



Article

Does Facilitating Human–Place Bonds Alleviate the Negative Effects of Incivilities on Health?

Massoomeh Hedayati Marzbali ^{1,*} , Mina Safizadeh ¹, Mohammad Javad Maghsoodi Tilaki ²  and Aldrin Abdullah ¹

¹ School of Housing, Building & Planning, Universiti Sains Malaysia, Penang 11800, Malaysia; safizadeh.mina@gmail.com (M.S.); aldrin@usm.my (A.A.)

² School of Humanities, Universiti Sains Malaysia, Penang 11800, Malaysia; maghsoodi@usm.my

* Correspondence: hedayati@usm.my; Tel.: +60-17-447-1295

Abstract: The present study has two purposes—methodological and theoretical. The methodological purpose is to examine a method for the analysis of perceived incivilities and health in urban neighbourhoods. The current study investigates the direct and indirect relationships between the two variables. The theoretical purpose is to measure neighbourhood incivility as a second-order latent variable that represents physical and social incivilities, and investigates place identity and place attachment as mediators in the relationship between incivilities and health. Previous research has focused on a single dimension of incivility. By contrast, the current study considers a multidimensional form of incivility. This quantitative study comprises 265 residents from an urban neighbourhood in Penang, Malaysia. The results of the structural equation modelling suggest that perceptions towards neighbourhood play a mediating role in the relationship between incivility and health. The mediation roles of place identity and place attachment in the relationship between incivilities and health are also supported. Thus, facilitating human–place bonds alleviates the negative effects of incivilities on health in the study neighbourhood. Residents are less attached to neighbourhoods that are perceived as socially and physically deteriorated. Thus, reducing incivilities and improving place attachment may enhance neighbourhood health.

Keywords: incivilities; health; Malaysia; place attachment; place identity; urban neighbourhood



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1. Introduction

In the past few decades, studies have identified positive and negative health determinants in urban neighbourhoods, such as physical and social incivilities, community events, and aesthetic issues. Studies have elaborated on the association between neighbourhood features and various affective variables, which can explain ties to the quality of wellbeing [1]. Neighbourhood incivility applies to features in physical and social dimensions that can indicate symptoms of a breakdown in social stability or order in neighbourhoods, resulting in a decrease in the quality of life of residents [2].

Evidence shows that place attachment mediates the influences of the perceived physical and social qualities of the environment on the wellbeing of residents [3]. This feeling of attachment is correlated with improved mental health and is negatively associated to depression [4,5].

Some reports have explored the influence of neighbourhood incivility on the spiritual wellbeing of residents, given the burden of neighbourhood incivilities [6], whereas others have focused on the role of the broken windows theory (BWT) [7,8]. Although the relevance of material and physical dimensions of neighbourhoods on residents' health has been generally recognised [9–11], few studies have considered the dimensions of physical and social incivilities on health simultaneously [2,12–15].

Studies on the relationship between incivilities and social relations are inconsistent. Although several researchers have reported a negative relationship between incivilities

and social ties [16,17], some have argued that impoverished neighbourhoods are positively correlated with social relationships. For example, studies have found that people living in disadvantaged neighbourhoods earn greater social assistance and more social cohesion compared with wealthier neighbourhoods [13,18]. In a similar vein, the reports in the literature on the relationship between incivilities and health are contradictory. In the study of Robinette et al. [14], no significant relationship was established between neighbourhood incivility and health, whereas several researchers have reported that social cohesion and an improved perception of neighbourhood environment have a significant relationship with the improvement of the quality of wellbeing [19–21]. Although these studies support the relationship, existing research on the effects of neighbourhood incivilities on health remains lacking in certain dimensions. Firstly, despite attempts to investigate the effects of neighbourhood incivilities on the health of residents, empirical studies that consider the mediating roles of the human–place bond and neighbourhood relationship are lacking. Notably, mediated relationships do not recognize the direct effects of incivilities on the perceptions of residents, and do not depend on BWT. However, in the present work, if incivilities diminish the human–place bond, then the ability of socialisation to improve residents’ wellbeing is decreased. This latter step is successfully captured by social disorganisation theory. This interpretation aligns with a recent study [22] that focused on the ability of a neighbourhood to self-regulate.

Furthermore, contextual factors have been investigated in previous studies, focusing mostly on only one dimension of incivility in the neighbourhood environment. Therefore, concerns emerge from casual directions that require a thorough emphasis on the physical and social incivilities of neighbourhoods. However, causal relationships between the social relationship of a neighbourhood and residents’ wellbeing have not been consistently evident. Furthermore, most studies in this field of research have been conducted in non-Asian contexts. In this sense, the relationship between neighbourhood incivility and health may slightly differ in Asian contexts, especially in rapidly urbanising and multi-ethnic societies, such as Malaysia; moreover, variables such as human–place bonds may play a mediating role in this relationship. The level of neighbourhood incivility and residents’ view of incivility may differ across nations having various ethnic groups [14], a phenomenon that will be considered in the present study sample.

Seeking solutions to strengthen human–place bonds and health in the Malaysian society is crucial because of the country’s various ethnic backgrounds [23]. To address the aforementioned research gaps, the present study mainly aims to investigate the relationship between perceived incivilities and health in urban neighbourhoods. Moreover, this work assumes that human–place bonds (i.e., place identity and place attachment) may mediate the relationship between incivilities and health. Two key issues are addressed in the study, which will be presented in the conclusion. Firstly, although studies on each dimension of incivility are comprehensive, only a few have explored the two dimensions simultaneously. This problem will be discussed with a multidimensional measure of incivility (i.e., physical and social incivilities) using structural equation modelling (SEM) in this study. Secondly, by considering the mediating role of human–place bonds, this study offers further insight into the relationship between health and place.

2. Literature Review

The neighbourhood or community environment has become a hot topic in the study of environmental and community psychology. Neighbourhoods that are recognized to have stronger social resources, such as social stability, lead to improved health; whereas those with more social and physical incivilities lead to a poor quality of wellbeing [14,19] and problems such as insomnia [24], binge drinking among youths [25], increases in blood pressure, cardio-metabolic diseases [14], obesity [26], and depression [27,28]. Perceived incivilities or other physical and social signs of unrest in neighbourhoods affect the rate of people’s stress levels and, consequently, their health [27,29]; such incivilities also reduce contributions in local group events or even the tendency to walk outdoors [30].

Social incivility represents the undesirable behaviours that take place in public settings, such as disruptive disputes, careless neighbours, loitering, and alcohol consumption. By contrast, undesirable environmental conditions, such as vandalised structures, litter, and abandoned cars, are examples of physical incivility [2,31,32]. People who consider their neighbourhood an important part of their identity are likely to spend time outside or to develop closer bonds with their neighbours [33].

2.1. Social Disorganisation Theory

Physical and social incivilities have been widely used in research on people's assessments of crime and safety in urban areas [34]. Shaw and McKay [17] initiated a disorder model by testing the social disorganisation theory throughout Chicago. This theory focuses on the neighbourhood environment's physical and social conditions, suggesting that people avoid spaces with incivility indicators. It indicates that perceived incivilities gradually diminish the innate capacity of a group to handle behaviours. Studies on cues to care [35] and BWT support this result [36].

People feel less attached to neighbourhoods that are considered to be deteriorated or have high levels of incivility [37]. However, the extent to which perceived incivilities can reduce place attachments to the home (microscale) or the block (macroscale) is unknown [38]. Home bonds are highly valued when the local environment is seen to be deteriorating and crime-ridden. Therefore, perceived incivilities may diminish neighbourhood attachments, but leave home attachments intact or strengthen them. When people think that their neighbourhood is dangerous or undesirable, they minimise the time they spend outside and avoid public spaces, which decreases the time spent on active commuting [39,40].

2.2. Conceptual Framework

The theory of criminological social disorganisation has motivated public health researchers to test the effect of neighbourhood disorder on the health habits of residents [22]. Recently, sophisticated methodological studies related to how people interpret and communicate in the neighbourhood environment have gained considerable attention [22,32]. Certain social and environmental characteristics may lead to residents' interactions, which can be a foundation for individual health. O'Brien, Farrell, and Welsh [22] used a meta-analysis to study the theoretical and empirical evidence of the relationship between incivilities and health according to three main approaches. They suggested a theoretical framework that connects (directly and indirectly) the aforementioned variables and represents the possible influence of the human–place bond as a mediator in this relationship. As shown in Figure 1, the current study proposes a conceptual model for examining the direct and indirect relationships between incivilities and health. Neighbourhoods lacking human–place bonds may have to cope with incivilities in physical and social dimensions [41] in order to achieve a healthy living environment. The model implies that if the neighbourhood characteristics can influence residents' health, they will possibly do so by promoting or hindering the degree of place identity and place attachment. To ground our investigation of the association between neighbourhood incivilities and health, and to examine place identity and place attachment as mediators, this study put forward nine hypotheses, as explained in detail below.

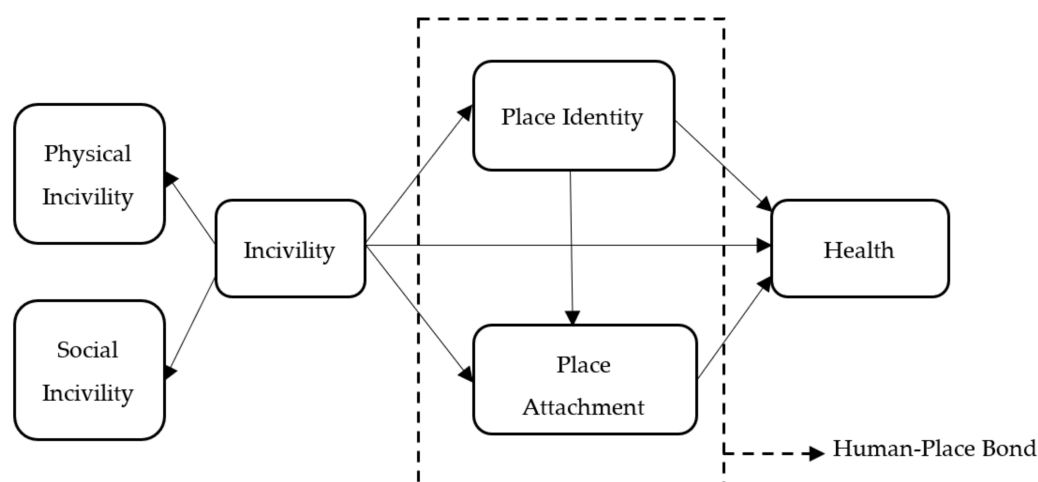


Figure 1. Conceptual pathways among the study variables.

2.2.1. Perceived Incivilities and Human–Place Bond

Neighbourhood incivilities refer to two types of incivilities, namely: (1) physical incivilities, characterised by observable incivilities (e.g., broken glass, vandalism, and litter), and (2) social incivilities, manifested by disruptive social behaviour (e.g., public drinking and lewd conduct) [42,43], which may also be seen in the physical environment. Neighbourhood incivility encourages residents to allow breaches against social order and be less likely to interfere to deter crime and incivility [44]. Residents thus tend to spend their leisure time at home, and they are unlikely to be in community relationships [45], suggesting low social regulation. Conversely, research on sense of place has provided insight into numerous meanings that people associate with their local surroundings.

Generally, sense of place is a broad attitudinal structure comprising three dimensions, namely: place attachment, place dependence, and place identity [46]. Schreyer et al. [47] and Williams and Roggenbuck [48] are the pioneers of the conceptualisation of place attachment; they determined the human–place bond in two components, namely, place identity and place dependence. Subsequent studies have revealed that affective and cognitive dimensions exist in the relationship between humans and their physical environment. Place attachment refers to an emotional bond towards places, whereas place identity refers to the self-cognition as a member of a place [49,50]. Place attachment can be described as the affective connection or bond formed between people and particular spaces where they remain and feel safe and secure [38]. Human–place bonds establish a form of “stickiness” [51], which increases the dependency and loyalty of residents to their living environment [52]. Therefore, the following hypotheses have been driven from the results of previous studies and the theoretical background.

H1. *Incivility is negatively associated with place identity.*

H2. *Incivility is negatively associated with place attachment.*

2.2.2. Perceived Incivilities and Health

Neighbourhood incivilities may discourage residents from engaging in neighbourhood spaces associated with physical and social activities concomitant with community health and wellbeing [53]. Therefore, social and environmental indicators of neighbourhood disorder are fundamentally associated with health and quality of life [34,54]. Residents suffer a burden on their wellbeing when they perceive more incivilities in their neighbourhood; by contrast, a friendlier and more supportive atmosphere can encourage residents to go out and engage in social activities [12]. For example, people may avoid green spaces that have vandalism, destroyed properties, or loitering youths [55]. In a review study, Gardener and Lemes de Oliveira [56] concluded that perceptions of the neighbourhood

play a significant role in the health and well-being of the residents, and the elderly in particular. These include fear of crime, the presence of social and physical incivilities, sense of belonging, and neighbourhood cohesion. Furthermore, improving social and physical disorders in neighbourhoods could be a pivotal strategy for improving young children's physical activity and health [57]. Therefore, the following hypothesis has been developed to test this relationship.

H3. *Incivility is negatively associated with health.*

2.2.3. Human–Place Bond and Health

Evidence shows that place attachment is directly linked to health and wellbeing in various people, including adolescents [58], the elderly [11], ethnic groups [59], and households with different income rates [60]. The psychological literature has also found a relationship between considering an environment as an appropriate place to live in and place attachment, in which a higher place attachment is shown by those who indicate a more favourable assessment of that environment [50,61]. Place attachment is also linked negatively with depression [62]. In addition to a healthy and safe environment, aesthetic condition is associated with a stronger place attachment [63], and the perception of greater incivilities and physical degradation contributes to weaker place attachment [64]. On the basis of the above discussions, the following research hypotheses are drawn.

H4. *Place identity is positively associated with place attachment.*

H5. *Place identity is positively associated with health.*

H6. *Place attachment is positively associated with health.*

2.2.4. Potential Mediating Role of Human–Place Bonds

Extant empirical studies found that the neighbourhood environment has direct and indirect effects on residents' overall health. It seems that feeling part of the community is essential for maintaining residents' well-being, regardless of age, nationality, or income level. In their study, Jaśkiewicz and Wiwatowska [2] confirmed the mediating role of place identity in association with perceived incivilities and residents' health. Neighbourhoods with a high rate of incivility perception witness events that promote mistrust and lack of human–place bonds. The belief that other people are not trustworthy may limit social interactions between neighbours. Ross and Mirowsky [29] found that a lack of human–place bonds mediated the relationship between neighbourhood disorder and distress.

In another study by Zhang and Zhang [11], the results showed that sense of community mediated the effect of the incivilities of the neighbourhood on one's subjective health. Evans [65] concluded that a favorable neighbourhood environment could improve individuals' social interaction with people (making it easier to get social support from others) and lead to faster recovery from fatigue and discomfort, which could further enhance one's physical and mental health. Furthermore, similar studies concluded that the quality of public open space in neighbourhoods and shops was positively associated with human–place bonds, and could further affect one's mental health [66]. As mentioned above, the physical and social characteristics of the neighbourhood environment not only directly influence residents' mood and well-being, but also indirectly affect well-being by strengthening identification with or belonging to a residential neighbourhood [11]. Therefore, the following hypotheses are drawn based on the above discussions.

H7. *Place identity mediates the relationship between incivility and health.*

H8. *Place attachment mediates the relationship between incivility and health.*

H9. *The relationship between incivility and health is serially mediated by place identity and place attachment.*

2.2.5. Study Variables

The conceptual boundaries of the relationship between place attachment and place identity remain unclear and open from a theoretical point of view. Occasionally, these concepts are used interchangeably [67], as if they were synonyms. However, Lalli [68] and Puddifoot [69] incorporated place attachment under the concept of place identity. Hernández et al. [49] found that residents develop place attachment before place identity. However, Lewicka [70] argued that no agreement occurs on how the two concepts are correlated. The present work proposes that place identity and place attachment are different but related concepts, in which the former precedes the formation of the latter.

Neighbourhood incivility, as a multidimensional construct, including indicators of physical and social disorder [71], has the potential to decrease health behaviours (e.g., physical activity) among neighbourhood residents, as well as their physical and mental health [72]. It can be measured by physical and social incivilities [73]. Therefore, the proposed incivility variable is specified as a reflective second-order variable through the repeated use of all of the evident variables of the underlying first-order latent variable [74]. These hierarchical views have long been accepted in the current literature. In their study, Foster et al. [75] examined neighbourhood disorder items associated with fear of crime, through variables of physical incivilities and social incivilities. Jackson [76], in examining the social and cultural significance in the fear of crime, considered environmental incivilities using two sub-variables of physical incivilities and social incivilities. However, limited studies have empirically investigated the incivility variable using a second-order factor, because the aim is to examine the effects of the collective elements of social and physical incivilities on health.

Numerous studies have connected the concept of neighbourhood conditions to personal health. However, little research bears the theoretical framing of incivilities on the human–place bond that could undermine individuals' health. This study examines the idea that health is partially a feature of a residential neighbourhood's physical and social structures. The human–place bond has been recognized as a potential mediator between incivilities and health [22]. Although some variations are anticipated between the effects of the neighbourhood context and health, the degree to which this relationship differs depending on the level of place identity and place attachment among neighbours is largely unknown. Table 1 presents the definition of each dimension.

Table 1. Operationalisation of latent variables.

Dimensions	Definitions
Physical incivility	Residents' perceptions of physical incivility, such as trash and litter, and vacant houses in the neighbourhood environment.
Social incivility	Residents' perceptions of social incivility, such as loitering youths, inconsiderate neighbours and drugs, in the neighbourhood environment.
Place attachment	The extent to which respondents are fond of their neighbourhood; this involves caretaking and surveillance behaviours in the neighbourhood.
Place identity	The extent to which respondents convey and declare their identity in relation to their neighbourhood.
Health	The extent to which respondents convey the condition of their mental and physical health.

3. Materials and Methods

3.1. Site Selection

Penang was selected as the research location for this study. It is an island-state off the northwest coast of Peninsular Malaysia, and is one of the most developed Malaysian states with a population of 1.77 million [77]. This study contributes on the empirical examination and validation of social disorganisation theory by using multiple mediators. Countless

aspects present across areas encompassing diverse cultures and neighbourhoods, such as physical and social factors, can be considered.

A survey conducted in Penang, Malaysia, covered a sample of 265 residents (after data cleaning) across a heterogeneous neighbourhood using a systematic sampling method. The study area is in the southeast part of Penang, Malaysia. It is built in on what used to be paddy fields in the mid-1970s, and was quickly converted into the residential neighbourhood that it is now. The location, which consists of landed properties, is a typical medium-class housing area with semi-detached terrace houses. A few condominium blocks and walk-up apartments have been constructed in the last decade at the boundaries of housing estates. This study focused on the landed properties, because they are the predominant types of dwelling in the area. This study used a systematic sampling procedure to select residents at intervals of every fourth unit in the study area.

3.2. Survey Instrument

In terms of research design, the current study is a cross-sectional design carried out in a residential housing neighbourhood. This research is based on a quantitative method, which prompted participants to respond to a series of questionnaires. The purpose of the study is not to develop a theory; however, the exploratory approach was used to bring new insight on the direct and indirect links between incivilities and health in residential areas. SEM was used to empirically test the conceptualised variables and framework.

The respondents provided their demographic information, as well as 25 statements that reflected physical incivility, social incivility, place identity, place attachment, and health. Incivility is a second-order construct created by considering social and physical incivilities of first-order constructs, and was extracted from an exploratory factor analysis.

Letters were sent to all of the selected houses a week before the first questionnaire interview was scheduled, informing them of the study. The letters ensured that the residents were aware of the study and that they would have already made up their mind whether to participate by the start of the interview. The response rate of the study was 62%. This study, as part of a larger project, was approved by the Ethics Committee of Universiti Sains Malaysia. Table 2 presents the study variables with their respective indicators.

Table 2. Study variables with respective indicators.

Construct	Item	Description
Physical incivility: Items were adapted from Foster et al. [78], Gibson et al. [79] (2002), Marzbali et al. [32], and Sampson and Raudenbush [16] (ranging from 1 = not an issue/no problem, to 7 = big problem)		
	PhysicInc1	Unkempt lawns and gardens
	PhysicInc2	Houses and fences not looked after (vacant houses)
	PhysicInc3	Upkeep of children's playgrounds
	PhysicInc4	Littering and dumping of rubbish in public areas
	PhysicInc5	Poor street lighting
	PhysicInc6	Vandalism or graffiti on public properties
	PhysicInc7	The condition of streets, sidewalks or road signs
Social incivility: Items were adapted from Foster, Giles-Corti, and Knuiman [78] and Sampson and Raudenbush [16] (ranging from 1 = not an issue/no problem, to 7 = big problem)		
	SocInc1	Inconsiderate or disruptive neighbours
	SocInc2	Noisy neighbours and loud parties
	SocInc3	Problems regarding selling and dealing of drugs
	SocInc4	Uncontrolled pets
	SocInc5	Teenagers hanging around the street
	SocInc6	Motorbike racing is high in this street
Place identity: Items were adapted from Kyle, Graefe, Manning, and Bacon [67]; Tournois and Rollero [50]; and Zhang et al. [80] (ranging from 1 = strongly disagree, to 7 = strongly agree)		
	PI1	This neighbourhood means a lot to me
	PI2	I am very attached to this neighbourhood
	PI3	I identify strongly with this neighbourhood
	PI4	I have a special connection to this area and my neighbours

Table 2. Cont.

Construct	Item	Description
Place attachment- Items were adapted from the work of Hipp and Perrin [81], Lewicka [70], Marzbali et al. [32], and Tournois and Rollero [50] (ranging from 1 = strongly disagree, to 7 = strongly agree)	PA1	I feel a sense of belonging to my neighbourhood
	PA2	I feel that I am a member of this neighbourhood
	PA3	I see myself as part of this neighbourhood
	PA4	I do keep an eye on what occurs in front of my house daily
	PA5	It would be very hard for me to leave this neighbourhood
	PA6	I feel comfortable when interacting with other races in this neighbourhood
Health: Items were adapted from Abdullah et al. [82], Baum et al. [83], and Wallace [84] (ranging from 1 = poor, to 5 = excellent)	Health1	Would you say that your mental health is poor, fair, good, very good, or excellent?
	Health2	Would you say that your physical health is poor, fair, good, very good, or excellent?

3.3. Statistical Analyses

The proposed model and hypotheses were tested by performing a partial least squares (PLS) analysis using SmartPLS3 software [85]. PLS was selected because of its suitability to the exploratory nature of this study, in which some of the hypothesised relationships amongst the variables had not been previously examined. Moreover, PLS is suitable when a research model is in its infancy, and it avoids the limitations of covariance-based SEM, such as sample size and restrictions, because of modelling complexity [74]. Nonparametric bootstrapping was utilized to assess the significance of the path coefficients amongst the latent variables, and between the latent and evident variables.

4. Results

4.1. Data Cleaning and Respondent Profiles

Among the 280 collected responses, 15 were excluded from subsequent analyses because of missing values. Among the remaining 265 responses, all standardised values were within the range of -4 to $+4$, as suggested by Mertler and Reinhart [86], considering that no outliers were present in the dataset. The average age of the respondents was 46 years (standard deviation (SD) = 16), and they had lived at their current home for an average of 18 years (SD = 11). Table 3 shows the other sociodemographic characteristics of the respondents. From the table, the majority of the respondents were homeowners, male, had completed an undergraduate degree, were married, and were living with their family. Data based on the sociodemographic characteristics show that the residents in the study area were considered to be healthy households.

Table 3. Respondents' demographic characteristics.

Demographic Factors	Categories	Number	Percentage
Ownership	Owner	206	77.7%
	Tenant	31	11.7%
	Others	28	10.6%
Gender	Male	143	54%
	Female	122	46%
Marital status	Single, widowed, or separated	73	27.5%
	Married and living as married	192	72.5%
Education	University/college	139	52.5%
	Secondary education	104	39.2%
	Primary education	15	5.7%
	Non-formal education	7	2.6%

Table 3. Cont.

Demographic Factors	Categories	Number	Percentage
Occupation	Self-employed	43	16.2%
	Private sector employee	83	31.3%
	Public sector employee	26	9.8%
	Retiree	35	13.2%
	Unemployed	54	20.4%
	Others	24	9.1%
	Less than 5 years	31	11.7%
Length of residence	5–9 years	36	13.6%
	10 years and over	198	74.7%
Ethnicity	Malay	118	44.5%
	Chinese	116	43.8%
	Indian	31	11.7%

4.2. Measurement Model Results

To evaluate the hypotheses, PLS structural equation modelling was used. Multiple parameters were considered in order to assess the validity and reliability of the measurements. Outer loadings, convergent validity, composite reliability, and discriminant validity were required in order to evaluate the measurement model (Tables 4 and 5). As suggested by Hair et al. [87], the outer loadings should exceed 0.4. The smallest outer loading value was 0.556 (SocDis6; Table 4). In the testing reliability, the threshold value of Cronbach's alpha, rho-A, and composite reliability for a given construct is 0.7. All constructs had reliabilities of more than 0.70 (Table 4). Convergent validity was measured by the average variance extracted (AVE), the threshold value of which was 0.5 [88].

Table 4. Outer loadings and cross loadings of latent constructs.

	Health	Physical Incivility	Place Identity	Place Attachment	Social Incivility
Health1	0.945	−0.140	0.265	0.575	0.005
Health2	0.954	−0.254	0.309	0.635	−0.181
PI1	0.245	−0.311	0.879	0.248	−0.150
PI2	0.261	−0.329	0.953	0.279	−0.188
PI3	0.344	−0.323	0.924	0.335	−0.215
PI4	0.246	−0.301	0.903	0.258	−0.195
PhysicInc1	−0.195	0.870	−0.257	−0.241	0.606
PhysicInc2	−0.207	0.888	−0.226	−0.252	0.646
PhysicInc3	−0.229	0.837	−0.336	−0.213	0.532
PhysicInc4	−0.212	0.886	−0.325	−0.299	0.605
PhysicInc5	−0.104	0.857	−0.242	−0.235	0.634
PhysicInc6	−0.161	0.871	−0.331	−0.249	0.607
PhysicInc7	−0.174	0.890	−0.389	−0.284	0.605
PA1	0.587	−0.278	0.293	0.896	−0.230
PA2	0.564	−0.298	0.331	0.912	−0.244
PA3	0.562	−0.336	0.339	0.911	−0.287
PA4	0.586	−0.262	0.231	0.893	−0.232
PA5	0.540	−0.172	0.207	0.858	−0.124
PA6	0.561	−0.186	0.231	0.851	−0.167
SocInc1	−0.116	0.640	−0.169	−0.276	0.891
SocInc2	−0.063	0.640	−0.154	−0.212	0.910
SocInc3	−0.074	0.611	−0.222	−0.205	0.860
SocInc4	−0.148	0.519	−0.137	−0.165	0.735
SocInc5	−0.094	0.539	−0.246	−0.197	0.787
SocInc6	0.082	0.321	−0.014	−0.075	0.556

Notes: values in boldface are outer loadings, whereas others are cross loadings.

Table 5. Assessment of reliability and validity of constructs.

	Health	Physical Incivility	Place Identity	Place Attachment	Social Incivility
Health	0.950				
Physical Incivility	−0.210	0.871			
Place Identity	0.304	−0.345	0.915		
Place attachment	0.638	−0.291	0.309	0.887	
Social Incivility	−0.097	0.712	−0.206	−0.245	0.799
Average Variance Extracted	0.902	0.759	0.838	0.787	0.638
Composite Reliability	0.948	0.957	0.954	0.957	0.912
rho_A	0.897	0.948	0.946	0.948	0.903
Cronbach's Alpha	0.891	0.947	0.935	0.946	0.881

Note: The diagonals (in bold) represent the square root of the AVE.

Discriminant validity was examined using three criteria. Firstly, following Fornell and Larcker [88], the square root of the AVEs of each construct needed to be greater than the correlation estimate among the constructs (Table 5). Secondly, the outer loading values on the respective constructs needed to be more significant than their cross-loadings on the other constructs (Table 4). Thirdly, the heterotrait–monotrait (HTMT) ratio and confidence interval needed to be less than 0.85 and 1, respectively [89]. The square root of AVE exceeded the intercorrelations of the constructs in the model (Table 5). This result suggests that the model had a sufficient discriminant validity [90]. The HTMT ratios and corresponding confidence intervals for each pair were less than 0.85 and 1, respectively (Table 6). Thus, the model possessed convergent and discriminant validities.

Table 6. Heterotrait–monotrait (HTMT).

	Health	Physical Incivility	Place Identity	Place Attachment
Physical Incivility	0.226 CI 90 (0.108, 0.364)			
Place Identity	0.327 CI 90 (0.192, 0.454)	0.367 CI 90 (0.238, 0.479)		
Place Attachment	0.694 CI 90 (0.582, 0.795)	0.303 CI 90 (0.182, 0.422)	0.322 CI 90 (0.183, 0.458)	
Social Incivility	0.148 CI 90 (0.103, 0.263)	0.770 CI 90 (0.686, 0.839)	0.219 CI 90 (0.116, 0.351)	0.257 CI 90 (0.146, 0.396)

Harman's one-factor test [91] was conducted to examine the potential for common method variance. Common method variance is observed when only one factor arises from a factor analysis, or when the first factor describes more than 50% of the variance. Therefore, all items for the constructs were introduced into the factor analysis. The unrotated matrix shows that the first factor explained 38% of the variance. Thus, common method variance was not an issue in this study.

4.3. Assessment of the Hierarchical Incivility Construct

Incivilities were treated as a second-order construct, comprising two first-order reflective constructs (physical and social incivilities) that represent 13 items. Physical incivilities ($R^2 = 90.6\%$) and social incivilities ($R^2 = 79.8\%$) reflected the degree of the explained variance of the hierarchical construct. The entire path coefficient from its incivilities to its dimensions was significant at $p < 0.01$.

4.4. Assessment of the Structural Model

4.4.1. Direct Effects

Table 7 shows the results of the path analysis, which was conducted to test the hypothesised direct effects amongst the latent variables. The effect of incivility on place identity ($\beta = -0.312$, $p < 0.01$) and place attachment ($\beta = -0.219$, $p < 0.01$) was negative and significant. In agreement with previous studies, the results suggest that high perceptions

of social and physical incivilities were linked with a lower sense of place identity and place attachment. However, the direct association between incivility and health was insignificant ($\beta = 0.042$, $p > 0.05$). As hypothesised, place identity had a positive and significant effect on place attachment ($\beta = 0.241$, $p < 0.01$). Moreover, place identity ($\beta = 0.128$, $p < 0.01$) and place attachment ($\beta = 0.611$, $p < 0.01$) had positive and significant effects on health. Thus, participants who felt high levels of place identity and place attachment reported positively about their health. Therefore, the results supported H1, H2, H4, and H5, but not H3. The R² value for health was 0.422.

Table 7. Path coefficient and hypothesis testing (direct effects).

Hs	Relationship	β	t Value	Decision	f ²	VIF
H1	Incivility → Place identity	−0.312	4.950 ***	Supported	0.108 (Small)	1.000
H2	Incivility → Place attachment	−0.219	3.173 ***	Supported	0.050 (Small)	1.108
H3	Incivility → Health	0.042	0.987	Not supported	0.003	1.164
H4	Place identity → Place attachment	0.241	3.455 ***	Supported	0.061 (Small)	1.108
H5	Place identity → Health	0.128	2.008 **	Supported	0.024 (Small)	1.176
H6	Place attachment → Health	0.611	11.385 ***	Supported	0.556 (Substantial)	1.161

Beta = regression weight, t values are computed through bootstrapping procedure with 265 cases and 10,000 samples; ** $p < 0.05$, *** $p < 0.01$.

4.4.2. Indirect Effects

This study estimated three mediating relationships. Table 8 shows the results of the path analysis, which tested the hypotheses of the indirect effects. The t values were calculated using the bootstrapping procedure suggested by Hayes [92], with 10,000 samples by reading the specific indirect effect from the PLS output. Table 8 shows that the t values of two indirect effects (H6 and H7) were significant at the 0.05 and 0.01 levels, respectively. Therefore, H6 and H7 were supported.

Table 8. Hypothesis testing (indirect effects).

Hs	Specific Indirect Effect	Path Coefficients (O)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	p Values	Decision	VAF (%)
H7	Incivility → Place identity → Health	−0.043	0.024	1.784	0.075	Not supported	–
H8	Incivility → Place attachment → Health	−0.151	0.050	3.032 **	0.002	Supported	75.29
H9	Incivility → Place identity → Place attachment → Health	−0.055	0.020	2.714 **	0.007	Supported	25.93

** $p < 0.01$, VAF (variance accounted for) = indirect effect/total effect.

Calculating the intensity of mediation is crucial for making decisions relevant to mediation effects. Following Hair et al. [87], the strength of a mediation effect was calculated by considering the variance accounted for (VAF), where $VAF > 80\%$ implies full mediation, $20\% \leq VAF \leq 80\%$ indicates partial mediation, and $VAF < 20\%$ does not indicate any mediation. VAF was calculated to estimate the intensity of the indirect effect by dividing the indirect effect by the total effect [93]. The VAF value indicates that approximately 75% of the total indirect effect of incivility on health is explained by the partial mediating effect of place attachment (Table 8). Hence, the relationship between incivilities and health is serially and partially mediated by place identity and place attachment, given that the VAF value is greater than 20% (i.e., 26%). Thus, indirect-only mediation was assumed, because the indirect effects were significant, but not the direct effect [87].

The R² values suggest that incivility explained approximately 10% of the variance in place identity, whereas incivility and place identity explained approximately 14% of the variance in place attachment. However, incivility (indirectly), place identity, and place attachment reasonably explained 42% of the variance in health. Effect size (f²) was calcu-

lated to estimate the extent of the effect of an independent latent variable on the dependent variable. It is based on the change in the coefficient of determination (R^2). According to Chin [94], 0.02, 0.15, and 0.35 represent a small, moderate, and substantial effect size, respectively. Table 7 shows that the f^2 values for place identity and place attachment on health were 0.024 and 0.556, respectively. Thus, place attachment has a substantial effect on health.

The multicollinearity amongst the variables in the model was also tested. The results did not emphasize any cause for concern in using variance inflation factor (VIF), the values of which were all below the suggested threshold of 5.00 (Table 7) [95]. Hair et al. [96] suggested that the predictive relevance of the model should be examined using a blindfolding procedure. The Q^2 values for social incivility ($Q^2 = 0.476$), physical incivility ($Q^2 = 0.640$), place identity ($Q^2 = 0.073$), place attachment ($Q^2 = 0.100$), and health ($Q^2 = 0.356$) were >0 . Thus, the model had sufficient predictive relevance.

5. Discussion and Conclusions

This study aims to test a model on the neglected, but pivotal, mediating role of human–place bond on the relationship between incivility and health. Direct and indirect relationships between incivility and health were tested. Understanding how residents create human–place bonds, which can affect health outcomes, is crucial. The conceptual framework was formed based on social disorganisation theory. Data were collected from a heterogeneous neighbourhood in Penang, Malaysia, using a sample of 265 residents. In contrast to predictions, no significant direct relationship was found between incivility and health. This is not surprising, as previous literature reported inconsistent evidence for incivilities' impact on health and risky behaviours [22]. O'Brien and colleagues [22] found a quite weak impact of incivilities on general health.

The results further suggest that place attachment significantly mediates the relationship between incivility and health, whereas place identity does not mediate this relationship. This is an interesting finding and may refer to methodological inconsistencies undermining the study of BWT [22]. However, the relationship between incivility and health is serially mediated by place identity and place attachment. Thus, although place identity does not play a mediating role in the relationship between incivility and health, it promotes the sense of place attachment by integrating the place as part of one's self. Therefore, if residents' health and wellbeing are affected by their environment, then the effect is likely caused by promoting or decreasing the degree of human–place bonds.

As two research hypotheses were not supported, the results help to better understand the relationship between incivility and health. This result is inconsistent with previous studies, and may refer to employing a second-order factor for the incivility construct in the research model. Many neighbourhood characteristics, in particular social and physical incivilities, may not directly affect health [39]; however, these features may influence perceptions of place identity and place attachment towards the neighbourhood, and consequently health. This finding helps to better understand the cognitive and social mechanisms underlying health, and give some insight into the incivility–health relationship. Therefore, longitudinal studies would assist in cross-validating the findings and determining the generalisability of the study findings to other contexts.

In terms of theoretical implications, this study provides insight into the mechanisms that lead to the experience and perception of the environment. The study findings may improve the knowledge on how the dimensions of an urban environment (social and physical) can affect the manner in which individuals perceive and experience their living environment. On the basis of the study findings, a stronger identity and attachment to a place is attributed to individuals who experience less incivilities in their neighbourhood. The study improves the research on the human–place relationship, which remains unclear in the literature [70]. This study revealed a positive and significant relationship between place identity and place attachment. Place identity and place attachment are conjectured to

two different, but related, concepts, in which high levels of place identification indicate high levels of place attachment.

Previous research has indicated that place attachment and place identity promote health and wellbeing [14,19,22,32]. Our findings extend on such research, by revealing that individuals with high levels of identification and attachment with place also show high levels of general health. By evaluating the serial mediating roles of place identity and place attachment, the study found that the human–place bond can alleviate the negative effects of incivilities on residents' health in neighbourhoods. An ideal neighbourhood for residents is one that is safe, clean, and stable, whereas social and physical incivilities are associated with a poor quality of the neighbourhood. In agreement with the literature [22], the results further suggest that incivilities can diminish place identity and place attachment, which decreases the ability of residents to improve their health and wellbeing.

The more people perceive their area of residency as being deteriorated, the less they report a place attachment to it in relation to estimating their general health. This finding is consistent with previous studies, which reported that disadvantaged neighbourhoods exacerbate the development process of social relationships [16]. By contrast, the human–place bond improves the perception of the environment as a safe place to live, where people choose to live in the same neighbourhood. People's experience of incivilities could have an even greater influence than the experience of crime, because of the higher feasibility of residents having behavioural reactions to physical or social disorders (by confronting offenders) compared with criminal offenders, who may be dangerous to confront. The findings of this study show that incivilities and place identity are the antecedents of place attachment.

The practical implication of the study is as follows. Local authorities may improve the living conditions of residents to strengthen their level of attachment and identification to their living environment, which may improve individuals' health. Local authorities have the responsibility to design and make beneficial use of public areas. Thus, they have a crucial role in improving the social and physical qualities of the environment. The result further suggests that the degree of attachment and identification considerably affects individuals' health. Residents' bonds to the neighbourhood affect their level of engagement in community events. Thus, by planning neighbourhood gatherings, local authorities or the neighbourhood committee can promote a sense of belonging and feelings of attachment among the residents. Therefore, effective communication between residents is crucial in order to promote the spirit of neighbourliness and the creation of human–place bonds, and consequently enhance individuals' health. This promotion can be achieved by organising (i) public meetings on neighbourhood development; (ii) community clean-up incentives; (iii) recreational, athletic, and social events; and (iv) other activities conducted in the neighbourhood aimed at persuading residents to participate and promote a sense of community.

6. Limitations and Directions for Future Research

The study has some limitations that also provide directions for future research. Firstly, the study concentrated only on a heterogeneous middle-class neighbourhood. Although the study area represents a typical neighbourhood in Penang, Malaysia, the findings might not necessarily be applicable to other homogenous low- or high-class neighbourhoods. Secondly, although incivility was measured with subjective scales that have been validated in previous studies [32], results could differ if incivility was measured using quantitative methods, such as observation checklists. As such, future studies can use different samples and measure incivility objectively in order to improve the external validity of the proposed model. Thirdly, based on the basis of social disorganisation theory, neighbourhood structures, such as socioeconomic factors, are powerful determinants of the perception of safety and health, regardless of the role of neighbourhood physical attributes [97,98]. Sampson and Raudenbush [16] hypothesise that physical and social incivilities are greater in neighbourhoods marked by instability, poverty, and high ethnic transition. Future studies may consider the effect of neighbourhood structural factors, such as neighbourhood

socioeconomic status and residents' turnover, on the perception of safety, crime, and health. Lastly, a prevailing tendency among the research on place identity and place attachment is considering the neighbourhood scale as the main category of analysis [99]. However, Casakin et al. [100] have suggested a city scale as having a predominant effect on the development of human–place bonds. Thus, additional studies should be conducted in order to investigate the creation of human–place bonds at neighbourhood and city scales.

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