developing representation and analysis of the spatial structure (from the scale of internal spaces to the large

urban systems) used in society (Kim & Sohn, 2002). This theory along with theoretical developments and improving techniques and computer analysis methods has attracted the attention of architects and the urbanists (Siadatian & Pourjafar, 2015). In this method, the pattern of spatial communications is analyzed using graphs and is investigated through syntactic variables. Using these tools, the identifying spatial structure is performed through the analysis of the relation between these social variables and qualities, since individual aspect of these variables has not any value (Hillier & Vaughan, 2007; Rismanchian & Bell, 2010). In this theory and method, using indexes such as integration, depth, connectivity, intelligibility, etc., the spatial layout has been analyzed (Long, Baran, & Moore, 2007; Hillier & Hanson, 1984; Bafina, 2003). Actually, the space syntax is posed to describe configuration, connectivity, and articulation of the constructed places (including buildings and passages network). This interpretation of configuration is suggested to describe different psychological and environmental features of the studied area. Features include the experience of the neighborhood by people, preference of the movement base of people in the place and understanding and recalling the place (Montello, 2007). Moreover, according to the theory of "natural movement" (Hillier et al., 1993), distribution of the pedestrian flow is derived from spatial configuration (Zhani & Baran, 2016). If people show more willingness to use some paths (in relation to other paths) (like paths with high integration and connectivity), it may be assumed that some physical elements (such as signs and nodes) are in these paths that can be reflected explicitly in their cognitive maps. This process in turn will help to the individuals' navigation (Long, Baran, & Moore, 2007). So, the situation of spatial configuration of the neighborhoods and cognitive maps of the residents can be related to each other.

5.2. Cognitive Topography

Hart and Moore, 1971 have defined the spatial cognition in the form of internal representations and reconstruction of space in the mind. In other words, according to them, spatial cognition has been defined in the form of cognitive representations related to the structure, factors, and spatial relations. In the definition of Downs and Stea, 1973, the complex set of information that are in different environments, forms cognitive topography process. The final product of this process is creation of a cognitive map. Burnett, 1978, defined perception and recognition of the relation of human and the around environment as a psychological process that is related to the human behavior. Five key elements including path, node, edge, area, and sign are identified by Lynch and other researchers of this area as the users' cognitive map details (Lynch, 1960; Long, 2007). In this research, by

focusing on the elements of path, node, and sign, it is tried to progress the research subject. Different methods are used to extract cognitive maps and each of them has their own usage. In the production of cognitive maps, variables such as simplifying and quality of drawing the elements and details (Asadpour et al., 2015) result in the production of errors in the extraction of correct information. So, in this research, it was tried to use a method that can somehow remove available decreases. Hence, respondents do not have a generative and active role in the production of informational maps, rather they have a non-generative role in the classification of the spaces. The reason to use such a method was using a complementary method to reach the research purpose. In this research, it was assumed that citizens show more willingness to have presence and social interaction in parts of the neighborhood that have more appropriate spatial structure. However, is it enough to rely on the computer modelling of the space syntax to measure the individuals' social activities? Studies have shown that spatial configuration and spatial cognition have relations to each other (Kim, 2001). So, in this research, in addition to relying on the quantitative parameters of the space syntax method, a complementary qualitative method called cognitive maps (the map that is the result of spatial cognition of the environment users) was used in the identification of formation of beds of cumulative life. The purpose of adaptation of these two methods was to identify points of the neighborhood spatial structure that in the two methods have an undeniable role in the attraction of people to the environment and interaction between them and to understand the accuracy amount of the findings of the space syntax method.

6. ANALYSIS AND DISCUSSION OF THE FINDINGS

6.1. Analysis of Findings of the Cognitive Features

In this part, two cognitive maps have been provided. One of these maps was the result of overlapping cognitive maps of local residents and the other was formed by overlapping of the classified cognitive maps by non-local people (Figs. 2 & 3). In the cognitive map of local residents, in addition to Pamenar and Mostafa Khomeini axis, environmental axis such as Rey, Panzdah Khordad, and Naser Khosro and some union axis of the mentioned main frameworks were also of proper familiarity among citizens in order to establish social interactions. However, in the cognitive map of non-local people, the individual's emphasizes was on the mentioned main axis and the internal axis of the tissue had less importance among them and had an acceptability of 25-50% among individual . The other eminent difference of the two cognitive

maps, according to the two groups of respondents, was defined in the urban signs. Local respondents had more ability in the recognition of the urban signs due to the long familiarity but, non-local respondents had difficulty in the recognition of the signs. Finally, regarding the spatial nodes, it can be said that the two respondent groups had commonalities in the recognition of the environmental nodes that were placed on the main frameworks of the neighborhood but, the two groups were different in the recognition of internal nodes that showed inability of non-local respondents in the recognition of internal nodes.

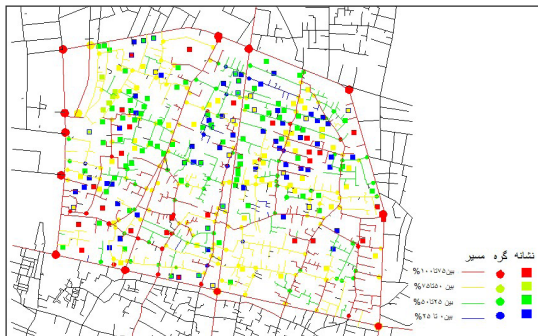


Fig. 2. Cognitive Map from Local Residents

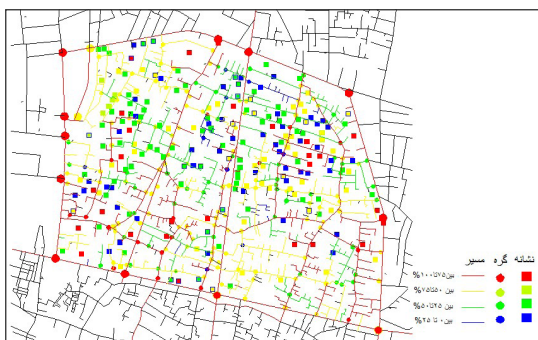


Fig. 3. Cognitive Map of the Neighborhood from the Point of View of those Who Are Not Local, But Who Use the Neighborhood and Less Familiar to Them

6.2. Analysis of the Findings of the Spatial Configuration

In the table 1, the findings of the analysis of the spatial configuration indexes have been presented in the map of the available situation of Oudlajan neighborhood. These findings included connectivity, integration, depth, and intelligibility. In the presented maps, the color spectrum was used to show values. So that in places that component had the most value, diagram was red and in places that had less amount of component, diagram was blue (Table 1). Integration is the most important factor in spatial layout. In other words, to the extent that a space has a higher integration, it has more coherence with spaces and the city structure. Moreover, more integrated spaces have higher accessibility (Rismanchian &

Bill, 2010). In contrast to the integration component is the depth component. The space depth shows the amount of isolation and separation. Actually, deep spaces have lower integrations. To analyze spatial configuration of the Oudlajan neighborhood, the Pamenar axis, Mostafa Khomeini and Panzdah Khordad which were the results of building street in the historical neighborhood of Oudlajan, are were integrated than the other points (environmental axis has also a proper situation in this respect). In the other words, mentioned axis had more integrity with the set and had more accessibility. In the more integrated axis and points, due to less depth and more accessibility, the possibility of the presence of individuals was more. Also, this presence made the possibility of occurrence of social interactions among citizens more. By looking more at the analysis of the depth and integration maps of Oudlajan neighborhood, other results could also be achieved including that the most integrated points were in the convergence place of the streets. Also, most of the internal axis of the tissue had a low integration due to the separation from the main axis of the neighborhood and more depth. This separation could result in the creation of isolated spaces that usually had lower security (insecurity with local origin) in relation to other points and decreased the possibility of occurrence of social interactions. Connectivity is of the other components of the space syntax and shows the number of accesses to the required space (Long, Baran, & Moore, 2007). Having analyzed the connectivity map of the Oudlajan neighborhood, it was concluded that the axis of Panzdah Khordad, Mostafa Khomeini, and Pamenar had the most amount of the connectivity component, respectively and in the other classes were surrounded streets and some local short allies. This issue showed that the mentioned axis formed the main framework of the neighborhood and due to higher connection with other points, it was used more than other points by citizens showing high penetrability of these sections.





Moreover, this presence can have results such as being more secure (by assuming internal insecurity of the neighborhood). In other words, according to the connectivity and depth components, some of the internal axis of the neighborhood that had more depth and was predicted to have less penetrability and traffic, according to the Hillier view, had lower security and they had low possibility of having social interaction. According to the available experimental literature, the presence of individuals makes the possibility of social interactions more (a spectrum of looking to talking between individuals can be placed in the social interaction subset) (Daneshpour & Charkhchian, 2007).

Another index that has been discussed in this research was the complementary component of intelligibility which was achieved by the statistical correlation between "general integration" and "connectivity"

(Hillier & Jlienne, 1984; Long, Baran, & Moore, 2011; Tiangxiang, Dony & Shoubing, 2014). From the analysis of the intelligibility map of the Oudlajan neighborhood, it was concluded that the axis of

Panzdah Khordad, Mostafa Khomeini, and Pamenar and environmental axis of the neighborhood had the most amount of value. Also, results showed the intelligibility signs of many internal axis of the tissue.

Table 1. Finding of Connectivity, Integration, Depth and Intelligibility(Indicator) of the Oudlajan Neighborhood

The Amount of		Neighborhood Status Based on Analysis	Indicator
0	Min		Connectivity
2.21	Average		
24	Max		
0.1	Min		Integration
0.6	Average		
1.16	Max		
1	Min		Depth
14.98	Average		
28.64	Max		
			Intelligibility
		<p>شهرکامی</p> <ul style="list-style-type: none"> 0.605448 - 1.785710 1.785711 - 2.447880 2.447881 - 2.912520 2.912521 - 4.087300 4.087301 - 9.273560 9.273561 - 21.629499 	

6.3. Criticizing Methods and Discussion about the Role of Cognitive- Spatial Findings on the Space Sociability









In an urban artificial environment, the city spatial configuration and spatial cognition that citizens achieve from spatial configuration of the city, affect their social behaviors. So, comparative comparison of the city spatial configuration and spatial cognition of the citizens were used as a combinatorial method in the measurement of the citizens' sociability. For this comparative comparison and with the purpose of responding to the questions about the sociability of Oudlajan neighborhood and relying on the pooling of the maps, in the first stage the cognitive map of local residents on the spatial configuration maps of the neighborhood and in the second stage, the cognitive map of non-local users were adapted on the spatial configuration maps of the neighborhood (Table 2).

Having comparatively compared the cognitive and spatial configuration maps of the neighborhood, it can be concluded that there were differences between the qualitative data of analyzing cognitive maps and quantitative data of investigating the spatial configuration maps. In other words, cumulative spaces welcomed by the residents were relatively different from beds that were presented (predicted) through computer modelling (that is through the space syntax method) as the possible places of the individuals' presence and having social interactions which may be due to the fact that software analysis had analyzed available axis of the neighborhood (there are mathematical relations between them) which were two-dimensional and could not recognize 3D elements (like signs). Moreover, in these methods, the space users were not taken into account. With a more look at the analysis and comparing quantitative and qualitative data, following results were obtained:

In comparing the spatial cognition of local residents and connectivity map, it was observed that the main axis (3 axis of the main framework) in the two maps were lap on each other so that, in the cognitive map in addition to the main axis, environmental axis were also of adequate acceptability among residents in order to have social interactions. Moreover, in the cognitive map of the residents (from the social interaction aspect) several internal tissue axis had

a high degree of importance (75-100%). But, the spatial configuration map was weak in recognition of these parts and these axis were shown with a less amount of connectivity. In other words, in the spatial cognition of the residents (in relation to computer modelling), the number of nodes and paths that could be effective in the attraction of individuals and as a result could provide social interactions, were more. But in the cognitive map which was drawn by non-local residents, cognitive and spatial configuration maps had more adaptation. Results of comparing cognitive maps and integration map of the Oudlajan neighborhood showed that in a relatively large part of the internal axis of the neighborhood, low integration and movement prediction and less presence of residents could be observed, although some of these axis in the cognitive maps of the residents had the most coefficient from the social interaction aspect. The depth component also (that shows separation of the neighborhood parts from the whole set) was achieved by comparing configuration maps and cognitive maps that the amount of depth component in the main (and small extensions to the main axis) and environmental axis had the least amount which was a believable result because these axis after building the street were more accessible than the other parts and the possibility of attraction, presence, movement, and having social interaction of individuals was more in them due to the low isolation degree of the axis. This finding adapted to cognitive findings. Some of the internal axis as compared with the main framework, had a less amount in the depth of the neighborhood map and were more accessible. The presence of people and the possibility of occurrence of social interactions in them seems to be more. This finding was adapted more to the cognitive map of local people. Comparing the diagram of intelligibility and cognitive map of the residents, following results have been achieved: Adaptation of the intelligibility and cognitive maps of the neighborhood showed that the main framework of the neighborhood has had a higher intelligibility from the computer modelling aspect. According to the cognition of local and non-local residents also, the possibility of the occurrence of social interactions were more in these parts so, it was observed that in spaces with higher amount of intelligibility, the possibility of occurrence of social interactions were more.

Table 2. Overlapping Cognitive Maps and Spatial Configuration Maps

Overlapping Cognitive Maps of Non-Local Users on Spatial Configuration Maps	Overlapping Cognitive Maps of Local Residents on Spatial Configuration Maps	
		Overlapping Connectivity Map and Cognitive Map
		Overlapping Integration Map and Cognitive Map
		Overlapping Depth Map and Cognitive Map
		Overlapping Intelligibility Map and Cognitive Map

7. CONCLUSION

The effects of environment on the social behavior of the citizens formed the axis of the present research. The present study was looking for the answer to this question that how spatial relations can persuade citizens to be present in the space and have social interactions? And how this process can be measured? In this research in addition to analysis of spatial configuration of the environment through quantitative parameters of space syntax, the spatial cognition of the citizens was also used to reach more pervasive results. To do so and in the qualitative part of the research, citizens participated in the measurement of sociable points of the environment. Views of the respondents overlapped, which included two groups of local residents and non-local users in the classification of three environmental elements including path, node, and sign that in their mental memory had an important role in the formation of social interactions. The product of this adaptation was the creation of two cognitive maps. In the next stage, the residents' cognitive map and spatial configuration maps were compared. Results showed that despite the commonality of cognitive map of the residents

and spatial configuration map in the recognition of formation beds of social interactions, having a detailed look at the environmental elements would result from the weakness of the space syntax method in the recognition of social interaction beds. It seems that one of the reasons of this issue is the dependence of the space syntax method on the two-dimensional analysis and inattention to 3D elements including urban signs. Generally, results of the study showed that positing the space syntax method and computer modelling of this method (which is formed based on the math science) in the measurement of social concepts have been useful but not enough. In order to do somatic actions to improve social situation of urban tissues, complementary methods such as cognitive maps are needed (in the previous studies also the necessity of attention to complementary results was confirmed). In this relation, more studies are needed regarding the urban tissues and future researchers can evaluate the generalization of this subject with non-generative methods (such as electronic sight of behavioral patterns) so that respondent could have no role in the production of the information, rather his behavior is recorded, imperceptibly.

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