

Social Interaction and the Built Environment: A case study of  
university students in Waterloo, Ontario

by  
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## Author's Declaration

This thesis consists of material all of which I authored or co-authored: see Statement of Contributions included in the thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

## Statement of Contributions

The contents of this thesis are primarily authored by Tharushe Jayaveer. The survey data is part of Dr. Markus Moos' funded research program. Dr. Moos led the design and administration of the survey, and contributed to research design, methodology and editing of the thesis in the capacity as research supervisor.

## Abstract

In recent years, there have been rising calls for universities to develop policies that support student well-being due to the growing concern for mental health on campuses. One area of concern is the influence of the built environment on students' mental health. A built environment that fosters social interaction is often recognized as a vital component in supporting well-being, friendship formation, academic achievement, self-identity and even knowledge creation. The literature has identified housing type, location, and quality as substantial determinants of students' social lives and well-being. However, research has not yet studied the importance of housing and the built environment in shaping social interactions among university students in detail.

In this study, we examine the relationship between the role of the built environment, such as proximity to third places, on social interaction among students at the University of Waterloo. We particularly compare the degree of social interaction and connectedness and studying at third places like university libraries and coffeeshops and compare degree of social interaction and connectedness with students who study at home. We draw on unique time-series survey data that includes information from the same group of students collected over the course of the academic year (Fall 2018 to Summer 2019). The survey design allows us to draw potential conclusions about causal links between built form and indicators commonly associated with mental health, such as degree of social interaction and feelings of connectedness.

The survey includes information on students' residential environments, built form, demography, and various indicators of social interactions and chance encounters. Through ordered logistic regression analysis, we found that students who study at coffeeshops and university libraries felt a higher degree of social connectedness, had more positive attitudes toward planned gatherings, and preferred living close to amenities compared to students who study at home. However, it is important to note that there were differences in these findings over the course of the academic year, and that programming, such as social events, were as important as built form in shaping indicators of well-being.

The empirical evidence from this research supports the notion that the use of third places heightens feelings toward social connectedness. The knowledge gained from investigating the relationship between the role of the built environment in influencing social interactions among the student population will be valuable to universities and planners to develop policies, programs, and initiatives to provide opportunities and create environments that support social connectedness.

A crucial element of this research was to acknowledge the differences among students who study at third places and those who study at home. Though some students use third places to socialize, and feel connected, others may not. This research raises some questions – are there other alternative initiatives that can be taken beyond creating social built environments that could encourage students to engage in social interaction? This research emphasizes the important role of the built environment and programming in shaping students' social interaction and well-being.

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# 1. Introduction

## 1.1 The Examination of Third Places and its Influence on Student Life and Preferences

This project is a case study of University of Waterloo (UW) students. Dr. Markus Moos designed and conducted a survey which collected information about students' residential environments, built form, demography, and various indicators of social interactions and chance encounters (e.g., Likert scale questions on likelihood of running into friends while studying or running errands). Students were recruited to participate through the UW's Housing and Residences' social media channels. The survey was also included in a newsletter and was sent to students via email. The researchers, student organizations and UW's Students Success Office also encouraged students to partake in the survey using social media. Each student participant who completed a survey received a \$10 gift which was applied to their identification card (WatCard) for use on campus. The survey was sent out to the same group of students six times throughout the school year, on a bi-monthly basis, which resulted in a total of six surveys and approximately 2,000 responses from the first survey. This research was funded by and completed in partnership with the UW's Housing and Residences department (hence, the focus on Waterloo students).

This study examines the descriptive characteristics of students who study at the university library, nearby coffeeshops and at home. It also observes the causal link between studying at these places and (1) its influence on students' perception of social connectedness, (2) their attitudes toward planned gatherings, and (3) their

preferences toward living within proximity to amenities, using ordered logistic regression analysis.

## 1.2 Thesis Structure

The thesis primarily adopts a quantitative analytical method to answer the research questions. The introduction section provides a brief overview of the case study, and research questions. Following this section, an examination of existing literature is provided on third places, social connectedness, and built environments. Then, a brief discussion regarding quantitative and qualitative methods used for similar studies is described prior to outlining the methodology used for this case study. The methodology section describes the survey administration, the quantitative approach, how the analysis is conducted through ordered logistic regression analysis, and the limitations of the methodology. Following the methodology section, a narrative is provided to explain the regional and local context of the City of Waterloo and the University of Waterloo. The survey findings are then presented, in addition to an analysis of the key results. Finally, this thesis will conclude by summarizing the research findings, discussing the implications for planning policy and post-secondary student environments, and propose ideas for further research.

## 2. Literature Review

This study of third places and student demographics requires us to look at three areas of literature – planning for the public realm, social connectivity, and the role of second and third places on student life. Scholars and planning practitioners are interested in studying third places and examining their role in planning for communities and identifying their implications for planning practice. Primarily, most existing research on third places and planning for the public realm tests the validity of third places in terms of how they influence social interaction, cohesion and sense of belonging within the community context (Jeffres et al., 2009; Mehta & Bosson, 2010; Yuen & Johnson, 2017; Williams & Hipp, 2019; Cilliers, 2019). Most researchers study the relationship between specific third places, such as libraries, cafés, and restaurants, and particular demographic groups, such as students, seniors or immigrants (Campbell, 2017; Johnson, 2012; Ferria et al., 2017; Waxman et al., 2007; Lukito & Xenia, 2017; Lee & Tan, 2019). Other studies compare the concept of third places with restorative places, and the applicability of third places on technology and virtual environments (Banning et al., 2010; Rosenbaum & Smallwood, 2011; Rosenbaum et al., 2014; Chua, 2002; McArthur & White, 2016; Lukito & Xenia, 2017, Yuen & Johnson, 2017). These studies acknowledge that third places have evolved over the years since the emergence of this area of literature (Banning et al., 2010; Rosenbaum & Smallwood, 2011; Rosenbaum et al., 2014; Chua, 2002; McArthur & White, 2016; Lukito & Xenia, 2017, Yuen & Johnson, 2017). This literature review will begin by examining the role of third places on the public realm, the definition of third places, their evolution, the social dimension of third



places, the significance of second and third places on the student demographic, and finally understanding the role of libraries and coffeeshops as third places.

## 2.1 Third Places and Planning for the Public Realm

The Ontario Professional Planner's Institute defines the public realm as "publicly owned places and spaces that belong to and are accessible by everyone" (Ontario Professional Planners Institute [OPPI], 2016). Examples of these spaces can range from the street, to open spaces and parks, public transit systems, cafés, libraries, community centres or even a bike lane (OPPI, 2016). The Institute further emphasizes the importance of planning for the public realm as it facilitates individuals to feel connected to their community, experience a sense of place, increase physical and mental health, and improves public safety (OPPI, 2016). Moreover, scholars note that the public realm offers space for strangers to coexist and develop civic norms (Walters & McCrea, 2014). Evidently, there are positive attributes linked with the public realm and the need to plan for it.

Nonetheless, the literature often highlights the decline and criticisms regarding the public realm and the deeper underlying issues associated with them. For instance, scholars note that the decline of the public realm and negative views towards it began in the early twentieth century (Aelbrecht, 2016). Banerjee (2001) describes the historical justifications for the decline of true public spaces over the years:

"The early resistance of American Puritanism to pleasure and decadence associated with public life; the advent of industrialization that preordained the dominance of the automobile; the flight of the American middle class from the

inner city; the Modern movement in architecture, which glamorized the urban grid, [and] the economics of cheap and expedient land development (Hitt, et al., 1990)” (2001, p. 12).

Additionally, Aelbrecht (2016) cites other findings from scholars who argue that the decline of the public realm has been due to the dense and rising population, as well as urban spaces becoming duller with a lack of meaningful gathering spaces (Simmel, 1903; Wirth, 1938; Sennet 1977; Oldenburg, 1989). Banerjee (2001) identifies other themes and aspects which contribute to the modern public realm, which include the introduction of “zoning, suburban shopping malls, office parks, strip malls, and urban sprawl” (p.12). Though these places may contribute to public congregation, they are not truly public places because they are not accessible to all individuals who comprise the public. Scholars also have contradicting views on the public realm as some note that the decline in quality and supply of public spaces is due to the lack of security and weakened social control, alluding to the criminal activity that may take place and the rise of homeless individuals seeking shelter in public spaces (Banerjee, 2001). However, others argue that public spaces reduce crime due to the nature of space being occupied by a variety of individuals (Williams & Hipp, 2019; Jeffres et al., 2009), consistent with Jane Jacob’s “eyes on the street” hypothesis (1992).

Many of the criticisms around the public realm are associated with semi-public private spaces (e.g., coffeeshops) because they are not truly “public” and often result in barriers to entry and exit. Scholars recognize that though some privatized spaces (particularly semi-private/semi-public spaces) may appear to be public in nature, there are “invisible boundaries”, or barriers, which prevent all

individuals of various socioeconomic backgrounds from accessing and using the space (Banerjee, 2001; Webster, 2002; Walters & McCrea, 2014). Social barriers may include racism, sexism, homophobia and other 'isms' (Walter & McCrea, 2014). Additionally, a coffeeshop or restaurant, or public facilities that require a fee all include the aspect of consumerism which acts as an invisible barrier. Often, individuals who use these spaces are exclusive users because they are required to make a purchase or pay a fee to use the space (Banerjee, 2001; Webster, 2002). Owners of publicized private spaces are also legally able to create restrictions in their spaces, such as using signs to prohibit the entry of certain individuals or removing individuals from the space (Banerjee, 2001). Accessibility and proximity are another barrier of both public and private spaces, implying that those who live close to a public space are its exclusive users (Webster, 2002). Therefore, it is evident that both public and semi-public private spaces, which appear to be public in nature, often have barriers associated with them and are not equally accessible and available for all.

There are conflicting perspectives on the public realm. The variations of the public realm, and the negative and positive characteristics of these spaces are valid. The public realm does allow strangers to interact with one another and does provide an educational opportunity for individuals to learn about others who are different from themselves. This observation is consistent with contact hypothesis developed by Gordon Allport (1950) which argues,

“prejudice...may be reduced by equal status contact between majority and minority groups in the pursuit of common goals. The effect is greatly

enhanced if this contact is sanctioned by institutional supports (i.e., by law, custom, or local atmosphere), and provided it is of the sort that leads to the perception of common interests and common humanity between members of two groups (Allport, 1950, p. 281 as cited in Dovidio, 2008, p.9).

However, semi-public private spaces do have barriers associated with them which may prevent individuals from entering. The next section will focus on one specific aspect of the public realm, third places.

## 2.2 Defining Third Places

The term 'third place' was coined by sociologist Ray Oldenburg (Banning et al., 2010; Oldenburg, 1999). Oldenburg (1999) defines third places as spaces individuals can regularly visit to interact with acquaintances or strangers away from first and second places, which are the home and the workplace, respectively (Yuen & Johnson, 2017; Mehta & Bosson, 2010; Campbell, 2017). Most literature on third places cite Ray Oldenburg because of his immense work in introducing and defining the term (Yuen & Johnson, 2017; Mehta & Bosson, 2010; Campbell, 2017; Waxman et al., 2007; Johnson, 2011; Ferria et al., 2017; Lukito & Xenia, 2017). Oldenburg (1999) argues that the lack of interaction in America is due to suburban development (p. 17-18). Thus, he proposes creating an engaging public life using third places (Oldenburg, 1999, p. 17-18). Oldenburg (1997) also applies the concept of third places to post-secondary environments, recognizing its influence in forming a student community (Banning et al., 2010). Some examples of third places include "small businesses such as cafés, coffeeshops, bars, pubs, restaurants, community centres, general stores, parks, and others" (Mehta & Bosson, 2010, p. 780; Campbell, 2017, p. 157; Yuen & Johnson, 2017, p. 296).

Oldenburg (1999) argues that numerous characteristics need to be present in order to create community cohesion. Scholars have taken a variety of approaches in identifying these characteristics. Specifically, McArthur and White (2016) categorize eight characteristics as follows:

1. *Neutral Ground*: The space is seen as neutral ground because individuals can “come and go as they please” and eliminates the host or hostess role which exists when entertaining at home (Oldenburg, 1999, p.22 as cited in McArthur & White, 2016, p. 3).
2. *Leveler*: The space is accessible and inclusive as it strips individuals of any form of status or hierarchy, thus resulting in everyone being on the same social level (Oldenburg, 1999 as cited in McArthur & White, 2016, p. 3).
3. *Conversation*: The primary activity in a third place is conversation. It is a space where individuals “can connect and share similar interests” (Oldenburg, 1999 as cited in McArthur & White, 2016, p. 3).
4. *Accessibility and accommodation*: The place provide individuals with familiarity, comfort, and community. It is the place individuals can go to at any time of the day with the certainty that they will encounter acquaintances. It also plays a role in individuals’ mental health as they will be able to remove feelings of boredom or loneliness (Oldenburg, 1999 as cited in McArthur & White, 2016, p. 3).
5. *Regulars*: The place will consist of ‘regulars’, however Oldenburg (1999) emphasizes that the frequency of visits does not define an individual as a

- regular, instead he argues it is important for there to be a level of familiarity with surroundings and other individuals (McArthur & White, 2016, p. 3).
6. *Low profile*: Individuals can keep to oneself; the individuals that gather at the place are what creates a sense of community (McArthur & White, 2016).
  7. *Playful mood*: The environment in the place will be lively and encourage individuals to “return, recreate and recapture the experience” (Oldenburg, 1999, p. 39 as cited in McArthur & White, 2016, p.3).
  8. *Home away from home*: In comparison to the first and second place, home and work respectively, third places do not expect an individual to be there, however instead, people choose to go to a third place and want to be there (Oldenburg, 1999 as cited in McArthur & White, 2016).

### 2.3 The Evolution of Third Places

The term third place has evolved over the years, with scholars examining Oldenburg’s characteristics and original definition. Scholars have applied the term to several places beyond Oldenburg’s original application to North American low-density contexts (Thompson, 2018). Researchers applied the concept of third places to high-density contexts, low-income neighbourhoods, and urban, rural, and suburban environments (Thompson, 2018; Williams & Hipp, 2019; Jeffres et al., 2009). Additionally, the concept of third places has been applied to online environments such as forums, and social media platforms, and observed the influence of technology in third place environments (Chua, 2002; McArthur & White, 2016; Lukito & Xenia, 2017, Yuen & Johnson, 2017).

The application of third places beyond the North American sub-urban context has proven to support Oldenburg's (1999) theory. For example, Thompson's (2018) application to high-density environments in Australia, finds that social spaces provide individuals of diverse backgrounds places to relax on neutral grounds, which, in turn, increases their sense of belonging. Although connections among individuals are identified as "weak ties" due to the nature of living in a high-density environment, they are still valuable for individuals because they provide daily social interaction, and neighbourly aid (Thompson, 2018, p. 315). The findings of this study suggest that high-density environments do not provide enough spaces for individuals to be social, thus supporting Oldenburg's original concept of third places (Thompson, 2018, p. 315). Likewise, Jeffres et al.'s (2009) analysis of a United States national telephone survey found that Americans who live in suburban communities able to identify third places in their communities compared to those who reside in rural communities. Therefore, the concept of third places appears to be more evident in suburban environments as opposed to rural areas.

Moreover, Williams and Hipp's (2018) examination of third places on low- and high-income communities found that residents living in low-income communities experience greater levels of social cohesion as a result of living within close proximity to third places as opposed to those living in affluent communities. This supports Oldenburg's (1999) theory because they conclude that third places create niche communities where individuals with similar interests and values can connect (Williams & Hipp, 2018). The researchers emphasize that these findings could be context-based and high-income residents could be meeting in third places outside of

their neighbourhoods, thus undermining the effect of third places on social cohesion (Williams & Hipp, 2018).

Oldenburg and Brissett (1982), and other researchers have acknowledged that the concept of third places is bound to evolve over time (Oldenburg & Brissett, 1982 as cited in Thompson, 2018). For example, researchers have examined the characteristics noted by Oldenburg (1999) and highlight and critique their applicability to present day. In particular, the following characteristics are re-defined or critiqued by scholars: accessibility, regulars, and leveler.

Oldenburg's (1999) understanding of accessibility implies that users live near third places. However, Yuen & Johnson (2017) use other scholars' definition of accessibility, which is more applicable to present day. Trussel & Mair (2010) define it as "social inclusions and judgement free spaces where there is a sense of acceptance and connection to the broader community" (Trussel & Mair, 2010 as cited in Yuen & Johnson, 2017, p. 297). In some instances, the owners of third places create physical and social barriers for users, such as "No Loitering" signs, or metal spikes to prevent homeless individuals from staying near local businesses in Montreal, Quebec, Canada (Yuen & Johnson, 2017). Scholars suggest that though the aspect of regulars promotes familiarity, it is crucial to create an environment that also promotes diversity and is open to change (Mair, 2009 as cited in Yuen & Johnson, 2017). Thus, the definition of accessibility has evolved over the years from being proximity-based to becoming a socially constructed variable of third places.



Yuen and Johnson (2017) argue that some aspects of urban design do not foster an inclusionary environment, as they attract individuals of higher status and thus conflicts with Oldenburg's notion of third places being a leveler. Though certain third places can improve feelings of belonging and social cohesion for some, it can also result in feelings of exclusion and marginalization to other demographic groups (Yuen & Johnson, 2017). Examples of this include the use of spikes in street furniture, as previously mentioned, to deter the homeless population from using a space. In other instances, the ambiance and social environment of spaces may attract a certain socioeconomic population. Scholars note that though coffeeshops and pubs are identified to be inclusionary third places, they are arguably private spaces that include an aspect of consumption (Yuen & Johnson, 2017). Thus, these spaces provide a place for social cohesion, but they do not necessarily fit the criteria of being a welcoming third place as they exclude portions of the population due to socioeconomic status and the potential lack of affordability.

When examining third places, scholars often understand their influence on social capital and creating a sense of belonging. However, although these places create a community, they often result in the marginalization of certain demographic groups and may even foster feelings of exclusion. Though certain public spaces are recognized as third places, they may not embody the true characteristics of a third place. It can be argued that all public spaces cater to a particular group of people in some ways, but the strategic and systematic exclusion would be of most concern.

## 2.4 The Third Place Versus Restorative Place

Another emerging area of literature with regard to third spaces is its comparison to other place-based concepts. A common comparison or additional term used in third place studies are *restorative places*, and scholars have begun examining the influence of these places on students and at cancer care centres and senior homes (Banning et al., 2010; Rosenbaum & Smallwood, 2011; Rosenbaum et al., 2014). Restorative environments can be defined as “places to relax, rest, recuperate, unwind, and feel safe” (Banning et al., 2010, p. 907). As outlined by Banning et al. (2010), the components of restorative places are the following:

“(a) being away – need a place other than the source of the fatigue; (b) extent – a place that is different, whole, has coherence; (c) fascination – a place that relates to thinking, doing, wondering, figuring things, predicting and recognizing; and, (d) compatibility – a place that is a good fit to one’s inclination” (p. 907).

Although both places contribute to individuals’ mental health and well-being, the primary difference between third place and restorative environments is that the former fosters social interaction and the latter provides a place for relaxation.

The study conducted by Banning et al. (2010) found that 80% of students identify off-campus environments as third places for social interaction and conversation as opposed to on-campus environments (p. 911). The researchers also note that the presence of food and drink are highly correlated with their identification of third places (Banning et al., 2010). Restorative places are often identified on-campus in “natural and built environments and surrounding natural landscapes” (Banning et al., 2010, p. 911). Both third and restorative places have large influences on the student demographic as brief interactions may contribute to informal learning, for example

(Banning et al., 2010, p 910). Because of this, Banning (2002) concludes that it is vital to have these places, particularly in learning environments (Banning, 2002 as cited in Banning et al., 2010). Waxman et al. (2007) also recognize that an aspect of third places not identified by Oldenburg (1999) is the notion of being able to “get away” and “hang out” in spaces, which students often provide as justification for using third places such as cafés, restaurants, and libraries (or for using restorative spaces such as gardens, street furniture and well-designed public squares). Waxman et al. (2007) further explain that this supports the notion of a restorative environment that provides opportunities for community engagement or engaging in intellectual conversations.

Overall, the term “third place” has been defined, redefined and evolved over the years to adapt to the current context. Scholars apply the term to various spaces and critique its characteristics. However, the notion of third places appears to have an important role in community planning and influencing individual’s sense of belonging, social cohesion and social interaction.

## 2.5 The Social Dimensions and Importance of Place

Social dimensions and the relationship between space and society are vital aspects in shaping individuals’ everyday movements, decisions, and interactions (Neutens et al., 2013). It is difficult to comprehend the built environment without considering the social element, and similarly perceive the social elements of humanity without observing the spatial component (Carmona et al., 2010).

Nonetheless, it is important to recognize that this two-way process affects individuals

of various demographic groups and is dependent on socio-economic status and built environment (Carmona et al., 2010).

Mental health is a growing concern on university campuses (El Morr et al., 2017), and there have been rising calls for universities to develop policies and programs to support mental health. One area of concern is the built environment as it impacts student well-being. A built environment that fosters social interaction is recognized as a critical component in supporting mental health as it can provide opportunities for community involvement, collaboration, knowledge creation and even influence students' sense of belonging, and self-identity (Chua, 2002; Thomsen, 2007). A primary built environment which influences student life are third places. The next subsections will define social connectedness and the social role of the built environment on students' well-being.

### *Social Connectedness*

Social relationships among individuals are vital in enhancing quality of life (Lee & Tan, 2019; van den Berg et al., 2016). Lee & Tan (2019) cite the definition of social connectedness as "the amount and quality of social relationships" (Jong-Gierveld et al., 2006 as cited in Lee & Tan, 2019, p. 2). The researchers identify two dimensions of social connectedness, (1) having a social support network which consists of individuals that can provide help or care, and (2) feelings of loneliness or isolation which results in an individual facing a lack of sense of belonging, engagement with others, minimal social contacts and quality relationships (Wang, 2016; Nicholson, 2009 as cited in Lee & Tan, 2019, p. 2). There are a wide range of individuals who are more susceptible to feeling lonely, such as women, older adults,

individuals who have experienced a recent death of a significant family member or friend, moving into a new neighbourhood, residing in a community for a short period of time, having poor health, not owning a home, and living alone (Lee & Tan, 2019, p.2). Social connectedness is therefore a crucial aspect of individual's overall well-being.

### *Social Connectedness and the Built Environment*

Jane Jacobs is famously known for emphasizing the need to build communities which promote social interaction and physical welfare (Jacobs, 1961 as cited in Neutens et al., 2013). She urges planners to understand the social aspects of communities and the connections among residents, during the height of urban renewal when there was a large emphasis on the construction of highways and the promotion of automobile use which severely impacted established neighbourhoods and communities. In some ways, her observations recognize the role of the built environment in influencing social cohesion. Many of Oldenburg's (1999) identified characteristics of third places were derived by the factors observed by Jacobs (1961) and the built environment, such as: neutral ground, low profile and home away from home.

Numerous studies examine the role of the built environment on feelings of social connectedness. Many of these studies cite the quality of the built environment and various characteristics that contribute to or deter social cohesion. For example, one study found that individuals who move into a new community or live in a community for a short period of time often encounter feelings of loneliness and

isolation (Lee & Tan, 2019, p.2). Other studies note that feelings of loneliness are lower for individuals who feel connected to their residential location (Weijts-Perrée et al., 2015 as cited in van der Berg et al., 2016, p. 49). However, residing in an environment of high density resulted in feeling lonely and is unfavourable for social interaction (Scharf and De Jong Gierveld, 2008 as cited in van der Berg et al., 2016, p. 49; Evans et al., 2003; Nguyen, 2010 as cited in Neutens et al., 2013).

The role of the built environment is often examined; however, some scholars observe the factors which make a high-quality built environment. Mixed use development is often attributed to a high-quality environment because it provides access to services and facilities that are used regularly (Dempsey, 2008). However, Dempsey (2008) notes that there is a lack of consensus regarding the types of mixed use development that create a high-quality environment, yet the following uses are frequently cited: post office, medical services, restaurants, and grocery stores. Accessibility is also a contributing feature of a high-quality environment as it allows individuals to get to a destination with ease and within a reasonable time and expense (Dempsey, 2008). Additionally, scholars recognize the factor of inclusiveness, as inclusive environments allow individuals of various backgrounds to feel welcome (Dempsey, 2008). Additional features of the built environment that influence social cohesion include neighbourhood quality, maintenance, surveillance, and the character and attractiveness of the neighbourhood (Dempsey, 2008, p. 109). Overall, it is evident that factors of a high-quality built environment are directly correlated to social cohesion.

## 2.6 Second and Third Place and the Student Population

Post-secondary school environments consist of first, second and third places. However, there is limited research about how students utilize third places and whether these spaces foster social interaction. Nonetheless, some research examines how third places such as libraries, cafés, and restaurants are used as spaces for social interaction among students and the community (Waxman et al., 2007; Johnson, 2012; Ferria et al., 2017; Lukito & Xenia, 2017). For example, Waxman et al. (2007) highlight the significance of this type of research, as the post-secondary environment is a community, and its design and proximity to third places can significantly influence students' experience in university and their attitudes toward student life (p. 425). Other scholars provide similar reasons for conducting further research on these topics and the student demographic (Ferria et al., 2017; Abu-Obeid & Atoum, 1999; Lukito & Xenia, 2017).

## 2.7 Student Housing & Social Interaction

Student housing is recognized as a first place and institutional space, because it is a space where certain rules must be followed (Mogenet & Rioux, 2014, p. 304; Holton, 2016; Waxman et al., 2007, p. 425; Piekut & Valentine, 2016, p. 177). One common misconception scholars recognize is the argument that formal housing and student housing share similar characteristics, implying the redundancy of observing the student environment, however, the lack of permanence and unique community associated with student residences necessitates a separate research focus on the student demographic (Thomsen, 2007, p. 579; Thomsen & Eikemo, 2010, p. 275; Amole, 2009, p. 77; Khajehzadeh & Vale; 2015, p. 104).

Scholars observe the relationships between student housing and dependent variables such as personal belonging and identities, social capital, and academic performance (AlKandari, 2007; Holton & Riley, 2016; Holton, 2016; Turley & Wodtke, 2010; Dusselier et al., 2010). However, most literature on student housing and social interaction heavily focuses on residential satisfaction and the architectural design elements of housing (Amole, 2009; Mogenet & Rioux, 2014; Holahan & Wilcox, 1978; Moos, 1978; Khajehzadeh & Vale, 2015). These elements include bedroom/hallway design, density, size, and building materials. Though this research does not engage directly with the role of student housing on social interaction, they do highlight the structural elements (i.e., high-rise vs low-rise) and the location of the residence (i.e., on- vs. off-campus) which undoubtedly influence social interaction among students.

### *Residential Satisfaction and Housing*

The definition of satisfaction varies across studies, however there are two common approaches (1) the gap between consumers' actual and aspired needs (Galster, 1987 as cited in Amole, 2009, p. 76) or (2) the measure of environmental factors that may inhibit or facilitate the goal of the user" (Canter & Ress, 1982 as cited in Amole, 2009, p. 77). Housing types also varied across each study, ranging from high-rise to low-rise, on-campus to off-campus, and detached to attached housing (Holahan & Wilcox, 1978; Moos, 1978; Amole, 2009; Mogenet & Rioux, 2014; Khozaei et al., 2010).

Studies find that students residing in high-rise buildings are more dissatisfied with their residential life than those in low-rise buildings, with one contributing factor



being the lack of social interactions with other students and with the rest of the community (Holahan & Wilcox, 1978, p. 240; Moos, 1978, p. 119-120). Students residing in low-rise buildings are able to establish more friendships in their dormitories than those in high-rise buildings (Holahan & Wilcox, 1978, p. 237). Another study that did not examine students specifically, found that individuals residing on higher floors in apartment buildings are spatially segregated due to the lack of chance encounters (Raman, 2010, p.77). Overall, however, there is limited and outdated direct research on the implications of social interaction on different types of student housing.

Very few studies observe the difference in residential satisfaction between gender, but overall, found that females establish more friendships in residential housing than males and have greater levels of residential satisfaction (Holahan & Wilcox, 1978; AlKandari, 2007, p. 232). The studies included in this literature review acknowledge the descriptive statistics of gender but do not observe the difference in residential satisfaction among genders.

When examining studies that compare on- versus off-campus living on social interactions, results are mixed. One study found that students living off-campus experience greater levels of satisfaction than those living on-campus, even with similar interior designs, because there are greater opportunities for social interaction in off-campus locations (Mogenet & Rioux, 2014, p. 316). However, other studies note that students residing on-campus show higher levels of social interaction, because of their involvement in extra-curricular and campus activities (Ballou, Reavill, & Shultz, 1995 as cited in Khozaei et al., 2010, p. 150). Additionally,

students are able to make friends immediately through residence events such as movie nights, barbeques and sports events (Holton, 2016, p. 68). However, researchers note that if interactions are not made during orientation events, lasting friendships are difficult to sustain (Holton, 2016, p. 68). Thus, due to the contextual basis of these studies, there are contradicting results regarding social interaction in on- and off-campus housing.

## 2.8 The Role of Libraries as a Third Place

The role of libraries has evolved over the years, changing from being an informational service for communities to providing services and resources electronically and being a place of interaction and collaborative learning (Montgomery & Miller, 2011). Bennett (2003) argues that the changing role of libraries and the way in which people use this space results in a direct impact toward how libraries should be designed (Montgomery & Miller, 2011). The library is considered a third place because it provides a community institution that fosters interaction for individuals (Waxman et al., 2007, p. 426). A study undertaken in Australia recognizes the four areas in which libraries contribute to building social capital in communities:

“(1) providing free internet access and other related information technology resources, (2) educating and assisting people to locate information thus creating better informed communities, (3) providing specially designed programs that encourage lifelong learning and literacy within community, and (4) building connections within the community, between individuals, groups and government” (Harris, 2007, p. 146).

Libraries also provide ample resources to those without access or social networks and are, generally speaking, a welcoming space away from home and work

(Johnson, 2012, p. 53). Additionally, they are a barrier-free space that provide individuals of various social and economic backgrounds to use the space and feel its naturally inclusive and welcoming environment (Montgomery & Miller, 2011).

In a university environment, libraries offer students and faculty members with a space to engage with individuals from other disciplines, areas of academic expertise, and socioeconomic backgrounds (Montgomery & Miller, 2011). University libraries also create an inclusive environment to share new ideas, and provide a sense of familiarity as students are able to see the same faces of strangers, even if they don't interact, and provide a sense of comfort as they share a common bond (Montgomery & Miller, 2011). University libraries offer different uses for students. For example, Ferria et al. (2017) found that students use libraries equally for individual study and social engagement (p. 30). Significant features that influence students' decision for using a third place are "atmosphere, opportunity for socialization and location" (Waxman et al., 2007, p. 427). It is important to note that though many students use libraries as a place for interaction, other students use libraries as a restorative place for relaxation, which may include quiet time, meeting with peers or people watching (Waxman et al., 2007, p. 430). Another study found that students prefer using campus to interact with others because that is where most of their time is spent (Campbell, 2017, p. 168). Though one study found that off-campus locations such as cafés and restaurants are indicated as students' favourite third place, as opposed to libraries (Waxman et al., 2007, p. 427). Overall, there are few studies on libraries and student social interaction, and most studies focused on the design elements that campuses should implement, and the implications of incorporating a

coffeeshop in the library to further enhance usage as students often have to leave the library for food (Waxman et al., 2007; Johnson, 2012; Ferria et al., 2017).

## 2.9 The Role of Coffeeshops as a Third Place

Cafés and coffeeshops are labeled as third places because they accommodate gatherings of acquaintances and strangers away from home and work (Lukito & Xenia, 2017, p. 1). However, when examining the characteristics of third places identified by Oldenburg (1999), it has been argued that coffeeshops fail to embody third places in its purest form, because the aspect of consumerism is involved, which results in barriers to entry (Lukito & Xenia, 2018). Moreover, the space is not necessarily neutral because there are aspects of social hierarchy that are present (Lukito & Xenia, 2018). Though third places are recognized as a “home away from home”, Lukito and Xenia (2018) recognize that coffeeshops may offer similar or greater psychological benefits than home. Additionally, they acknowledge that individuals often use coffeeshops as an office space (Lukito and Xenia, 2018). These observations imply that a coffeeshop shares aspects of first, second and third places. Scholars highlight that cafés and coffeeshops have evolved over time as it has now become a lifestyle in modern society (Lukito & Xenia, 2017, p. 1). However, they note that use of technology, laptops, phones and tablets have become a hindrance to conversation and social interactions in coffeeshops (Lukito & Xenia, 2017, p.1). For example, one study conducted in Australia found particular characteristics in coffeeshops that result in social benefits and feelings of belonging, which include: “the opportunity for individuals to linger, [feelings of ownership and territoriality], trust, respect, and anonymity, the opportunity for productivity and

personal growth, the choice to be social or to enjoy familiar stranger and enjoy a support system of patrons and staff” (Waxman, 2006, p. 51).

Modern cafés like Starbucks are most visited and preferred by students, individually or in groups (Lukito & Xenia, 2017, p.1; Waxman et al., 2007, p. 427; Abu-Obeid & Atoum, 1999, p. 207). It is important to note that the way in which a coffeeshop is designed fosters space for work, or socialization. For instance, bar chairs along a window may primarily be used by those who are studying or working, whereas small round tables create a space for interaction. The design of space results in a particular coffeeshop etiquette which guides individuals’ behaviours and use of space (Lukito & Xenia, 2017). Observations prior to the 2000s argue that coffeeshops played a vital role in the public realm. For instance, Lofland (1998) argues that coffeeshops created a space where individuals of various socioeconomic backgrounds could interact, and essentially be a space for “strangers” to interact in an “accidental” way. Coffeeshops also offer individuals the opportunity to interact with those who are different from them and provide an educational opportunity to learn about “the other” – and to embrace this aspect of diversity (as cited in Walters and McCrea, 2014). However, Walters and Broom (2013) note that the notion of coexisting with strangers is becoming increasingly rare, especially with the privacy associated with homes, individual commuting with automobiles, education, and workplace. Essentially, the authors recognize that today, people are less inclined to mingle with others outside of their “own kind” (Walters & Broom, 2013). They highlight that access to the public realm must be more open to “unassimilated otherness” as this will have a direct contribution to

avoiding any intolerance or ridicule that can derive from racism, sexism, homophobia and other forms of discrimination (Walters & Broom, 2013).

Additionally, Lukito and Xenia (2017) argue that cafés do not foster interactions among strangers but do however create a relaxing environment for working, using social media and planned gatherings. Moreover, Walters and Broom (2013) recognize that coffeeshops do have an important role in creating a sense of community and creating a social space that results in feelings of familiarity. One study found that university students prefer off-campus eating environments for social interaction (Abu-Obeid & Atoum, 1999). Overall, based on existing studies, it is evident that cafés are used as space for social interaction among the public and university students. However, there is limited research on student demographic groups to draw strong conclusions on the impacts of using coffeeshops to study on feelings of social connectedness.

## 2.10 Summary

The role of the built environment, second places and third places are crucial factors which contribute to individuals' feelings of social connectedness and community cohesion. The student demographic is no different. An ample amount of research examines residential satisfaction and elements of socialization in residences. However, the literature that examined these relationships is outdated. Most studies were conducted in the 1970s because there was much interest placed on the unique characteristics of the student environment in comparison to family housing environments (Moos, 1978; [Wilcox & Holahan, 1976; Bickman et al., 1973; Valins & Baum, 1973; as cited in Holahan & Wilcox, 1978]). Moreover, it is evident

that many studies focus on the architectural features of housing satisfaction. Recent studies focus on the morphological configuration or architectural features by examining the interior design of the room, halls, and structural design of the building (Amole, 2009; Khajehzadeh & Vale, 2015; Thomsen, 2007; Thomsen & Eikemo, 2010). The studies on architectural design result in contextual literature that cannot be applied generally across student residences. Thus, future research on student housing, built environments and social elements are needed in a general context to be applicable to various geographical locations. Additionally, through this literature review it is evident that there is a lack of research on students' use of third places and the interactions that occur within them. Though there are findings that are relevant to the general public, the student demographic may differ in terms of its use of third places. For instance, students generally use coffeeshops and libraries more to study and interact, as opposed to the general public. This study will examine how studying in third places influences students' feelings of connectedness compared to those who study at home.

### 3. Regional and Local Context

The City of Waterloo is located in the Region of Waterloo, Ontario. The Region comprises three municipalities and four rural townships. The City of Waterloo is just outside of the Greater Toronto Area, and is located approximately 100 kilometres west from the City of Toronto. The Region is recognized as the 4<sup>th</sup> largest community in Ontario and the 10<sup>th</sup> largest in Canada (Region of Waterloo, n.d.). Its proximity to Highway 401, Ontario's east-west transportation corridor, places it as a highly attractive location for residents and businesses alike. Additionally, the Region is well-known for its regional transit system which consists of local bus and bus rapid transit. In 2019, the Region began operation of its ION light rail system which connects 19 stations from Conestoga station in Waterloo to Fairway station in Kitchener (GRT, n.d.). The City has established itself as a knowledge-based economy due to its Economic Development Strategy, which is used to drive in the knowledge economy and high-tech industries and is also supported by the University of Waterloo's reputation for engineering and computer science (Revington et al., 2020).

Three post-secondary institutions are located in the City of Waterloo, the University of Waterloo, Wilfrid Laurier University and Conestoga College. The University of Waterloo is a well-renowned institution and is recognized for its research and innovation. It is located in Canada's technology hub. In 2018, about 69,160 students were enrolled in full-time post-secondary studies (Region of Waterloo, 2019). Approximately 12,960 of those students were commuters or on co-



op, 56,200 students were residing in the Region, and 25,930 of those students resided in the City of Waterloo (Region of Waterloo, 2019).

Though students are distributed throughout the Region, a majority of the student population is concentrated in on-campus student housing and off-campus housing within the neighbourhoods near the University of Waterloo and Wilfred Laurier University (Revington et al., 2020). Northdale is a notable neighbourhood with a high concentration of the student population due to its location between both university campuses and a substantial amount of private student housing development (Revington et al., 2020). It was previously home to permanent owners for the last 25 years and has been substituted by the student population and rental housing (City of Waterloo, 2021). In comparison to other post-secondary communities, such as Toronto and Ottawa, which is home to more than two post-secondary institutions in its cities; the City of Waterloo's innovative and creative approach to planning and implementing policies for its post-secondary communities is evident in its purposeful and intentional student housing market (Revington et al., 2020). Much of the recent development around these educational institutions include residential or mixed-use development, in addition to commercial uses such as new restaurants and coffeeshops. The next sections will provide greater context regarding the University's mental health initiatives, campus libraries, coffeeshops and off-campus coffeeshops.

### 3.1 University of Waterloo Mental Health Initiatives

In 2017, students at the University of Waterloo staged a walkout demanding the University make a commitment to mental health resources. The President's

Advisory Committee on Student Mental Health created a report and a list of recommendations to support students' wellness. From this list, one of the recommendations highlights the influence of the built environment and interaction:

*#13: Identify infrastructure standards and best practices into design, planning, and rejuvenation for all campus physical spaces to promote and enhance student wellness and supporting learning environments (University of Waterloo, 2017).*

It is evident that the University recognizes the importance of implementing policies and recommendations that prioritize planning initiatives which encourage social interaction on-campus. Similarly, the Region of Waterloo has acknowledged the influence of the physical environment and student housing on student wellness (Desmond, 2015). In 2015, the Region's Town and Gown Committee encouraged universities and community services to conduct research to examine student housing and social interaction on the mental wellness of students (Desmond, 2015).

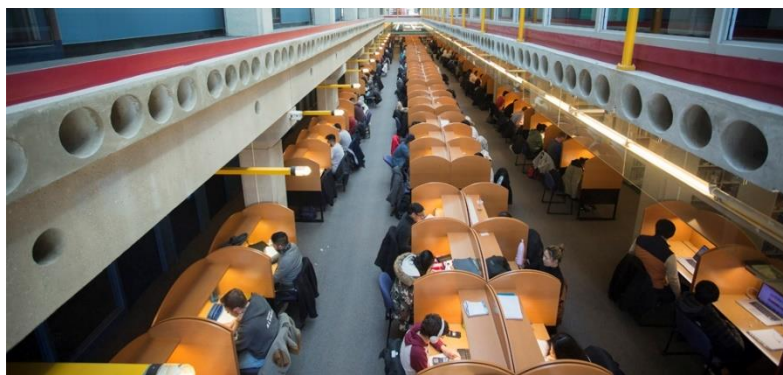
### 3.2 University of Waterloo Libraries

The University of Waterloo has numerous libraries on campus; however, the most notable locations, and largest libraries, are Dana Porter Library (Figure 1) and David Centre Library (Figure 2). Dana Porter Library is located at the centre of campus and offers resources for the arts, such as social sciences, humanities and government publications (University of Waterloo, n.d.). There is also a café called Browsers Café in the library. The Davis Centre Library is located in the engineering, mathematics and science quad (University of Waterloo, n.d.). Both libraries offer

individual study booths, group study rooms, silent study, and lounge spaces. Other libraries on campus include Witer Learning Resource Centre, which is located in the School of Optometry and Vision Science (University of Waterloo, n.d.). Affiliated libraries include Lusi Wong Library located at Renison University College, Milton Good Library at Conrad Grebel University College, Library & Archives at St. Jerome's University and other smaller campus libraries which provide students with various resources (University of Waterloo, n.d.).



*Figure 1:* Dana Porter Library located in the centre of campus. University of Waterloo, (n.d.). Retrieved from <https://uwaterloo.ca/alumni/benefits-and-services/alumni-watcard>



*Figure 2:* Davis Centre Library located in the engineering, mathematics and science quad. University of Waterloo, (n.d.). Retrieved from <https://uwaterloo.ca/beyond-ideas/stories/student-life/presenting-waterloo-ies>

### 3.3 University of Waterloo Coffeeshops

The University of Waterloo offers various food services across campus, including numerous coffeeshops and cafés. However, many of the coffeeshops do not offer lounge or study spaces, and only provide takeout services, but are located near lounges and study spaces accessible to students. The coffeeshops that offer ample restorative and study spaces on campus include the Environmental Studies Coffeeshop located in Environment 1 (Figure 3), Williams Café in Environment 3 (Figure 4), Starbucks in the Science Teaching Complex (Figure 5), ML Diner and Tim Hortons (Figure 6) in the Modern Languages building, and H3 Café and a small coffeeshop in Hagey Hall (Figure 7).



*Figure 3: Environmental Studies Coffeeshop in Environment 1. University of Waterloo, (n.d.). Retrieved from <https://uwaterloo.ca/beyond-ideas/stories/feature/getting-involved-faculty-environment>*



*Figure 4: Williams Café in the Environment 3 building. University of Waterloo, (n.d.). Retrieved from <https://uwaterloo.ca/environment/about-environment/leedr-platinum-environment-3-ev3>*



*Figure 5: Starbucks Coffee located in the Science Teaching Complex. University of Waterloo, (n.d.). Retrieved from <https://uwaterloo.ca/science-teaching-complex/resources-and-services-science-teaching-complex>*



*Figure 6: ML Diner located in the Modern Languages Building. UWaterloo Arts Blog, (n.d.). Retrieved from <https://artsonline.uwaterloo.ca/blog/11-awesome-study-spots-for-arts-students/>*

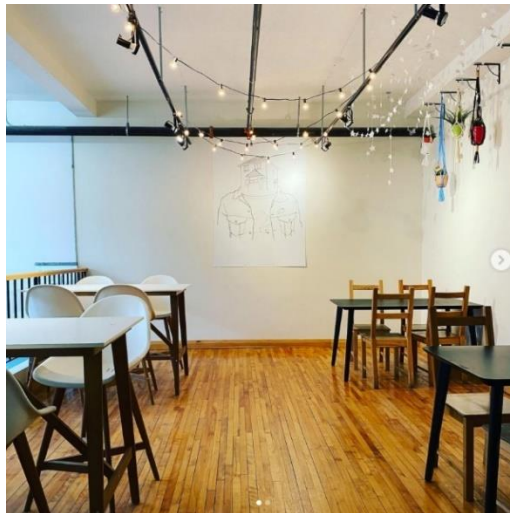


*Figure 7: Hagey Hall Hub with a little coffeeshop in Hagey Hall. UWaterloo Arts Blog, (n.d.). Retrieved from <https://artsonline.uwaterloo.ca/blog/11-awesome-study-spots-for-arts-students/>*

### 3.4 Coffeeshops Off-Campus in Waterloo

Coffeeshops are scattered across the City of Waterloo. Though coffee chains such as Tim Hortons and Starbucks are located throughout the City, there are also numerous local coffeeshops that offer plenty of space for relaxation, work, and who

cater to the student demographic. The most popular coffeeshops within proximity to the University of Waterloo are located in Uptown Waterloo and include Princess Café (Figure 8), Settlement Coffee Roasters (Figure 9), Seven Shores (Figure 10), Café 22, and Aroma Café. Students may also commute further to Downtown Kitchener to visit local coffeeshops such as Smile Tiger Coffee Roasters, Balzac's Kitchener, Aint Jimmy's Coffee, Matter of Taste Coffee Roaster and The Yeti Café. These coffeeshops are often known and advertised as “hipster” or “modern” cafés because they create an aesthetic that is appealing to the millennial demographic. They also provide a substantial amount of space for work, study and interaction.



*Figure 8: Princess Café (The Annex) located at 46 King Street North in Uptown Waterloo. Princess Café, (2020). Retrieved from <https://www.instagram.com/p/CGXoASgAlNQ/>*



Figure 9: Settlement Coffee Roasters located at 23 King St North in Uptown Waterloo. Settlement Coffee, (2019). Retrieved from <https://www.instagram.com/p/BvXeMuPg7yR/>



Figure 10: Seven Shores located at 10 Regina St North located in Uptown Waterloo. Seven Shores, (2016). Retrieved from <https://www.instagram.com/p/BBvW2GskqzG/>



## 4. Measuring Social Connectedness: Student residential satisfaction and third places

### 4.1 A Review of Qualitative and Quantitative Methods

The methods used in this area of literature varied from quantitative and qualitative methodologies. The most common tool used to collect data on student residential satisfaction are surveys and questionnaires (Holahan & Wilcox, 1978; Amole, 2009; Thomsen, 2007; Moos, 1978; Thomsen & Eikemo, 2010; Mogenet & Rioux, 2014; Dusselier et al., 2010; AlKandari, 2007; Khajehzadeh & Vale, 2015). Other studies used a mixed-method approach with surveys, questionnaires, and interviews (Khajehzadeh & Vale, 2015; Holton, 2016, Thomsen & Eikemo, 2010; Thomsen, 2007). Studies that examine the relationship between coffeeshops, libraries and social connectedness also use a mixed-method approach. Researchers use various methods including visual documentation, case study methods, literature studies, observation and behavioural mapping, interviews, surveys, and questionnaires (Waxman, 2006; Abu-Obeid & Atoum, 1999; Lukito & Xenia, 2018; Montgomery & Miller, 2011). The combination of quantitative and qualitative methods appears to be the most effective as because interviews provide a more in-depth collection of data beyond surveys and questionnaires. Further, a combination of approaches allows researchers to understand individuals' perceptions about their living environment in greater detail and with more context.

Researchers who observe the student demographic utilize quantitative, qualitative and mixed-methods to examine the relationship between places and social interaction. Some researchers employed a case study approach and used

visual documentation to determine the architectural design elements that enhance interaction in third places (Waxman et al., 2007; Lukito & Xenia, 2017; Ferria et al., 2017). The use of quantitative data analysis methods is rare, only one study reviewed utilized descriptive statistics, correlation analysis or regression analysis (Campbell, 2017). Qualitative methods include the use of interviews and focus groups to determine how students use third places, and appear to be the most common method to determine how students use third places and engage in social interaction (Lentini & Decortis, 2010; Mehta & Bosson, 2010). This may be because researchers are able to observe the environment and understand students' decisions, preferences, and choices.

#### 4.2 Quantitative Method

This study uses a quantitative method using ordered logistic regression analysis. Stata/IC is the software used to analyze the data. A series of six identical surveys were administered to students at the University of Waterloo throughout the school year which included a series of Likert scale questions. The Likert scale allows researchers to assess attitudes and measures self-efficacy (Croasmun & Ostrom, 2011). The Likert questions in this survey have five response categories, 1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, and 5 = strongly agree. Though the number of categories is contemplated by scholars, increasing the number of response categories from three to five to is proven to increase internal reliability (Croasmun & Ostrom, 2011). Moreover, having an odd number of categories allows for a neutral category, which has been proven to reduce response bias as participants are not forced to favour one category over another

when they prefer to stay neutral (Croasmun & Ostrom, 2011). Future research could incorporate an additional qualitative method such as interviews or focus groups, as this would provide greater context regarding a participant's perception. This will further be discussed in Section 3.7 Limitations of Methodology.

#### 4.3 Survey Administration

Data was collected through a series of six surveys which were administered by Dr. Markus Moos. Students were recruited through the University of Waterloo and student organization social media channels. Each student who completed a survey received a \$10 gift (for each survey) which was applied to student cards for use on purchases from campus food vendors and retailers. The same survey was sent out to the same group of students on a bi-monthly basis beginning in September 2018 and ending in August 2019. A total of approximately 1,740 responses were collected in Survey 1 with regards to preferences for study location. It is important to note that the number of responses did decline from Survey 1 to Survey 6 (see Appendix A) however, the responses from various demographic groups remained relatively equal. The survey consisted of 40 questions about students' residential environment, built form (e.g., housing type), demography (e.g., gender, visible minority), personal characteristics (e.g., Likert scale questions on the importance toward socializing with others, considering myself to be more of an introverted person), and various indicators of social interaction and chance encounters (e.g., Likert scale questions on likelihood of running in to friends while studying or running errands). Statement-based questions were responded to using a five-point Likert scale which ranged from strongly disagree to strongly agree. The survey form is included in Appendix B.

#### 4.4 Examining Descriptive Statistics

Two-way tables are used to obtain summary statistics on variables such as gender, visible minority, living on- or off-campus, being an undergraduate or graduate student, and having regular access to a car. These variables are examined against the place variables: studying at a coffeeshop, a university library and at home.

#### 4.5 Ordered Logistic Regression Analysis

We use ordered logistic regression analysis to test whether studying at either of the third place environments (coffeeshops or a university library) or at home and its influence on students' (1) perceptions toward social connectedness, (2) the built environment and attitudes toward planned gatherings, and (3) preferences to live within proximity to amenities. This method is used to observe the relationship between variables at a point in time using the data from Survey 1, and temporal trends by examining the change from students' responses from Survey 1 to each of the following surveys (up to Survey 6). Ordered logistic regression models are commonly used when variables are ordinal. In this case, both the dependent and independent variables are on a Likert scale thus warranting the use of ordinal regression analysis and its relevant use for this study.

##### *Defining the Response Variables*

Social connectedness is described as feelings of closeness to others, it also plays an important role on individuals' sense of belonging and is derived from relationship experiences with others (Bower et al., 2015; Lee & Robbins, 2000; Hoye et al., 2015). Scholars identify numerous benefits associated with social

connectedness such as, “increased sense of well-being, increased self-worth and overall better health” (Hoye et al., p. 5, 2015). It also has a vital role in “fostering positive human development” (Hoye et al., p. 5, 2015). Contrary, “lack of social connectedness can result in self-alienation, loneliness and a lack of meaning or purpose” (Hoye et al., p. 5, 2015). Nonetheless, Lee and Robbins (1995) develop a robust measure of social connectedness consisting of three main elements of belongingness: connectedness, affiliation and companionship. The three elements originate from a young age (Lee & Robbins, 1995). Companionship is explained as forming a strong bond with another person which results in the development of confidence and a sense of self (Lee & Robbins, 1995, p. 233). Affiliation is when individuals build relationships and feel more comfortable around those who share similar qualities such as “appearance, opinions and values” (Lee & Robbins, 1995, p. 233). Connectedness is when an individual can connect and identify with those beyond their friends and family circle (Lee & Robbins, 1995, p. 233).

In this study, four dependent (response) variables are selected as proxies for perceptions of social connectedness. As per the elements of social connectedness established by Lee & Robbins (1995), each of the proxy variables represents one of the three elements:

- (i) I feel connected to my local community (Affiliation).
- (ii) There are always people nearby I can turn to if I want to socialize (Companionship).
- (iii) I regularly run in to friends or classmates when studying (Connectedness).

- (iv) I regularly run in to friends or classmates when running errands  
(Connectedness).

A planned gathering is when a person or persons meet in an expected manner that is not accidental, it is the opposite of a chance encounter. The following four dependent variables represent students' attitudes toward planned gatherings because they have the intention to meet with other individuals in these settings. These variables were selected as proxies:

- (i) There are regular social events in my building that I could attend.
- (ii) I have access to a communal space in my building where I can interact with others.
- (iii) I regularly attend events held on-campus.
- (iv) I regularly attend community events held off-campus.

University environments are offering more amenities than was the case for previous generations due to the demands of current student populations (Moore et al., 2019). Living within proximity to amenities has shown to be an effective indicator of residents' well-being (Moore et al., 2019). Three dependent variables were chosen to assess students' preferences toward living within proximity to amenities:

- (i) Living close to campus is important to me.
- (ii) Living close to coffeeshops and restaurants is important to me.
- (iii) Living close to transit is important to me.

#### 4.6 Survey 1 and Temporal Analysis

For the Survey 1 analysis, the relationship between the dependent variables and independent place variables (studying at a coffeeshop, university library and at home) were observed by using ordered logistic regression analysis.

For the temporal analysis, the following functions were applied prior to using the ordered logistic regression analysis.

First, for each of the six surveys, new variables were generated for each independent and dependent variable. This new variable represented the student's difference in response from Survey 1 <math>n</math>6 and Survey 1. Second, a categorical variable was then generated to represent the change in students' responses. If the difference in the response from Survey 1 <math>n</math>6 and Survey 1 was greater than 0 this variable equaled 1, if the response from Survey 1 <math>n</math>6 and Survey 1 was less than 0, this variable equaled -1, and if the response from Survey 1 <math>n</math>6 and Survey 1 did not change, this variable equaled 0. Table 1 demonstrates the temporal change in a variable from Survey 1 <math>n</math>6 and Survey 1.

*Table 1: Temporal change in respondents' answers among surveys.*

		Survey 1 <math>n</math>6				
		Strongly Disagree	Disagree	Agree nor Disagree	Agree	Strongly Agree
Survey 1	Strongly Disagree	0	1	1	1	1
	Disagree	-1	0	1	1	1
	Agree nor Disagree	-1	-1	0	1	1
	Agree	-1	-1	-1	0	1
	Strongly Agree	-1	-1	-1	-1	0

After creating the categorical variables, the ordered logistic regression model was used to observe the relationship between the dependent categorical variables and the place categorical variables.

#### 4.7 Limitations of Methodology

There are some limitations to the research and data collected for this study. The first limitation involves the lack of qualitative data collected, the second element which results in limitations for this study is the lack of multiple variables used in the regression analysis to examine the data and the final aspect is the case study's applicability to other post-secondary environments.

First, this research uses exclusively quantitative methods. It is recognized that future research should incorporate an additional qualitative method using interviews or focus groups, for example, to gain a broader picture and provide the researcher with a greater understanding regarding the context of students' perceptions regarding each of the three objectives examined. For instance, additional factors contribute to an individual's perception of social connectedness beyond the proxies that were chosen to represent this objective. Thus, the 'why' factor regarding a respondent's choice for each Likert scale question is missing from this study.

Second, the use of regression analysis results in some limitations for this study. This study observes the relationship between each place variable on the proxy variables. For instance, the place variable "I regularly study at a local coffeeshop" is tested on the social connectedness proxy variable "I feel connected to the local



community”. However, additional variables could be included into the regression. This could provide for a greater understanding regarding the influence of the other factors and its level of significance as it contributes to the likelihood of an individual feeling connected to the local community. Moreover, regression analysis can only observe relationships and the likelihood of students’ perception of social connectedness, planned gatherings and their preferences for living within proximity to amenities.

The final limitation of this case study is that the findings are context-specific to the University of Waterloo. This is not to say that these findings may not be applicable to other post-secondary environments, however there are unique elements to the University that may differ from other environments. One unique element is the structure of co-op studies at the University which often results in students moving one or two times during the academic year. This may result in different temporal trends compared to other post-secondary environments because of changing residential environments, neighbourhoods, communities, and perceptions toward social connectedness, planned gatherings, and preferences toward living within proximity to amenities. However, the results from Survey 1 for each of the objectives may be more generally applicable to other post-secondary environments that share similarities to the University. Additionally, though the findings may not be applicable to other unique communities such as senior homes, or cancer care homes, the methodology can be applicable to these institutions to observe individual’s perceptions toward each of the three objectives.

## 5. Survey Findings

This section will briefly discuss summary statistics from the survey respondents and make comparisons to the general student population at the University of Waterloo. Although the recruitment method was not random (heavily reliant on social media), the respondent characteristics show that, generally speaking, our sample has similar traits to the student population as a whole. The results from survey 1 indicates that 45% of the students were female, aligns with the University's male-to-female ratio, as 48% of students are female at the University (University of Waterloo, 2018). In this survey, 51% of students identify as a visible minority. Moreover, approximately 68% of students were on a co-op term in the Fall of 2018, and only 15% of students on co-op completed the survey, which underestimates the regular Fall co-op term student ratio (University of Waterloo, 2018). In this survey, 92% of students are enrolled in an undergraduate program, this slightly overstates the undergraduate population in the Fall term of 2018, as 87% of the student population were undergraduate students at the time (University of Waterloo, 2018). Approximately 40% of students are in their first year of studies, and 23%, 19.8%, 11.7%, and 4% of students were in their second, third, fourth and fifth year of study, respectively. See Table 2.

With regards to housing statistics, 60% of students who completed Survey 1 indicate that they reside off-campus. This finding is understated; however, it does correlate with the number of beds available off-campus as opposed to on-campus. The Town and Gown committee reported that 24,457 beds are available off-campus, which is approximately 73% of all rental beds available (King & Curic, 2017). This

indicates that majority of student housing is available off-campus, which is why the majority of the students indicate that they live off-campus. Students' living arrangements ranged from living with roommates, partners and family members. 67% of students had their own room but shared communal spaces with roommates, 17% of students shared a room with a roommate, and 6.2% of students lived with their parents.

Regarding location of residence, 88% of students who completed Survey 1 live in the City of Waterloo and 6.6% of students live in the City of Kitchener. The students who completed the survey live in various neighbourhoods across the Region. Specifically, 2.8% live in Downtown Kitchener, 22% live in Northdale, and 10% live in Uptown Waterloo. However, approximately 65% of student indicate that they live in a different neighbourhood. The mode of transportation most commonly used by students to travel to campus range from walking, public transit, personal vehicles, and biking. In particular, 65% walk, 25% use public transit, 5% use their personal vehicles and approximately 3% bike to campus. Other, less common, modes of transportation include skateboarding and longboarding. Some participants used an electric skateboard to travel to campus and within campus.

When examining study location preference, 414 students study at coffeeshops (24%), 898 students study at a university library (47%), and 1,483 students study at home (84%). These numbers are not mutually exclusive, as students choose to study at multiple locations. There are 59 students who indicated that they study at both coffeeshops and university libraries (3.3%), 242 students

study at both university libraries and at home (13%), and 108 students study at coffeeshops and at home (6%).

Table 2: Comparing survey data and University of Waterloo and community statistics.

<b>Statistics</b>	<b>Survey Data</b>	<b>University of Waterloo/Community Statistic</b>
<b>Demographic Statistics</b>		
Gender – Female	45%	48% (2018)
Visible Minority	51%	Not available
Co-op	15%	68% (2018)
Undergraduate	92%	87% (2018)
Year of Study	40% (1 <sup>st</sup> Year), 23% (2 <sup>nd</sup> Year), 19.8% (3 <sup>rd</sup> Year), 11.75% (4 <sup>th</sup> Year), 4% (5 <sup>th</sup> Year)	Not available
<b>Housing Statistics</b>		
Off-Campus Housing	60%	73% of all rental beds are available off-campus
<b>Housing Type</b>		
Own Room but shared communal spaces with roommates	67%	Not available
Shared a room with a roommate	17%	Not available
Lived with parents	6.2%	Not available
<b>City</b>		
Reside in Waterloo	88%	Not available
Reside in Kitchener	6.6%	Not available
<b>Neighbourhood</b>		
Downtown Kitchener	2.81%	Not available
Northdale	22%	Not available
Uptown Waterloo	10%	Not available
Different Neighbourhood	65%	Not available
<b>Mode of transportation</b>		
Walk	65%	Not available
Public Transit	25%	Not available
Personal Vehicle	3%	Not available
Bike	3%	Not available
<b>Preferences for Studying</b>		
Coffeeshops	24%	Not available
University Library	47%	Not available
Home	84%	Not available

Coffeeshops and at Home	3.3%	Not available
University library and at home	13%	Not available
Coffeeshops and at home	6%	Not available

## 5.1 Summary Statistics

Table 2 provides descriptive statistics for the third and second place variables in the study. The mean value for students who study regularly at a university library is 3.1 out of a possible 5 on the Likert scale. This demonstrates a greater preference for studying at a university library than the other third places examined in this study. However, it is important to note, that studying at home, the second place in this study, has a mean of 4.1, which signifies a strong preference for studying at home in comparison to studying at any of the third places examined in this research.

Over 50% of students who identify as a visible minority study at third places. However, the relationship between those who identify as a visible minority and study at a university library<sup>1</sup> and coffeeshop<sup>2</sup> is not statistically significant since  $p > .05$ . However, when observing the relationship between students who identify as a visible minority and study at home<sup>3</sup>, this relationship becomes significant, and indicates that there is an association between studying at home and identifying as a visible minority.

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<sup>1</sup> The Survey 1 p-value for the relationship between visible minority and studying at a university library is 0.052.

<sup>2</sup> The Survey 1 p-value for the relationship between visible minority and studying at a coffeeshop is 0.941.

<sup>3</sup> The Survey 1 p-value for the relationship between visible minority and studying at home is 0.041.

The majority of students who study at coffeeshops identify as female (57.3%), while just over 50% of students who identify as male study at a university library. The relationship between gender and studying at coffeeshops is statistically significant as  $p < .0001$ , indicating that there is an association between gender and studying at a coffeeshop<sup>4</sup>. However, the relationship between gender and studying at a university library, and at home are not statistically significant.

Students who live off-campus prefer studying at third places in comparison to those who live on-campus. Specifically, 65% of students who study at a university library live off-campus, and 67% of students who study at a coffeeshop live off-campus. The relationships between living on- or off-campus and studying at coffeeshops<sup>5</sup>, and at a university library<sup>6</sup> are statistically significant at  $p < .05$ , and demonstrate that there is an association between living on- or off-campus and studying at third places. The relationship between living on- or off-campus and studying at home<sup>7</sup> is not statistically significant, however; approximately 60% of students who reside off-campus study at home. The relationship between housing type and studying at a coffeeshop<sup>8</sup> are statistically significant at  $p < 0.05$ . However, the relationships between studying at a university library<sup>9</sup> and at home<sup>10</sup> are not

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<sup>4</sup> The Survey 1 p-value for the relationship between gender and studying at a coffeeshop is 0.000.

<sup>5</sup> The Survey 1 p-value for the relationship between living on- or off-campus and studying at a coffeeshop is 0.001.

<sup>6</sup> The Survey 1 p-value for the relationship between living on- or off-campus and studying at a university library is 0.000.

<sup>7</sup> The Survey 1 p-value for the relationship between living on- or off-campus and studying at home is 0.097.

<sup>8</sup> The Survey 1 p-value for the relationship between housing type and studying at a coffeeshop is 0.002.

<sup>9</sup> The Survey 1 p-value for the relationship between housing type and studying at a university library is 0.094.

<sup>10</sup> The Survey 1 p-value for the relationship between housing type and studying at home is 0.640.

statistically significant. Additionally, just over 50% of students who study at coffeeshops reside in apartment-style housing.

Most respondents who study at third places do not have regular access to a car. Specifically, the relationship between having regular access to a car and studying at coffeeshops<sup>11</sup> is statistically significant at  $p < 0.05$ . This finding indicates that there is an association between studying at coffeeshops and having regular access to a car. The relationship between having regular access to a car and studying at a university library<sup>12</sup> was not statistically significant. Moreover, majority of students who prefer to study at home had regular access to a car (82.9%), however this relationship was not statistically significant<sup>13</sup>.

*Table 3: Mean values for third place variables.*

Variable	Mean	Std. Dev
I regularly study at a university library.	3.15	1.22
I regularly study at a coffeeshop.	2.42	1.16
I regularly study at a city library.	1.81	0.88
I regularly study at home.	4.12	0.93

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<sup>11</sup> The Survey 1 p-value for the relationship between car access and studying at a coffeeshop is 0.036.

<sup>12</sup> The Survey 1 p-value for the relationship between car access and studying at a university library is 0.089.

<sup>13</sup> The Survey 1 p-value for the relationship between car access and studying at home is 0.844.

## 6. Results

### 6.1 Social Connectedness

#### *Survey 1*

This section presents the results from the ordered logistic regression models which examines the relationship between each of the independent variables that ask where students study and each dependent variable measuring social connectedness.

The independent variables are:

- *I regularly study at a university library* (univ\_lib1)
- *I regularly study at nearby coffeeshops* (coffeeshop\_1)
- *I regularly study at home* (study\_home1)

The dependent variables are:

- *I feel connected to my local community* (loc\_com1)
- *There are always people nearby I can turn to if I want to socialize* (ppl\_soc1)
- *I regularly run in to friends or classmates when studying* (run\_study1)
- *I regularly run in to friends or classmates when running errands*  
(run\_errands1)

The regression models examine the responses from Survey 1, and indicate a positive association between the social connectedness variables and studying at a university library, and coffeeshops. The regressions show a negative association between social connectedness and studying at home (see Table 3). Specifically, all



the regression models indicate a statistically significant result except for the relationship between studying at a university library and the *ppl\_soc1* variable and, studying at home and the *loc\_com1* variable. Students who study at a university library or coffeeshops are more likely to feel connected to the local community. Additionally, students who study at a university library or coffeeshops are more likely to regularly run in to friends or classmates while studying or running errands. Students who study at a coffeeshop are more likely to have people nearby they can socialize with. Contrary, students who study at home are less likely to have people nearby they can socialize with and are less likely to regularly run into friends or classmates when studying or running errands. However, there is no association between students who study at home and feel connected to the local community. There is also no association between students who study at a university library and the likelihood of always having people nearby they can socialize with.

Table 4: Survey 1 & Social Connectedness Variables – This table shows the results from the ordered logistic regressions which tested the relationship between studying at a university library, coffeeshop or at home and the social connectedness variables.

Variable	Variable Description	University Libraries	Coffeeshops	Study at Home
loc_com1	I feel connected to the local community.	**** p-value = .0000	**** p-value = .0000	ns p-value = 0.619
ppl_soc1	There are always people nearby I can turn to if I want to socialize.	ns p-value = .093	** p-value = .0043	**** p-value = 0.0001
run_study1	I regularly run in to friends or classmates when studying.	**** p-value = .0000	**** p-value = .0000	** p-value = 0.0025
run_errands1	I regularly run in to friends or classmates when running errands.	** p-value = .0046	**** p-value = .0000	* p-value=0.02
<p>p &gt; 0.05 ns (not significant)                      p ≤ 0.05 *                      p ≤ 0.01 **                      p ≤ 0.001 ***                      p ≤ 0.0001 ****</p> <p>Green = Positive coefficient                      Red = Negative coefficient</p> <p>The abbreviated results are shown in Table 3, full results are shown in Appendices B.</p>				

### Temporal Trends

This section presents the results from the ordered logistic regression models which examine the survey responses over time. The ratings for studying at a university library, coffeeshop or at home are compared between Survey 1 and 2, Survey 1 and 3, Survey 1 and 4, Survey 1 and 5, and Survey 1 and 6. Similarly, the ratings in connectedness are compared between Survey 1 and 2, Survey 1 and 3, Survey 1 and 4, Survey 1 and 5, and Survey 1 and 6. Specifically, the dependent

variables that ask where students study are tested individually against the variables measuring social connectedness to observe the potential temporal trends and shifts in students' perceptions toward social connectedness from survey 1 to  $n$ . There are three potential outcomes from the ordered logistic regression analysis. If a regression results in a positive association this means that an increase in students' rating when asked where they study, likely results in an increase in the social connectedness rating. If a regression results in a negative association this means that an increase in students' rating when asked where they study, likely results in a decrease in the social connectedness rating. Additionally, no association means that an increase in students' rating when asked where they study likely results in no positive or negative change to the social connectedness rating. The independent variables are:

- *I regularly study at nearby coffeeshops* (coffeeshop1nchange)
- *I regularly study at a university library* (univlib1nchange)
- *I regularly study at home* (studyhome1nchange).

The dependent variables are:

- *I feel connected to my local community* (loc\_com1nchange)
- *There are always people nearby I can turn to if I want to socialize*  
(ppl\_soc1nchange)
- *I regularly run in to friends or classmates when studying*  
(run\_study1nchange)

- *I regularly run in to friends or classmates when running errands*  
(run\_err1nchange)

*Studying at a university library and social connectedness over time*

The regression results are statistically significant between the dependent variables *loc\_com13change* (compare Survey 1 and 3), *run\_study12change* (compare Survey 1 and 2), *run\_study14change* (compare Survey 1 and 4), *run\_study15change* (compare Survey 1 and 5) and the accompanying independent variable *univlib1nchange* (see Table 4).

The survey results only demonstrate a positive association between Survey 1 and 3 when examining feeling connected to the local community and studying at a university library. This implies that an increased rating for studying at a university library is associated with an increased rating for feeling connected to the local community (as measured through the Likert scale questions). However, considering that this association occurs only once when comparing Survey 1 to n, it is difficult to infer a result or conclusion. Though it does raise the question regarding this association and requires further research.

Additionally, when comparing Survey 1 and 2, Survey 1 and 4, and Survey 1 and 5, there are positive associations between students who study at a university library and regularly running into friends or classmates when studying. This finding indicates that an increase in rating for studying at the library is associated with increased agreement for regularly running into friends or classmates when studying.

There is no association between the *ppl\_soc1nchange* and *run\_err1nchange* variables. This implies that students who increase their rating for studying at a university library results in no positive or negative change to ratings when asked whether there are people nearby they can socialize with, or whether they regularly run into friends or classmates when running errands. These relationships require further research.

*Studying at a coffeeshop and social connectedness over time*

Conversely, the second set of regression results were statistically significant between the dependent variables *loc\_com12change* (compare Survey 1 and 2), *loc\_com15change* (compare Survey 1 and 5), *loc\_com16change* (compare Survey 1 and 6), *ppl\_soc14change* (compare Survey 1 and 4), *run\_err12change* (compare Survey 1 and 2), and the associated independent variable *coffeeshop1nchange* (see Table 3).

It is evident that there is an association between students who study at coffeeshops and feeling connected to their local community when comparing Survey 1 and 2 and Survey 1 and 4. This implies that an increase in rating for studying at a coffeeshop is associated with an increase in agreement for feeling connected to the local community.

The survey results also show that there is an association between students who study at a coffeeshop and having people nearby to socialize with when they want to when comparing Survey 1 and 4. Additionally, there is an association between students who study at a coffeeshop and regularly running in to friends or

classmates while running errands, when comparing Survey 1 and 2. However these associations only occur once when comparing Survey 1 and  $n$  for both social connectedness variables. These relationships raise questions regarding why this relationship only occurs once.

There is no association between the `ppl_soc1nchange` and `run_err1nchange` variables, which indicates that an increase in students' rating when asked whether they study at a coffeeshop resulted in no positive or negative change to students' ratings when asked if they regularly run in to friends or classmates when studying. These relationships require further analysis.

*Studying at home and social connectedness over time*

Finally, the third set of regression results are statistically significant between the dependent variable `loc_com16change` (compare Survey 1 and 6) and the associated independent variable `studyhome16change` (compare Survey 1 and 6) (see Table 6). The survey results indicate a positive association between survey 1 and 6 when observing whether students felt connected to their local community. This implies that an increased rating for studying at home is associated with an increased agreement with feeling connected to the local community. However, considering that this association occurred only once when comparing Survey 1 to  $n$ , it is difficult to infer a result or conclusion, though it does raise a question regarding the basis behind why this association was evident at the end of the academic term. This relationship requires further research.

Table 5: Temporal Trends & Social Connectedness (University Library) - This table shows the results from the ordered logistic regressions which tested the relationship between studying at a university library and the social connectedness variables. Each regression compares Survey 1 and n.

University Library		Surveys					Total
Variable	Variable Description	1-2	1-3	1-4	1-5	1-6	
loc_com1nchange	I feel connected to the local community.	ns	*	ns	ns	ns	1/5
ppl_soc1nchange	There are always people nearby I can turn to if I want to socialize.	ns	ns	ns	ns	ns	0/5
run_study1nchange	I regularly run in to friends or classmates when studying.	****	ns	*** *	***	ns	3/5
run_err1nchange	I regularly run in to friends or classmates when running errands.	ns	ns	ns	ns	ns	0/5
<p>p &gt; 0.05 ns (not significant)                      p ≤ 0.05 *                      p ≤ 0.01 **                      p ≤ 0.001 ***                      p ≤ 0.0001 ****</p> <p>Green = Positive coefficient                      Red = Negative coefficient                      Yellow = Positive and negative coefficient</p> <p>The abbreviated results are shown in Table 4, full results are shown in Appendices C.</p>							

Table 6: Temporal Trends & Social Connectedness (Coffeeshops) - This table shows the results from the ordered logistic regressions which tested the relationship between studying at a coffeeshop and the social connectedness variables. Each regression compares Survey 1 and n.

Coffeeshop		Surveys					Total
Variable	Variable Description	1-2	1-3	1-4	1-5	1-6	
loc_com1nchange	I feel connected to the local community.	**	ns	ns	*	*	3/5
ppl_soc1nchange	There are always people nearby I can turn to if I want to socialize.	ns	ns	*	ns	ns	1/5
run_study1nchange	I regularly run in to friends or classmates when studying.	ns	ns	ns	ns	ns	0/5
run_err1nchange	I regularly run in to friends or classmates when running errands.	*	ns	ns	ns	ns	1/5
<p>p &gt; 0.05 ns (not significant)                      p ≤ 0.05 *                      p ≤ 0.01 **                      p ≤ 0.001 ***                      p ≤ 0.0001 ****</p> <p>Green = Positive coefficient                      Red = Negative coefficient                      Yellow = Positive and negative coefficient</p> <p>The abbreviated results are shown in Table 5, full results are shown in Appendices C.</p>							



Table 7: Temporal Trends & Social Connectedness (Study at Home) - This table shows the results from the ordered logistic regressions which tested the relationship between studying at home and the social connectedness variables. Each regression compares Survey 1 and n.

Study at Home		Surveys					Total
Variable	Variable Description	1-2	1-3	1-4	1-5	1-6	
loc_com1nchange	I feel connected to the local community.	ns	ns	ns	ns	*	1/5
ppl_soc1nchange	There are always people nearby I can turn to if I want to socialize.	ns	ns	ns	ns	ns	0/5
run_study1nchange	I regularly run in to friends or classmates when studying.	ns	ns	ns	ns	ns	0/5
run_err1nchange	I regularly run in to friends or classmates when running errands.	ns	ns	ns	ns	ns	0/5
<p>p &gt; 0.05 ns (not significant)                      p ≤ 0.05 *                      p ≤ 0.01 **                      p ≤ 0.001 ***                      p ≤ 0.0001 ****</p> <p>Green = Positive coefficient                      Red = Negative coefficient                      Yellow = Positive and negative coefficient</p> <p>The abbreviated results are shown in Table 6, full results are shown in Appendices C.</p>							

## 6.2 Built Environment and Attitudes Toward Planned Gatherings

### Survey 1

This section presents the results from the ordered logistic regression models which examines the relationship between the independent variables that ask where students study and each dependent variable measuring students' built environment and attitudes toward planned gatherings.

The independent variables are:

- *I regularly study at a university library (univ\_lib1)*
- *I regularly study at nearby coffeeshops (coffeeshop\_1)*

- *I regularly study at home (study\_home1)*

*The dependent variables are:*

- *There are regular social events in my building that I could attend (event\_building1)*
- *I have access to a communal space in my building where I can interact with others (com\_space1)*
- *I regularly attend events held on campus (event\_campus1)*
- *I regularly attend community events held off campus (event\_offcampus1).*

These regression models examine the responses from Survey 1. The regression results show some positive associations between the built environment variables and studying at a university library, coffeeshops and at home (see Table 7). Specifically, all the regression models indicate a statistically significant result except for the relationship between studying at a coffeeshop and the *com\_space1* variable, and studying at home and the *event\_building1* variable. Students who study at a university library or at coffeeshops are more likely to have regular social events in their buildings that they could attend. Contrary, there is no association between student who study at home and access to regular events in their building that they could attend. Additionally, students who study at a university library, coffeeshops or at home are more likely to regularly attend events on- and off-campus. On one hand, students who study at a university library are more likely to have access to a communal space in their building. On the other hand, students who study at home are less likely to have access to a communal space in their building

where they can interact with others. However, there is no association between students who study at a coffeeshop and have access to a communal space.

*Table 8: Survey 1 & Built Environment Variables - This table shows the results from the ordered logistic regressions which tested the relationship between studying at a university library, coffeeshop or at home and the built environment and attitudes toward planned gatherings.*

Variable	Variable Description	University Library	Coffeeshop	Study at Home
event_building1	There are regular social events in my building that I could attend	**** p-value = .0000	**** p-value = .0001	ns p-value = 0.0574
com_space1	I have access to a communal space in my building where I can interact with others	**** p-value = .0000	ns p-value = .114	*** p-value = 0.0002
event_campus1	I regularly attend events held on campus	**** p-value = .0000	**** p-value = .0000	* p-value = 0.0333
event_offcampus1	I regularly attend community events held off campus	**** p-value = .0000	**** p-value = .0000	**** p-value = 0.0000
<p>p &gt; 0.05 ns (not significant)            p ≤ 0.05 *            p ≤ 0.01 **            p ≤ 0.001 ***            p ≤ 0.0001 ****</p> <p>Green = Positive coefficient            Red = Negative coefficient</p> <p>The abbreviated results are shown in Table 7, full results are show in Appendices B.</p>				

### *Temporal Trends*

This section presents the results from the ordered logistic regression models which examine the survey responses over time. The ratings for studying at a university library, coffeeshop or at home are compared between Survey 1 and 2, Survey 1 and 3, Survey 1 and 4, Survey 1 and 5, and Survey 1 and 6. Similarly, the ratings in measuring the built environment and attitudes planned gatherings are

compared between Survey 1 and 2, Survey 1 and 3, Survey 1 and 4, Survey 1 and 5, and Survey 1 and 6. Specifically, the dependent variables are tested individually against the built environment variables to observe the potential temporal trends and shifts in students' attitudes toward planned gatherings and their built environment between Surveys 1 and  $n$ . There are three potential outcomes from the ordered logistic regression analysis. If a regression results in a positive association, this means that an increase in students' rating when asked where they study is likely to result in an increase in the rating for measuring the built environment and attitudes toward planned gatherings variable. If a regression results in a negative association this means that an increase in students' rating when asked where they study, is likely to result in a decrease in the rating for measuring the built environment and attitudes toward planned gatherings variable. Additionally, no association means that an increase in students' rating when asked where they study resulted in no positive or negative change to the rating for measuring the built environment and attitudes toward planned gatherings variable.

The independent variables are:

- *I regularly study at nearby coffeeshops (coffeeshop\_1nchange)*
- *I regularly study at a university library (univlib\_1nchange)*
- *I regularly study at home (studyhome\_1nchange)*

The dependent variables are:

- *There are regular social events in my building that I could attend (event\_build\_1nchange)*

- *I have access to a communal space in my building where I can interact with others* (com\_space\_1nchange)
- *I regularly attend events held on campus* (event\_campus\_1nchange)
- *I regularly attend community events held off campus* (event\_offcampus\_1nchange)

*Studying at a university library and the built environment and attitudes toward planned gatherings*

The regression results are statistically significant between the dependent variables *event\_build\_12change* (compare Survey 1 and 2), *event\_build14change* (compare Survey 1 and 4), *event\_campus12change* (compare Survey 1 and 2), *event\_campus14change* (compare Survey 1 and 4), *event\_campus15change* (compare Survey 1 and 5), *event\_offcampus12change* (compare Survey 1 and 2), *event\_offcampus14change* (compare Survey 1 and 4), *event\_offcampus15change* (compare Survey 1 and 5), *event\_offcampus16change* (compare Survey 1 and 6) and the accompanying independent variables *univlib1nchange* (see Table 8).

It is evident when comparing Survey 1 and 2, and Survey 1 and 4, there is an association between studying at a university library and having regular social events in their buildings that they could attend. This means an increased rating for studying at a university library is associated with increased agreement with having regular social events in their buildings that they could attend.

Moreover, when comparing Survey 1 and 2, Survey 1 and 4 and Survey 1 and 5, there is an association between studying at a university library and attending events held on-campus. When comparing Survey 1 and 2, Survey 1 and 4, Survey 1

and 5 and Survey 1 and 6, there is an association between studying at a university library and attending events off-campus. This implies an increased rating for studying at a university library is associated with an increased rating for attending events on- or off-campus.

*Studying at a coffeeshop and the built environment and attitudes toward planned gatherings*

The following set of regression results illustrate a positive association between the dependent variables *event\_campus14change* (compare Survey 1 and 4), *event\_campus15change* (compare Survey 1 and 5), *event\_campus16change* (compare Survey 1 and 6), *event\_offcampus12change* (compare Survey 1 and 2), *event\_offcampus13change* (compare Survey 1 and 3), *event\_offcampus14change* (compare Survey 1 and 4), *event\_offcampus15change* (compare Survey 1 and 5), *event\_offcampus16change* (compare Survey 1 and 6) and the accompanying independent variables *coffeeshop1nchange* (see Table 9).

There is an association between students who study at nearby coffeeshops and attending events held on campus when comparing Survey 1 and 4, Survey 1 and 5, and Survey 1 and 6. Additionally, there is an association between students who study at nearby coffeeshops and attending events off-campus when comparing Survey 1 and 2, Survey 1 and 3, Survey 1 and 4, Survey 1 and 5 and Survey 1 and 6. This indicates an increased rating for studying at a coffeeshop is associated with an increased rating for attending social events on and off-campus.

There are no associations between the *event\_built1nchange* and *com\_space1nchange* variables, which that an increase in students' rating when

asked if they study at a coffeeshop resulted in no positive or negative change in students' ratings when asked if there are regular social events they could attend in their building or have access to communal space in their building. These relationships require further research, though it could appear that students in this survey who study at coffeeshops did not have a built environment that supports social interaction with others.

*Studying at home and the built environment and attitudes toward planned gatherings*

In comparison to the third place regression results, associations were evident between event\_build13change (compare Survey 1 and 3), event\_campus12change (compare Survey 1 and 2), event\_offcampus13change (compare Survey 1 and 3) and the accompanying independent variables studyhome1nchange (see Table 10).

There is an association between students who study at home and having regular social events their building that they could attend, when comparing Survey 1 and 3. On one hand, there is an association between these students and attending events on campus when comparing Survey 1 and 2. On the other hand, there an association between these students and attending events off-campus when comparing Survey 1 and 3. However, considering that these associations occur only once when comparing Survey 1 to n, it is difficult to infer a result or conclusion, though it does raise a question regarding these relationships and requires future research.

There is no association between students who study at home and access to communal space in their building. This demonstrates students who increase their

likelihood of studying at home results in no positive or negative change in students' ratings when asked if they have communal space in their building. This relationship requires further research.

*Table 9: Temporal Trends & Built Environment (University Library) - This table shows the results from the ordered logistic regressions which measures the relationship between the change in rating for studying at a university library and the built environment variables. Each regression compares Survey 1 and n.*

University Library		Surveys					Total
Variable	Variable Description	1-2	1-3	1-4	1-5	1-6	
event_build_1nchange	There are regular social events in my building that I could attend	*	ns	*	ns	ns	2/5
com_space_1nchange	I have access to a communal space in my building where I can interact with others	ns	ns	ns	ns	ns	0/5
event_campus_1nchange	I regularly attend events held on campus	**	ns	*	*	ns	3/5
event_offcampus_1nchange	I regularly attend community events held off campus	**	ns	*	*	***	3/5
<p>p &gt; 0.05 ns (not significant)            p ≤ 0.05 *            p ≤ 0.01 **            p ≤ 0.001 ***            p ≤ 0.0001 ****</p> <p>Green = Positive coefficient            Red = Negative coefficient            Yellow = Positive and negative coefficient</p> <p>The abbreviated results are shown in Table 8, full results are show in Appendices D.</p>							



Table 10: Temporal Trends & Built Environment (Coffeeshops) - This table shows the results from the ordered logistic regressions which measures the relationship between the change in rating for studying at a coffeeshop and the built environment variables. Each regression compares Survey 1 and n.

Coffeeshop		Surveys					Total
Variable	Variable Description	1-2	1-3	1-4	1-5	1-6	
event_build_1nchange	There are regular social events in my building that I could attend	ns	ns	ns	ns	ns	0/5
com_space_1nchange	I have access to a communal space in my building where I can interact with others	ns	ns	ns	ns	ns	0/5
event_campus_1nchange	I regularly attend events held on campus	ns	ns	**	***	****	3/5
event_offcampus_1nchange	I regularly attend community events held off campus	***	***	****	****	****	5/5
<p>p &gt; 0.05 ns (not significant)                      p ≤ 0.05 *                      p ≤ 0.01 **                      p ≤ 0.001 ***                      p ≤ 0.0001 ****</p> <p>Green = Positive coefficient                      Red = Negative coefficient                      Yellow = Positive and negative coefficient</p> <p>The abbreviated results are shown in Table 9, full results are shown in Appendices D.</p>							

Table 11: Temporal Trends & Built Environment (Study at Home) - This table shows the results from the ordered logistic regressions which measures the relationship between the change in rating for studying at home and the built environment variables. Each regression compares Survey 1 and n.

Study at Home		Surveys					Total
Variable	Variable Description	1-2	1-3	1-4	1-5	1-6	
event_build_1nchange	There are regular social events in my building that I could attend	ns	*	ns	ns	ns	1/5
com_space_1nchange	I have access to a communal space in my building where I can interact with others	ns	ns	ns	ns	ns	0/5
event_campus_1nchange	I regularly attend events held on campus	**	ns	ns	ns	ns	1/5
event_offcampus_1nchange	I regularly attend community events held off campus	ns	*	ns	ns	ns	1/5
<p>p &gt; 0.05 ns (not significant)                      p ≤ 0.05 *                      p ≤ 0.01 **                      p ≤ 0.001 ***                      p ≤ 0.0001 ****</p> <p>Green = Positive coefficient                      Red = Negative coefficient                      Yellow = Positive and negative coefficient</p> <p>The abbreviated results are shown in Table 10, full results are shown in Appendices D.</p>							

### 6.3 Proximity to Amenities

#### Survey 1

This section presents the results from the ordered logistic regression models which examine the relationship between the independent variables that ask where students study and each dependent variable measuring proximity to amenities.

The independent variables are:

- *I regularly study at a university library* (univ\_lib1)
- *I regularly study at nearby coffeeshops* (coffeeshop\_1)

- *I regularly study at home* (study\_home1)

The dependent variables are:

- *Living close to campus is important to me* (close\_campus1)
- *Living close to coffeeshops or restaurants is important to me* (coffee\_restaurant1)
- *Living close to transit is important to me* (close\_transit1).

These regression models examine the responses from Survey 1. The regression results indicate associations between many of the proximity to amenities variables and studying at a university library, coffeeshops, and at home (see Table 11). Specifically, all the regression models indicate a statistically significant result except for the relationship between students who study at a university library or at home and *coffee\_restaurant1*, and students who study at coffeeshops and *close\_transit1*. Students who study at a university library, coffeeshops or, at home are less likely to prioritize living close to campus. Students who study at a university library or at home are likely also less likely to prioritize living close to transit. Conversely, students who study at coffeeshops are more report living close to coffeeshops and restaurants as being important to them. There is no association between students who study at a university library or at home and the importance of living close to coffeeshops or restaurants. There is also no association between students who study at a coffeeshop and the importance of living close to transit.

Table 12: Survey 1 & Proximity to Amenities Variables – This table shows the results from the ordered logistic regressions which measures the relationship between studying at a university library, coffeeshop or at home and the proximity to amenities variables.

Variable	Variable Description	University Library	Coffeeshops	Study at Home
Close_campus1	Living close to campus is important to me.	**** p-value = .0000	*** p-value = .0005	**** p-value = .0000
Coffee_restaurant1	Living close to coffeeshops or restaurants is important to me	ns p-value = .340	**** p-value = .0000	ns p-value = .806
Close_transit1	Living close to transit is important to me	**** p-value = .0000	ns p-value = .079	**** p-value = .0000
<p>p &gt; 0.05 ns                      p ≤ 0.05 *                      p ≤ 0.01 **                      p ≤ 0.001 ***                      p ≤ 0.0001 ****</p> <p>Green = Positive coefficient                      Red = Negative coefficient</p> <p>The abbreviated results are shown in Table 11, full results are show in Appendices B.</p>				

### Temporal Trends

This section presents the results from the ordered logistic regression models which examine survey responses over time. The ratings for studying at a university library, coffeeshop or at home are compared between Survey 1 and 2, Survey 1 and 3, Survey 1 and 4, Survey 1 and 5, and Survey 1 and 6. Similarly, the ratings in measuring proximity to amenities are compared between Survey 1 and 2, Survey 1 and 3, Survey 1 and 4, Survey 1 and 5, and Survey 1 and 6. Specifically, the dependent variables were tested individually against the proximity to amenities variables to observe the potential temporal trends and shifts in students' preferences

to live within proximity to amenities from survey 1 and  $n$ . There are three potential outcomes from the ordered logistic regression analysis. If a regression results in a positive association this means that an increase in students' rating when asked where they study is likely to result in an increase in the rating for measuring preferences toward proximity to amenities. If a regression results in a negative association this means that an increase in students' rating when asked where they study, is likely to result in a decrease in the rating for measuring preferences toward proximity to amenities. Additionally, no association means that an increase in students' rating when asked where they study resulted in no positive or negative change to the rating for measuring preferences toward proximity to amenities.

The independent variables are:

- *I regularly study at nearby coffeeshops (coffeeshop1nchange)*
- *I regularly study at a university library (univlib1nchange)*
- *I regularly study at home (studyhome1nchange).*

The dependent variables are:

- *Living close to campus is important to me (close\_campus1nchange)*
- *Living close to coffeeshops or restaurants is important to me (coffee\_restaurant1nchange)*
- *Living close to transit is important to me (close\_transit1nchange)*

*Studying at a university library and proximity to amenities*

The regression results demonstrate a positive association between the dependent variables *close\_campus15change* (compare Survey 1 and 5), *coffee\_restaurant14change* (compare Survey 1 and 4), *coffee\_restaurant15change* (compare Survey 1 and 5) and the accompanying independent variable *univlib1nchange* (see Table 9).

The survey results only indicate a positive association over time, between survey 1 and 5 when observing students' level of importance toward living close to campus. This implies an increased rating of studying at a university library is associated with an increased level of importance toward living close to campus. However, considering that this association occur only once when comparing Survey 1 to n, it is difficult to infer a result or conclusion. Though it does raise a question regarding the timing of this relationship in the academic year. This relationship requires further research.

There is an association between studying at a university library and valuing living close to coffeeshops and restaurants when comparing Survey 1 and 4, and Survey 1 and 5. This implies that an increased rating for studying at a university library is associated with an increased level of importance toward living close to coffeeshops and restaurants.

The survey results also indicate that there is an association between students who study at a university library and the level of importance toward living close to campus when comparing Survey 1 and 5. This means an increased rating for

studying at a university library is associated with an increased level of importance for living close to campus. However, this association only occurs once when comparing Survey 1 and  $n$  for both social connectedness variables. This relationship raises the question regarding why this relationship only occurs once when comparing the surveys. This relationship requires further analysis.

*Studying at a coffeeshops and proximity to amenities*

Conversely, the second set of regression results demonstrate associations between the dependent variables *close\_campus12change* (compare Survey 1 and 2), *close\_campus16change* (compare Survey 1 and 6), *coffee\_restaurant13change* (compare Survey 1 and 3), *coffee\_restaurant14change* (compare Survey 1 and 4), *coffee\_restaurant15change* (compare Survey 1 and 5), *coffee\_restaurant16change* (compare Survey 1 and 6), *close\_transit14change* (compare Survey 1 and 4), *close\_transit15change* (compare Survey 1 and 5) and the accompanying independent variable *coffeeshop1nchange* (see Table 10).

Our results reveal that there is a relationship between students who study at coffeeshops and living close to campus when comparing Survey 1 and 2 and Survey 1 and 6. This is a unique relationship because no change in rating for studying at a coffeeshop is associated with an increased level of importance toward living close to campus, however, an increased rating for studying at coffeeshop is associated with a decreased level of importance for living close to campus. Additionally, there is a unique association between students who study at coffeeshops and living close to transit. When comparing Survey 1 and 4, students who increase their likelihood or did not change their rating for studying at coffeeshops also became less likely to live

close to transit. When comparing Survey 1 and 5, no change in rating for studying at coffeeshops is associated with an increased level of importance for living close to transit, however this relationship was the inverse when there is an increase in rating for studying at coffeeshops.

There is also an association between studying at coffeeshops and living close to coffeeshops and restaurants, when comparing Survey 1 and 3, Survey 1 and 4, Survey 1 and 5, and Survey 1 and 6. Essentially, this means an increased rating for studying at coffeeshops is associated with an increased level of importance for living near coffeeshops and restaurants.

*Studying at home and proximity to amenities*

The third set of regression results demonstrate an association between the dependent variables *close\_campus12change*, *close\_campus13change*, *close\_campus14change*, *close\_campus15change*, *close\_campus16change*, *close\_transit12change*, *close\_transit13change*, *close\_transit14change*, *close\_transit15change*, *close\_transit16change* (see Table 14). It is evident that students who study at home are more likely to live close to campus and close to transit over time.

Students who study at home indicate that living close to campus and transit is important to them when comparing Survey 1 and 2, Survey 1 and 3, Survey 1 and 4, Survey 1 and 5, and Survey 1 and 6. This implies an increased rating for studying at home is associated with an increased level of importance for living close to campus and transit.



There are no associations between the coffee\_restaurant1nchange variable. This indicates that an increase in students' rating when asked if they study at home results in no positive or negative change in students' ratings when asked if living close to coffeeshops or restaurants is important to them. This relationship requires further research, though it could appear that students in this survey who study at home do not prioritize living close to coffeeshops or restaurants.

*Table 13: Temporal Trends & Proximity to Amenities (University Library) - This table shows the results from the ordered logistic regressions which measures the relationship between the change in rating for studying at a university library and the proximity to amenities variables. Each regression compares Survey 1 and n.*

University Library		Surveys					Total
Variable	Variable Description	1-2	1-3	1-4	1-5	1-6	
Close_campus1nchange	Living close to campus is important to me.	ns	ns	ns	*	ns	1/5
Coffee_restaurant1nchange	Living close to coffeeshops or restaurants is important to me	ns	ns	*	**	ns	2/5
Close_transit1nchange	Living close to transit is important to me	ns	ns	ns	ns	ns	0/5
<p>p &gt; 0.05 ns (not significant)  p ≤ 0.05 *  p ≤ 0.01 **  p ≤ 0.001 ***  p ≤ 0.0001 ****</p> <p>Green = Positive coefficient  Red = Negative coefficient  Yellow = Positive and negative coefficient</p> <p>The abbreviated results are shown in Table 12, full results are shown in Appendices E.</p>							

Table 14: Temporal Trends & Proximity to Amenities (Coffeeshops) - This table shows the results from the ordered logistic regressions which measures the relationship between the change in rating for studying at a coffeeshop and the proximity to amenities variables. Each regression compares Survey 1 and n.

Coffeeshops		Surveys					Total
Variable	Variable Description	1-2	1-3	1-4	1-5	1-6	
Close_campus1nchange	Living close to campus is important to me.	*	ns	ns	ns	*	2/5
Coffee_restaurant1nchange	Living close to coffeeshops or restaurants is important to me	ns	**	**	**	***	4/5
Close_transit1nchange	Living close to transit is important to me	ns	ns	*	**	ns	2/5
<p>p &gt; 0.05 ns (not significant)                      p ≤ 0.05 *                      p ≤ 0.01 **                      p ≤ 0.001 ***                      p ≤ 0.0001 ****</p> <p>Green = Positive coefficient                      Red = Negative coefficient                      Yellow = Positive and negative coefficient</p> <p>The abbreviated results are shown in Table 13, full results are shown in Appendices E.</p>							

Table 15: Temporal Trends & Proximity to Amenities (Study at Home) - This table shows the results from the ordered logistic regressions which measures the relationship between the change in rating for studying at home and the proximity to amenities variables. Each regression compares Survey 1 and n.

Study at Home		Surveys					Total
Variable	Variable Description	1-2	1-3	1-4	1-5	1-6	
Close_campus1nchange	Living close to campus is important to me.	****	****	****	****	***	5/5
Coffee_restaurant1nchange	Living close to coffeeshops or restaurants is important to me	ns	ns	ns	ns	ns	0/5
Close_transit1nchange	Living close to transit is important to me	****	****	***	***	***	5/5
<p>p &gt; 0.05 ns (not significant)                      p ≤ 0.05 *                      p ≤ 0.01 **                      p ≤ 0.001 ***                      p ≤ 0.0001 ****</p> <p>Green = Positive coefficient                      Red = Negative coefficient                      Yellow = Positive and negative coefficient</p> <p>The abbreviated results are shown in Table 14, full results are shown in Appendices E.</p>							

## 7. Discussion

### 7.1 Social Connectedness

The Survey 1 and temporal analysis demonstrate that students who study at a university library and coffeeshops are more likely to feel socially connected.

Students who study in these third places may feel more socially connected because they prefer to be in the company of new people, students and classmates. Further, students who study at a university library are more likely to run in to friends or classmates while studying, as evident through the temporal trend analysis.

Additionally, the temporal trends demonstrate that students who study at coffeeshops are more likely to feel connected to their local community.

In this study, majority of students study at a university library in comparison to coffeeshops (47% and 24% respectively), which, according to existing research, may be because this is where most of their time is spent (Campbell, 2017).

Additionally, scholars note that libraries provide a sense of familiarity because students are able to see familiar faces of strangers even if they do not interact, it provides a sense of comfort as they share a common bond (Montgomery & Miller, 2011). This study finds that students who study at a university library are more likely to run into friends or classmates while studying as evident through the temporal trend analysis. Thus, the findings from existing literature and this study correlate.

Research suggests that individuals use coffeeshops as an office space (Lukito & Xenia, 2018). Students who study in coffeeshops use them as a study space. Additionally, scholars argue that individuals who go to coffeeshops

experience positive social benefits, such as a sense of belonging (Waxman, 2006). Through this study, it is evident that students who study at coffeeshops experience a sense of connection to their local community, as evident through the temporal trend analysis. Thus, the findings from this study correlate with the findings from existing literature.

Moreover, scholars argue that coffeeshops create barriers to entry as individuals need to engage in consumerism in order to use the space (Lukito & Xenia, 2018). In this study, there is a negative association between studying at a coffeeshop and annual income<sup>14</sup>. In our survey, 720 students are either earning no income or did not want to provide this information. However, from the 1030 students who did provide financial information, 87% of students earn less than \$30,000, 10% of students earn greater than \$31,000 and less than \$60,000, and 1.9% of students earn greater than \$60,000. There are 25% of students who provided financial information study in coffeeshops. However, 89% of students who study in coffeeshops and provided financial information earn an income greater than 0 and less than \$30,000. Therefore, students who study at coffeeshops

Students who study at home are less likely to feel socially connected as evident through the Survey 1 analysis. It is important to note that the temporal trend analysis did not indicate a level of significance for any of the social connectedness variables and studying at home. Though, there was one relationship between feeling

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<sup>14</sup> The p-value for the relationship between studying at a coffeeshop and annual income is 0.000. The coefficients are negative values as follows: If income is greater than 30 but equal or less than 45 is -19.733, if income is greater than 45 but equal or less than 60 is -19.720, if income is greater than 60 is -19.69.

connected to the local community when comparing Survey 1 and 6, which requires further investigation. It is possible to infer that students who study at home are spending majority of their time in their second place – home – in comparison to students who study at third places.

The findings from this study indicate that students who study at home did spend time at the start of the academic year attending events on- and off-campus, however it is evident that this relationship does not sustain itself throughout the rest of the academic year. This implies that students who study at home are less likely to visit third places. Moreover, 60% of students who study at home consider themselves to be an introvert. The association between studying at home and being an introvert is statistically significant ( $p < 0.01$ )<sup>15</sup>, implying that students who study at home are more likely to be an introvert. Therefore, it is likely that these students are less likely to engage with others, the built environment, and are less likely to feel socially connected.

In this study, 37% of students who study at home live in high-rise housing (greater than 5 floors). Existing literature suggests that students residing in high-rise buildings are more dissatisfied with their residential life than those residing in low-rise buildings (Holahan & Wilcox, 1978, p. 240; Moos, 1978). Scholars note that this is due to the lack of social interactions with other students and the rest of the community. Additionally, this study indicates that 59% of students who study at home live off-campus. There are contradicting findings regarding students'

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<sup>15</sup> The Survey 1 p-value for the relationship between studying at home and being an introvert is 0.000.

perceptions of social connectedness based on whether they live on- or off-campus. Some scholars suggest that students who live off-campus are more likely to engage with their built environment, while students who live on-campus are more likely to participate in on-campus events and extra-curricular activities (Mogenet & Rioux, 2014; Feldman & Newcomb, 1969; Lundgren & Schwab, 1979; cited in Rinn, 2004; as cited in Khozaei et al., 2010). However, this study finds that students who study at home may not be likely to engage in on- or off-campus events, as evident through the temporal trend analysis, since the associations only occur once. Though, it is important to note that there were positive associations when observing these relationships in Survey 1. This may support the findings in existing literature that suggest that this is because they were unable to sustain friendships in residence over the course of the academic term (Holton, 2016). In this study, students who study at home are less likely to feel socially connected. It is possible that living in high-rise housing and living on- or off-campus influences their perceptions toward social connectedness.

## 7.2 Attitudes Toward Planned Gatherings and Access to Social Built Environments

Students who study at a university library and coffeeshops are more likely to have positive attitudes toward planned gatherings as evident through the Survey 1 and temporal trend analysis. These students are also more likely to have access to social spaces at the start of the academic year (Survey 1), however, students who study at a university library have regular social events in their building they could attend as evident through the temporal trend analysis.

Scholars have found that university libraries offer a variety of uses to students. Though it is a place to study, research suggests that students use libraries for socialization as well (Ferria et al., 2017). Additionally, studies have found that students prefer to spend time on campus for interaction because this is where most of their time is spent (Campbell, 2017). However, another study notes that students' favourite third place locations are off-campus for interaction, such as cafes and restaurants (Waxman et al., 2007). Considering that students who study at a university library are more likely to run into friends or classmates while studying they may be attending planned gatherings and events on- or off-campus together. Additionally, in this study, there was a positive association at the start of the academic term that indicate that students who study at coffeeshops felt that socializing with others was important to them (Survey 1). This is likely why these students showed positive attitudes toward planned gatherings over the temporal trend analysis. However, there was no significant relationship between these variables for students who study at a university library.

Students who study at home are more likely to have positive attitudes toward planned gatherings but are less likely to have access to social spaces at the start of the academic year but not throughout the year. There are no positive associations between their perceptions toward planned gatherings and access to social built environments over the course of the year, as evident through the temporal trend analysis. In this study, there is no significant association between students who study at home and students' feelings regarding the importance of socializing with others.

### 7.3 Proximity to Amenities and Connectivity

Students who study at a university library, coffeeshops and at home are less likely to live close to amenities at the start of the academic year (Survey 1).

However, students who study at a university library and at coffeeshops are more likely to live close to coffeeshops and restaurants over the course of the year, as evident through the temporal trend analysis. It is understandable that students who study at coffeeshops prioritize living close to coffeeshops and restaurants over the course of the academic year, as evident through the temporal trend analysis.

Alternatively, students who study at home are more likely to live close to campus and transit over the academic year. **The** majority of the student population, despite their preferences for study location, prefer to use public transit or walking as their main mode of transportation to campus. However, only students who prefer to study at home prioritize living close to transit over the course of the academic term, and this is likely because they use transit as their main mode of transportation to get to campus. Specifically, 65% of students walk and 25% of students use public transit. As mentioned above, 83% of students did not have regular access to a car at the start of the academic term.

Overall, existing literature emphasizes that living close to amenities increases individuals' level of well-being (Moore et al., 2019). The availability of amenities is crucial for the student demographic as it provides them with access to engage in social connectivity. It is important to note that students who study in third places prioritize amenities that allow them to engage in social activity, whereas students



who study at home prioritize the ability to commute through the use of transit and living close to campus.

## 8. Conclusion & Recommendations

This section will answer the research questions and provide as a basis for the major takeaways from this study, the administrative and policy implications of the findings, and further research.

The purpose of this research was to examine the causal link between studying at a university library, coffeeshop, and at home and (1) its influence on students' perception of social connectedness, (2) their attitudes toward planned gatherings, and (3) their preferences toward living within proximity to amenities and connectivity using ordered logistic regression analysis. University libraries and coffeeshops are the third place environments that were examined in this study, and students' homes are the second place environment. The three main findings from this study are as follows:

1. Students who are more likely to study at third places are more likely to feel socially connected than those who study at home in Survey 1. Social connectedness also increases more for students who study in third places over the academic year which is evident through the temporal analysis.
2. Students who study at third places are more likely to have positive attitudes toward planned gatherings and access to social spaces in Survey 1 and throughout the academic year, compared to students who study at home.
3. Students who study at third places and at home value living close to different amenities over the academic year but not at the start of the year in Survey 1. Students who study at third places are more likely to value living close to

coffeeshops and restaurants, whereas students who study at home are more likely to value living close to campus and transit over the academic year.

Despite the role of the built environment on students' perceptions toward social connectivity, planned gatherings, access to social space, and their preferences toward living within proximity to amenities, it is also evident that programming and the ability to socialize through events are crucial to students' well-being. The results from this study are substantial and require consideration from university administration and planning policy as will be discussed in the next section.

## 8.1 Administrative and Policy Implications

### *University's Role*

The University of Waterloo has a significant role in enhancing student life. The University administration manages numerous departments that improve student satisfaction and their experience within its boundaries, however the institution is also responsible for advocating for students within the local community. The University of Waterloo has relationships with the greater community, the City and the Region of Waterloo. Connections and communications can continue to be developed between developers and off-campus housing property management. Advocating for the student population, maintaining existing connections, and creating new relationships is essential to ensure that students are provided with more opportunities for social connectedness, planned gatherings and understanding their preferences toward living within proximity to amenities.

The findings from this study demonstrate that there are students who have positive perceptions toward social connectedness, planned gatherings and feel connected through third places. However, there are ways in which the University administration can enhance social connectedness for students through policy and building relationships with the local community, especially for students who spend more time at home, within their community, and off-campus. Currently, the University of Waterloo has a Committee of Student Mental Health, whose purpose is to understand the causes of stress, anxiety and depression among students and identify ways to mitigate them. One of the Committee's objectives in its report is to enhance the built environment to better students' mental health and wellness. This research further supports that the built environment influences students' wellness and perceptions toward connectedness. Third places within campus grounds, such as libraries and coffeeshops can be further enhanced by providing restorative spaces, or group study spaces which can offer more opportunities for social interaction. Though this report identifies objectives to enhance campus space, the committee can also advocate for the implementation of spaces off-campus that can enhance connectedness through third places, not only for the student demographic but for the local community as well.

The University's Housing and Residences department's mission statement is to "foster growth and learning opportunities by providing a safe, accessible, clean and a supportive home where all students succeed personally and academically" (University of Waterloo, n.d.). The department should continue to provide events and programming within residences and create interactive communal spaces within

buildings to provide opportunities for social connectedness. The University administration should continue to host events on-campus and support student societies that host events on- and off-campus. It is important to note that hosting events on-campus, and outside of student residences, is crucial so that students who commute have the ability to interact with their peers and create connections. Furthermore, the availability of communal space is also vital outside of residence as it provides a space for interaction and can also act a restorative space for all students who live on- or off-campus.

The findings suggest that the University should particularly focus on students who spend more time at home and off campus, as this study demonstrates that students who study at home are not as socially connected as those who spend time on-campus and in third places. The University should continue to advocate for students through the City and demonstrate the need to provide student housing with social spaces which will then enhance connectedness. The university can do this by continued their engagement through the City of Waterloo's Town and Gown Committee. The purpose of this committee is to "enhance relationships, communications and policies among the universities, college, students, city, policy and the community" (City of Waterloo, 2020a). The mandate of the committee also includes "addressing issues of common concern [which] may include neighbourhood development/community relations, housing, the environment, economic activities, charitable/volunteer programs, recreational and cultural events, health and safety and academic outreach". Through this committee, the University can continue to advocate for more third places such as coffeeshops in the community as they tend

to be preferred space for students to study. These places also provide a space for social interaction and connectedness.

Currently, post-secondary institutions are adapting to an added complication when it comes to providing opportunities for social interaction due to the COVID-19 pandemic. This pandemic has resulted in universities and colleges switching to an online format which impacts social connectedness and interaction among students. Considering that the pandemic is still on-going, the implications from the pandemic and its effect on interaction and the student demographic has not been identified. However, considering that interaction has a large impact on student life, university administration should try to provide students with the opportunity to interact online and provide programming online. This will allow students to feel connected to faculty as well as their peers, though this is not nearly the same in-person engagement, it does allow students to feel some sense of connection. Additionally, this pandemic can also result in the need for more social space post-pandemic, as compact spaces may not be ideal. Lower-density student housing options may be more appealing to students as well. Nonetheless, the University should refer to future research and student preferences to better understand the implications of COVID-19 and whether more spaces are to be provided to result in less dense social environments. Overall, the University has a responsibility to ensure that there is still a focus on providing third places and communal spaces for interaction.

### *City's Role*

The student demographic makes up a substantial amount of the population for the City of Waterloo. The City is responsible for effectively planning around its

post-secondary institutions that cater to students and the greater community. As per the City's Official Plan (OP) which sets out to 2031, the City aims to provide a balance of social, cultural, environmental, and economic interests (City of Waterloo, 2020b). Currently, the lands surrounding the University are designated for academic use, residential, employment area, commercial, and open space land uses (City of Waterloo, 2020b). Additionally, there is an existing and planned active transportation framework which outlines the City-wide cycling and multi-use routes (City of Waterloo, 2020b). The City has a responsibility to effectively plan the built form for the student demographic and the surrounding community which includes understanding the implications of development applications and whether a proposed use enhances quality of life and provides a balance of the various interests mentioned above.

Transportation and walkability are substantial priorities for students because it allows them to live within proximity to amenities, and campus. The City has a responsibility to ensure amenities are near student housing, and transit is provided for students to have access to commute to campus and around the City. This study identified that most students walk and use transit as their main mode of transportation. The City is responsible for maintaining sidewalks especially in the winter months so that students can continue to walk safely around the community. Additionally, the Regional municipality should continue to understand transportation needs of students particularly with regards to the frequency of buses near post-secondary institutions as the demand is significantly higher in these areas.

The Planning department at the City of Waterloo should prioritize the social implications associated with planning around post-secondary institutions. As discussed above, there are positive and negative associations with living in high-rise apartments. Recent student housing development provided for students are high-density. Some examples include King Street Towers, the ICON, and the HUB. These developments provide students with high-end features such as ensuite bathrooms, floor-to-ceiling windows and walk-in closets. However, some high-density developments do not provide communal spaces, while others provide rooftop basketball, study lounges, movie theatres, and games rooms. These features are vital as it provides students with a third place, as well as a restorative space to relax and unwind. The City can continue to create policies which highlight the importance of interaction and the public realm as seen in the Northdale Land Use and Community Improvement Plan Study – Urban Design and Built Form Guidelines. Additionally, the City can encourage the development of student housing to enhance well-being and sense of belonging, and consider the social implications of third places, open space and restorative spaces around and within housing and student communities. Finally, similar to the university’s responsibility, the City and the Region should also understand the implications of COVID-19 and whether the pandemic will impact student housing, and social connectedness when students return back to Waterloo.

Overall, there are institutions and entities that have a responsibility to plan built environments effectively for students. As this case study has shown, third places, communal spaces, and programming are vital to ensure that students feel



socially connected and have opportunities for social interaction. Additionally, the proximity to amenities can further enhance student's accessibility to spaces that provide social interaction. Students have numerous roles and obligations and require a place to relax (Waxman et al., 2007). Students living on campus may need a restorative space, or third place to rejuvenate and socialize (Waxman et al., 2007). Similarly, students living off campus will need these spaces; however, it must be implemented with the interests of the greater community as well. The University, Region and City of Waterloo must understand the social implications of planning for student communities as social connectedness can enhance student life, academic achievement, and sense of belonging.

### 8.3 Further Research

This study has its limitations as discussed in Section 3.7, and include the lack of qualitative data collected, multiple variables used in the regression analysis to examine the data, and the case study's applicability to other post-secondary environments. However, there are additional research opportunities that can be examined to further enhance the understanding of student spaces and its impact of social connectedness. Researchers should examine socioeconomics of participants. This would provide a great understanding regarding who uses third places, and whether certain groups are excluded from these spaces, and thus identifies the potential barriers that may exist in post-secondary communities. Additionally, researchers should examine the relationships that students have with their roommates to further understand the socialization that occurs in residences. For case studies, researchers should conduct interviews with the student demographic,

university administration, and planners from the City, and Region to further understand their respective roles in planning for student communities. Moreover, developers can also be engaged to understand their interests in planning around post-secondary institutions and how they consider social implications in the design of their amenities and built structures. Finally, the design of social spaces can also be examined to understand how it can be a productive, restorative, and social space for students.

#### 8.4 Conclusion

Examining the role of the built environment on social connectedness is crucial. This is because it provides a greater understanding regarding the use of space, efficient planning and other key initiatives that are necessary to create social cohesion. These initiatives can go beyond the scope of planning practice and include programming and social events.

This research found that students who study in third places are more likely to feel socially connected, have positive attitudes toward planned gatherings and prefer to live within proximity to amenities. These results are apparent over the course of the academic year, as examined through the time series data and temporal analysis which observed students' preferences on a bi-monthly basis from September 2018 to August 2019. This empirical evidence supports the theory that third places have an important role in community planning and impact individuals' social connectedness, sense of belonging and opportunities for social cohesion.

Planners aim to create spaces and design the public realm for social interaction, comfort, and vibrancy. However, this may not always be the outcome. The literature

review in this thesis highlighted the challenges associated with spaces such as third places, and semi-public private environments. Some challenges include invisible barriers such as the aspect of consumerism which is required to enter and use a space. In some instances, spaces can cater to particular groups of individuals based on socioeconomic status, preference to use spaces for planned or chance encounters as well as other reasons. This highlights the importance of free programming and social events as it provides individuals with the opportunity to use spaces for planned gatherings and reduce the barriers for entry and exit.

This study recognizes that students who study at third places and at home attended events on- and off-campus at the start of the academic year. It is evident that both groups are interested in attending social events. Students who studied in third places are more likely to attend social events over the academic year which is apparent through the time series analysis. Further research is required to understand the factors that deter students who study at home and their lack of attendance at social events throughout the year in comparison to students who study in third places. It is important to note that students who study at home indicated an inverse relationship for having access to communal space at the start of the academic year. This could indicate that these students did not have a social space to interact with others or the opportunity to attend social events within their place of residence. Nonetheless, the interest in planned social gatherings is a commonality between both groups.

Access to social space such as third places is available to both groups, though availability of programming and social events can be invaluable, whether it be

available in residences, or through on- or off-campus events. The key is to offer free social events and programming as it reduces barriers to entry and removes any costs associated with attending. Additionally, the events should be accessible to students and within proximity to transit, or accessible by other forms of transportation such as walking, or biking.

A successful example of programming that was offered in Waterloo was Bridges, an intergenerational learning program. This program ran in partnership with the University of Waterloo's School of Planning, and community organizations. This program offered social events focusing on a particular theme such as cooking or art. It removed barriers to entry because there was no entry fee, invited community members of all ages, and was held in accessible venues or third places. The program aimed to promote interaction amongst individuals of various age groups, diversities, and backgrounds. This program demonstrated the effective use of space and programming.

In a university community, students may experience socioeconomic barriers to entering a space. This may include the cost of entry, accessibility to the space or other reasons. These challenges must be examined in order to effectively use and create space, increase social interaction and cohesion, and create a welcoming environment for students of various backgrounds. This conclusion raises the question – what other initiatives can be put in place to increase social interaction beyond creating social spaces, planning for the public realm and offering social events and programming?

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## Appendices

### Appendix A – Attrition Rate

Survey	Number of Participants
1	2293
2	899
3	557
4	569
5	468
6	418

Preferences for studying at multiple locations			
Survey	Studying at a coffeeshop	Studying at a university library	Studying at home
1	1750	1750	1748
2	894	894	896
3	555	556	556
4	568	568	567
5	466	466	466
6	415	413	416

Gender					
Survey	Female	Male	Other	Prefer Not to Say	Total
1	779	926	5	15	1725
2	422	417	2	10	851
3	Not available				
4	262	275	2	5	544
5	215	232	1	4	452
6	195	204	1	4	404

Visible Minority			
Survey	Yes	No	Total
1	884	843	1727
2	414	438	852
3	Not available		
4	263	282	545
5	220	232	452
6	193	211	404

## Appendix B – Survey Questions

### Survey Questions

1. Are you currently enrolled at the University of Waterloo in:
  - a. An undergraduate program
  - b. A graduate program
  - c. Neither (not eligible, survey terminates)
2. Are you currently on co-op?
  - a. No
  - b. Yes
3. What's your current year of study?
4. Are you a full- or part-time student?
  - a. Full-time
  - b. Part-time
5. Do you live on or off campus?
6. What type of housing do you currently live in?
  - a. Single-detached house
  - b. Attached (i.e., semi-detached, row-house, walk-up apartment, or other apartment in a house with no more than three storeys)
  - c. Apartment in a building with more than three but fewer than 5 storeys
  - d. Apartment in a building with 5 to 10 storeys
  - e. Apartment in a building with more than 10 storeys
7. How many months have you lived at your current address?
8. Do you own or have regular access to a car?
9. How long does it take you to travel from where you live to South Campus Hall (center of campus)?
10. How do you typically travel to campus on a daily basis?
  - a. Car as driver
  - b. Car as passenger
  - c. Public transit
  - d. Walk
  - e. Bike
  - f. Other (please specify)
11. On how many days per week do you typically travel to campus during a school term?
12. What's your current living arrangement?
  - a. Share a room with a roommate
  - b. Have my own room but share communal spaces (e.g., kitchen, lounge) with one or more roommates
  - c. Live on my own

- d. Live with a partner
- e. Live with my parent(s)
- f. Other

13. Where do you currently live?

- a. City of Kitchener
- b. City of Waterloo
- c. City of Cambridge
- d. One of the Townships in the Region of Waterloo (North Dumfries, Wellesley, Wilmot, or Woolwich)
- e. Outside of the Region of Waterloo
  - i. If e, ask about city name.

14. Do you live in one of the following neighbourhoods? (if a or b in 13)

- a. Uptown Waterloo
- b. Northdale (east of campus)
- c. Downtown Kitchener
- d. None of the above

15. Please follow the link to the WalkScore website to determine your Walk and Transit Scores, and enter them separately below. This will help us determine how connected your neighbourhood is but your address will remain confidential. WalkScore does not save addresses.

<https://www.walkscore.com/>

Likert scale questions (five options: strongly agree, agree, neutral, disagree, strongly disagree)

- 16. I feel connected to the local community
- 17. There are always people nearby I can turn to if I want to socialize
- 18. There are regular social events in my building that I could attend
- 19. I have access to a communal space in my building where I can interact with others if I want
- 20. Socializing with others is important to me
- 21. I consider myself to be more of an introverted person
- 22. I regularly attend events held on campus
- 23. I regularly attend community events held off campus
- 24. I regularly study at nearby coffeeshops
- 25. I regularly study at a university library
- 26. I regularly study at a city library
- 27. I regularly study at home
- 28. Living close to campus is important to me
- 29. Living close to coffeeshops or restaurants is important to me
- 30. Living close to transit is important to me
- 31. I regularly run into friends or classmates when studying

32. I regularly run into friends or classmates when running errands
33. Are you:
- a. A Canadian citizen
  - b. A permanent resident
  - c. A refugee
  - d. An international student
34. Do you consider yourself to be an ethnic or visible minority?
- a. Yes
  - b. No
35. What's your gender?
- a. Male
  - b. Female
  - c. Other
  - d. Prefer not to say
36. How old are you?
37. What's your current yearly individual income from all sources? (before tax)
38. How much do you pay in rent per month?
39. Does your rent include cost of utilities (heating, electricity, water etc.)?
- a. If not, what is the total cost of your monthly utility bills?
40. Please enter your student ID and email address. This information is collected to provide your \$10 remuneration to your WatCard, to link your responses between surveys, and to notify you when it is time to complete the next survey. Your identity will remain confidential.

## Appendix C – Survey 1 & Place Variables Results

Variable	Variable Label	Survey 1 – University Library	Survey 1 - Coffeeshop	Survey 1 – Study at Home
<b>Social Connectedness Variables</b>				
Local_community1	I feel connected to the local community.	✓ p-value = .0000  Coefficients: Disagree = .944 Neither Disagree/Agree = 1.211 Agree = .799 Strongly Agree = 1.39	✓ p-value = .0000  Coefficients: Disagree = .381 Neither Disagree/Agree = .621 Agree = .734 Strongly Agree = 1.39	p-value = .619  Coefficients: Disagree = -.3044 Neither Disagree/Agree = -.068 Agree = -.103 Strongly Agree = -.214
Ppl_socialize_near1	There are always people nearby if I want to socialize.	p-value = .093  Coefficients: Disagree = .357 Neither Disagree/Agree = .387 Agree = .299 Strongly Agree = .514	✓ p-value = .0043  Coefficients: Disagree = .198 Neither Disagree/Agree = .111 Agree = .260 Strongly Agree = .887	✓ p-value = .0001  Coefficients: Disagree = -.542 Neither Disagree/Agree = -.502 Agree = .103 Strongly Agree = .111
Run_friends_study1	I regularly run in to friends or classmates when studying.	✓ p-value = .0000  Coefficients: Disagree = .783 Neither Disagree/Agree = 1.05 Agree = 1.30 Strongly Agree = 1.55	✓ p-value = .0000  Coefficients: Disagree = .614 Neither Disagree/Agree = .804 Agree = .997 Strongly Agree = 1.34	✓ p-value = .0025  Coefficients: Disagree = -.628 Neither Disagree/Agree = -.606 Agree = -.389 Strongly Agree = -.737

Run_friends_errands1	I regularly run in to friends or classmates when running errands.	<p>✓ p-value = .0046</p> <p>Coefficients: Disagree = .425 Neither Disagree/Agree = .590 Agree = .433 Strongly Agree = .663</p>	<p>✓ p-value = .0000</p> <p>Coefficients: Disagree = .338 Neither Disagree/Agree = .643 Agree = .678 Strongly Agree = 1.20</p>	<p>✓ p-value = .0275</p> <p>Coefficients: Disagree = -.994 Neither Disagree/Agree = -.692 Agree = -.520 Strongly Agree = -.640</p>
Built Environment Variables				
Event_building1	There are regular social events in my building that I could attend	<p>✓ p-value = .0000</p> <p>Coefficients: Disagree = .992 Neither Disagree/Agree = 1.21 Agree = .780 Strongly Agree = .561</p>	<p>✓ p-value = .0001</p> <p>Coefficients: Disagree = .425 Neither Disagree/Agree = .685 Agree = .366 Strongly Agree = .320</p>	<p>p-value = .0574</p> <p>Coefficients: Disagree = .205 Neither Disagree/Agree = .336 Agree = .561 Strongly Agree = .366</p>
Com_space1	I have access to a communal space in my building where I can interact with other	<p>✓ p-value = .0000</p> <p>Coefficients: Disagree = .851 Neither Disagree/Agree = .769 Agree = .568 Strongly Agree = .609</p>	<p>p-value = .114</p> <p>Coefficients: Disagree = .253 Neither Disagree/Agree = .137 Agree = .146 Strongly Agree = .511</p>	<p>✓ p-value = .0002</p> <p>Coefficients: Disagree = -.182 Neither Disagree/Agree = -.495 Agree = .153 Strongly Agree = .282</p>
Event_campus1	I regularly attend events held on campus	<p>✓ p-value = .0000</p> <p>Coefficients: Disagree = .814</p>	<p>✓ p-value = .0000</p> <p>Coefficients: Disagree = .429</p>	<p>✓ p-value = .0333</p> <p>Coefficients: Disagree = .179</p>



		Neither Disagree/Agree = .965 Agree = .837 Strongly Agree = 1.00	Neither Disagree/Agree = .494 Agree = .800 Strongly Agree = 1.36	Neither Disagree/Agree = .410 Agree = .239 Strongly Agree = -.021
Event_offcampus1	I regularly attend community events held off campus	✓ p-value = .0000  Coefficients: Disagree = .882 Neither Disagree/Agree = 1.07 Agree = 1.00 Strongly Agree = 1.04	✓ p-value = .0000  Coefficients: Disagree = .717 Neither Disagree/Agree = 1.24 Agree = 1.23 Strongly Agree = 1.23	✓ p-value = .0000  Coefficients: Disagree = .389 Neither Disagree/Agree = .659 Agree = .473 Strongly Agree = .035
Proximity to Amenities				
Close_campus1	Living close to campus is important to me.	✓ p-value = .0000  Coefficients: Disagree = -.214 Neither Disagree/Agree = -.425 Agree = -.188 Strongly Agree = .397	✓ p-value = .0005  Coefficients: Disagree = -.199 Neither Disagree/Agree = -.487 Agree = -.550 Strongly Agree = -.048	✓ p-value = .0000  Coefficients: Disagree = -.524 Neither Disagree/Agree = -.902 Agree = -.471 Strongly Agree = .460
Coffee_restaurant1	Living close to coffeeshops or restaurants is important to me	p-value = .340  Coefficients: Disagree = .150 Neither Disagree/Agree = .192 Agree = .270	✓ p-value = .0000  Coefficients: Disagree = .585 Neither Disagree/Agree = 1.14	p-value = .8065  Coefficients: Disagree = .081 Neither Disagree/Agree = .157 Agree = .215

		Strongly Agree = .351	Agree = 1.56 Strongly Agree = 2.81	Strongly Agree = .166
Close_transit1	Living close to transit is important to me	<p>✓</p> <p>p-value = .0000</p> <p>Coefficients: Disagree = -.415 Neither Disagree/Agree = -.407 Agree = -.237 Strongly Agree = .551</p>	<p>p-value = .079</p> <p>Coefficients: Disagree = -.129 Neither Disagree/Agree = -.154 Agree = .025 Strongly Agree = .477</p>	<p>✓</p> <p>p-value = .0000</p> <p>Coefficients: Disagree = -.055 Neither Disagree/Agree = -.573 Agree = -.189 Strongly Agree = .258</p>

## Appendix D – Social Connectedness & Temporal Trends

University Library	Survey					
Variables	1-2	1-3	1-4	1-5	1-6	<b>Total</b>
Loccom-x-change	p-value = .405  Coefficient: No_change = .057 Inc_change = .229	✓ p-value = .013  Coefficient: No_change = .485 Inc_change = .542	p-value = .577  Coefficient: No_change = .192 Inc_change = .168	p-value = .509  Coefficient: No_change = .237 Inc_change = .148	p-value = .185  Coefficient: No_change = .324 Inc_change = .430	1/5
Pplsoc-x-change	p-value = .963  Coefficient: No_change = .033 Inc_change = .044	p-value = .966  Coefficient: No_change = .013 Inc_change = -.039	p-value = .474  Coefficient: No_change = .231 Inc_change = .155	p-value = .232  Coefficient: No_change = .313 Inc_change = .340	p-value = .939  Coefficient: No_change = -.065 Inc_change = .003	0/5
Runfrstudy-x-change	✓ p-value = .0000  Coefficient: No_change = .619 Inc_change = .888	p-value = 0.257  Coefficient: No_change = .263 Inc_change = .304	✓ p-value = 0.0000  Coefficient: No_change = .613 Inc_change = .962	✓ p-value = .0002  Coefficient: No_change = .449 Inc_change = .961	p-value = .134  Coefficient: No_change = .320 Inc_change = .481	3/5
Runfrerrr-x-change	p-value = .198  Coefficient: No_change = .267 Inc_change = .219	p-value = .457  Coefficient: No_change = .099 Inc_change = .268	p-value = 0.210  Coefficient: No_change = .298 Inc_change = .309	p-value = .214  Coefficient: No_change = .294 Inc_change = .375	p-value = .251  Coefficient: No_change = .356 Inc_change = .151	0/5

Coffeeshop	Survey					
Variables	1-2	1-3	1-4	1-5	1-6	Total
Loccom-x-change	<p>✓ p-value = .002</p> <p>Coefficient: No_change = .482 Inc_change = .545</p>	<p>p-value = .440</p> <p>Coefficient: No_change = .234 Inc_change = .235</p>	<p>p-value = .591</p> <p>Coefficient: No_change = .194 Inc_change = .093</p>	<p>✓ p-value = .024</p> <p>Coefficient: No_change = .127 Inc_change = .622</p>	<p>✓ p-value = .039</p> <p>Coefficient: No_change = .371 Inc_change = .663</p>	3/5
Pplsoc-x-change	<p>p-value = .332</p> <p>Coefficient: No_change = .157 Inc_change = -.063</p>	<p>p-value = .206</p> <p>Coefficient: No_change = .224 Inc_change =</p>	<p>✓ p-value = .028</p> <p>Coefficient: No_change = .483 Inc_change = .125</p>	<p>p-value = .196</p> <p>Coefficient: No_change = .370 Inc_change = .128</p>	<p>p-value = .597</p> <p>Coefficient: No_change = .203 Inc_change = .027</p>	0/5
Runfrstudy-x-change	<p>p-value = .605</p> <p>Coefficient: No_change = .143 Inc_change = .151</p>	<p>p-value = .83</p> <p>Coefficient: No_change = .090 Inc_change = .132</p>	<p>p-value = .855</p> <p>Coefficient: No_change = -.107 Inc_change = -.064</p>	<p>p-value = .655</p> <p>Coefficient: No_change = .188 Inc_change = -.071</p>	<p>p-value = .578</p> <p>Coefficient: No_change = -.224 Inc_change = -.065</p>	0/5
Runfrerr-x-change	<p>✓ p-value = .040</p> <p>Coefficient: No_change = .266 Inc_change = .457</p>	<p>p-value = .081</p> <p>Coefficient: No_change = .094 Inc_change = .481</p>	<p>p-value = .126</p> <p>Coefficient: No_change = .054 Inc_change = .426</p>	<p>p-value = .243</p> <p>Coefficient: No_change = .224 Inc_change = .414</p>	<p>p-value = .087</p> <p>Coefficient: No_change = .141 Inc_change = .539</p>	1/5

Study at Home	Survey					
Variables	1-2	1-3	1-4	1-5	1-6	Total
Loccom-x-change	p-value = .645  Coefficient: No_change = .084 Inc_change = .189	p-value = .656  Coefficient: No_change = -.136 Inc_change = -.211	p-value = .144  Coefficient: No_change = .396 Inc_change = .311	p-value = .839  Coefficient: No_change = -.114 Inc_change = .149	✓ p-value = .043  Coefficient: No_change = .559 Inc_change = .221	1/5
Pplsoc-x-change	p-value = .108  Coefficient: No_change = .273 Inc_change = .413	p-value = .202  Coefficient: No_change = .191 Inc_change = .419	p-value = .496  Coefficient: No_change = -.008 Inc_change = .218	p-value = .657  Coefficient: No_change = .113 Inc_change = -.083	p-value = .576  Coefficient: No_change = .238 Inc_change = .113	0/5
Runfrstudy-x-change	p-value = .485  Coefficient: No_change = -.110 Inc_change = .078	p-value = .706  Coefficient: No_change = .008 Inc_change = .157	p-value = .411  Coefficient: No_change = -.242 Inc_change = -.062	p-value = .187  Coefficient: No_change = .101 Inc_change = .457	p-value = .839  Coefficient: No_change = .137 Inc_change = .106	0/5
Runfrerr-x-change	p-value = .318  Coefficient: No_change = .142 Inc_change = .305	p-value = .751  Coefficient: No_change = .145 Inc_change = .065	p-value = .340  Coefficient: No_change = -.191 Inc_change = .075	p-value = .443  Coefficient: No_change = -.273 Inc_change = -.112	p-value = .822  Coefficient: No_change = -.011 Inc_change = .128	0/5

## Appendix E – Built Environment & Temporal Trends

University Library	Survey					
Variables	1-2	1-3	1-4	1-5	1-6	<b>Total</b>
Eventbuild1nchange	✓ p-value = .024  Coefficient: No_change = .408 Inc_change = .325	p-value = .155  Coefficient: No_change = .267 Inc_change = .395	✓ p-value = .0296  Coefficient: No_change = .449 Inc_change = .479	p-value = .165  Coefficient: No_change = .302 Inc_change = -.066	p-value = .741  Coefficient: No_change = .154 Inc_change = .022	2/5
Comspace1nchange	p-value = .692  Coefficient: No_change = .105 Inc_change = -.011	p-value = .543  Coefficient: No_change = .167 Inc_change = -.021	p-value = .268  Coefficient: No_change = .234 Inc_change = .322	p-value = .058  Coefficient: No_change = .489 Inc_change = .265	p-value = .862  Coefficient: No_change = -.067 Inc_change = -.133	0/5
Eventcampus1nchange	✓ p-value = .0014  Coefficient: No_change = .431 Inc_change = .599	p-value = .194  Coefficient: No_change = .265 Inc_change = .362	✓ p-value = .0106  Coefficient: No_change = .544 Inc_change = .496	✓ p-value = .014  Coefficient: No_change = .359 Inc_change = .682	p-value = .059  Coefficient: No_change = .190 Inc_change = .588	3/5
Eventoffcampus1nchange	✓ p-value = .0035  Coefficient: No_change = .344 Inc_change = .588	p-value = .110  Coefficient: No_change = .295 Inc_change = .428	✓ p-value = .0108  Coefficient: No_change = .491 Inc_change = .576	✓ p-value = .0305  Coefficient: No_change = .038 Inc_change = .557	✓ p-value = .0002  Coefficient: No_change = .599 Inc_change = 1.03	4/5

Coffeeshops	Survey					
Variables	1-2	1-3	1-4	1-5	1-6	Total
Eventbuild-x-change	p-value = .531  Coefficient: No_change = .174 Inc_change = .096	p-value = .317  Coefficient: No_change = -.258 Inc_change = -.300	p-value = .268  Coefficient: No_change = -.019 Inc_change = .303	p-value = .866  Coefficient: No_change = .100 Inc_change = .114	p-value = .262  Coefficient: No_change = .357 Inc_change = .338	0/5
comspace-x-change	p-value = .666  Coefficient: No_change = .138 Inc_change = .088	p-value = .282  Coefficient: No_change = .267 Inc_change = .031	p-value = .698  Coefficient: No_change = .155 Inc_change = .141	p-value = .487  Coefficient: No_change = .245 Inc_change = .087	p-value = .801  Coefficient: No_change = -.146 Inc_change = -.063	0/5
Event_campus-x-change	p-value = .218  Coefficient: No_change = .145 Inc_change = .322	p-value = .091  Coefficient: No_change = .185 Inc_change = .503	✓ p-value = .0027  Coefficient: No_change = .319 Inc_change = .780	✓ p-value = .001  Coefficient: No_change = .027 Inc_change = .775	✓ p-value = .0000  Coefficient: No_change = .155 Inc_change = 1.26	3/5
Event_offcampus-x-change	✓ p-value = .0009  Coefficient: No_change = .248 Inc_change = .697	✓ p-value = .0002  Coefficient: No_change = .420 Inc_change = .987	✓ p-value = 0.0000  Coefficient: No_change = .273 Inc_change = 1.24	✓ p-value = .0000  Coefficient: No_change = .278 Inc_change = 1.49	✓ p-value = .0000  Coefficient: No_change = .302 Inc_change = 1.21	5/5

Study at Home	Survey					
Variables	1-2	1-3	1-4	1-5	1-6	Total
Eventbuild-x-change	p-value = .990 Coefficient: No_change = .021 Inc_change = .007	✓ p-value = .041 Coefficient: No_change = .511 Inc_change = .347	p-value = .052 Coefficient: No_change = .296 Inc_change = -.162	p-value = .567 Coefficient: No_change = .036 Inc_change = -.199	p-value = .160 Coefficient: No_change = .118 Inc_change = -.329	1/5
comspace-x-change	p-value = .343 Coefficient: No_change = -.074 Inc_change = .170	p-value = .881 Coefficient: No_change = -.100 Inc_change = -.057	p-value = .053 Coefficient: No_change = .470 Inc_change = .464	p-value = .864 Coefficient: No_change = .063 Inc_change = .140	p-value = .175 Coefficient: No_change = .330 Inc_change = -.031	0/5
Event_campus-x-change	✓ p-value = .006 Coefficient: No_change = .441 Inc_change = .607	p-value = .504 Coefficient: No_change = .231 Inc_change = .111	p-value = .911 Coefficient: No_change = .072 Inc_change = .004	p-value = .771 Coefficient: No_change = -.087 Inc_change = .065	p-value = .358 Coefficient: No_change = .331 Inc_change = .229	1/5
Event_offcampus-x-change	p-value = .072 Coefficient: No_change = -.315 Inc_change = -.016	✓ p-value = .025 Coefficient: No_change = -.405 Inc_change = -.628	p-value = 0.756 Coefficient: No_change = .093 Inc_change = -.044	p-value = .320 Coefficient: No_change = -.333 Inc_change = -.199	p-value = .565 Coefficient: No_change = .056 Inc_change = .266	1/5



## Appendix F – Proximity to Amenities & Temporal Trends

University Library	Survey					
Variables	1-2	1-3	1-4	1-5	1-6	<b>Total</b>
Close_campus	p-value = .546  Coefficient: No_change = .176 Inc_change = .069	p-value = .762  Coefficient: No_change = .134 Inc_change = .029	p-value = .265  Coefficient: No_change = .179 Inc_change = .365	✓ p-value = .0128  Coefficient: No_change = .287 Inc_change = .725	p-value = .156  Coefficient: No_change = .256 Inc_change = .507	1/5
Coffee_restaurant	p-value = .670  Coefficient: No_change = -.053 Inc_change = .091	p-value = .197  Coefficient: No_change = .200 Inc_change = .383	✓ p-value = .0468  Coefficient: No_change = .297 Inc_change = .537	✓ p-value = .0024  Coefficient: No_change = .640 Inc_change = .676	p-value = .246  Coefficient: No_change = .107 Inc_change = .411	2/5
Close_transit	p-value = .480  Coefficient: No_change = .179 Inc_change = .027	p-value = .698  Coefficient: No_change = .099 Inc_change = -.077	p-value = .480  Coefficient: No_change = -.0013 Inc_change = .245	p-value = .996  Coefficient: No_change = .017 Inc_change = 4.95e-16	p-value = .308  Coefficient: No_change = .315 Inc_change = 4.28e-16	0/5

Coffeeshop	Survey					
Variables	1-2	1-3	1-4	1-5	1-6	Total
Close_campus	✓ p-value = .024  Coefficient: No_change = .231 Inc_change = -.234	p-value = .520  Coefficient: No_change = -.204 Inc_change = -.236	p-value = .680  Coefficient: No_change = -.0009 Inc_change = -.178	p-value = .188  Coefficient: No_change = -.099 Inc_change = -.439	✓ p-value = .0354  Coefficient: No_change = .083 Inc_change = -.515	2/5
Coffee_restaurant	p-value = .055  Coefficient: No_change = .294 Inc_change = .425	✓ p-value = .0033  Coefficient: No_change = .568 Inc_change = .691	✓ p-value = .0012  Coefficient: No_change = .295 Inc_change = .845	✓ p-value = .002  Coefficient: No_change = .510 Inc_change = .868	✓ p-value = .0003  Coefficient: No_change = .610 Inc_change = 1.06	4/5
Close_transit	p-value = .053  Coefficient: No_change = .215 Inc_change = -.195	p-value = .418  Coefficient: No_change = -.092 Inc_change = -.311	✓ p-value = .0106  Coefficient: No_change = -.347 Inc_change = -.765	✓ p-value = .0065  Coefficient: No_change = .026 Inc_change = -.694	p-value = 0.159  Coefficient: No_change = -.156 Inc_change = -.527	2/5

Study at Home	Survey					
Variables	1-2	1-3	1-4	1-5	1-6	Total
Close_campus	✓ p-value = .0000  Coefficient: No_change = .509 Inc_change = 1.19	✓ p-value = .0000  Coefficient: No_change = .944 Inc_change = 1.51	✓ p-value = .0000  Coefficient: No_change = .473 Inc_change = 1.19	✓ p-value = .0000  Coefficient: No_change = .864 Inc_change = 1.32	✓ p-value = .0007  Coefficient: No_change = .648 Inc_change = 1.11	5/5
Coffee_restaurant	p-value = .387  Coefficient: No_change = -.094 Inc_change = .138	p-value = .355  Coefficient: No_change = .188 Inc_change = .344	p-value = .228  Coefficient: No_change = .068 Inc_change = .371	p-value = .200  Coefficient: No_change = .182 Inc_change = .476	p-value = .972  Coefficient: No_change = .018 Inc_change = -.037	0/5
Close_transit	✓ p-value = .0000  Coefficient: No_change = .388 Inc_change = 1.01	✓ p-value = .0000  Coefficient: No_change = .776 Inc_change = 1.09	✓ p-value = .0003  Coefficient: No_change = .740 Inc_change = 1.01	✓ p-value = .0001  Coefficient: No_change = 1.04 Inc_change = .967	✓ p-value = 0.0002  Coefficient: No_change = .827 Inc_change = 1.19	5/5