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Article

A comparison of ageism among Uzbek and Hungarian university students: Can we prepare older adults to adapt to technological changes as societies age?

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Abstract: The proportion of elderly people is growing steadily in many countries, and this trend is expected to continue. As a result, ageism—negative discrimination often tied to perceptions of the elderly—becomes especially harmful. Ageism prevents older generations from being fully accepted by society and, in turn, hinders their ability to adapt to today's technological changes. In this article, we present the results of our survey mapping the extent of ageism among youth in Uzbekistan, known for its cultural tolerance in Central Asia, and in Hungary, a more individualistic society in Central Europe. To interpret the survey results accurately, we included specific questions to measure social desirability bias, enabling a realistic comparison of ageism levels between the two countries. Data was collected through a survey translated into multiple languages, with a final sample of nearly 400 respondents, each either currently pursuing or already holding a college-level diploma. Our methodological approach was twofold. First, we conducted simple chi-square tests to compare levels of negative and positive ageism between the two countries under study. Upon finding significant differences, we used multivariable OLS regression to explain the variance in types of ageism in Uzbekistan and Hungary, accounting for the possible effects of social desirability bias. Uzbek youth demonstrated higher levels of positive ageism and lower levels of negative ageism compared to Hungarian youth. This finding confirms that the cultural tolerance in Uzbek society remains strong and, in many ways, could serve as a model for Hungary. Additionally, our literature review highlights that adequate infrastructure is essential for a society to treat older adults equitably alongside other citizens.

Keywords: cross-sectional study; ageism; social desirability bias; tolerance toward older people; Hungary; Uzbekistan

1. Introduction

The perception of older people has shifted multiple times throughout history. In certain periods, older adults were highly valued, while in others, society viewed them as a burden (Luh, 2003; Ng and Chow, 2021). The term "ageism" was coined by Butler (1969) to describe negative discrimination against older people.

Ageism can manifest not only negatively but also as positive ageism. Positive ageism reflects a supportive attitude within society, where individuals appreciate older adults, associate positive thoughts with them, and view them as valuable contributors. In contrast, negative ageism involves viewing older people as a burden, looking down on them, and associating them with negative qualities.

Today, the discriminatory perception of the elderly is significant not only for ethical reasons but also because the populations of many countries are rapidly aging,

with the proportion of those aged 65 and over steadily increasing. Ageism places psychological burdens and daily practical challenges on people over 65. It also worsens the lives of those under 65, who, if fortunate, will eventually become part of the older age group themselves. When older adults are marginalized, younger individuals are often forced to provide support for those who, if accepted, could care for themselves. Ageism thus prevents older adults from being respected and active participants in socio-economic life, depriving societies of valuable resources.

Ageism is especially harmful to older adults who are still working. Rapid technological advancements today require that all generations adapt, including older adults. Yet, ageism hinders—and sometimes even prevents—them from accessing essential information and participating in training programs. Among these, learning to use digital devices is perhaps the most critical, as such devices are integral to the modern infrastructure. To counter ageism, it's also essential to provide older adults with the opportunity for free movement. They should be able to travel safely and freely, even if their mobility has declined with age. A well-organized transportation system can meet this need by offering safe and accessible options. This freedom of movement supports their openness to the world and fosters acceptance from others in society.

Our research examines the discriminatory perception of the elderly, focusing specifically on Uzbekistan and Hungary—two countries we know well. Our small team has worked together for several years on international research concerning aging and fertility rates. Over time, we noticed that the social reception of older people was often inadequate, a factor that can hinder economic development in many areas. This observation sparked our curiosity about ageist attitudes in our own countries. How does ageism differ between Uzbekistan and Hungary? Is it true that people in Uzbekistan, an Asian country, are less ageist than those in Hungary, an individualistic European society?

In our previous research, we observed that ageism is often linked to the size of a society's elderly population. Generally, an inclusive society may tolerate a smaller elderly population more easily than a larger one. A larger older generation requires greater sacrifices to uphold the material and intellectual interests of older individuals. However, a larger elderly population can also be better positioned to assert its interests, potentially resisting ageist attitudes more effectively. In the end, less ageist societies—regardless of how they developed this inclusivity—can serve as valuable examples of how to reduce ageism.

The old-age dependency ratio is a useful indicator of the burden a country faces in supporting its elderly population. Numerically, this ratio represents the percentage of people aged 65 and over relative to the working-age population (15–64 years old). For a detailed definition, see Loichinger et al. (2017). In Hungary—like most European countries—the dependency ratio is already high and is projected to rise significantly in the future. In contrast, Uzbekistan experienced a decline in its still-low dependency ratio between 2000 and 2015. World Bank projections indicate only modest increases for Uzbekistan in the coming years. This trend is illustrated in **Figure 1**.

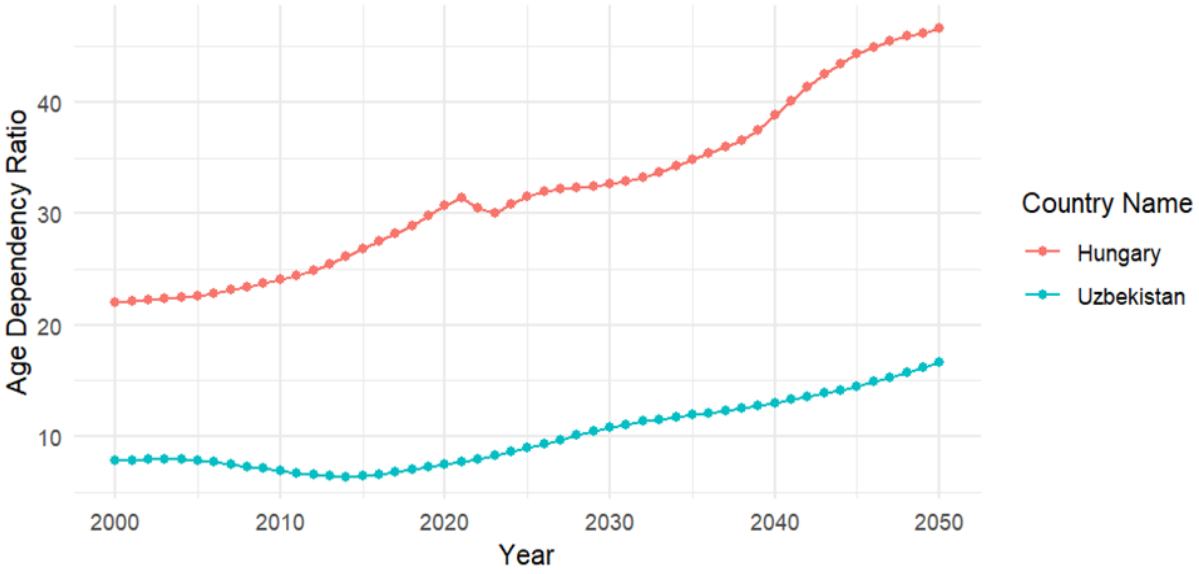

Figure 1. Trends in old-age dependency ratios for Uzbekistan and Hungary.
Data source: World Bank: Population estimates and projections. Last updated on 7 January 2024.

As shown in **Figure 1**, Uzbekistan's old-age dependency ratio will not even reach the level Hungary experienced in 2000 by the year 2050, remaining below 20. This means that by 2050, Uzbekistan will have fewer than 20 elderly individuals for every 100 working-age citizens. In contrast, projections for Hungary indicate that this ratio will exceed 45 by 2050, with approximately one-third of the population aged 65 or older. This demographic shift highlights the importance for Hungary to treat the elderly as equal members of society, for which less ageist countries may serve as valuable examples. The significantly larger elderly population in Hungary raises an interesting question: which country experiences a lower level of ageism? This led us to our research question: Do Uzbekistan and Hungary differ in their levels of ageism, and if so, what factors might explain these differences?

To compare levels of ageism in the two countries, we developed our own questionnaire. This questionnaire was distributed among university students in both countries, as they represent the future intellectuals who will shape societal attitudes. In our survey, we focused on potential differences in desirability bias between the two countries. Desirability bias occurs when people express opinions they believe are socially expected. This can lead them to provide answers that do not reflect their true beliefs, even in anonymous surveys. If respondents in one country are more prone to desirability bias than those in another, this can distort the comparison. To address this, we included questions to help estimate levels of desirability bias. As we will show in our article, desirability bias levels differed between the two countries but did not significantly explain the variations in ageism. To our knowledge, this type of comparative analysis has not been explored in the existing literature.

The structure of our article is as follows. After the introduction, Section 2 provides a brief background, including literature review on ageism. Section 3 describes our survey and methods. Section 4 presents and discusses the results, and Section 5 concludes with our findings and offers insights for policymakers.

2. Background

As mentioned in the Introduction, the term ‘ageism’ refers to discriminatory attitudes or stereotypes based on age (Butler, 1969) and has become increasingly prevalent as the proportion of older people (aged 65 and over) has grown. Ageism can target both older and younger individuals, though it is more commonly directed towards elderly. This phenomenon suggests that societies often struggle to adequately support their older members, who are frequently viewed as burdens on the working-age population, labor market, healthcare system, social services, and welfare state (Börsch-Supan, 2003; Peterson and Ralston, 2017). However, the extent and types of ageism vary across countries.

For instance, students in Australia showed more negative attitudes toward those aged 80 and over (Schüttengruber et al., 2022). Similar negative attitudes were also observed in Jordan and Egypt (Mohammed and Omar, 2019; Rababa et al., 2021). Such variations in ageist attitudes can be influenced by factors like income level, as seen in Kazakhstan, where people with lower incomes exhibited stronger ageism (Kurbanova and Berde, 2024). Demographic factors also play a role, as demonstrated in Italy, where adults aged 31-60 showed more positive ageism than younger individuals aged 18-30 (Bincoletto et al., 2023).

In contrast, a study in Turkey (Bardakcı and Büyükbayraktar, 2024) using the Positive and Negative Ageism Scale revealed that students held more positive attitudes toward the elderly than middle-aged adults. Similarly, in Taiwan and Korea, moderate ageist attitudes were observed among nursing students(Ha and Kim, 2021; Wang et al., 2024).

Further exploring the role of cultural values, it becomes evident that Asian cultures, characterized by collectivism, often hold a higher regard for the elderly, valuing respect for seniors as a cultural norm (Nelson, 2009). This contrasts with Western and more individualistic societies, where there may be less reverence for older adults. However, ageist prejudices can manifest unconsciously in any society, and research suggests that ageist attitudes are often influenced more by individual traits than cultural background alone.

For example, Luo et al. (2013) challenged prevailing assumptions by showing that Chinese college students exhibited more ageist attitudes than their American counterparts, who were more engaged with seniors outside their immediate family circle. Similarly, Vauclair et al. (2017) found that Taiwanese students displayed greater ageism than those in the United Kingdom. De Paula Couto et al. (2023) also observed that older adults, especially those aged 60–90 years old in Eastern cultures, such as in Hong Kong and Taiwan, experienced more frequent age discrimination than their peers in the Czech Republic, Germany, and the USA.

One possible explanation for this paradox could be that the hierarchical and collectivistic nature of Asian cultures, which mandates youth respect and care for the elderly, may paradoxically intensify negative attitudes toward seniors (Bergeron and Lagacé, 2021; Stanciu, 2020). In our study, we also aim to compare two countries with distinct cultural backgrounds and demographics to explore these nuances in ageism.

Beyond cultural values, structural factors such as environmental infrastructure and mobility options also play an essential role in the living conditions of older adults. For example, in considering infrastructure, the digital environment is particularly significant, as it can either reinforce or weaken structural ageism (Rosales and Fernández-Ardèvol, 2019). In this regard, while a digital divide exists in Hungary, it is much less pronounced than in Uzbekistan (Butaboyev and Askarov, 2023; Győrffy et al., 2023). Consequently, ageism resulting from the digital divide appears lower in Hungary than in Uzbekistan.

Moreover, the physical environment and a well-developed transportation system, which enable older adults to move freely within cities or across the country, have an even more significant impact than the digital environment. The study by Van Hoof et al. (2020) illustrates that providing suitable travel options can help older adults remain engaged and productive members of society, thereby supporting economic transfers between age groups. When transportation presents barriers for older adults, it can lead to social isolation and exacerbate ageism, as observed in Bangladesh (Jahangir et al., 2022).

While research on age-friendly transportation in Uzbekistan is limited, some studies suggest that mobility skills are crucial for social integration among older adults. For example, Inakov et al. (2020) show that older adults who can move freely are more likely to live within family or partner communities, significantly enhancing their social connections. Similarly, Rétsági et al. (2020) highlight the role of accessible transportation in fostering the social acceptance of older adults in Hungary, emphasizing that while society must maintain such infrastructure, older adults should also strive to stay physically active to engage fully in these resources.

In terms of transportation, there is a common belief that older adults are less safe in traffic, which often justifies ageist behavior toward them. However, this view is mostly incorrect, as older adults tend to be more cautious due to their experience and better self-awareness. As Trifunovic and Senic (2024) demonstrated, they generally cause fewer accidents. Nevertheless, older adults are more vulnerable to environmental hazards, which should be taken into account when transporting dangerous materials (Simić et al., 2023). From this perspective, transportation indeed presents greater risks for older adults.

A review of the literature on infrastructure and regional mobility reveals that, despite its importance, few studies examine these elements in relation to ageism. We feel that this represents a gap in the economic literature where significant progress can be expected in the future. Given these structural influences on ageism, it has become increasingly important for researchers to develop tools to quantify and monitor attitudes towards older adults more accurately.

As interest among scholars in assessing attitudes toward seniors has grown due to the widespread presence of ageism across the country, it became crucial to develop a method to measure ageism. Such tools allow researchers to quantify what is being examined and observe its evolution (Shiovitz-Ezra et al., 2016). Over the years, the study of ageism has adopted a multidimensional approach, analyzing its occurrence across various levels (micro, meso, and macro) and types (conscious, unconscious, hostile, benevolent, etc.), leading to refined and expanded measurement tools (Gendron et al., 2020). One such tool is the Relating to Older People

Evaluation (ROPE), developed by Cherry and Palmore (2008). This instrument is designed to measure ageist behavior in everyday interactions, incorporating both positive and negative attitudes toward older adults.

The ROPE survey includes 14 negative items (e.g., "tell old people jokes about old age") and 6 positive items (e.g., "hold doors open for old people because of their age"). Respondents must choose from three possible responses—Never (0), Sometimes (1), or Often (2)—for each item, with total scores calculated separately for each dimension to capture a wide range of potential ageist behavior. This technique will be utilized in our current research to analyze ageism more effectively.

Researchers have used the ROPE across various countries and target groups to assess both negative and positive ageist attitudes. For example, Frost et al. (2016) utilized it to study first-year nursing students in Australia, finding these students displayed a higher tolerance toward older adults, indicative of prevalent positive ageism. Similarly, McKenzie and Brown (2014), focusing on the same country and demographic, observed that nursing students tend to exhibit more positive ageism as they age. Comparable outcomes have been noted in international studies as well, with Rababa et al. (2020) identifying common positive ageism among Jordanian nursing students and Bahtiar (2021) documenting similar findings in an Indonesian context.

Targeting various groups with diverse academic backgrounds, Erwin and Cherry (2024) assessed positive ageism among students and faculty members in southeast Louisiana across courses in history, biology, sociology, and psychology. They found that while both types of ageism existed, positive ageism was more frequently reported. Students admitted to ageist behaviors more often than faculty members. Similarly, Cherry et al. (2016) revealed that adolescents and young adults exhibited fewer ageist behaviors compared to middle-aged and older adults. In line with our findings, women reported more frequent positive ageist attitudes than men, though there was no significant difference in negative ageist attitudes between genders. Overall, positive ageism was more common across all groups.

One might conclude from the aforementioned studies that the level of ageism is relatively low. However, self-reported surveys can yield biased results due to social desirability bias, where respondents provide answers that are socially acceptable rather than their true opinions (de Paula Couto and Rothermund, 2019). This bias can result in inaccurate measurements of ageism, as individuals may conceal negative attitudes, thoughts, behaviors, and feelings towards older people (Chen et al., 2011; Fazio and Olson, 2003; Lassonde et al., 2012).

To address this issue, researchers have developed various methods to reduce biased responses. Despite these efforts, it is challenging to completely eliminate social desirability bias in ageism studies. However, certain techniques, such as the Marlowe-Crowne Social Desirability Scale (MC-SDS), have proven effective. Originally consisting of 33 true or false questions, this scale assesses culturally acceptable behaviors, with higher scores indicating greater social desirability. Over time, shorter versions of the MC-SDS have been created (Reynolds, 1982; Strahan and Gerbasi, 1972) and are widely used in ageism research.

For example, Cherry et al. (2015) examined social desirability in self-reported measures of ageism using the ROPE and the Fraboni Scale of Ageism (FSA) among

college students and community adults in the USA. Their findings indicated that positive attitudes towards older people were often influenced by a desire to respond in a socially acceptable manner.

Reviewing the literature on ageism in the two countries under study, Hungary and Uzbekistan, reveals an abundance of studies in Hungary, while such research is relatively sparse in Uzbekistan. One possible explanation for this disparity is the demographic differences in age structure. Hungary is considered a rapidly aging country, where the proportion of the population aged 65 and above increased from 13% in 1990 to 20% in 2023. In contrast, this proportion in Uzbekistan is four times smaller and has remained nearly unchanged over the same period (World Bank, 2023) (**Figure 2**).

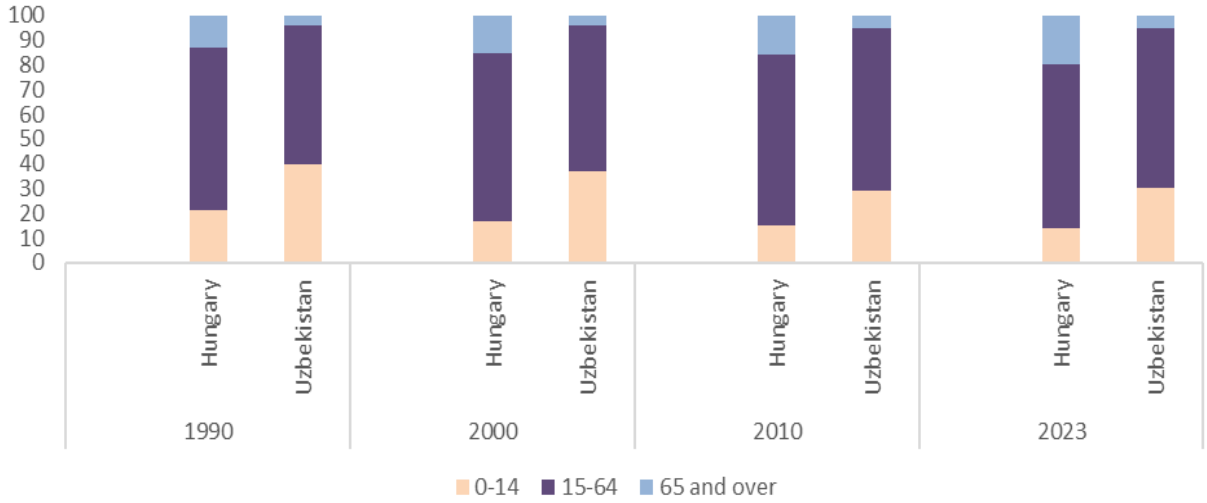

Figure 2. Age structure comparison between Hungary and Uzbekistan.
Source: World Bank database.

Additionally, cultural traditions also vary between these two countries. Hungary is considered an individualistic society where, due to modernization, extended family living arrangements have become rare. This shift means that most older adults live alone and receive limited support from family (Gyarmati, 2019). Furthermore, Hungarians often perceive older adults as having poor health and mental status, being dependent on others, and struggling to adapt to changes (Monostori and Gresits, 2018).

In contrast, Uzbek traditions frequently involve living in extended families, where caring for older family members—physically, morally, and financially—is a common practice (Bondarenko, 2021). Older individuals are valued as mentors, with their wisdom and expertise strengthening family bonds (Mamayusupova, 2022). From early childhood, children are taught to respect and obey their elders. This deep-seated regard for older generations may create the impression that ageism is less common in Uzbek society.

Conversely, existing studies highlight the persistence of ageism in Hungary. For instance, Csoba and Ladancsik (2023) found that stereotypes about older workers and the lack of financial necessity due to transfer income provided to older people by the government are major obstacles preventing the silver generation (65+) from being active in the labor market. Similarly, Berde and Mago (2021) noted the

presence of ageism in the Hungarian labor market, with older individuals facing significant challenges. Lovász and Simonovits (2019) discovered that these challenges are particularly pronounced during job interviews. Kolos and Kenesei (2023) examined ageism in tourism from the perspective of young Hungarians, finding that positive interactions with older adults can directly reduce ageist attitudes. They also identified metastereotypes as significant mediators and noted gender differences (similar to our findings, discussed later) in how aging anxiety affects ageism, suggesting distinct coping strategies between men and women.

Studies on ageism in Uzbekistan's labor market are limited, but those that are available also interestingly report ageism. For example, Abdullaeva (2024) mentioned that age discrimination exists in the labor market, particularly when seeking job offers. Aniyozova (2017) found that ageism affects the quality of life for older people in Uzbekistan. Berde et al. (2022) analyzed the existence of ageism during the COVID-19 pandemic in Hungary, Uzbekistan, and Tunisia, highlighting that social desirability bias might contribute to the low reported levels of ageism in these countries. Despite this bias, the study detected factors of ageism through small variations.

In light of the above, the particular interest of our current survey is that, at the outset of our research, we attempt to compare the level of desirability bias between the two countries. The subsequent comparison of ageism levels will thus provide much more realistic results than if we had skipped this first step.

3. Materials and methods

We conducted a survey comparing ageism in Uzbekistan and Hungary among university students. These students, as future social and economic leaders, hold important opinions, as their behavior significantly influences other members of society. Additionally, they will be responsible for making hiring decisions for various positions. We analyzed the results of our survey using the chi-square test and the ordinary least squares method. Below, we first present the themes of our survey and describe the participants. Afterward, we detail our analytical methods.

3.1. Our survey

The survey was translated into Uzbek, Russian, and Hungarian and was presented to university students aged 17–26 in their native languages as an online survey, using 'Qualtrics' in Uzbekistan and 'Google Forms' in Hungary. The survey was conducted in September and October 2023. The number of respondents before data cleaning was 571: 169 were from Hungary and 402 from Uzbekistan. This distribution reflects the different population sizes of the two countries—Hungary, a Central European country, has a population of roughly 9.7 million people (and decreasing), while Uzbekistan, a Central Asian country, has the population of about 36.6 million people (and growing). As (Kotrlik and Higgins, 2001; Naing et al., 2006) describes, when sampling from multiple populations and comparing samples, the original population size must be considered, and sampling should be conducted proportionately.

The survey questions were categorized into three groups:

- Statements for the Marlowe–Crowne Social Desirability Scale (Strahan and Gerbasi, 1972): 10 statements
- Ageism-Related Statements (Selected Statements of the Relating to Older People Evaluation – ROPE, Cherry and Palmore, 2008): 14 statements
- Socio-Demographic Questions: 9 questions

The 'Ageism-Related Statements' as well as the 'Socio-Demographic Questions' were used to compare the levels of ageism (both positive and negative) in the two samples, while the 'Statements for Marlowe-Crowne Social Desirability Scale' helped capture potential behavioral biases that might distort survey results, as even in anonymous surveys, respondents may seek to portray themselves in a positive light.

Next, dummy variables were created to capture the experience of 'working with', 'living with', and being 'taught by' older people, as well as having 'no experience' with older people. Since respondents could select multiple answer options, all dummy variables were considered simultaneously in the estimations. For the question, "Do you have a fear that you will be treated badly in society when you get old?", answer option 3 ("I do not know/hard to answer") was replaced with missing values to encourage responses expressed with conviction, omitting those who chose the uncertain option. Similarly, the "Others" option was replaced by missing values for the demographic variable of marital status.

Finally, we acknowledge some potential ambiguities in the demographic question options: terms like "Rural place", "Small town", "Big city", "Old-age", or "Bad", "Middle", "Good" economic conditions were not explicitly defined. As such, responses reflect the respondents' personal interpretations of these terms, which may introduce some variability in the data. The table of descriptive statistics for all cleaned responses is provided in the Appendix (see **Table A1** in Appendix) In short, the average age of the respondents across the entire sample was about 20.7 years; Hungarian participants were slightly younger (mean age: 19.7) than Uzbek participants (mean age: 21.2). The gender ratio of male to female respondents was nearly balanced (0.5), with slightly fewer male respondents in Hungary than in Uzbekistan. Almost all participants were at the BA level in their education, and only a minority were currently employed. Most respondents were single and came from towns or cities.

3.2. Methodology

Our methodological approach was twofold. First, we hypothesized that positive as well as negative ageism levels differed between Hungary and Uzbekistan. To test this, we used chi-square tests under the null hypothesis of common distribution. Once significant differences were found between Hungarian and Uzbek respondents, we aimed to identify the variables that best explained the two types of ageism in each country. To this end, we used ordinary least squares (OLS) regression to explain the variation in positive and negative ageism based on the demographic information of the participants. To ensure that the results reflected unbiased beliefs, we also created an independent variable for each respondent to capture their tendency toward social desirability.

For the analysis, individual statements were transformed to characterize the level of ageism, as detailed in the method of transformation below.

To explain the variation in positive and negative ageism in the samples from Uzbekistan and Hungary, the 'Ageism-Related Statements' were divided into two categories:

Positive Ageism Statements: 7 statements.

- Compliment old people on how well they look, despite their age.
- Enjoy conversations with old people because of their age.
- Hold doors open for old people because of their age.
- When I find out an old person's age, I may say, ''You don't look that old.''
- Ask an old person for advice because of their age.
- Talk louder or slower to old people because of their age.
- Offer to help an old person across the street because of their age.

Negative Ageism Statements: 7 statements

- Send birthday cards to old people that joke about their age.
- Tell old people jokes about old age
- Tell an old person, ''You're too old for that.''
- When an older person has an ailment, I may say, ''That's normal at your age.''
- When an older person can't remember something, I may say ''That's what they call a 'Senior Moment.'''
- Use simple words when talking to old people.
- Ignore old people because of their age.

As explained in the previous section, positive ageism expresses an appreciation of older people, while negative ageism captures a negative attitude towards the elderly. A country was considered more ageist if it exhibited higher levels of negative ageism and/or lower levels of positive ageism. The answers to these 'Ageism-Related Statements' were ordinal and were transformed so that higher values consistently indicated a higher level of ageism, whether positive or negative.

We also assigned values to the 'Statements for the Marlowe–Crowne Social Desirability Scale', awarding one point for each socially approved statement and zero for the opposite. These points were then summed, resulting in aggregate values that could range from 0 to 10, with higher values representing a greater desire for social approval, as per work of Cherry et al., (2015). As mentioned above, this step was necessary because each respondent's expressed ageism (in the 'Ageism-Related Statements') could potentially mask a deeper desire for social approval.

The 10 selected statements from the original desirability scale were divided into two categories:

- 5 Positive Statements: Captures socially desired qualities. (Expected answer: True-worth 1 point)
  - You are always willing to admit it when you make a mistake.
  - You always try to practice what you preach.
  - You never resent being asked to return a favour.
  - You have never been annoyed when people expressed ideas very different from your own.
  - You have never deliberately said something that hurt someone's feelings.

- 5 Negative Statements: Expresses socially undesired traits. (Expected answer: False – worth 1 point)
  - You like to gossip at times.
  - There have been occasions when you took advantage of someone.
  - You sometimes try to get even rather than forgive and forget.
  - At times you have really insisted on having things your own way.
  - There have been occasions when you felt like smashing things.

In the next step, the assigned values for both the positive and negative ageism statements, as well as the social desirability scale, were summed. Then, all three aggregate values (sums) were normalized using the 'min-max' method, as shown in Equation (1).

$$\sum \text{NIAV} = \frac{\text{IAV} - \min[\text{AV}]}{\max[\text{AV}] - \min[\text{AV}]} \quad (1)$$

where NIAV is Normalised Individual Aggregate Value, IAV is the Individual Aggregate Value, and AV represents All Aggregates Values.

This normalization step was necessary as the values of the aggregates were limited to integers ranging from 7 to 21 in the case of the two types of ageism and 0 to 10 in the case of social desirability. After normalization, all values fell within the range of 0 and 1, regardless of the number of statements included from the survey.

After the transformation, the results became comparable. The comparison was conducted as follows:

As explained at the beginning of section 3.2, the two normalized ageism aggregates and the social desirability aggregates of the two countries were compared using three chi-square tests. If the two countries were to be found to differ significantly in their positive and negative ageism, the next goal was to identify the socio-demographic variables that best explained the variation in the two types of ageism across countries. To achieve this, OLS equations were estimated to determine which 'Socio-Demographic' variables best explained the variation in the two types of ageism while accounting for the desire for social acceptance. One equation was estimated for each normalized aggregate across the entire sample, followed by separate equations for each country. The equation for these of the estimations is provided below (see Equation (2)).

$$\text{Normalized Aggregate Ageism}=\beta_0+\sum_{i=1}^{i=12-13}\beta_i \times D\text{emographic Variables}_i + \beta_{14}\times \text{Social Desirability} + \varepsilon \quad (2)$$

In Equation (2), the β_i coefficients denote the effect of moving from the lowest to the highest value in the dependent 'Normalized Aggregate Ageism' variable when the independent variable changes by one unit, and ε is the estimation error.

4. Results and discussion

4.1. Testing differences in positive and negative ageism in Uzbekistan and Hungary

The descriptive statistics and chi-square test results for the normalized positive and negative ageism aggregates, as well as the normalized aggregate for the Marlowe–Crowne Social Desirability Scale, are presented in **Table 1** below. The

null hypothesis for each chi-square test is that the responses (normalized aggregate values) from Hungarian and Uzbek participants follow a common distribution. If the results of these three tests (one for each normalized aggregate) are significant, it indicates that the results differ between the two countries. This initial step is essential to confirm whether there are indeed differences in the levels of positive and negative ageism, as well as in social approval-seeking, between Uzbek and Hungarian participants.

Table 1. Chi-square results for normalized positive and negative ageism and social desirability aggregates.

Variable	Hungary (*n* = 169)		Uzbekistan (*n* = 348)		Chi-square test* (significance = differences between HUN and UZB)
	Mean	Standard deviation	Mean	Standard deviation	
Normalized aggregate positive ageism	0.280	0.146	0.754	0.139	significant
Normalized aggregate negative ageism	0.418	0.142	0.283	0.163	significant
Normalized aggregate marlowe–crowne 'social desirability' scale	0.190	0.113	0.216	0.137	significant

* The chi-square test is a statistical method used to determine if there is a significant association between categorical variables. It compares observed frequencies in each category to the expected frequencies if no association exists, helping assess whether any observed differences are likely due to chance.

The results of the chi-square tests supported our hypothesis that there were indeed significant differences in the positive and negative ageism, as well as in the desire for social acceptance, among participants from Uzbekistan and Hungary. The Uzbek participants expressed significantly higher positive ageism and lower negative ageism compared to the Hungarian respondents. This result is unsurprising, given the distinct cultural backgrounds of the two nations, as discussed in the 'Introduction' and 'Literature review' sections. We also found that respondents from Uzbekistan cared significantly more about social desirability than the Hungarian participants, aligning with our expectations. These findings provided a basis for further analysis to identify the 'Socio-Demographic' variables that best explained the variation in the two types of ageism (positive and negative) in each country.

4.2. Explaining the variance in positive and negative ageism in Uzbekistan and Hungary

As the second step of this analysis, we present the results of six OLS estimations (see **Table 2**).

- Two regressions were run for the whole sample: One with 'Normalized Aggregate Positive Ageism' as the dependent variable and one with 'Normalized Aggregate Negative Ageism' as the dependent variable. In these estimations, the demographic variable 'Country' was included as an explanatory dummy variable, with "HUN" = 0 and "UZB" =1.
- The other four estimations used the same two aggregate ageism dependents but were run separately for the two countries' samples.

All estimations include the variable capturing social desirability bias ('Social Desirability') for each individual in our samples to minimize its impact on the results.

Table 2. OLS results.

Variables	(1) Normalized aggregate positive ageism	(2) Normalized aggregate positive ageism HUN	(3) Normalized aggregate positive ageism UZB	(4) Normalized aggregate negative ageism	(5) Normalized aggregate negative ageism HUN	(6) Normalized aggregate negative ageism UZB
Age	0.00563	0.0141	0.00469	−0.00261	−6.09e−05	−0.00450
	(0.00367)	(0.0170)	(0.00368)	(0.00410)	(0.0154)	(0.00439)
Sex	−0.0187	−0.0376	−0.00172	0.0188	0.00831	**0.0437****
	(0.0147)	(0.0344)	(0.0166)	(0.0165)	(0.0311)	(0.0198)
Education (MA = 1)	0.00509	−0.104	0.0373	−0.00759	0.0444	−0.0132
	(0.0249)	(0.0767)	(0.0260)	(0.0278)	(0.0695)	(0.0309)
Has a job = 1	−0.0141	−0.00933	−0.0330*	0.00347	0.0543	−0.0195
	(0.0165)	(0.0429)	(0.0180)	(0.0184)	(0.0388)	(0.0215)
Unregistered marriage = 1	−0.0609		0.183*	−0.0185		0.342***
	(0.0450)		(0.0984)	(0.0502)		(0.117)
Single = 2	−0.0370	0.0621	−0.0414	−0.0949***	−0.0179	−0.111***
	(0.0302)	(0.0429)	(0.0289)	(0.0338)	(0.0388)	(0.0345)
Working Experience	0.00274	−0.0699	0.0163	0.0669*	0.128	0.0595
	(0.0326)	(0.0901)	(0.0347)	(0.0363)	(0.0816)	(0.0413)
Living Experience	0.0293	0.00786	0.0224	0.00889	−0.0127	0.00340
	(0.0201)	(0.0865)	(0.0209)	(0.0225)	(0.0783)	(0.0249)
Teaching Experience	0.0341*	0.0880**	0.00737	0.0228	0.0334	0.00842
	(0.0189)	(0.0380)	(0.0223)	(0.0211)	(0.0344)	(0.0266)
No Experience	−0.0366	−0.0507	−0.0347	0.00986	−0.0678	0.0211
	(0.0233)	(0.0573)	(0.0259)	(0.0260)	(0.0519)	(0.0308)
Small Town = 1	−0.0155	−0.0287	−0.00548	−0.00183	0.00947	−0.00645
	(0.0217)	(0.0763)	(0.0223)	(0.0242)	(0.0691)	(0.0265)
Big City = 2	−0.0242	−0.0399	−0.0164	−0.0309	−0.0477	−0.0180
	(0.0195)	(0.0727)	(0.0196)	(0.0218)	(0.0658)	(0.0233)
Middle Economic Condition = 1	−0.113*	−0.0938		−0.0733	−0.0706	
	(0.0601)	(0.0748)		(0.0671)	(0.0677)	
Good Economic Condition = 2	−0.0972	−0.0777	0.0236	−0.106	**−0.107***	**−0.0333***
	(0.0595)	(0.0712)	(0.0160)	(0.0665)	(0.0644)	(0.0191)
Fear of Old-Age = 1	0.00307	0.0422	−0.0354	0.0354	**0.0564***	0.00572
	(0.0199)	(0.0345)	(0.0261)	(0.0223)	(0.0313)	(0.0311)
Country (UZB = 1)	**0.458*****			**−0.142*****		
	(0.0223)			(0.0249)		
Social desirability	0.0497	−0.110	0.0909	**0.123****	**0.312****	0.0644
	(0.0557)	(0.162)	(0.0586)	(0.0621)	(0.146)	(0.0698)
Social desirability # country	0.230			−0.236		
	(0.144)			(0.160)		
Constant	0.329***	0.0801	0.682***	0.617***	0.456	0.463***
	(0.104)	(0.347)	(0.0937)	(0.116)	(0.315)	(0.112)
Observations	391	97	294	391	97	294
R-squared	0.701	0.183	0.097	0.235	0.264	0.115

Standard errors in parentheses
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
Note: SIGNIFICANT results are in bold.

Considering the whole sample (391 observations after data cleaning), we found significant differences between the Hungarian and Uzbek participants in both positive and negative ageism (significant 'Country' dummies; see columns 1 and 4). Compared to Hungarian respondents, Uzbek participants unveiled significantly higher positive ageism (0.458; see column 1) and lower negative ageism (−0.142; see column 4). Thus, we conclude that, in general, Hungary is more ageist than Uzbekistan. This result aligns with both the literature presented above and our own intuition and experience. However, it should be noted that cultural differences in the interpretation of positive and negative ageism may have influenced these results and the observed differences between the two countries. Given the distinct cultural backgrounds of Hungary and Uzbekistan (see Introduction and Literature review), participants' attitudes and their interpretations of the ageism statements may vary, even though we controlled for social desirability bias. This limitation is inherent to online questionnaires, where detailed explanations of social phenomena (such as positive and negative ageism) are not feasible.

We also found that having an older person as a teacher ('Teaching Experience') was associated with increased positive ageism in the whole sample (0.341; see column 1). This result is likely driven primarily by the Hungarian participants, as, after separating the sample by country, the variable for experience with older-age teachers was significant only in Hungary (0.088; see column 2), but not in Uzbekistan.

In addition, in the whole sample, respondents from a 'Middle Economic Condition' expressed significantly less positive ageism than those from other economic backgrounds (−0.113; see column 1).

Overall, single respondents showed significantly less negative ageism compared to married individuals (−0.0949; see column 4), while working with older people was associated with higher negative ageism (0.0669; see column 4).

Interestingly, a higher score on the 'Social Desirability' scale was significantly linked to negative ageism (0.123; see column 4). This result perhaps highlights a key issue with negative ageism: while it is undoubtedly a form of discrimination, it is not socially disapproved. This finding contrasts with Cherry et al. (2015), whose results suggested that a higher tendency for social desirability was connected to self-reported positive ageism, whereas in our case, it was linked to negative ageism. It is worth noting that their sample was smaller and included only respondents from U.S. universities.

Neither of the interaction terms 'Social Desirability # Country' was significant (see columns 1 and 4), leading us to conclude that the social approval-seeking tendencies of participants in the two countries do not explain the variance in positive and negative ageism aggregates. In other words, differences in social desirability between the two countries do not influence our positive and negative ageism results.

In Hungary, 'Good Economic Condition' was associated with lower negative ageism (-0.107; see column 5), while 'Fear of Old-Age' was unexpectedly linked to increased negative ageism (0.0564; see column 5). Once again, the coefficient for 'Social Desirability' was significant and positive (0.312; see column 5), further confirming that negative ageism is not disapproved of in Hungary.

In Uzbekistan, working participants displayed lower positive ageism (-0.033; see column 3), while people in unregistered marriages were more favorable toward the elderly (0.183; see column 3). Additionally, in Uzbekistan, males (0.0437; see column 6) and people in unregistered marriages (0.342; see column 6) showed higher negative ageism, whereas single individuals were less negatively ageist (−0.111; see column 6). Similar to Hungary, 'Good Economic Condition' was associated with increased negative ageism in Uzbekistan (−0.0333; see column 6).

Finally, the robustness of our results should be examined. Even if the coefficients are not significant, the consistency of their signs suggests that older respondents were generally more favorable toward older people, as were females compared to males. Working participants showed less favor toward the elderly compared to those without jobs. None of these findings were surprising; as people age, they often gain a greater understanding of the challenges associated with older age. Additionally, women are generally more socially sensitive, empathetic, and accepting, making them less prone to negative ageism, as suggested by the literature. Those with jobs might experience competition with older, more experienced colleagues, potentially contributing to their increased negative ageism.

5. Conclusions, limitations, and future directions

The comparison of ageist behavior among Uzbek and Hungarian youth essentially showed the expected result. In Uzbekistan, where the elderly people are smaller and cultural traditions promote greater tolerance, youth exhibited lower levels of negative ageism and higher levels of positive ageism. However, this does not mean that these patterns will remain unchanged. Although Uzbekistan's elderly population is growing at a slower rate, the increase may eventually lead to resentment among younger generations who may feel burdened by the responsibility of caring for the elderly. In Hungary, the projected increase in the elderly population could eventually lead to greater advocacy for equal treatment due to the elderly's larger numbers. At present, Hungary could benefit from adopting Uzbekistan's more tolerant attitudes toward the elderly.

Our survey also highlighted the need to consider social desirability bias when comparing results between countries, as this bias can distort findings. Including a variable to capture 'social desirability' was essential, and the chi-square test results suggest that our findings should be interpreted cautiously, as Uzbek participants appeared significantly more concerned with social approval than Hungarian participants.

The sample sizes from the two countries under study also raise some concerns. Although the two samples roughly align with the population sizes of Uzbekistan and Hungary, the total number of respondents was just below 400. We acknowledge that this may affect the generalizability of our conclusions. However, as no similar survey has been conducted to our knowledge, our work undoubtedly serves an important attention-raising role.

Our findings, beyond indicating that Uzbek youth are less ageist towards the elderly, also highlighted other interesting correlations. Young people in both countries who were employed exhibited more ageist attitudes, possibly due to

concerns about job security in relation to older workers. Interestingly, single individuals in both countries were less ageist than those in relationships. Could it be that they desire human connections more and, therefore, are more accepting of others regardless of age? It was also unsurprising that women exhibited greater positive ageism and less negative ageism, aligning with the perception that women are generally more empathetic. In conclusion, we emphasize that, given aging populations, it is essential to treat the elderly as equal members of society.

Our survey has several limitations. One significant limitation is that data was collected only at a single point in time, restricting the potential for temporal comparisons. Among our future goals is to conduct a follow-up survey to track whether ageist attitudes in Uzbekistan and Hungary have since declined or strengthened.

We must again acknowledge the limited sample size. With just over 400 usable responses combined from both countries, caution is needed in generalizing our results. The sample size is at the threshold for generalizability; however, as no similar survey has been conducted, our sample holds considerable attention-raising value.

Another limitation is that we could not conduct in-depth interviews about young people's ageist attitudes. Such interviews could have offered valuable insights into the reasons behind Uzbekistan's higher tolerance levels, providing a positive example for the less tolerant Hungarian society and other countries with similar challenges.

In our literature review, we highlighted that infrastructure quality significantly impacts the level of ageism. With better infrastructure, it becomes easier to accommodate the needs of older adults and treat those over 65 as equals. However, relatively few studies address this topic, presenting an opportunity for further research to highlight potential infrastructural impacts on ageism.

We also see it as our responsibility to gather positive examples from Uzbekistan and other countries to help policymakers create an age-friendly society. Such a society would maximize the economic potential of older citizens, allowing them to actively participate in and contribute to social and technological changes, just as younger generations do.

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Appendix

Table A1. Descriptive statistics of survey responses.

Variable	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
	Whole sample (*n* = 517)		**Hungary (*n* = 169)**		**Uzbekistan (*n* = 348)**	
Positive ageism statements (1–3)						
Compliment old people on how well they look. despite their age.	2.236	0.655	1.876	0.579	2.411	0.617
Enjoy conversations with old people because of their age.	2.501	0.646	2.071	0.728	2.710	0.479
Hold doors open for old people because of their age.	2.571	0.601	2.112	0.631	2.793	0.440
Offer to help an old person across the street because of their age.	2.052	0.823	1.112	0.400	2.509	0.539
When I find out an old person's age. I may say. ''You don't look that old.''	2.014	0.786	1.296	0.552	2.362	0.631
Ask an old person for advice because of their age.	2.191	0.831	1.254	0.500	2.647	0.519
Talk louder or slower to old people because of their age.	1.820	0.699	1.195	0.479	2.124	0.577
Negative Ageism Statements (1–3)						
Send birthday cards to old people that joke about their age.	1.838	0.815	2.556	0.533	1.489	0.689
Tell old people jokes about old age	1.631	0.654	1.929	0.669	1.486	0.595
Tell an old person. ''You're too old for that.''	1.522	0.719	2.231	0.690	1.178	0.419
When an older person has an ailment. I may say. ''That's normal at your age.''	1.658	0.671	1.751	0.605	1.612	0.697
When an older person can't remember something. I may say ''That's what they call a 'Senior Moment.'''	1.338	0.535	1.337	0.510	1.339	0.547
Use simple words when talking to old people.	2.284	0.746	1.680	0.685	2.578	0.580
Ignore old people because of their age.	1.306	0.542	1.361	0.506	1.279	0.558
Social Desirability Statements (0–1)						
You are always willing to admit it when you make a mistake.	0.859	0.349	0.852	0.356	0.862	0.345
You always try to practice what you preach.	0.393	0.489	0.538	0.500	0.322	0.468
You never resent being asked to return a favour.	0.764	0.425	0.568	0.497	0.859	0.348
You have never been annoyed when people expressed ideas very different from your own.	0.513	0.500	0.432	0.497	0.552	0.498
You have never deliberately said something that hurt someone's feelings.	0.708	0.455	0.586	0.494	0.767	0.423
You like to gossip at times.	0.466	0.499	0.148	0.356	0.621	0.486
There have been occasions when you took advantage of someone.	0.493	0.500	0.527	0.501	0.477	0.500
You sometimes try to get even rather than forgive and forget.	0.638	0.481	0.686	0.465	0.615	0.487
At times you have really insisted on having things your own way.	0.190	0.392	0.207	0.406	0.181	0.386
There have been occasions when you felt like smashing things.	0.284	0.452	0.331	0.472	0.261	0.440

Table A1. (*Continued*).

Variable	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
	Whole sample (*n* = 517)		**Hungary (*n* = 169)**		**Uzbekistan (*n* = 348)**	
Demographic questions						
Age (17–26)	20.683	2.200	19.686	1.186	21.167	2.408
Sex (0 = Female. 1 = Male)	0.487	0.500	0.450	0.499	0.506	0.501
Education (0 = BA. 1 = MA)	0.091	0.288	0.053	0.225	0.109	0.312
Has a job (0 = No. 1 = Yes)	0.284	0.452	0.231	0.423	0.310	0.463
Marital Status (0=Married. 1=Unregistered marriage. 2=Single)	1.801	0.543	1.793	0.407	1.805	0.590
Working Experience (0 = No. 1 = Yes)	0.046	0.211	0.024	0.152	0.057	0.233
Living Experience (0 = No. 1 = Yes)	0.269	0.444	0.059	0.237	0.371	0.484
Teaching Experience (0 = No. 1 = Yes)	0.263	0.441	0.314	0.465	0.239	0.427
No Experience (0 = No. 1 = Yes)	0.143	0.351	0.089	0.285	0.170	0.376
Residency (0 = Rural place. 1 = Small town. 2 = Big city)	1.393	0.774	1.568	0.661	1.307	0.811
Economic Condition (0 = Bad. 1 = Middle. 2 = Good)	1.472	0.530	1.426	0.574	1.494	0.506
Fear of Old-Age (0 = No. 1 = Yes)	0.228	0.420	0.541	0.500	0.099	0.299