8-25-2018

Perceived Walkability, Social Capital, and Self-Reported Physical Activity in Las Vegas College Students

Melissa Bartshe
University of Nevada, Las Vegas, melissa.bartshe@unlv.edu

Courtney Coughenour
University of Nevada, Las Vegas, courtney.coughenour@unlv.edu

Jennifer Pharr
University of Nevada, Las Vegas, jennifer.pharr@unlv.edu

sustainability

MDPI

Article

Perceived Walkability, Social Capital, and Self-Reported Physical Activity in Las Vegas College Students

Melissa Bartshe, Courtney Coughenour * and Jennifer Pharr

UNLV School of Community Health Sciences, 4505 S. Maryland Parkway box 3064, Las Vegas, NV 89154, USA; Melissa.Bartshe@unlv.edu (M.B.); Jennifer.Pharr@unlv.edu (J.P.)

* Correspondence: Courtney.Coughenour@unlv.edu; Tel.: +1-702-895-4278, Fax: +1-702-895-5184

Received: 7 August 2018; Accepted: 23 August 2018; Published: 25 August 2018

Abstract: College students are an understudied, vulnerable population, whose inactivity rates exceed those reported by U.S. adults. Walkability in sprawling cities, such as Las Vegas, is challenged due to automobile-oriented development. The purpose of this study was to assess the relationship between perceived neighborhood walkability, social capital, and meeting physical activity recommendations among University of Nevada-Las Vegas college students. Of the 410 participants, 42.2% met physical activity recommendations, 77.1% were female, 37.3% were white, and 79.5% owned a vehicle. Logistic regression showed that social capital (odds ratio (OR) = 1.25, $p = 0.04$) and gender (OR = 0.49, $p < 0.01$) were the only positive indicators of physical activity; no perceived walkability subscales were significant. Findings confirm that social factors remain an important health determinant and that females continue to be less active than males. The authors speculate that sprawl characteristics may impact perceived walkability and act as a deterrent, or that it is the social norm to commute and complete errands by vehicle. It may also be that the survey tool used was unable to account for confounding variables associated with sprawl. Supporting social capital may be one approach to increase physical activity. Fostering walkability makes urban environments more livable, sustainable, healthy, and equitable; thus, further research into the relationship between walkability and physical activity in college students is needed.

Keywords: active living; social health; sprawl; university students; young adults

1. Introduction

There are extensive health benefits of physical activity. The Centers for Disease Control and Prevention (CDC) note that physical activity can help control weight and reduce the risk of cardiovascular disease, diabetes, and some cancers. Physical activity can also strengthen bones and muscles, improve mental health, improve the ability to prevent falls, and increase chances of living longer [1]. The CDC recommends that adults should attain 150 min of moderate-intensity activity per week [1]. Due to advanced technology and low-activity jobs, Americans are more sedentary than ever, spending about 70% of their time sitting [2]. This sedentary behaviour has been associated with 1.05 higher odds of all-cause mortality and 1.08 higher odds of cardiovascular mortality [3]. This suggests that finding ways to increase physical activity as well as other healthy behaviours is crucial to public health.

Efforts to increase physical activity rates in the United States have taken a different approach over the last decade. While a medical approach focuses on the individual, public health strives to take a socio-ecological approach to the current problem. This is due to the failures of previous decades, which focused on individual behaviour, to curb health problems [4]. Unless ready and

motivated to make a change, individuals are unlikely to heed recommendations to increase physical activity and better their overall health [4]. Instead, public health practitioners must understand why certain behaviours, such as a lack of physical activity, are occurring, and how they can be mitigated at the population level. How humans interact with their environment, whether socially, physically, or politically, can positively impact physical activity levels and obesity rates [5]. Understanding how the environment impacts health behaviour is a vital component to improving design qualities in a manner that facilitates physical activity.

Most research has sought to understand what influences physical activity levels in children, the elderly, or adults. Adults are commonly studied as one large group rather than being broken down into subcategories, such as college students, young adults, or professionals [6–8]. One understudied population in this category is college students. According to the National College Health Assessment, in 2017 only 47.4% of college students met the physical activity guidelines [9]. This is significant, as fewer college students reported meeting the guidelines than the 51% of U.S. adults who reported meeting the guidelines in 2015 [10]. Additionally, 23.2% of U.S. college students are overweight and 14.6% are obese [9]. The transition to college is marked by several life events that could decrease physical activity [11,12] Working, starting relationships, and alcohol consumption mixed with increased independence could all lead to decreased physical activity among college students [11]. These factors may lead to decreases in physical activity into adulthood as well, making college students a population worth studying [11].

One recently promoted strategy for increasing physical activity is through walking for recreation or for transport. In 2015, the U.S. Surgeon General released a call to action to promote walking and walkable communities. Travel-related decisions are influenced by the neighborhood's level of walkability, or how conducive the built environment is to walking [13,14]. Research has found that perceived neighborhood walkability is positively associated with being physically active [15–18]. Factors that have been found to influence walkability include safety, comfort and convenience, land use mix, crime, and social capital [15,19]. A lack of connected street networks and streets with high speeds have been shown to result in negative health outcomes, such as diabetes and heart disease [20]. Suburban neighborhoods have also been shown to limit walkability because of automobile dependence in newer built areas [21]. Older cities built before the rapid increase in automobile ownership and use have a density in population, jobs, and amenities that facilitates walking or public transit [22].

Las Vegas is a rather young city which negatively impacts walkability. Las Vegas saw significant population increases just after the automobile became popular, and as a result the city was designed and developed with the intent of efficiently moving automobiles rather than pedestrians around the city. The result is a non-dense, suburban-like development that is characteristic of urban sprawl. The sprawling design of Las Vegas makes it increasingly difficult to reach jobs and amenities within an acceptable travel time without utilizing an automobile. Watson and colleagues found that 75% of respondents perceived one-half mile or 10 min as acceptable travel time without utilizing an automobile. Less than half of the respondents perceived one mile or 20 min as acceptable travel time [23]. The majority of neighborhoods are designed to include a cement brick wall perimeter around residential units, with many containing a single entry or access point to enter the compound. The street networks within these walls often contain many cul-de-sacs and non-through streets, which decrease travel route options and increase walking distance [5,24,25]. Using a sprawl index, Ewing and colleagues [26] found that individuals in sprawling counties were less likely to walk; but in an update and refinement of the tool, it failed to find a difference in physical activity levels based on sprawl indices [27]. The authors speculate that this inconsistency may be due to changes in the wording of the survey question, which made it unlikely for individuals to report walking for active travel. Fostering walkability makes urban environments more livable, sustainable, healthy, and equitable; thus, there is a need to understand how perceptions of walkability relate to physical activity in sprawling communities.

In addition to travel behaviours, sprawl also has an impact on social health. Sprawling communities may limit opportunities for social interaction and building a sense of community. Social capital refers to social networks, interactions, and relationships that influence trust, reciprocity, and collective action among citizens [28]. Social capital is one social health measure that has been linked to many health behaviours and outcomes, including lower stress, self-reported depression, suicide risk, self-reported health, and mortality; it can also aid in shaping social norms to reinforce positive health behaviors [29,30]. Researchers have found that social capital [31,32] and social connectedness [33] are higher in more walkable neighborhoods compared to sprawling neighborhoods. Interestingly, Wood and colleagues [34] found that objectively measured connected streets were associated with higher social capital, but respondents in conventional suburbs (low street connectivity, segregated land use, and multiple cul-de-sacs) had higher levels of social capital than those in the traditional suburbs (grid-like streets with high connectivity) or the hybrid suburbs (a mix of grid and cul-de-sacs). An ability to understand how these factors impact walking behaviours, along with mitigation strategies, may have a positive impact on physical activity rates and social health indicators within Las Vegas, NV.

Current gaps in research related to the role that the built environment plays on physical activity exist in both study locations and populations. Limited focus has been placed on sprawling U.S. cities that saw significant growth post-automobile, even though these cities are likely to require the greatest physical activity interventions. Limited research exists which focuses on college students, even though they are overburdened by low rates of physical activity and nearly 40% are overweight or obese. Understanding specific determinants of physical activity in this population is warranted. The purpose of this study is to assess the association between perceived neighborhood walkability, social capital, and meeting physical activity recommendations in college students within Las Vegas, Nevada.

2. Material and Methods

2.1. Study Setting

Surveys were collected from students at the University of Nevada, Las Vegas (UNLV). This public university is one of the most diverse colleges in the U.S., with over 30,000 students and 57% of "undergraduate students report being part of a racial or ethnic minority" [35]. Roughly 13,000 students are male and over 17,000 are female. The average age of a student at UNLV is 23 [35]. UNLV is mainly a "commuter campus", as only first year students from out of state are required to live on campus.

2.2. Participants

Participants were sent a request to complete the survey, along with additional weekly campus updates and happenings, through the campus-wide weekly e-newsletter to their university email accounts in the fall semester of 2017. The request was sent out twice, 1 month apart. Participants were asked to click on the link within the announcements to complete a 10-min survey. Entry into a drawing for one $100 gift card was offered upon completion of the survey. Participants were limited to those over 18 years old, as consent was required. Thus, a convenience sample and a voluntary population comprised the study sample. This study was deemed exempt by the UNLV Office of Research Integrity.

2.3. Survey Tools

The Neighborhood Environment Walkability Scale, abbreviated (NEWS-A), is a validated survey tool developed to collect information on perceptions of the built environment [17,36]. The NEWS-A subscales were used to measure perceptions related to (1) residential density; (2) land use mix (diversity), (3), land use mix (aesthetics); (4) street connectivity; (5) infrastructure and safety; (6) aesthetics; (7) traffic hazards; (8) crime; (9) lack of parking; (10) lack of cul-de-sacs; and (11) physical barriers [17]). A 12th variable was adapted from Araya and colleagues [28] and Leyden [32] to measure the social health indicator of social capital. The variables of social cohesion, social participation, and informal social control were used from Araya et al. [28], modifying some of the social participation

questions to reflect activities that college students may participate in (removal of a question related to participation in adult education/night classes and adding "student group" and "fraternity/sorority" to the list of activities). The variable "trust" was measured using the following two questions: "Think about the neighborhood or area in which you live. (1) In general, how well do you feel you know your neighbors?" [31] and (2) "Do you trust your neighbors?" Responses were based on the following Likert scale: (1) Not at all, (2) Just a little, (3) Moderately well, (4) Extremely well. A composite variable of social cohesion (7 items), trust (2 items), social participation (16 items), and informal social control (4 items) was used to measure social capital ($\alpha = 0.64$).

The International Physical Activity Questionnaire (IPAQ) was used to measure self-reported minutes of physical activity. The IPAQ was validated in a 12-country study and found to have measurement properties equivalent to similar self-report questionnaires [37] and a literature review found that most studies validated the tool against accelerometer data [38]. Participants are asked to report (1) how many days in the last week they walked for transportation and for leisure, engaged in moderate-intensity activity, and engaged in vigorous-intensity activity, and (2) how much time they usually spent on those days doing that activity. From this information, it was determined how many minutes per week each participant spent being active. Those who spent 150 min per week or more being active were determined to have met the physical activity recommendations. The full survey can be found in Supplementary Materials.

2.4. Data Analysis

Logistic regression was conducted using SPSS statistical software (IBM SPSS Statistics version 24) to assess the impact of the 12 walkability subscales and social capital on the likelihood that respondents would report meeting the physical activity recommendations.

3. Results

A total of 465 surveys were returned from UNLV students. This is an estimated response rate of less than 2% of the entire UNLV student body of over 30,000 students. Females (77.1%) and non-white students (62.7%) were slightly more represented in our sample than in the greater student population (56.7% and 57%, respectively). Three participants were excluded because they met the outlier requirements set by the IPAQ protocol of having more than 960 min (16 h) per week of physical activity, and three participants were excluded because they did not meet the age requirement of 18 years. An additional 49 participants were excluded due to incomplete and missing data, and 410 participants were included in the logistic regression model. Ages ranged from 18 to 61, with a mean age of 24 years. The mean age of our sample was similar to the mean age of the greater student population, 23 years. A total of 79.5% of respondents owned a vehicle, and 42.2% met the recommended 150 min of physical activity per week. Table 1 shows all demographic data for the respondents.

The logistic regression model containing all 11 walkability subscales and the social capital composite, vehicle ownership, and demographic variables were statistically significant, $\mathcal{X}^1$ (18, $n = 410$) = 31.09, $p = 0.03$. The model had moderate pseudo R^2 values; 7.3% (Cox and Snell) and 9.8% (Nagelkerke). Multicollinearity tests showed no variance inflation factors (VIF) above 2.

As shown in Table 2, only two of the independent variables were statistically significant in the logistic regression model. Respondents who had higher social capital scores were more likely to meet the physical activity recommendations, with an odds ratio of 1.25, and females had 51% lower odds of meeting the recommendations than males (see Table 2 for full model results).

Table 1. Demographic data and frequency of meeting the physical activity recommendation in University of Nevada, Las Vegas (UNLV) student respondents in Fall 2017 (n = 410).

Gender	% of Sample
Male (n = 94)	22.9
Female (n = 316)	77.1
Race/ethnicity	
White (n = 153)	37.3
Asian (n = 92)	22.4
Latino (n = 80)	19.5
Black (n = 23)	5.6
Other (n = 62)	15.1
Met physical activity requirements *	
Yes (n = 173)	42.2
No (n = 237)	57.8

* Physical activity requirements ≥150 min per week.

Table 2. Logistic regression model predicting meeting the physical activity recommendation of 150 min per week in UNLV student respondents in Fall 2017 (n = 410).

Variables	S.E.	Wald	p-Value	Odds Ratio
Residential Density	0.001	0.972	0.324	1.001
Land Use Mix (Diversity)	0.133	0.783	0.376	1.125
Land Use Mix (Access)	0.145	1.409	0.235	1.187
Street Connectivity	0.130	2.617	0.106	1.234
Infrastructure and Safety	0.262	0.282	0.595	0.870
Aesthetics	0.168	0.490	0.484	0.889
Traffic Hazards	0.272	0.088	0.767	0.923
Crime	0.216	0.001	0.980	1.005
Lack of Parking	0.136	0.957	0.328	0.876
Lack of Cul-de-sacs	0.099	1.162	0.281	1.112
Physical Barriers	0.098	0.775	0.379	1.090
Age	0.016	2.516	0.113	0.975
Gender [a]	0.260	7.491	0.006	0.491
Black [b]	0.474	0.126	0.722	1.184
Asian [b]	0.291	2.455	0.117	0.634
Latino [b]	0.289	0.139	0.709	0.898
Own Vehicle	0.268	0.216	0.642	1.133
Social Capital	0.108	4.361	0.037	1.254
Constant	1.558	0.291	0.589	0.431

* Degrees of Freedom for all variables = 1; [a] reference category = males; [b] reference category = white. S.E. = standard error.

4. Discussion

The current study yielded three interesting findings: only 42% of respondents met the physical activity recommendations, higher perceived social capital was associated with a greater likelihood of

meeting the physical activity recommendations, and all walkability subscales had no significant relationship with meeting the recommendations. Previous research has found that living in walkable neighborhoods is associated with meeting the physical activity recommendations. However, understanding the determinants of walking in a less-traditional, sprawling urban development is more complicated as sprawl undermines walkability. It is possible that the many automobile-oriented features which are characteristic of sprawl, including high-speed limits, arterial roadways, and high pedestrian crash rates, for example, have a strong impact on perceived walkability. As such, it may be that respondents are highly deterred from participating in physical activity within their neighborhood. Given that most residents of Las Vegas commute by motorized vehicle [39], it may be that it is the social norm to commute and complete errands by vehicle, even if conditions are acceptable, and even more favorable, to walk. It may also be that the NEWS-A, which measures perceived walkability, may not be able to accurately account for the numerous confounding variables associated with sprawl. Qualitative methodologies, such as focus groups, may be useful in helping to determine if this survey tool can accurately gauge walkability in a sprawling community. Further research is needed to better understand this relationship, or lack thereof.

As with most studies examining walkability, our questionnaire focused on perceptions of neighborhood walkability, defined as a 15 min walk from home, yet the walkability of other environments, such as school or work, can influence walking and physical activity behaviours [40]. It is possible that perceptions of walkability in other environments that respondents spend time in have a relationship with physical activity behaviors, but we were unable to capture this given the nature of the survey tool. Howell and colleagues [41] found that when they considered the walkability of "full activity space", or all locations visited, there was a stronger association with physical activity than considering the walkability of a neighborhood alone.

Another potential explanation for the lack of association between walkability and physical activity may be the harsh summer climate. Weather has been found to be a deterrent to physical activity [42]. The average daily high temperature throughout the summer months in Las Vegas is over 100 °F, which may supersede any need or desire to walk or recreate outdoors. While the temperature is within what most would consider an acceptable range for recreating outdoors nine months per year, our survey was disseminated during the summer months (August). This may have influenced perceptions related to acceptable walking conditions. Another explanation may be that college students lack the time or perceive to lack the time necessary to meet the physical activity recommendations, which may increase the likelihood of type II error and mask the true relationship between perceptions of walkability and physical activity. Given that our target population was college students, we are unable to determine if we would have found the same lack of relationship with perceived walkability and physical activity in non-college students within southern Nevada. The results of the current study preclude us from understanding further the true nature of this relationship. However, college students are still a population of importance and are in need of physical activity interventions due to their low rates.

Only 42% of respondents in the current study met the physical activity recommendations, which is below the 47.4% of college students who reported meeting the guidelines in the 2017 National College Health Assessment [9]. These rates are alarming since not meeting the guidelines is correlated with negative health outcomes and increased mortality [3,43,44]. One potential factor may be that UNLV is considered a "commuter campus", with 93% of students living off-campus [45]. As such, it is not surprising that nearly 80% of respondents owned a vehicle. Spending more time in a vehicle has been associated with more sedentary behaviour and physical inactivity [46,47]. Additionally, Small and colleagues [48] found that living off-campus exacerbated declines in physical activity compared to living on campus. Time constraints due to driving time, studying, and extracurricular activities or employment may also make it hard to be physically activity. Low physical activity rates highlight the need to focus on college students, especially on a commuter campus such as UNLV [9,11].

Our findings suggest that social capital is a positive predictor of meeting the physical activity recommendations. This is consistent with findings by Ball and colleagues [49] that individual and neighborhood level indicators of social capital were positively associated with being physically active in women and with findings by Lindstrom that low social participation predicted low leisure time physical activity. Being a college student and the activities associated with school may be one factor that fosters social capital. Jun and Hur (2015) [21] posit that suburban neighborhoods limit social interaction and a sense of community. While further study is needed, it is possible that the suburban developments common in Las Vegas may facilitate community engagement which can enhance measures of social capital. The majority of houses in Las Vegas belong to a common interest development (CID) and are governed by a home owners association. It is possible that this collective ownership and upkeep of the neighborhood may be one influencer of social and physical health outcomes. Additionally, many CIDs have common spaces and amenities, such as club houses, pools, and recreational facilities. These may influence physical activity levels directly or foster social interactions and influence measures of social capital. This may explain why Wood and colleagues [34] found that respondents in conventional suburbs with low street connectivity, segregated land use, and multiple cul-de-sacs had higher levels of social capital than those in the traditional and hybrid suburbs. Moreover, social capital can help to reinforce positive health behaviours as a social norm [30]. Given our finding that social capital was associated with meeting the physical activity recommendations, promoting and fostering social factors, such as social capital, may be one advantageous approach to improving rates of activity in college students. This finding is important, as a better understanding of specific factors that might be successfully targeted to increase physical activity is needed given that rates are lower in college students than adults, both nationally and in our sample.

Our study indicated that male respondents were more likely to meet the physical activity recommendations. This coincides with previous research which consistently finds that women are less active than men [1,9,50,51]. Previous findings have concluded that physical activity among women is more influenced by social factors [50,52]. While these findings are not new, this disparity in physical activity has persisted, which suggests a continued need for targeted interventions aimed at increasing physical activity among women.

There is still a need to better understand the relationship between walkability and physical activity in the presence of urban sprawl. While the current study did not find a relationship, the few studies that have examined walkability in sprawling communities have mixed results. The application of a mixed method study that includes the collection of qualitative data on the supports and barriers to being active in a sprawling community would be informative. With the high rates of physical inactivity and associated health consequences, interventions that increase activity are necessary. Additionally, understanding this relationship among college students at a non-commuting campus might yield differing results. Fostering activity through walkable communities is one effective mechanism to increasing rates of physical activity and overall livability and a clear understanding of these determinants is necessary to inform public health workers, urban planners, and policy makers of the most effective next steps.

This study does present some limitations. Selection bias is present in this study as it used a non-random sample from one university in southern Nevada. Additionally, although the sample size was large, it constituted a small percentage of the total student body. It is possible that those who were more interested in walking were more likely to complete the survey, resulting in a non-response bias. There was also gender bias present within this study, with over 77% of respondents being female. All of these factors may make our findings non-generalizable to a broader sampling of college students. The current study relied on self-reported minutes of physical activity, which have been found to be both higher and lower than objectively measured accelerometer data [53,54]. Also, this study only considered neighborhood walkability, so we cannot extrapolate findings to other environments. While this study only examined one college within Nevada, to our knowledge it is the first of its kind within the state.

5. Conclusions

Our findings confirm that social capital and gender are associated with meeting the physical activity recommendations, but fails to support the hypothesis that perceptions of walkability are associated with meeting the recommendations in our sample of college students at UNLV. Fostering walkability makes urban environments more livable, sustainable, healthy, and equitable; thus, further research is needed to understand the relationship between perceived walkability, urban form, and physical activity in sprawling cities such as Las Vegas. This research should incorporate some qualitative methodology to provide more detailed information on perceptions of the supports and barriers to being active in sprawl. This level of detail may be useful in developing tools to accurately assess perceptions of walkability in sprawl. It may also prove beneficial to conduct a similar study in a more traditional or non-commuter campus setting. While this study focused on an important and understudied population, future research should also focus on various age ranges and populations. Safe, walkable neighborhoods that facilitate physical activity and social capital are important for all ages, and understanding the nature of these relationships is necessary for proper planning of targeted interventions as well as development and retrofitting of urban form. Future studies should combine subjective and objective measures of walkability and consider the walkability of various environments to reduce limitations. Public health professionals should explore ways to capitalize on social capital to enhance physical activity levels in college students, with a specific focus on females.

Supplementary Materials: The following are available online at http://www.mdpi.com/2071-1050/10/9/3023/s1 Figure S1.

Author Contributions: Conceptualization, C.C., M.B., and J.P.; Methodology, C.C. and J.P.; Formal Analysis, C.C.; Investigation, C.C.; Resources, C.C.; Data Curation, C.C. and M.B.; Writing-Original Draft Preparation, M.B., C.C. and J.P.; Writing-Review & Editing, M.B., C.C., and J.P.; Supervision, C.C. and J.P.; Project Administration, C.C.

Funding: The publication fees for this article were supported by the UNLV University Libraries Open Article Fund.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Centers for Disease Control and Prevention (CDC). Physical Activity and Health. Available online: https://www.cdc.gov/physicalactivity/basics/pa-health/index.htm (accessed on 27 March 2018).
2. Owen, N.; Sparling, P.B.; Healy, G.N.; Dunstan, D.W.; Matthews, C.E. Sedentary behavior: Emerging evidence for a new health risk. *Mayo Clin. Proc.* **2010**, *85*, 1138–1141. [CrossRef] [PubMed]
3. Katzmarzyk, P.T. Physical activity, sedentary behavior, and health: Paradigm paralysis or paradigm Shift? *Diabetes* **2010**, *59*, 2717–2725. [CrossRef] [PubMed]
4. Stokols, D. Translating social ecological theory into guidelines for community health promotion. *Am. J. Health Promot.* **1996**, *10*, 282–298. [CrossRef] [PubMed]
5. Mehtälä, M.A.; Sääkslahti, A.; Inkinen, M.; Poskiparta, M.E. A socio-ecological approach to physical activity interventions in childcare: A systematic review. *Int. J. Behav. Nutr. Phys. Act.* **2014**, *11*, 22. [CrossRef] [PubMed]
6. Ding, D.; Sallis, J.F.; Kerr, J.; Lee, S.; Rosenberg, D.E. Neighborhood environment and physical activity among youth. *Am. J. Prev. Med.* **2011**, *41*, 442–455. [CrossRef] [PubMed]
7. Hajna, S.; Ross, N.A.; Brazeau, A.-S.; Bélisle, P.; Joseph, L.; Dasgupta, K. Associations between neighbourhood walkability and daily steps in adults: A systematic review and meta-analysis. *BMC Public Health* **2015**, *15*, 768. [CrossRef] [PubMed]
8. Van Cauwenberg, J.; De Bourdeaudhuij, I.; De Meester, F.; Van Dyck, D.; Salmon, J.; Clarys, P.; Deforche, B. Relationship between the physical environment and physical activity in older adults: A systematic review. *Health Place* **2011**, *17*, 458–469. [CrossRef] [PubMed]
9. American College Health Association (ACHA) Executive Summary: Fall 2018. Available online: http://www.acha-ncha.org/docs/NCHA-II_FALL_2017_REFERENCE_GROUP_EXECUTIVE_SUMMARY.pdf (accessed on 27 March 2018).

10. Behavioral Risk Factor Surveillance System (BRFSS). Available online: https://nccd.cdc.gov/BRFSSPrevalence/rdPage.aspx?rdReport=DPH_BRFSS.ExploreByTopic&irbLocationType=StatesAndMMSA&islClass=CLASS15&islTopic=TOPIC45&islYear=2015&rdRnd=96647 (accessed on 27 March 2018).
11. Gordon-Larsen, P.; Nelson, M.C.; Popkin, B.M. Longitudinal physical activity and sedentary behavior trends. *Am. J. Prev. Med.* **2004**, *27*, 277–283. [CrossRef] [PubMed]
12. Kwan, M.; Cairney, J.; Faulkner, G.; Pullenayegum, E. Physical activity and other health-risk behaviors during the transition into early adulthood: A longitudinal cohort study. *Am. J. Prev. Med.* **2011**, *42*, 14–20. [CrossRef] [PubMed]
13. Tribby, C.P.; Miller, H.J.; Brown, B.B.; Werner, C.M.; Smith, K.R. Analyzing walking route choice through built environments using random forests and discrete choice techniques. *Environ. Plan. B Urban Anal. City Sci.* **2016**, *44*, 1145–1167. [CrossRef] [PubMed]
14. Zuniga-Teran, A.; Orr, B.; Gimblett, R.; Chalfoun, N.; Guertin, D.; Marsh, S. Neighborhood design, physical activity, and wellbeing: Applying the walkability model. *Int. J. Environ. Res. Public Health* **2017**, *14*, 76. [CrossRef] [PubMed]
15. McCormack, G.R.; Shiell, A. In search of causality: A systematic review of the relationship between the built environment and physical activity among adults. *Int. J. Behav. Nutr. Phys. Act.* **2011**, *8*, 125. [CrossRef] [PubMed]
16. Peachey, A.A.; Baller, S.L. Perceived built environment characteristics of on-campus and off-campus neighborhoods associated with physical activity of college students. *J. Am. Coll. Health* **2015**, *63*, 337–342. [CrossRef] [PubMed]
17. Saelens, B.E.; Sallis, J.F.; Black, J.B.; Chen, D. Neighborhood-based differences in physical activity: An environment scale evaluation. *Am. J. Public Health* **2003**, *93*, 1552–1558. [CrossRef] [PubMed]
18. Van Dyck, D.; Cardon, G.; Deforche, B.; Sallis, J.F.; Owen, N.; De Bourdeaudhuij, I. Neighborhood SES and walkability are related to physical activity behavior in Belgian adults. *Prev. Med.* **2010**, *50*, S74–S79. [CrossRef] [PubMed]
19. Sallis, J.F. Measuring physical activity environments. *Am. J. Prev. Med.* **2009**, *36*, S86–S92. [CrossRef] [PubMed]
20. Marshall, W.E.; Piatkowski, D.P.; Garrick, N.W. Community design, street networks, and public health. *J. Transp. Health* **2014**, *1*, 326–340. [CrossRef]
21. Jun, H.-J.; Hur, M. The relationship between walkability and neighborhood social environment: The importance of physical and perceived walkability. *Appl. Geogr.* **2015**, *62*, 115–124. [CrossRef]
22. Newman, P.; Kenworthy, J. Urban design to reduce automobile dependence. *Opolis* **2006**, *2*, 35–52.
23. Watson, K.B.; Carlson, S.A.; Humbert-Rico, T.; Carroll, D.D.; Fulton, J.E. Walking for transportation: What do U.S. adults think is a reasonable distance and time? *J. Phys. Act. Health* **2015**, *12*, S53–S61. [CrossRef] [PubMed]
24. Coughenour, C.; Bungum, T. Single entry communities increase trip distance and may overestimate neighborhood walkability. *J. Phys. Act. Health* **2015**, *12*, S46–S52. [CrossRef] [PubMed]
25. Handy, S. L Regional versus local accessibility: Neo-traditional developement and its implications for non-work travel. *Built. Environ.* **1992**, *18*, 253–267.
26. Ewing, R.; Schmid, T.; Killingsworth, R.; Zlot, A.; Raudenbush, S. Relationship between urban sprawl and physical activity, obesity, and morbidity. *Am. J. Health Promot.* **2003**, *18*, 47–57. [CrossRef] [PubMed]
27. Ewing, R.; Meakins, G.; Hamidi, S.; Nelson, A.C. Relationship between urban sprawl and physical activity, obesity, and morbidity—Update and refinement. *Health Place* **2014**, *26*, 118–126. [CrossRef] [PubMed]
28. Araya, R.; Dunstan, F.; Playle, R.; Thomas, H.; Palmer, S.; Lewis, G. Perceptions of social capital and the built environment and mental health. *Soc. Sci. Med.* **2006**, *62*, 3072–3083. [CrossRef] [PubMed]
29. Murayam, H.; Fujiwara, Y.; Kawachi, I. Social capital and health: A review of prospective multilevel studies. *J. Epidemiol.* **2012**, *22*, 179–187. [CrossRef]
30. McNeill, L.H.; Kreuter, M.W.; Subramanian, S.V. Social Environment and Physical activity: A review of concepts and evidence. *Soc. Sci. Med.* **2006**, *63*, 1011–1022. [CrossRef] [PubMed]
31. Leyden, K.M. Social capital and the built environment: The importance of walkable neighborhoods. *Am. J. Public Health* **2003**, *93*, 1546–1551. [CrossRef] [PubMed]

32. Rogers, S.H.; Halstead, J.M.; Gardner, K.H.; Carlson, C.H. Examining walkability and social capital as indicators of quality of life at the municipal and neighborhood scales. *J. Appl. Res. Qual. Life* **2011**, *6*, 201. [CrossRef]
33. Kaczynkski, A.T.; Glover, T.D. Talking the walk, walking the walk: Examining the effect of neighborhood walkability and social connectedness on physical activity. *J. Public Health* **2012**, *34*, 382–389. [CrossRef] [PubMed]
34. Wood, L.; Frank, L.D.; Giles-Corti, B. Sense of community and its relationship with walking and neighborhood design. *Soc. Sci. Med.* **2010**, *70*, 1381–1390. [CrossRef] [PubMed]
35. Office of Decision Support. *Undergraduate Student Profile: Fall 2017*; University of Nevada Las Vegas: Las Vegas, NV, USA, 2018; Available online: https://ir.unlv.edu/IAP/Reports/Content/UndergraduateStudentProfile_Fall2017.aspx (accessed on 27 March 2018).
36. Cerin, E.; Saelens, B.E.; Sallis, J.F.; Frank, L.D. Neighborhood environment walkability scale. *Med. Sci. Sports Exerc.* **2006**, *38*, 1682–1691. [CrossRef] [PubMed]
37. Craig, C.L.; Marshall, A.L.; Sjostrom, M.; Bauman, A.E.; Boothm, M.L.; Ainsworth, B.E.; Pratt, M.; Ekelund, U.; Yngve, A.; Sallis, J.F.; et al. International physical activity questionnaire: 12-Country reliability and validity. *Med. Sci. Sports Exerc.* **2003**, *35*, 1381–1395. [CrossRef] [PubMed]
38. Hagströmer, M.; Oja, P.; Sjöström, M. The international physical activity questionnaire (IPAQ): A study of concurrent and construct validity. *Public Health Nutr.* **2006**, *9*, 755–762. [CrossRef] [PubMed]
39. U.S. Census Bureau. 2012–2016 American Community Survey 5-Year Estimates. Table S0801—Community Characteristics by Sex. Available online: https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk (accessed on 19 July 2018).
40. Adlakha, D.; Hipp, A.J.; Marx, C.; Yang, L.; Tabak, R.; Dodson, E.A.; Brownson, R.C. Home and workplace built environment supports for physical activity. *Am. J. Prev. Med.* **2015**, *48*, 104–107. [CrossRef] [PubMed]
41. Howell, N.; Farber, S.; Widener, M.; Booth, G. Effects of neighbourhood exposure definition on the association between walkability and transportation physical activity (breakout presentation). *J. Transp. Health* **2017**, *7*, S59. [CrossRef]
42. Tucker, P.; Gilliland, J. The effect of season and weather on physical activity: A systematic review. *Public Health* **2007**, *121*, 909–922. [CrossRef] [PubMed]
43. Dinger, M.K.; Brittain, D.R.; Hutchinson, S.R. Associations between physical activity and health-related factors in a national sample of college students. *J. Am. Coll. Health* **2013**, *62*, 67–74. [CrossRef] [PubMed]
44. Samitz, G.; Egger, M.; Zwahlen, M. Domains of physical activity and all-cause mortality: Systematic review and dose–response meta-analysis of cohort studies. *Int. J. Epidemiol.* **2011**, *40*, 1382–1400. [CrossRef] [PubMed]
45. U.S. News & World Report. UNLV Student Life. Available online: https://www.usnews.com/best-colleges/unlv-2569/student-life (accessed on 27 March 2018).
46. Ding, D.; Gebel, K.; Phongsavan, P.; Bauman, A.E.; Merom, D. Driving: A road to unhealthy lifestyles and poor health outcomes. *PloS ONE* **2014**, *9*. [CrossRef]
47. Douglas, M.J.; Watkins, S.J.; Gorman, D.R.; Higgins, M. Are cars the new tobacco? *J. Public Health* **2011**, *33*, 160–169. [CrossRef] [PubMed]
48. Small, M.; Bailey-Davis, L.; Morgan, N.; Maggs, J. Changes in eating and physical activity behaviors across seven semesters of college. *Health Educ. Behav.* **2012**, *40*, 435–441. [CrossRef] [PubMed]
49. Ball, K.; Cleland, V.J.; Timperio, A.F.; Salmon, J.; Giles-Corti, B.; Crawford, D.A. Love thy neighbour? Associations of social capital and crime with physical activity amongst women. *Soc. Sci. Med.* **2010**, *71*, 807–814. [CrossRef] [PubMed]
50. Sallis, J.F.; Hovell, M.F.; Richard Hofstetter, C. Predictors of adoption and maintenance of vigorous physical activity in men and women. *Prev. Med.* **1992**, *21*, 237–251. [CrossRef]
51. Dyck, D.; Cerin, E.; De Bourdeaudhuji, I.; Salvo, D.; Christiansen, L.B; Macfarlane, D.; Owen, N.; Mitas, J.; Troelsen, J.; Aguinaga-Ontoso, I.; et al. Moderating effects of age, gender, and education on the associations of perceived neighborhood environment attributes with the accelerometer-based physical activity: The IPEN adult study. *Health Place* **2015**, *36*, 65–73. [CrossRef] [PubMed]
52. Edwards, E.S.; Sackett, S.C. Psychosocial variables related to why women are less active than men and related health implications. *Clin. Med. Insight Womens Health* **2016**, *9*, 47–56. [CrossRef] [PubMed]

53. Lee, P.H.; Macfarlane, D.J.; Lam, T.; Stewart, S.M. Validity of the international physical activity questionnaire short form (IPAQ-SF): A systematic review. *Int. J. Behav. Nutr. Phys. Act.* **2011**, *8*, 115. [CrossRef] [PubMed]
54. Prince, S.A.; Adamo, K.B.; Hamel, M.; Hardt, J.; Connor Gorber, S.; Tremblay, M. A comparison of direct versus self-report measures for assessing physical activity in adults: A systematic review. *Int. J. Behav. Nutr. Phys. Act.* **2008**, *5*, 56. [CrossRef] [PubMed]