Examining the bi-directional temporal associations between perceived age-based discrimination and perceived neighborhood characteristics

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ABSTRACT

Perceived age-based discrimination has negative effects on health and wellbeing. Although its consequences are well acknowledged, less is known about the environmental context in which perceived age-based discrimination occurs and whether it affects people's perceptions of their nearby environment. This study aimed to disentangle the bi-directional temporal associations between perceived age-based discrimination and perceived neighborhood characteristics. The Health and Retirement Study is a representative panel study of US residents over the age of 50. The present study relied on three waves of the leave behind psychosocial questionnaire administered in 2010 ($N = 8332$), 2014 ($N = 7.541$), and 2018 ($N = 5738$). A cross-lagged analysis was conducted using Mplus. The study found a temporal bi-directional association between perceived neighborhood positive characteristics and perceived age discrimination, so that those who hold more positive perceptions of their own environment also are less likely to report perceived age-based discrimination four years later. The opposite direction of effects also was supported. There were no differences between the younger age group (50–65 years old) and the older age group (65+years) in these cross-lagged associations. The findings highlight the subjective nature of both perceived age-based discrimination and perceived neighborhood characteristics by possibly pointing to a shared worldview, which contributes to both.

1. Introduction

Ageism, defined as stereotypes, prejudice, and discrimination towards people because of their age has received growing attention in recent years (Ayalon and Tesch-Römer, 2018). Its behavioral component, termed discrimination, has been examined mainly as a subjective construct, which reflects people's perception of varied social situations as being discriminatory due to a bias introduced by focusing on their chronological age (Gee et al., 2007; Rychtaříková, 2019). Perceived neighborhood characteristics refers to one's subjective (dis)satisfaction with his or her nearby environment. The present study examines the bi-directional temporal associations between perceived age-based discrimination and perceived neighborhood characteristics. Such an analysis is important for several reasons. First, it highlights the subjective nature of both perceived age-based discrimination and perceived neighborhood characteristics by possibly pointing to a shared worldview, which contributes to both. Second, it stresses the social context (e. g., perceived neighborhood characteristics) in which perceived age-based discrimination occurs. This can possibly provide information concerning its etiology. Third, the analysis also attempts to disentangle

the role that perceived age-based discrimination plays in older persons' lives by possibly shaping their perception of their near-by environment. Hence, it possibly points to some additional, unexplored consequences of perceived age-based discrimination.

By examining bi-directional temporal associations between the two constructs, we advance current understanding, which has mainly addressed the context including the neighborhood one lives in as a precipitator of one's perceived aged-based discrimination but has paid limited attention to the other direction of effect from perceived age-based discrimination to one's perceptions of the environment. Although there is plenty of research on the negative impact of perceived age-based discrimination on one's health and wellbeing (Carr, 2023; Chang et al., 2020; Officer et al., 2020), its coloring of one's relations with the living environment has not been examined thus far. As a substantial portion of our lives, especially in older age is spent in the nearby environment (Noon and Ayalon, 2018), examining this bi-directional association is essential. The study also highlights the subjective nature of the two constructs, thus introducing the possibility that a third, component, representing one's subjective perceptions colors both. The findings can improve the quality of life and wellbeing of older persons by

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identifying the relationships between the two constructs and pointing to factors that are of substantial impact on the lives of older persons.

1.1. Perceived age-based discrimination

Although ageism can be directed towards people of any age group, research and policy have stressed its negative impact on older persons (Ayalon and Tesch-Römer, 2018; Officer et al., 2020). The impact of ageism on older persons' health, wellbeing and even mortality has been unequivocal (Chang et al., 2020; Hu et al., 2021). A recent systematic review and meta-analysis has shown that ageism is responsible for worse health outcomes in 95.5 % of the 422 studies maintained for the analysis. In total, the effects of ageism were reported in all 45 countries in which it was examined, across 11 health domains and over 25 years of research (Chang et al., 2020).

Exposure to ageism is highly prevalent, with more than 30 % of European citizens reporting perceived age-based discrimination (Ayalon, 2014) and one in two people reporting being ageist (Officer et al., 2020). Ageism is prevalent in all aspects of life and is manifested at the institutional macro-level, at the interpersonal meso-level and at the intrapersonal micro-level (Ayalon and Tesch-Römer, 2018; Iversen et al., 2009). At the macro-level, for instance, certain policies and regulations prevent older persons from receiving appropriate treatment simply because of their age and other policies ignore older persons all together (Jönson and Larsson, 2009). However, ageism also is evident in interpersonal interactions (meso-level) which belittle or ignore older persons simply because of their age (Williams et al., 2009). Self-stereotypes (micro-level) which portray one's own age and aging in a negative light because of his or her age are also prevalent and have shown to result in reduced health, wellbeing and even life expectancy (Sargent-Cox et al., 2012; Tully-Wilson et al., 2021).

Ageism does not occur in a vacuum and is highly context dependent (Kornadt and Rothermund, 2011). Research has shown that context level factors account for as much as 4.2 % of the variance in perceived age-based discrimination in different European countries (Ayalon, 2014). Hence, although much of the variability is at the individual level, countries also differ regarding the level in which people perceive exposure to age-based discrimination. In a systematic review which aimed to identify determinants of ageism, only two consistent determinants at the structural/institutional level (out of a total of 14 determinants) were identified: the availability of resources in the country and the percentage of older persons in the country. Accordingly, under scarce resources, ageism is more likely to flourish (Marques et al., 2020). Compared to a country, a neighborhood represents a substantially smaller geographic area and therefore, its association with perceived age-based discrimination could be even stronger.

1.2. Perceived neighborhood characteristics

The neighborhood is considered a relatively small area surrounding the person's residence. It is defined by its geographic, administrative, or subjective properties (Guo et al., 2019). Oftentimes in later life, older persons' mobility is restricted due to deteriorated physical and functional abilities as well as because of retirement from work. Under such circumstances, the nearby neighborhood gains increasing importance in old age. The area surrounding people's residence from which they can watch and interact with the outside world is called the surveillance zone (Rowles, 1981). It allows older persons to remain part of the social fabric even when their mobility is restricted.

The neighborhood has several properties that make it particularly attractive for older persons. First, it allows for social interactions, not only with friends and family members, but also with acquaintances and neighbors (Buffel et al., 2012). The latter can be meaningful given a study conducted in China, which has shown that even superficial ties contribute to older persons' cognitive functioning (Pan and Chee, 2020). More recently, a systematic review of 34 articles published between 2012 and 2020 has concluded that poor social relationship is associated with cognitive decline (Piolatto et al., 2022). Moreover, older persons tend to spend time in their nearby environment not always for the purpose of going from place X to place Y, but simply to stay present in the outdoor environment, to watch and at times interact with others in their nearby environment (Noon and Ayalon, 2018).

The physical characteristics of the environment also play a role. This is the drive behind the World Health Organization age friendly cities initiative to ensure that the physical environment fosters active and healthy aging (Davern et al., 2020). For instance, the presence of social, health, transportational, and recreational services within the neighborhood is considered beneficial for older persons (Bissonnette et al., 2012; Chen et al., 2022). Consistently, green parks and walkable environments have been associated with improved longevity (Enssle and Kabisch, 2020; Takano et al., 2002).

Nonetheless, subjective or perceived characteristics of the environment also are relevant (Cagney et al., 2009). Perceived neighborhood cohesion represents the degree of connectedness one feels towards his or her nearby social environment. Perceived neighborhood disorder on the other hand, is defined as decay and neglect which contribute to a general sense of threat and a sense of insecurity in one's physical environment (Cagney et al., 2009). Both perceived social environment and perceived physical environment play an important role in older persons' health and wellbeing (Chen-Edinboro et al., 2015; Choi and Matz-Costa, 2018; Echeverría et al., 2008).

There is some research to show a relationship between neighborhood characteristics and ageism. For instance, in a study conducted in three neighborhoods in Israel, the authors found that the levels of ageism and social integration varied across neighborhoods. A higher percentage of older persons in the neighborhood and better socioeconomic status are associated with lower levels of ageism (Vitman et al., 2014). A different study that relied on data from 1561 older persons from the National Survey of Midlife Development in the United States has found that a high density of older persons in one's neighborhood is a protective factor against perceived age-based discrimination, but this does not apply for the oldest-old, who report less age-based discrimination, regardless of their residence (Stokes and Moorman, 2016). In contrast, Hagestad and Uhlenberg (2005) have argued that it is likely that age-segregated housing limits the opportunities of people of different generations to interact and therefore, results in higher levels of ageism. A different study, which examined the neighborhood characteristics in Hong Kong has found that certain characteristics of the neighborhood environment, such as the presence of green parks or libraries are associated with lower levels of ageism, possibly because they allow for greater intergenerational interactions (Chan et al., 2023). Although informative, these studies mainly view the characteristics of the neighborhood as possible precipitators of ageism or perceived age-based discrimination. To date, the alternative direction has not been examined.

1.3. The theoretical framework of the study

The present study examines the temporal bi-directional associations of perceived age-based discrimination with perceived neighborhood characteristics. As illustrated below, the study builds on several prominent theories including a) the common subjective social nature of the two constructs, b) transactional model of stress and coping, c) ecological systems theory, and d) socioemotional selectivity theory.

Common to both is their *subjective nature* (Ayalon, 2018; Weden et al., 2008). It is possible, however, that the different constructs examined in this study are not limited to reflecting one's general view of the world, but rather reflect more refined distinctions. The hypothesis that perceived age-based discrimination predicts perceived neighborhood characteristics can be explained by the common social nature of both constructs. Exposure to age-based discrimination daily likely will result in a deteriorated sense of neighborhood cohesion. Hence, if people in your nearby environment do not "treat you right" it is highly likely

that you will not feel part of such a neighborhood. It also is likely that perceived age-based discrimination will contribute to a worse sense of perceived neighborhood disorder, because the two constructs also reflect a general sense of (dis)satisfaction with the world. This hypothesis is supported by the *transactional model of stress and coping* (Lazarus and Folkman, 1984). The model emphasizes the role of cognitive appraisal in people's ability to cope with stressors in their life. In the present study, perceived age-based discrimination can be seen as one such stressor, which subsequently shapes people's perceptions of their own neighborhood.

As to the opposite direction of association, it is likely that both perceived neighborhood cohesion and perceived neighborhood disorder contribute to perceived age-based discrimination. Living in a neighborhood which is characterized by limited social connectedness and solidarity as well as by limited sense of security, one is more likely to experience daily incidents of discrimination and possibly more likely to attribute some of them to age discrimination. This is largely supported by Bronfenbrenner (1992) *ecological systems theory*. The theory views the environment as being highly influential in people's lives, with varying levels of impact depending on its proximity to the individual. Following this theory, living in a disordered neighborhood with limited social cohesion impacts one's sense of age-based discrimination among other things.

When considering these bi-directional associations, it is important to take into consideration the age of the respondent. Past research has shown that the neighborhood is particularly important for older persons (Buffel et al., 2012; Rowles, 1981). As such, it is possible that the associations found between perceived neighborhood characteristics and perceived age-based discrimination will be stronger in the case of older persons. On the other hand, there is some research to show that compared with younger persons, older persons are less likely to report perceived age-based discrimination (Ayalon, 2014; Ayalon and Gum, 2011). This has been attributed to their tendency to internalize negative age stereotypes (Levy, 2009) and thus, be less observant of age-based discrimination in their surroundings. This in return, could result in lower temporal associations between perceived age-based discrimination and perceived neighborhood characteristics in the older age group.

The *socioemotional selectivity theory* predicts that as people age and their remaining time in the world is perceived as shrinking, they are more likely to be tuned in to positive, rather than negative information. Following this theory, we would expect the bi-directional temporal association between perceived age-based discrimination and perceived neighborhood characteristics to be weaker, compared with younger persons, who are more likely to perceive both negative and positive information (Carstensen, 2021).

1.4. The present study

To sum, bi-directional temporal associations between perceived neighborhood characteristics and perceived age-based discrimination were hypothesized, given the subjective nature of both. Consistent with the socioemotional selectivity theory, there was an expectation for the bi-directional associations to be stronger in the younger age group. This study highlights the subjective nature of perceived neighborhood characteristics and perceived age-based discrimination. It is important to note that the fact that these represent subjective constructs does not diminish their importance. Both perceived neighborhood characteristics and perceived age-based discrimination have been associated with health and wellbeing (Chang et al., 2020; Chen-Edinboro et al., 2015; Dong and Qin, 2017; Tomaszewski, 2013). Hence, by better identifying the relationships between these constructs, researchers and practitioners can possibly intervene and improve older persons quality of life and wellbeing.

2. Methods and materials

2.1. The sample and procedure

The Health and Retirement Study (HRS) represents a longitudinal panel study of US citizens over the age of 50. Data are collected every two years. However, the present study is based on the leave behind questionnaire, which is completed by half the sample every two years. Hence, a repeated sample is available every four years. Our sample is derived from the 2010 (N = ,332), 2014 (N = 7.541), and 2018 (N = 5738) waves. Respondents who completed all three waves, were younger, more educated, healthier, and reported better wellbeing compared with those who were lost to follow-up. Table 1 presents baseline characteristics of the sample. No ethical approval was required for data analysis given the public nature of the data.

2.2. Measures

2.2.1. Perceived neighborhood characteristics

This is an eight-item scale that can be divided into two subscales. The first, concerns perceived neighborhood cohesion ("I really feel part of this area"; "most people in this area can be trusted") and the second subscale addresses perceived neighborhood disorder ("There are many vacant or deserted houses or storefronts in this area"; "This area is always full of rubbish and litter"). Items are ranked on a 7-point scale (Latham and Clarke, 2018; Mendes de Leon et al., 2009). The two subscales have been used extensively with older persons (Chen-Edinboro et al., 2015; Kim et al., 2013; Robinette et al., 2018). Given the high correlation among the two subscales, a composite score was calculated with a reliability ranging between 0.90 and 0.92 across waves. Items were recoded so that a higher score would indicate better perceived neighborhood environment. Thus, a total higher composite score indicates better perceived neighborhood characteristics. Therefore, the term 'perceived positive neighborhood characteristics' is used in this study.

2.2.2. Perceived age-based discrimination

Perceived everyday discrimination was assessed using six items ("people act as if they are afraid of you"; "you are threatened or harassed"), ranked on a 1-almost every day to 6-never scale (Williams et al., 1997). Those who indicated perceived exposure to discrimination were then asked to attribute the discrimination to a variety of explanations including age. In the present study, those who indicated that the experience happened to them because of their age were classified as reporting perceived age-based discrimination. This measure has been used in past research as an indicator of perceived age-based discrimination (Ayalon, 2018).

2.2.3. Demographic variables

Age (continuous variable, in years), gender (0 = women, 1 = men), education (0–17 years of education), and minority status (0 = minority status, 1 = White) were gathered based on self-report.

2.3. Analysis

To characterize the sample, descriptive statistics and correlations between the variables were conducted. Listwise deletion was used for bivariate analysis. Next, Structural Equation Modeling, relying on Mplus version 8 was employed to examine the cross-lagged autoregressive model (Finkel, 1995). The proposed model examines the reciprocal temporal associations of perceived age-based discrimination and perceived neighborhood characteristics, while controlling for the measurement bias of perceived neighborhood characteristics. Perceived age-based discrimination is a single item and therefore, was examined as an observed variable. Age in 2010, gender, years of education, and minority status were included as covariates. These variables also were

Table 1

Sample characteristics at baseline 2010 ($N = 8332$).

	Mean (SD)/Frequency (%)	1	2	3	4	5
1. Age	67.52(10.64)					
2. Gender	4739(58.3 %)	0.01				
Women-reference group						
3. Education	12.89(2.98)	−0.12**	0.03**			
4. Minority status	2298(28.3 %)	0.21**	0.05**	0.26**		
4. Perceived age-based discrimination (no = reference group)	2199(27.3 %)	0.07**	0.01	−0.02	0.02	
6. perceived positive neighborhood characteristics (1–7)	5.40(1.33)	0.14**	0.02	0.16**	0.27**	−0.10**

*$p < 0.05$; **$p < 0.01$.

examined as observed indicators.

Mplus WLSMV estimator that allows for maximum likelihood estimation with robust standard errors and chi-square calculation in the presence of missing values was used to allow the analysis of all available data across the three waves. Weights and strata were used given the complex survey design. The following fit indices are reported: the Tucker–Lewis Index (TLI), the Comparative Fit Index (CFI), and the Root Mean-Square Error of Approximation (RMSEA). TLI and CFI close to or above .95 combined with RMSEA of 0.06 or lower indicate reasonably good fit (Hu and Bentler, 1999). The significance level criterion for all statistical tests was set at 0.05.

For the latent variables, perceived neighborhood cohesion and disorder, weak factorial invariance was established to ensure that item loadings are consistent across waves (Meredith, 1993). Stationarity was tested for and specified by setting all path coefficients to be invariant across waves. Given the strong correlation between the two constructs of perceived neighborhood characteristics, a combined construct was created (after recoding relevant items, a higher score represents a more positive perception of neighborhood characteristics). In the cross-lagged model, perceived age-based discrimination in wave #n was examined as a predictor of perceived positive neighborhood characteristics in wave #($n + 1$) and vice versa, perceived positive neighborhood characteristics in wave #n were examined as predictors of perceived age-based discrimination in wave #($n + 1$).

Next, multiple group comparisons were conducted to examine whether the cross-lagged effects vary across age groups (50–65 years old, >65 years). For multiple group comparisons, the grouping command and the Difftest function were used. The analysis started with two identical models: one for younger (50–65 years) and one for older persons (>65 years). This represents the restricted model, which sets the cross-lagged effects across the two groups to be equal. This was examined against a model, which allowed for the two age groups to differ. A significant result between the two models implies that the cross-lagged effects differ across the two groups of younger and older persons. In an additional sensitivity analysis, age was examined as a continuous variable and the cross-lagged interactions were estimated.

3. Results

Table 1 describes the study variables and correlations between them. Age was negatively correlated with education. It was positively correlated with being a non-minority, perceiving age-based discrimination and with perceived positive neighborhood characteristics. Men had higher levels of education and were more likely to be non-minority. Higher levels of education were associated with being non-minorities. Being a non-minority was associated with perceived positive neighborhood characteristics. Finally, there was a negative association between perceived positive neighborhood characteristics and perceived age-based discrimination.

Table 2 demonstrates the correlations between study variables across the three waves. There were significant positive correlations across the three waves between perceived age-based discrimination measured in 2010, 2014, 2018. The three measurements of perceived positive neighborhood characteristics also were positively correlated. Perceived positive neighborhood characteristics was negatively correlated with perceived age-based discrimination across all three waves.

An overall measure of perceived positive neighborhood characteristics was calculated by combining the measurement of neighborhood disorder with neighborhood cohesion (after recoding relevant items). This was done given the high correlation between the two subscales which prevented the model from converging. The analysis started by testing the measurement model of perceived positive neighborhood characteristics, while considering the older (65+) and younger (50–65) age groups. The model fit well to the data: X^2 (511) = 2867.746, $p < 0.001$, RMSEA 90 %CI = 0.035(0.033–0.036), CFI = 0.947, TLI = 0.943.

Next, the autoregressive cross-lagged model was fitted. Age, gender, education, and minority status were entered as time invariant covariates. This model fitted the data well: X^2 (861) = 4288.580, $p < 0.001$, RMSEA 90 %CI = 0.032(0.031–0.033), CFI = 0.935, TLI = 0.930. A model which allowed the cross-lagged effects of perceived age-based discrimination on perceived positive neighborhood characteristics and perceived positive neighborhood characteristics on perceived age-based discrimination to vary across age groups was tested. This model also fit well to the data: X^2 (860) = 4286.679, $p < 0.001$, RMSEA 90 %CI = 0.032(0.031–0.033), CFI = 0.935, TLI = 0.930. The Chi-square difference between the two models was non-significant ΔX^2 (Δdf) = 1.901 (1), suggesting that the cross-lagged effects do not vary across the two groups. Hence, a model which does not compare the two age groups was maintained. This model is reported in Fig. 1.

The model which did not distinguish between two age groups had a good fit to the data: X^2 (415) = 3514.901, $p < 0.001$, RMSEA 90 %CI = 0.032(0.031–0.032), CFI = 0.934, TLI = 0.927. The auto-regressive effects of perceived positive neighborhood characteristics ($B[SE]$ = 0.58 [0.02], $p < 0.01$) and perceived age-based discrimination ($B[SE]$ = 0.32

Table 2

Means, standard deviations, and correlations among perceived age-based discrimination and perceived positive neighborhood characteristics across the three waves: [2010 ($N = 8332$), 2014 ($N = 7.541$), and 2018 ($N = 5738$)].

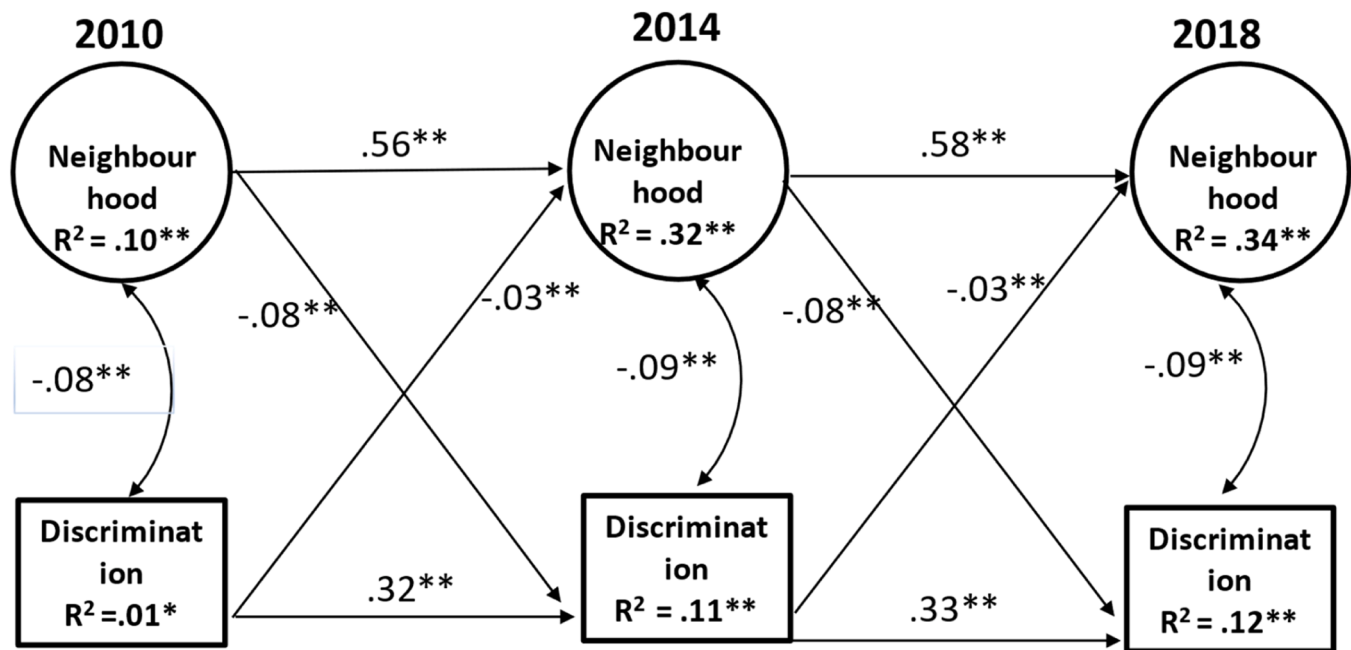|	Mean (Standard deviation)	1	2	3	4	5
1.Perceived age-based discrimination 2010	0.27(0.44)					
2.Perceived age-based discrimination 2014	0.28(0.45)	0.32**				
3.Perceived age-based discrimination 2018	0.30(0.46)	0.31**	0.34**			
4.Perceived positive neighborhood characteristics 2010	5.40(1.33)	−0.10**	−0.10**	−0.09**		
5.Perceived positive neighborhood characteristics 2014	5.38(1.33)	−0.08**	−0.09**	−0.07**	0.50**	
6.Perceived positive neighborhood characteristics 2018	5.48(1.30)	−0.05**	−0.06**	−0.10**	0.45**	0.48**

*$p < 0.05$; **$p < 0.01$.

Fig. 1. The cross-lagged model of perceived positive neighborhood characteristics and perceived age-based discrimination.

[0.01], $p < 0.01$) were significant across the three waves, supporting the stability of these constructs. The lagged effect of perceived positive neighborhood characteristics on perceived age-based discrimination was significant ($B[SE] = -0.08$ [0.01], $p < 0.01$). The opposite direction from perceived age-based discrimination to perceived positive neighborhood characteristics also was significant ($B[SE] = -0.03$ [0.01], $p = 0.01$).

In an additional sensitivity analysis, the interaction effects of age (as a continuous variable) with perceived positive neighborhood characteristics on perceived age-based discrimination and of age with perceived age-based discrimination on perceived neighborhood characteristics were examined. These interactions were non-significant (B [SE] = 0.00 [0.00], $p = 0.65$; $B[SE] = 0.01$ [0.01], $p = 0.29$, respectively).

An additional sensitivity analysis examined whether the cross-lagged effects from perceived age-based discrimination to perceived positive neighborhood characteristics are substantially different from the cross lagged effects from perceived positive neighborhood characteristics to perceived age-based discrimination. The model which constrained the cross-lagged effects to be equal resulted in the following fit statistics: X^2 (416) = 3519.056, $p < 0.001$, RMSEA 90 %CI = 0.032(0.031–0.032), CFI = 0.934, TLI = 0.927. This model was significantly different from the model which assumed that the bi-directional effects are different ΔX^2 (Δdf) = 4.155 (1), suggesting that there is a difference in the strength of the bi-directional cross-lagged effects with the effects of perceived positive neighborhood characteristics on perceived age-based discrimination being stronger than the effects in the opposite direction.

4. Discussion

This is the first study to examine the temporal bi-directional associations between perceived age-based discrimination and perceived positive neighborhood characteristics. This analysis is important because it points to the common subjective nature of the constructs (e.g., perceived age-based discrimination and perceived positive neighborhood characteristics), but at the same time aims to disentangle the link between them. The findings show a lagged effect from perceived age-based discrimination to perceived positive neighborhood characteristics and vice versa. In contrast to expectation, there were no differences

in these cross-lagged effects between the younger age group and the older age group.

Our findings support a bi-directional association between perceived positive neighborhood characteristics and perceived age-based discrimination. People who perceived their social interactions as colored by ageism (e.g., perceived age-based discrimination) were more likely to report inadequate social relations and solidarity in their neighborhood as well as inadequate sense of safety and security. The opposite direction was also significant: Neighborhood characterized by inadequate solidarity and lack of sense of safety predicted a sense of age-based discrimination four years later. The latter temporal association was stronger, thus possibly supporting the fact that the majority of past research has examined the environment as a possible predictor of perceived age-based discrimination and not the other way around (Vitman et al., 2014). Nonetheless, the findings also allude to the fact that possibly the effects of perceived neighborhood characteristics on perceived age-based discrimination evaluated in past research were somewhat inflated by the fact that the association between the two constructs also goes the other way around.

The temporal bi-directional associations are not surprising. Broadly speaking, the findings support the ecological theory (Bronfenbrenner, 1992), by pointing out to the important effects the nearby neighborhood has on our perceptions of age-based discrimination. At the same time, the findings also support the stress and coping model, which highlights the effects of stress on our appraisal of social situations (Lazarus and Folkman, 1984). In the present study, perceived age-based discrimination can be seen as a source of stress, which then colors one's views of the nearby neighborhood environment.

The measure of perceived age-based discrimination specifically assesses daily interactions. Hence, it is only logical that these daily interactions are affected but also affect people's degree of satisfaction and sense of belonging to their nearby environment. Although our findings highlight the subjective nature of perceived age-based discrimination and perceived neighborhood characteristics, this is not to say that these perceptions are meaningless. In fact, both perceived age-based discrimination and perceived neighborhood characteristics have shown to be associated with health and wellbeing (Chang et al., 2020; Eibich et al., 2016). Thus, the study suggests that by identifying methods to improve at least one of the two, it is possible to also improve the other.

A question raised by the study was whether the cross-lagged associations of the younger age group in the sample (50–65 years) would differ from that of the older age group (65+years). On the one hand, older persons have shown to be more attached to the nearby physical environment (Rowles, 1981), but on the other hand, although research has shown that ageism is highly prevalent among older persons (Ayalon and Tesch-Römer, 2018), they tend to report lower levels of perceived age-based discrimination compared with younger adults (Ayalon, 2014). Following the socioemotional selectivity theory (Carstensen, 2021), the bi-directional temporal associations were expected to be stronger in the younger age group compared with the older age group. However, in the present study, there were no age group differences in the cross-lagged effects. It is important to note that the two age groups were somewhat artificially dichotomized for the purpose of conducting age group analysis, though the proposed cutoff used in this study is considered quite universally as the age when older age starts or middle age ends (Ayalon et al., 2014). Moreover, an additional sensitivity analysis that examined age as a continuous variable resulted in similar findings.

The present study does not go without limitations. First, although this is a representative sample, older and more physically ill individuals are less likely to be represented. In addition, the study had no objective measures of the environment nor of age-based discrimination. Continued research, which relies on objective features of these constructs could be particularly useful. An example of an objective indicator of age-based discrimination could be the level of intergenerational contact facilitated via social services. Likewise, an example of an objective indicator at the level of the neighborhood could be the age composition in the neighborhood. Nonetheless, clearly, perceptions are important determinants of our health and wellbeing (Ayalon and Tesch-Römer, 2018; Stephens and Phillips, 2022) and thus, deserve our attention. It also is important to note that the measure of perceived age-based discrimination was not limited to the neighborhood environment. Although, as already noted, as people age, they are more likely to spend time in their nearby environment, and thus, it is possible that many of the interactions referred to in the measure actually took place in the neighborhood, a future study which examines the bi-directional temporal associations with a measure restricted to perceived age-based discrimination in the neighborhood environment is desirable.

Nonetheless, the study provides important insights that should be acknowledged. This is the first study to examine the bi-directional associations of perceived age-based discrimination and perceived positive neighborhood characteristics, thus highlight the subjective common nature of both. Moreover, despite the well-known understanding that ageism occurs within a social/environmental context, research has been quite limited in its attempts to understand the link between perceived age-based discrimination and the environment, especially when it comes to the neighborhood features.

The study highlights the susceptibility of older persons to the experiences of age-based discrimination as well as to the greater impact the social environment plays in the case of older persons. The findings stress the importance of both social and physical features of the environment to one's sense of perceived age-based discrimination. As older persons' environments often change because of gentrification and decay processes (Santos et al., 2022), the present findings are notable and should be viewed with caution by city planners and social service agencies. It also is important to note that there are several effective methods to address ageism including legal policy and laws, intergenerational contact, and education (World Health Organization, 2021). The present study suggests that such interventions can possibly assist in the social integration of older persons in their environment. This is particularly important given the strong link older persons have with their near-by environment (Noon and Ayalon, 2018; Rowles, 1981).

CRediT authorship contribution statement

Liat Ayalon: Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Conceptualization.

Declaration of competing interest

Author has no conflict of interest to declare.

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