Endogenous language use and patience

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Abstract
The linguistic-savings hypothesis posits that the grammatical marking of future events in languages is linked to future-oriented behavior. Recent experimental studies have suggested patience as a possible mechanism connecting language use and future-oriented behavior by exogenously manipulating what language is used. Our paper explores the association between patience and the language that people naturally use, thereby building on endogenous (as opposed to exogenously manipulated) language use. To capture natural language usage, we utilized a novel sentence-completion task designed for native speakers of the Hungarian language. This language allows for referencing future events through both present and future tenses. We hypothesized a positive correlation between being patient and using the present tense to refer to future events. We conducted incentivized and non-incentivized experiments with four independent samples of high school and university students, involving nearly 3,500 students in total. We find no consistent evidence that patience is correlated with endogenous future-time reference. Our null finding is further supported by a robustness check that leverages specific randomness in our data.

Keywords: Future-time reference; Intertemporal choice; Languages; Linguistic-savings hypothesis; Patience; Time preference

JEL codes: C90; D01; D90; Z13

1. Introduction

The linguistic-savings hypothesis posits a positive correlation between people's use of language and future-oriented behavior (Chen, 2013). The former proposes that individuals who use the present tense to refer to future events are more likely to be prepared to incur costs earlier in exchange for greater rewards later.

Drawing on the works of Dahl (2000) and Thieroff (2000), Chen (2013) categorizes languages into two broad groups: those that require grammatical marking for future events and those that do not. Languages in the first group are referred to as strong future-time reference languages (strong-FTR). In contrast, languages in which the distinction between present and future is not obligatory are termed weak future-time reference languages (weak-FTR).

Chen (2013) convincingly shows that speakers of weak-FTR languages tend to save more, smoke less, retire with greater wealth, and are less likely to be obese. One mechanism that may explain the association between language use and future-oriented behavior is patience (e.g., how much individuals discount the future). Chen (2013) suggests that speakers of weak-FTR languages may perceive that the future is less distant, as reflected in a smaller discount rate. Conversely, speakers of strong-FTR languages, who might view the future as more distant, could apply higher discount rates. Therefore, the perceived proximity of the future (whether it seems less or more distant) may influence people's level of patience, consequently affecting their investments in areas such as human capital, financial savings, or health. For example, the fact that in German, one can say, "Next month I start saving for retirement," while in English, the grammatically correct form is, "Next month I will start saving for retirement", could have real implications for retirement savings behaviors, even when controlling for relevant factors such as income or culture.

In line with the proposed mechanism in Chen (2013), recent studies have attempted to identify a causal mechanism by exogenously and randomly changing the language used to interact with participants in both lab and survey experiments. These studies examine how the tense used in experimental instructions in the lab or the language used to communicate with respondents in surveys affects people's patience.[1]

This empirical literature has yielded contradictory results. Laboratory experiments have failed to find a significant association between the manipulation of instructions and patience (Angerer et al., 2021; Chen et al., 2019), while survey experiments have revealed a significant relationship between strong/weak FTR languages and patience (Ayres et al., 2023; Perez and Tavits, 2017).

A potential explanation for the disparity of the results may be that the manipulations in the lab were rather light-touch. However, Chen's (2013) argument is based on long-term exposure to a specific language. Therefore, the lack of a significant association between short-term manipulation and patience does not preclude the possibility that long-term exposure to a specific language use could affect economic behavior.

These considerations highlight the need for new tests that elicit natural and long-term language use and link it to patience. In this study, we aim to take the initial steps in this direction. To achieve this, we use the Hungarian language because it allows for the use of both present and

[1] Chen (2013) also offers an alternative mechanism related to the precision of beliefs regarding the timing of future rewards, suggesting that more precise beliefs lead to less future-oriented behavior among speakers of strong-FTR languages.

future tenses to refer to future events. We employ a novel sentence-completion task to elicit natural language use among native speakers.

We hypothesize a positive relationship between being patient and using the present tense in the sentence-completion task. Since greater patience is associated with more future-oriented behavior (Sutter et al., 2013; Golsteyn et al., 2014), a positive association between the use of present tense to refer to future events and patience could corroborate that patience is a mechanism underlying the association between language use and future-oriented behavior.

Our test involved four samples: one consisting of high school students (N = 534) and three comprising university students (N = 694, N = 2040, and N = 211). Participants first engaged in intertemporal choices, choosing between an earlier, smaller amount of money and a later, larger amount. From these choices, we can infer their individual discount factors (e.g., their level of patience). Later, participants completed a sentence-completion task, indicating how they refer to near, middle-distance, or distant future events, specifically by using the present or future tense.

We find no significant difference in patience between those (groups of) individuals who use the present tense to refer to future events and those who do not. This result suggests that the linguistic-savings hypothesis may not depend on a positive association between the use of the present tense to speak about the future and exhibiting patience. Our null results are informative since both the point estimates and the standard errors are small, and our large sample size protects against small sample bias. Furthermore, these null results are confirmed by a robustness check where we leverage randomness in our data to identify respondents who use the present tense only under specific circumstances.

Regarding the absence of an endogenous association between future-time reference and patience, our findings could question the more restricted causal link between the use of the present tense to refer to future events and patience.[2] Our null results highlight the necessity of investigating additional mechanisms that may be behind the relationship between future-time reference and behavior oriented towards the future.

The rest of the study is organized as follows. Section 2 presents the literature review. In Section 3, we introduce our measure of future-time reference and the intertemporal choice task. This section also describes the data collection procedures. Section 4 contains the results, and Section 5 concludes.

2. Literature review

After the seminal study by Chen (2013), several studies confirmed the existence of an association between future-time reference, intertemporal choice, and future-oriented behavior. Some studies have identified a correlation between future-time reference and decisions in intertemporal choice tasks. For instance, Falk et al. (2018) documented a strong and significant association between time preferences and weak-FTR using data from a global survey on preferences. Sutter et al. (2018) exploited the fact that German is a weak-FTR language, while

[2] Theoretically, the absence of an association could be the result of two countervailing causal effects that cancel each other out. However, it is difficult to conceive why the causal effects should have opposite signs. This would require, for example, that while more frequent use of the present tense might cause greater patience, individuals with higher levels of patience use the present tense less frequently.

Italian is a strong-FTR language. The authors investigated students in a bilingual city, finding that German-speaking children are more likely to delay gratification than their Italian-speaking counterparts, even when taking into account a wide range of variables like risk attitude, IQ, and family background. Other studies focus on the relationship between future-time reference and future-oriented behavior. These studies generally reveal a strong relationship between future-time reference and environmental attitude (Mavisakaylan et al., 2018) and management decisions (Chen et al., 2017; Cheng et al., 2021; Chi et al., 2020; Guan et al. 2022; Kim et al., 2017; Kim et al., 2021; Liang et al., 2018).

After sufficient evidence accumulated about the association between future-time reference, intertemporal choice, and future-oriented behavior, researchers began to look for direct causal channels. These investigations followed the idea proposed by Chen (2013) that future-time preference is related to future-oriented behavior through patience. Chen et al. (2019) and Angerer et al. (2021) leveraged the weak-FTR feature of the Chinese and German languages in lab experiments, respectively. They randomized participants into two groups and had them make intertemporal choices between a sooner-smaller or later-larger reward. For one group, instructions described the later reward using the future tense, while the present tense was used in the other. The authors failed to identify a significant association between the future-time reference used in those instructions and intertemporal choice. Participants exposed to the present tense in the instructions did not behave differently from participants who read instructions using the future tense. The manipulation was light-touch as the instructions differed only minimally. Hence, the authors of both studies admitted that the lack of an instantaneous effect of the future tense on intertemporal choice does not refute the linguistic-savings hypothesis.

In contrast to lab experiments, survey experiments that randomly manipulated the language in which the survey was conducted have found support for the linguistic-savings hypothesis. Pérez and Tavits (2017) randomly assigned the language of a survey interview targeted at bilingual speakers. Notably, one of the languages that was used, Estonian, is a weak-FTR language, while the other, Russian, is a strong-FTR language. Those interviewed in Estonian had significantly stronger future-oriented attitudes (in the context of an environmental issue) than those interviewed in Russian, even after adjusting for education and political views. Similarly, Ayres et al. (2023) also used bilingual samples and found that participants discounted the future less (that is, were more patient) when asked in a weak-FTR language.

The differences in the setups may account for the varied findings. First, the survey experiments conducted by Pérez and Tavits (2017) and Ayres et al. (2023) might have been longer and thus may have more strongly affected the respondents than the light-touch manipulation in lab experiments by Chen et al. (2019) and Angerer et al. (2021).[3] Second, the sample in Pérez and Tavits (2017) and Ayres et al. (2023) consisted exclusively of bilingual individuals, while the subject pool in Chen et al. (2019) and Angerer et al. (2021) comprised university students.[4]

Despite these differences, all these studies applied the exogenous randomization of language use. This approach has the obvious advantage of allowing causal conclusions to be drawn. However, it is less suitable in evaluations of the natural use of language. For example, many

[3] We could not find any information about the duration of the surveys.

[4] A large body of literature addresses the cognitive consequences of bilingualism, which often documents that the latter is associated with better cognitive development (see, for instance, Barac and Bialystok, 2011, and references therein). Therefore, bilingual samples may have some special characteristics.

studies indicate that individual language use can be viewed as a personality trait that correlates with other individual characteristics (Furnham, 1990; Peterson and Ulrey, 1994; Tausczik and Pennebaker, 2010; Yarkoni, 2010). Furthermore, language use is associated with behavior and life outcomes (Peterson et al., 1988; Pennebaker, 1997; Pennebaker et al., 1997; Stein et al., 1997). Last, there is strong evidence that language use is stable across time and writing topics, and the use of verb tenses is a dimension where reliability has been demonstrated (Pennebaker and King, 1999; Pennebaker and Stone, 2003). Therefore, it is natural to ask how people's natural language use correlates with patience.

Based on the literature discussed above, we hypothesize a positive relationship between patience and the use of the present tense to refer to future events. Our hypotheses are as follows:

H1: Greater patience is associated with *the use of the present tense* to refer to future events.

H2: Greater patience is associated with *the frequency of use of the present tense* to refer to future events.

3. Research design and data

Students participated in the experiment through an online interface. Given our primary objective of assessing the association between students' patience and their endogenous language use, they first engaged in intertemporal decision-making. This involved choosing between an immediately available amount of money and a larger amount to be received two weeks later, enabling us to calculate their individual discount factor. Following this, a sentence-completion task was administered, prompting students to express how they refer to future events at varying distances—near, middle-distance, or distant—using either the present or the future tense. The questionnaire concluded with background questions that addressed the students' parental background, grade point average, gender, and age.

Participation in the survey was voluntary and took approximately 15 minutes. Data was collected after obtaining Institutional Review Board (IRB) approval at the HUN-REN Centre for Social Sciences. Supplementary materials, anonymized data, and all analytical scripts have been archived on the project page at the Open Science Framework: https://osf.io/jfydp/.

3.1 Measuring patience - the individual discount factor

Several established methods exist for measuring time preferences (Andreoni et al., 2015; Cohen et al., 2020). Following Falk et al. (2018), we applied the staircase method to measure patience. This task consists of three interdependent binary choices between an immediate and a later but larger payment.[5]

In each decision, respondents were presented with a choice between receiving a fixed 10,000 Hungarian Forints (HUF) immediately or a larger amount of X>10,000 HUF to be received two

[5] We selected a two-week delay between the payments based on prior research by Horn et al. (2022), which provides evidence that this duration works well with Hungarian high school students.

weeks later.[6] Depending on their choice, the amount X was then adjusted—either decreased or increased—for the subsequent decision.

Opting for the immediate payment indicated that the difference in payments (X-10,000) did not compensate for the inconvenience of having to wait two more weeks, thus X was increased in the next decision. In contrast, selecting the delayed larger amount implied that the respondent was satisfied with the compensation, so X was decreased in the next decision. Overall, our objective was to determine the approximate indifference point between receiving an immediate payment of 10,000 HUF and a larger amount X two weeks later.[7]

The final choice made by a respondent was used to determine their level of patience. For example, if the final choice was between receiving 10,000 HUF immediately or 20,200 HUF in two weeks, and the respondent opted for 10,000 HUF, this indicates that their indifference point was higher than 20,200 HUF. For simplicity, we assigned an indifference point of 20,200 HUF in such cases, as we lacked further information on the exact level above this value. Conversely, if the respondent chose 20,200 HUF, this suggests that their indifference point was at most 20,200 HUF. Having reached this option also implies that their indifference point was higher than 18,500 HUF, an earlier option offered to the respondent in an earlier choice for delivery two weeks later that they rejected. Therefore, we defined the respondent's indifference point as the midpoint between 18,500 HUF and 20,200 HUF – namely, 19,350 HUF. Applying this rationale, we assigned each respondent an indifference point (IP) based on their final choice.

The indifference point has an intuitive interpretation. For instance, if the indifference point is 19,350 HUF, this indicates that the respondent requires compensation of 9,350 HUF—the difference between the delayed and immediate amounts—for having to wait two weeks for the payment.

Our dependent variable in the analysis is the individual discount factor (IDF) (see, for instance, Meier and Sprenger, 2010), which is calculated as follows: $IDF = \frac{10{,}000}{IP}$. For example, if the indifference point is 19,350 HUF, then IDF = $\frac{10{,}000}{19{,}350} = 0.52$. Conversely, if the indifference point is 11,200 HUF, then IDF = $\frac{10{,}000}{11{,}200} = 0.89$. In summary, a higher IDF indicates greater patience, while a lower IDF signifies lesser patience.

In three of the samples, choices were not incentivized. However, in one sample, we employed the Between-Subjects Random Incentive System (BRIS, see, for instance, Harrison et al., 2002) incentivization scheme. Under this scheme, 10% of the participants were randomly selected to receive compensation. With this, we aimed to explore whether incentivization would lead to different patience levels.

3.2 Measuring future-time reference – the sentence-completion task

The exercise used to measure future-time reference (FTR) was a sentence-completion task, which has a long tradition in the social sciences (Holaday et al., 2000; Lah, 2001). In these

[6] At the time of the experiments, 10,000 Hungarian Forints (HUF) was approximately equivalent to 25 EUR or 26.3 USD.

[7] Figure A1 in the Appendix displays the structure of the elicitation.

tasks, respondents complete sentences that begin with initial words that are provided, known as the 'stem.' To our knowledge, none of these tasks was specifically designed to measure future-time reference. Therefore, we developed a novel task to capture people's natural language use.

Our aim was to elicit the tense that participants naturally use when referring to the future. To achieve this, participants were instructed to create three sentences, each corresponding to a different time frame.[8] The beginning of each sentence was fixed with a phrase indicating a future time frame: "At the weekend" for the near future, "In summer" for the middle-distance future, and "In ten years" for the distant future. Participants were given a set of words, displayed in random order, from which they could choose to complete each sentence. The verbs we provided were available in both present and future tenses, allowing for a choice between the two.[9]

In three of our samples, we presented the sentences in a fixed order that did not vary across respondents. Specifically, the first sentence referred to the near future, followed by the middle-distance and distant ones. Thus, while the tense used in the first completed sentence was independent, respondents' subsequent choices could be influenced by the first choice, and they could attempt to maintain consistency by using the same tense throughout. To account for the potential influence of sentence order, we randomized the order in one of our samples.

Figure 1 displays the words used in the sentence-completion task in both their original Hungarian form and their translated English equivalents.

[8] The English translation of the sentence-completion task is as follows: “Form a sentence using the words below. You do not need to use all of the words we have provided to complete the sentence. Although you can create more than one sentence with these words, you should choose the sentence that comes to mind first. To create a sentence, click on the words in the word cloud below and place them in the space highlighted above. The first words of the sentence are given.”

[9] Furthermore, we included a periphrastic construction that consisted of an additional time word (*majd* meaning “then” or “at some time soon”) that is often used in Hungarian to refer to the future.

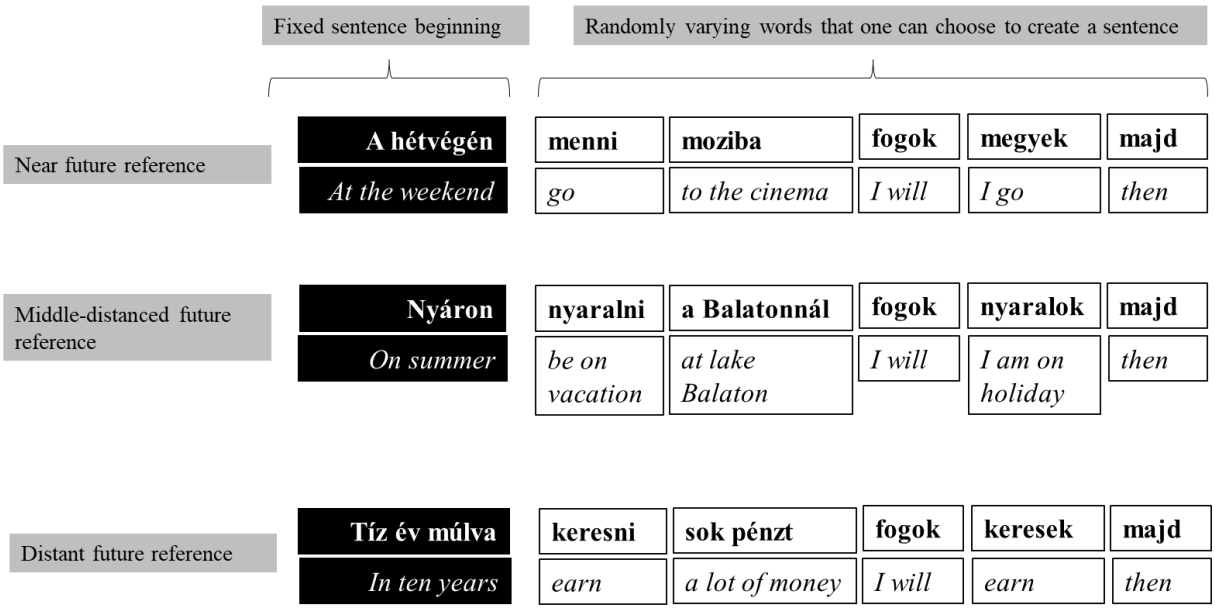


Fig. 1. Words used in the sentence-completion task

Three aspects of the sentence-completion task need to be highlighted. First, we did not use an open-ended task that only fixed the beginning of the sentence without providing the words to use. We made this decision after pre-testing revealed that individuals often use the expression "*would like"* (or something similar) to refer to a future event. For instance, many people said "In ten years, *I would like* to earn a lot of money," instead of using the present or future tense. Having many sentences that use such expressions would have hindered our ability to link future-time reference to patience. Therefore, we imposed more structure on the task by providing the words that could be used to complete the sentences.

Second, we deliberately employed different time horizons (near, middle-distance, distant future) since the use of the present tense to refer to future events might depend on the temporal distance between the present and the future. Specifically, individuals may naturally use the present tense more often when referring to a near-future event than a distant one.[10]

Third, it is important to note that both present and future tenses were grammatically correct in all the deployed sentences.

In the empirical models, we defined how respondents referred to future events in two ways:

1. As three specific dummy variables (=1) if respondents used the present tense when referring to a near, middle-distance, or distant future event, and (=0) if respondents used the future tense when referring to a near, middle-distance, or distant future event.
2. As the intensity of using the present tense corresponding to the number of sentences (from a maximum of three sentences) in which the respondent used the present tense—a variable ranging between 0 and 3.

3.3 Possible confounders

[10] Literature on the linguistic-savings hypothesis is silent about the issue of the horizon.

Some variables may be correlated with patience *and* language use. Such confounders may lead to spurious conclusions. Socioeconomic status (SES) is a prime candidate for such an effect. Numerous studies (e.g., Kosse and Pfeiffer, 2012; Chowdhury et al., 2022) show that family background is closely related to patience. Other studies (e.g., Arriaga et al., 1998; Huttenlocher et al., 2002) document an association between SES and language development.

To assess SES, we employed various measures. First, we utilized data on the number of books at home, categorized into seven levels ranging from 1-50 books to more than 1,000.[11] We transformed these categories into dummy variables to account for the often non-linear effects, as indicated by Wößmann (2008).[12] Second, students reported their mothers' and fathers' highest educational level, and we used both measures transformed into dummy variables as potential measures of SES. As additional measures of SES, we deployed self-evaluations on respondents' household's financial situation, self-reported position in the social hierarchy, and self-reported per-capita net household income in two of the four samples.[13]

Further possible confounders are age and gender. Studies suggest that patience changes with age (Green et al., 1999; Steinberg et al., 2009). Moreover, age and language use are also related (Pennebaker and Stone, 2003; Nguyen et al., 2013), making age a potential confounding variable. The same applies to gender, as it shapes language use (Newman et al., 2008; Eckert and McConnell-Ginet, 2013), and studies document gender differences in patience (Dittrich and Leipold, 2008). Therefore, to distinguish the association between language use and patience from these confounders, we have to control for them.

Overall, the correlations between the individual discount factor (IDF) and background variables are sporadic, indicating that these variables are not strong confounders. For instance, the only statistically significant correlation at the 5% level is between the number of books and the IDF (corr = 0.1). Similarly, the sole correlation significant at a 5% level between the number of sentences spoken in the present tense and the background variables occurred with age (corr = 0.22). This suggests that older respondents tend to use the present tense more frequently when referring to future events (see Appendix Figure 1).

3.4 The four samples

Our data stem from four online surveys: a high school sample (N=534) and three university samples (N=694, N=2040, and N=211).

[11] Fuchs and Wößmann (2007) provide evidence that this measure is an adequate measure of SES.

[12] There are several arguments in favor of using this measure. First, high-school-aged respondents may lack accurate knowledge of other SES measures, such as household income, but they are likely to know the number of books they have at home. Second, several studies report that the number of books at home is a useful measure of SES (Wößmann, 2003; Schütz et al., 2008; Hanushek & Wößmann, 2011). Third, there is a strong positive association between the number of books at home and measures of SES, such as parental education (Myrberg & Rosén, 2009), parental involvement (Bracken & Fischel, 2008), and household income (Schütz et al., 2008).

[13] In the analysis, we utilize the number of books and parental education as control variables for socioeconomic status (SES). Employing other SES measures yields qualitatively similar results; therefore, we do not include them in the analysis.

The high school sample comprised 11th-grade students, with an average age of 17.35 years (SD = 0.68), of whom 58% were female [referred to as *High School*]. The sentence-completion and the intertemporal choice tasks were integrated into the middle of an approximately 30-minute questionnaire, which also contained questions about civic behavior.[14] The online questionnaire w[15]as administered in the classroom during a regular school day under the supervision of the students' teachers. Fieldwork was conducted between May 6, 2022, and June 8, 2022, and involved students from 58 classes in 43 schools.[16] Background information was self-reported and collected as part of the survey. According to 2021 data, 32% of the mothers of high school students in Hungary had completed tertiary education, while in our sample, this proportion was clearly larger, at 74%. Therefore, our sample contains students with a higher socioeconomic status. Students were not incentivized, and the order of sentences in the sentence-completion task was fixed (near, middle-distance, distant).

The first university sample (N=694) consisted of students from the University of Szeged in Hungary [referred to as *SZTE 2022*]. All students (N=14,134) received an invitation e-mail that asked them to participate in the survey. The survey was open for responses from July 4, 2022, to July 25, 2022.[17] Students' gender, age, and grade point average (GPA) were obtained from the university's register, while parental education and the number of books at home were inquired about in the survey. In our sample, 47 % of participants' mothers had completed tertiary education, in contrast to the 42 % observed across all studentsin Hungary. This disparity indicates that our sample tends to have a slightly higher socioeconomic status than Hungary's general university student population. The average age of the respondents was 23.64 years (SD = 5.84 years), with 58% being female. Similar to with the high school sample, there were no incentives for participation and the sentences in the sentence-completion task followed a fixed order.

The second university sample (N=2,040) also comprised students from the University of Szeged [referred to as *SZTE 2023*]. Invitations were sent to the entire student body (N=14,399) via email, inviting participation in the survey, which remained open from July 11, 2023, to September 25, 2023.[18] The university's register provided information on the students' gender, age, and grade point average (GPA), whereas details regarding parental education and the quantity of books at home were gathered through the survey. This sample closely resembled the other Szeged-based sample in terms of mothers' education levels (46%), suggesting a slightly higher socioeconomic status than the national average. The average age of the participants was 23.23 years (SD = 6.94 years), with a female majority of 61%. Students were not incentivized.

[14] Civic behavior is a topic that is substantially distant from language use. Thus, we expected no major interference between these two topics on the same questionnaire. Descriptive evidence supports this assumption since the distribution of the sentences used in the high school and university student samples was qualitatively similar. In the university student sample, the questionnaire contained only the sentence-completion and the intertemporal choice tasks.

[15] This calculation is based on the latest available administrative data, encompassing 50% of the population born between June 1991 and May 1993, who had participated in tertiary education up until December 31, 2017.

[16] In the classrooms, the response rate was determined by two factors. First, students could opt out, as the survey was voluntary. Second, those absent due to illness or other reasons could not complete the survey. We do not have data on how many students did not complete the survey for these reasons, as the supervising teachers did not record it. Thus, we cannot provide exact information on the response rate.

[17] Two reminder e-mails were sent out on July 12 and 19, 2022. The response rate, calculated as the sample size divided by the number of invitation emails sent, was 4.9%.

[18] One reminder e-mail was sent out on 8 September 2023. The response rate was 14.2%.

Unlike the previous sample, the order of sentences in the sentence-completion task was randomized. This randomization enabled us to assess whether the sequence of sentences had influenced the choices made in the future-time reference (FTR) task.[19]

The third university sample (N=211) comprised students from Corvinus University of Budapest in Hungary [referred to as *Corvinus*]. Data collection spanned October 11 to 26, 2023. We visited classrooms where we were allowed to gather data at the end of classes. Participation was voluntary, and only a few students opted not to participate. We collected background information, including gender, age, and grade point average (GPA), from all students through the survey. In terms of socioeconomic status, this sample is notably above the national average. In our sample, 83% of students had a mother who had completed tertiary education, compared to only 42% among all university students in Hungary. The average age of the respondents was 19.67 years (SD = 1.5 years), with females constituting 37% of the sample. All participants were majoring in economics or business. A distinguishing feature of this sample was the incentivized intertemporal choice task: 10% of participants were randomly chosen to be compensated based on their choices in this task. The inclusion of real monetary incentives in this group was intended to explore their effect on patience.

Table 1 summarizes the characteristics of the four samples, and Table 2 provides descriptive statistics about their respondents. The majority of high school respondents were in their final year. At Corvinus University, most participants were in the early years of their studies, whereas students from the University of Szeged were generally older and displayed greater age diversity. The gender distribution was relatively balanced across all samples. Notably, students from Corvinus University had the most educated parents, the largest number of books at home, and the highest GPAs.

[19] As we detail in Appendix B, 116 students participated in both the SZTE 2022 and SZTE 2023 samples. As the same findings hold with these students as for the rest, we decided not to exclude them from the analysis.

Table 1 Characteristics of the four samples

	Participants	N of students	N of clusters*	Source of background information$	Order of sentences in the FTR task	Monetary incentive	Period of data collection
High School	High school students	534	58	Self-reports	Fixed	No	2022 May 6, - June 8
SZTE 2022	Students from the University of Szeged	694	174	University's register	Fixed	No	2022 July 4, - July 25
SZTE 2023	Students from the University of Szeged	2,040	331	University's register	Randomized	No	2023 July 11, - September 25
Corvinus	Students from the Corvinus University of Budapest	211	7	Self-reports	Fixed	Yes (BRIS method, random 10% paid)	2023 October 11 - October 26

* Clusters are classrooms in the high school sample and study programs in the university samples.
$ In the SZTE 2022 and SZTE 2023 samples, the following background information stems from the university's register: students' gender, age, GPA, and study program. Information regarding students' parental background, including parents' education and the number of books at home, is self-reported in all samples.

Table 2 Descriptive statistics of the four samples

	Age	Female	Mother completed tertiary education	Father completed tertiary education	More than 1,000 books	GPA
High School: N of students = 534						
Mean	17.35	0.58	0.74	0.43	0.20	4.05
SD	0.68	0.49	0.44	0.50	0.40	0.82
% of missing	0.00%	0.00%	31.65%	10.49%	7.68%	5.81%
SZTE 2022: N of students = 694						
Mean	23.64	0.58	0.47	0.35	0.16	4.09
SD	5.84	0.49	0.50	0.48	0.37	0.69
% of missing	0.00%	0.00%	0.00%	1.44%	1.30%	1.59%
SZTE 2023: N of students = 2,040						
Mean	23.23	0.61	0.46	0.36	0.13	4.10
SD	6.94	0.49	0.50	0.48	0.34	0.63
% of missing	0.00%	0.00%	0.69%	2.16%	1.57%	45.78%
Corvinus: N of students = 211						
Mean	19.67	0.37	0.83	0.76	0.22	4.66
SD	1.50	0.49	0.37	0.43	0.41	0.42
% of missing	0.00%	0.00%	0.00%	1.90%	0.00%	45.50%

Note: In the high school sample, there are many missing values for parental education and number of books. Consequently, the reported share of students with tertiary-educated mothers and fathers may be subject to bias, as we lack information about those with missing data in these categories.

The procedures of data collection differed in the four fieldworks in several respect. In the high school sample, we clearly stated at the beginning of the survey that it was designed to examine the relationship between school behavior and attitudes toward specific social issues. The tasks of sentence-completion and intertemporal choice were located at the second part of the 20 minutes long questionnire. These tasks were not typical school tasks, reducing the likelihood that participants would perceive the sentence-completion task as an exam.

At the University of Szeged, we were mandated to start the survey with a comprehensive description of data protection issues and the research objective, which we defined as studying how people think and talk about the future. Given that the students came from various study programs, predominantly outside the humanities, they were unlikely to perceive the sentence-completion task as a test.

At Corvinus University of Budapest, we were not obliged to outline the research goal. Nevertheless, we highlighted that there were no objectively correct answers in the sentence-completion and intertemporal choice tasks, thereby aiming to alleviate any perception of the task as an exam.

4. Results

4.1. Descriptive results

4.1.1. Individual discount factor (IDF)

Table 3 displays the distribution of the individual discount factor (IDF).[20] Approximately 9-10% of sample participants are heavy discounters, with an IDF of 0.52 or below. These students are only willing to wait two weeks if they receive at least an additional 9,350 HUF (≈ 23.4 EUR / 24.6 USD). In contrast, the majority have an IDF above 0.8, indicating a willingness to wait two weeks to receive an additional amount of around 1,000 HUF (≈ 2.5 EUR), reflecting greater patience.

When testing for the equality of the distributions of the individual discount factors between any pair of samples using the Kolmogorov-Smirnov test, we consistently found that the p-values are above 0.12. Adjusting for multiple hypothesis testing would result in even higher p-values. This indicates that patience levels do not differ significantly across the four samples.[21]

[20] Appendix B presents descriptive statistics for the sentence-completion task, demonstrating that the present tense is used more frequently to describe near-future events than it is for more distant time horizons.

[21] This finding also aligns with Brañas-Garza et al. (2022), who present convincing evidence that measured time preferences do not depend on incentivization.

Table 3 Distribution of individual discount factor (IDF) in each sample (in columns) according to the value of IDF (in rows), column percent

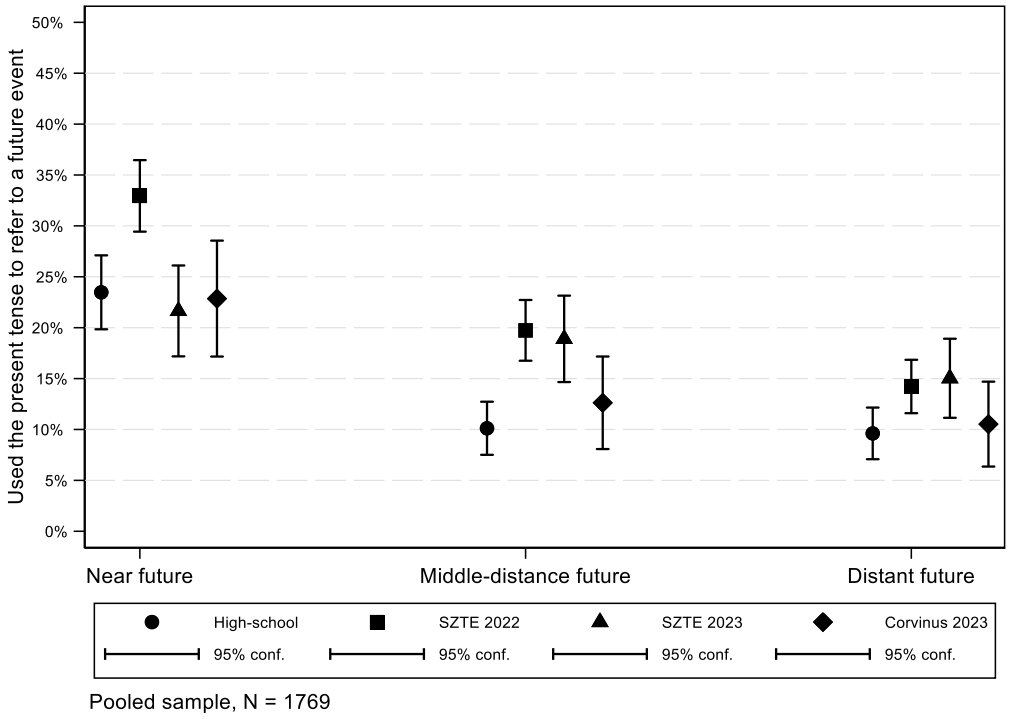
	IDF	Sum of money required to wait two weeks	High School	SZTE 2022	SZTE 2023	Corvinus	Total
less patient	0.50	10,200	5.99	5.62	4.56	4.74	5
↓	0.52	9,350	5.24	5.04	4.12	3.32	4.43
	0.57	7700	1.69	0.86	1.27	2.37	1.32
	0.62	6150	2.25	2.02	1.76	3.32	1.98
	0.68	4650	5.06	5.19	7.35	0.95	6.18
	0.76	3200	8.05	11.53	11.57	11.85	11.04
	0.84	1850	14.04	18.88	16.81	19.91	16.99
more patient	0.94	600	57.68	50.86	52.55	53.55	53.06
Total %			100.00	100.00	100.00	100.00	100.00

4.1.2.Frequency of use of present tense to refer to future events across the three time-horizons

Figure 2 depicts the percentage of students who utilized the present tense to describe future events at varying distances across four samples. Overall, students predominantly use the future tense when describing future events. Even when referring to near-future events, only about a quarter of the students used the present tense, irrespective of the sample. A more distant future event is less likely to be referred to in the present tense. For instance, when referring to an event ten years in the future, approximately 15 percent of students employed the present tense. Hence, there is a downward trend in the use of the present tense as the future becomes more distant, with students being more likely to use the present tense for near-future events than for distant future events.[22]

[22] As an aside, we note that in contrast to patience, there are some significant differences in future-time reference across samples. Interestingly, the differences are manifest only in the near and middle-distance future; there is no significant difference across samples when considering the distant future, as shown in Figure 4. Focusing on the near future, students in the SZTE 2022 sample are more likely to use the present tense than in the other samples. In the other three samples, we cannot discern any significant difference. Considering the middle-distance future, students in the High School sample are less likely to use the present tense than students in the SZTE 2022 and SZTE 2023 samples.

Fig. 2. Frequency of use of present tense to refer to future events across the three time horizons and four samples



Note: Only those who received the sentences in the following order: near, middle-distance, distant future.

4.1.3. Intensity of use of the present tense to refer to future events

Table 4 displays the distribution of students within each sample according to the frequency of use of the present tense to refer to future events. The majority of students did not use the present tense in any of the three sentences (number of present tense uses = 0). Overall, only a small fraction of students (3.52%) used the present tense in all three sentences (number of present tense uses = 3). However, due to the critically small sample sizes highlighted in some cells of the table (N < 25), the feasibility of employing multivariate regression analysis in these subgroups is limited.[23]

[23] A chi-square test suggested rejecting equality in the intensity of using the present tense to refer to future events across the four samples (Pearson chi2(9) = 82.04, p-value<0.001).

Table 4 Distribution of students in each sample by intensity of use of present tense to refer to future events, column percent, and N of observations

# of present	Stat	High School	SZTE 2022	SZTE 2023	Corvinus	Total
0	Column %	64.67%	52.44%	46.69%	61.17%	51.39%
	N	324	354	932	126	1,736
1	Column %	28.34%	32.74%	35.92%	32.52%	33.96%
	N	142	221	717	67	1,147
2	Column %	6.59%	10.96%	12.88%	5.83%	11.13%
	N	33	74	257	12	376
3	Column %	0.4%	3.85%	4.51%	0.49%	3.52%
	N	2	26	90	1	119
Total	Column %	100%	100%	100%	100%	100%
	N	501	675	1,996	206	3,378

Note: Cells highlighted in gray are excluded from later analyses due to their small sample sizes, which render estimations imprecise.

4.2. Bivariate association between the individual discount factor and language use

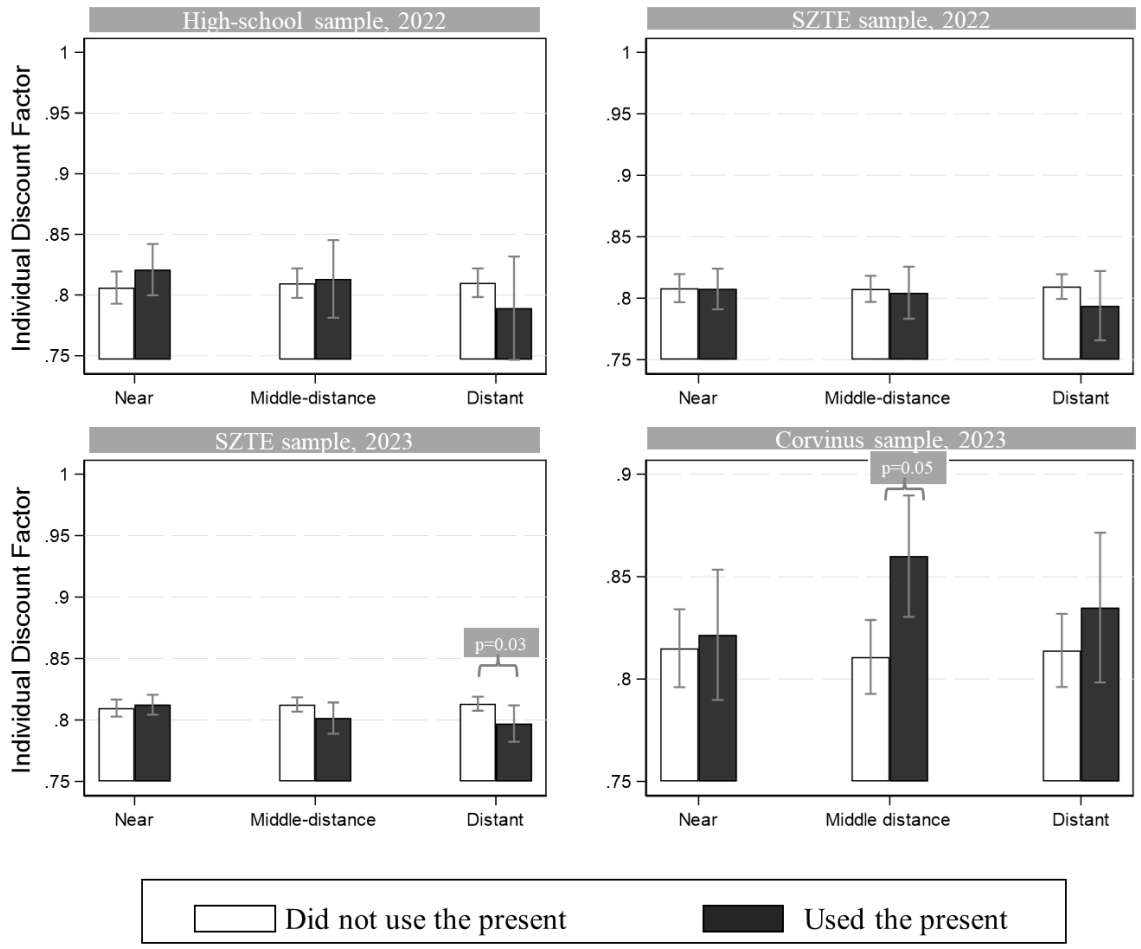
4.2.1. Associations according to the frequency of use of the present tense to refer to future events according to the three time horizons

Figure 3 provides an initial overview of the bivariate association between the individual discount factor (IDF) and language use. Visual inspection suggests there is no clear association, as individuals who used the present tense to refer to future events did not consistently exhibit greater patience, i.e., higher IDF. The differences between the black bars (representing those who used the present tense) and the white bars (representing those who used the future tense) are substantively small, as can be observed in the figures.

Furthermore, in larger samples (for example, the SZTE 2022 and SZTE 2023 samples), the number of those who used the present tense (black bars) almost never surpasses that of those who did not (white bars), suggesting a greater individual discount factor (indicative of greater patience). In the SZTE 2023 sample, there is even an occasional significant negative correlation, contradicting the hypothesis.

In the Corvinus sample, which is both the smallest and the only incentivized sample, the IDF of those who used present tense (black bars) exceeds that of those who did not (white bars). This may support the linguistic-saving hypothesis, suggesting that those who used the present tense might be more patient. However, the small sample size results in large standard errors (the largest across all four samples), indicating imprecise estimations. Additionally, only one of the three correlations is statistically significant, and only at the 5% level ($p = 0.05$). Consequently, we caution against overinterpreting the single significant coefficient that supports the hypothesis.

Fig. 3. Mean values of individual discount factor (IDF) in 95% confidence intervals for students who used the future/present tense to refer to near/middle-distance/distant future events, respectively, in the High School sample

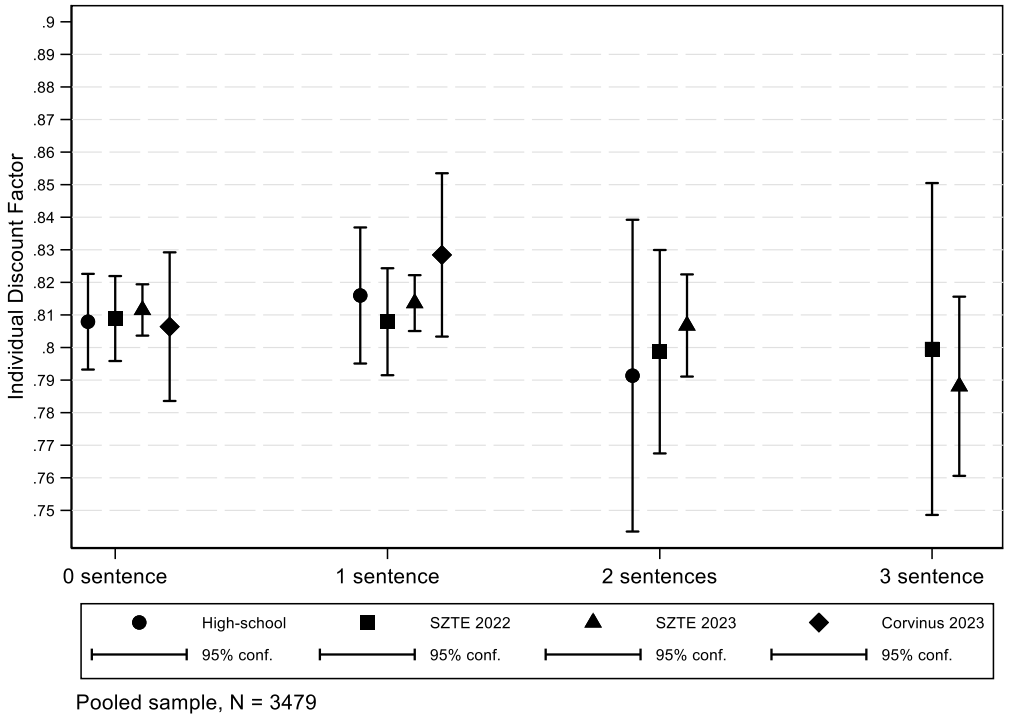


4.2.2. Associations according to the intensity of use of the present tense to refer to future events

Figure 4 shows the bivariate associations between the individual discount factor (IDF) and the intensity of the use of the present tense to refer to future events. As observed, there is no significant difference in the individual discount factor between those who never used the present tense (0 sentences) and those who used the present tense in one, two, or three sentences, respectively.

Furthermore, surprisingly small differences are evident when comparing the four different samples within each of the four categories of intensity measure (ranging from 0 to 3 sentences). This indicates a lack of considerable variance across the four samples regarding the association between the individual discount factor and language use under analysis.

Fig. 4. Mean values of individual discount factor (IDF) with 95% confidence intervals, categorized according to the number of sentences in which students used the present tense to refer to future events



Note: Bivariate associations are displayed only for groups with a minimum of N = 25 respondents (refer to Table 4 for details). In the Corvinus sample, only 12 students used the present tense in two sentences, and one used the present tense in three sentences. Additionally, in the High School sample, only two students used the present tense in three sentences. These specific cases are not depicted in the figure.
Within each sample, we observed no statistical differences in the individual discount factor (IDF) between participants based on their use of the present tense in 0, 1, 2, or 3 sentences. This was tested using bivariate OLS regressions, conducted independently for each sample, where the IDF served as the dependent variable and the intensity of present tense use, represented as the dummy variables, was the independent variable. The reference category in this analysis is the group of participants who did not use the present tense [0 sentences].

4.3. Multivariate association between the individual discount factor and language use

4.3.1. Associations according to the frequency of use of the present tense to refer to future events

Table 5 presents the unstandardized OLS coefficients from regressions where the individual discount factor is the dependent variable and the specific present-tense dummies corresponding to various time horizons and the samples are the main independent variables, presented in a condensed format. Subsequent specifications incorporate additional control variables. For example, in Panel A: Near future, the coefficient of 0.01 in the first row (High School, N = 524) and column (1) is derived from a regression conducted on the high school sample, focusing on

the sentence-completion task related to the near future, without any additional controls. This row also includes coefficients from regressions using the same sample and the same horizon, with additional control variables introduced in each subsequent column, as indicated at the bottom of the table. In the same panel, subsequent rows contain the coefficients on the same horizon (near future) for the university samples. The logic of the presentation is consistent across different panels, each focusing on a distinct time horizon. In summary, the coefficients presented in Table 5 are derived from 84 different regressions ($84 = 4 \times 7 \times 3$).[24]

Most point estimates are tight to zero with small standard errors, indicating a precisely estimated null effect. In some instances, notably in the Corvinus 2023 sample over the middle-distance horizon, there are significant coefficients in line with the hypothesis. However, considering Table 5 includes 84 regressions, finding significant coefficients by chance is highly likely. After adjusting significance levels for multiple hypothesis testing using Benjamini and Hochberg's (1995) procedure, with a 5% false-discovery rate, no association remains statistically significant.[25]

Overall, the main conclusion from these regression analyses is the absence of a significant and consistent association between the individual discount factor and the use of the present tense across all specifications.

[24] Complete regression outputs for each horizon, sample, and specification are available upon request.
[25] Given that we considered relatively narrow sets of tests, these adjustments amount to minor corrections compared to traditional, uncorrected standard errors. Therefore, more conservative corrections considering larger groups of exploratory tests would not reveal statistically significant effects since we failed to detect statistically significant effects without employing this mild correction.

Table 5 Association between the individual discount factor (dependent variable) and use of the present tense to refer to near, middle-distance, and distant future events—unstandardized OLS regression coefficients

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
PANEL A: Near future							
High School, N = 524	0.01	0.01	0.01	0.01	0.01	0.02	0.02
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)	(0.01)
SZTE 2022, N = 689	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	0.00
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
SZTE 2023, N = 2,031	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Corvinus 2023, N = 206	0.01	0.01	0.01	0.00	0.00	0.00	0.00
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)
PANEL B: Middle-distance future							
High School, N = 514	0.02	0.02	0.02	0.02	0.02	0.01	0.01
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
SZTE 2022, N = 684	-0.01	-0.01	-0.01	-0.00	-0.00	-0.00	-0.00
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
SZTE 2023, N = 2,027	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Corvinus 2023, N = 206	0.05*	0.05*	0.05*	0.05*	0.05**	0.05*	0.05*
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)
PANEL C: Distant future							
High School, N = 520	-0.03	-0.03	-0.03	-0.03	-0.03	-0.02	-0.02
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
SZTE 2022, N = 682	-0.00	-0.00	-0.00	0.00	0.00	0.00	0.00
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
SZTE 2023, N = 2,014	-0.02	-0.02	-0.02	-0.02	-0.02*	-0.02	-0.02
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Corvinus 2023, N = 209	0.02	0.02	0.02	0.02	0.01	0.02	0.02
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Control variables							
Fixed effects	✓	✓	✓	✓	✓	✓	✓
Sentence ordering		✓	✓	✓	✓	✓	✓
Female			✓	✓	✓	✓	✓
Age				✓	✓	✓	✓
SES dummies					✓	✓	✓
Mother's education						✓	✓
Father's education							✓

Robust standard errors, clustered at the study program/classroom level for the university/high school samples, are shown in parentheses. ** p<0.01, * p<0.05.

This table summarizes the results of N = 84 regression models. When penalizing significance levels for multiple hypothesis testing according to Benjamini and Hochberg's (1995) procedure with a 5% false-discovery rate considering the test sets within each panel and sample (rows of the table), no association remains statistically significant. Since we considered relatively narrow sets of tests, this amounts to minor corrections relative to traditional, uncorrected, standard errors. Therefore, more conservative corrections considering larger groups of exploratory tests would also fail to detect statistically significant effects since even employing this mild correction, we were unable to detect statistically significant effects.

Fixed effects refer to study programs/classrooms in the university/high school sample. Missing values in the control variables were coded as zero to avoid losing cases. We added missingness dummies to control for the missing status.

4.3.2. Associations according to the intensity of use of the present tense to refer to future events

Next, we analyzed the intensity of use of the present tense and its association with the individual discount factor. We conducted separate regressions for different samples, as summarized in Table 6.[26] The columns of the table illustrate the change in association resulting from the sequential introduction of additional control variables. The panels in the table present results for different samples.

The specifications in our analysis enabled us to examine the association between the individual discount factor and the intensity of the use of the present tense to refer to future events. In this analysis, the reference category consists of individuals who never used the present tense when referring to future events. We cannot observe a significant difference between this reference group and those who used the present tense more frequently. This pattern remains consistent across all samples. The introduction of additional control variables does not alter this lack of association. Consequently, we conclude that there is no consistent relationship between the individual discount factor and the intensity of present tense usage when referring to future events.

[26] Complete regression outputs for each horizon, sample, and specification are available upon request.

Table 6: Association between the individual discount factor (dependent variable) and intensity of use of the present tense to refer to future events—unstandardized OLS regression coefficients

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: High School sample, N = 501							
Present tense use							
No sentence	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
One sentence	0.01	0.01	0.01	0.01	0.01	0.01	0.02
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Two sentences	-0.03	-0.03	-0.03	-0.02	-0.03	-0.03	-0.03
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Three sentences	$	$	$	$	$	$	$
	$	$	$	$	$	$	$
Panel B: SZTE 2022, N = 675							
Present tense use							
No sentence	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
One sentence	0.00	0.00	0.00	0.00	0.00	-0.00	0.00
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Two sentences	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Three sentences	0.01	0.01	0.01	0.02	0.02	0.02	0.03
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Panel C: SZTE 2023, N = 1,996							
Present tense use							
No sentence	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
One sentence	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Two sentences	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Three sentences	-0.04*	-0.04	-0.04+	-0.04+	-0.04*	-0.04	-0.04
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Panel D: Corvinus 2023, N = 206							
Present tense use							
No sentence	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
One sentence	0.02	0.02	0.02	0.02	0.02	0.02	0.03
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)
Two sentences	$	$	$	$	$	$	$
	$	$	$	$	$	$	$
Three sentences	$	$	$	$	$	$	$
	$	$	$	$	$	$	$
Control variables							
Fixed effects	✓	✓	✓	✓	✓	✓	✓
Sentence ordering		✓	✓	✓	✓	✓	✓
Female			✓	✓	✓	✓	✓
Age				✓	✓	✓	✓
SES dummies					✓	✓	✓
Mother's education						✓	✓

Father's education	✓

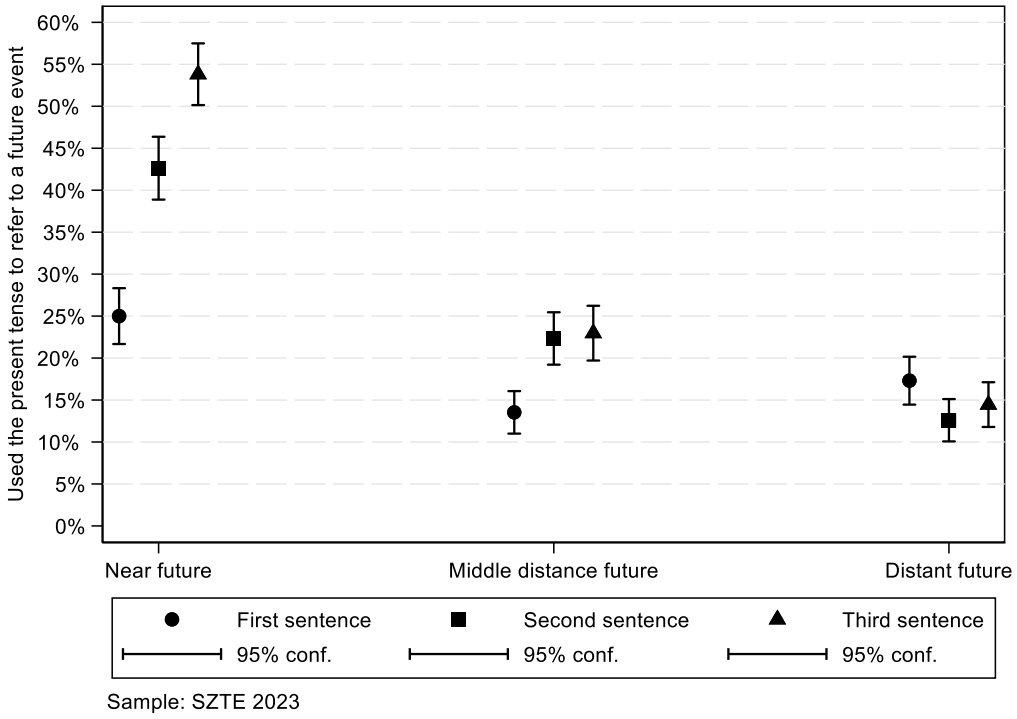
Robust standard errors, clustered at the study program/classroom level in the university/high school samples, are indicated in parentheses. ** p<0.01, * p<0.05. Fixed effects refer to study programs/classrooms in the university/high school sample. Missing values in the control variables were coded as zero to avoid losing cases. We added missingness dummies to control for the missing status.
Only those coefficients and standard errors are shown in the table for which there were at least N = 25 respondents (for reference, see Table 4). In the Corvinus sample, only 12 students used the present tense in two sentences, and one used the present tense in three sentences. Additionally, in the High School sample, only two students used the present tense in three sentences. These specific cases are not depicted in the table. Coefficients and standard errors that are not shown in the table (but were included in the regressions) are marked using the $ symbol.
This table summarizes the results of N = 28 regression models and tests the statistical significance of three coefficients concerning each model (N = 84 coefficients). When penalizing significance levels for multiple hypothesis testing according to Benjamini and Hochberg's (1995) procedure with a 5% false-discovery rate concerning the three coefficients by considering the test sets within each panel, no association remains statistically significant. Since we considered relatively narrow sets of tests, this amounts to minor corrections relative to traditional, uncorrected, standard errors. Therefore, more conservative corrections considering larger groups of exploratory tests would also fail to detect statistically significant effects since even employing this mild correction, we were unable to detect statistically significant effects.

4.4. An experimental manipulation regarding the share of those who used the present tense to refer to future events

In the SZTE 2023 sample, we randomized the order of the time horizons in the sentence-completion task to explore whether priming people with specific future time horizons affects the use of the present tense (instead of the future tense) to refer to future events. Specifically, in this sample, respondents received the sentences not in a fixed order (near/middle-distance/distant future) but randomly ordered, allowing any combination from the six theoretically feasible orderings of time horizons.[27]

[27] The six different combinations of Near (N), Middle-distance (M), and Distant (D) future time horizon sentences are well-balanced in the SZTE 2023 sample, as the distribution of each of these combinations is similar to one another: N-M-D (16.2%); N-D-M (16.0%); M-N-D (17.3%); M-D-N (17.3%); D-N-M (15.8%); D-M-N (17.5%).

Fig. 5. The causal effect of sentence ordering on the use of the present tense to refer to future events



As Figure 5 shows, if students received the near future question as the third sentence in the sentence-completion task, the frequency of present tense use increased significantly to 55%. This starkly contrasts with instances when the near future sentence was presented first, resulting in only 25% of respondents using the present tense. Table 7 confirms the previous findings in a regression framework.

Table 7 Effect of order of sentence on use of the present tense to refer to a future event—unstandardized regression coefficients from linear probability models

	(1) Near future	(2) Middle-distance future	(3) Distant future
Rank order of the sentence			
First	Ref.	Ref.	Ref.
Second	0.19**	0.08**	-0.03
	(0.03)	(0.02)	(0.02)
Third	0.30**	0.10**	-0.02
	(0.04)	(0.03)	(0.02)
Mean of the dependent variable	0.49	0.40	0.36
Constant	✓	✓	✓
Control variables			

Fixed effects	✓	✓	✓
Sentence ordering	✓	✓	✓
Female	✓	✓	✓
Age	✓	✓	✓
SES dummies	✓	✓	✓
Mother's education	✓	✓	✓
Father's education	✓	✓	✓

Robust standard errors (clustered at study program/classroom level in the university/high school sample) in parentheses, ** p<0.01, * p<0.05.
Fixed effects refer to study programs/classrooms in the university/high school sample.
Missing values in the control variables were coded zero to avoid losing cases. We added missingness dummies to control for the missing status.

This variation in the frequency of present tense use, induced by the randomized order of sentences, provides a unique opportunity to examine how the association between the individual discount factor and language use might shift when the proportion of individuals using the present tense is experimentally increased. More specifically, in the previous analysis, we relied on the mechanism that more patient individuals, as opposed to their less patient counterparts, are more inclined to use the present tense frequently when referring to future events. However, this argument was based on a binary distinction between those who naturally use the present tense (group A) and those who do not (group B).

However, suppose the picture is more nuanced and a third group of people (group C) use the present tense only in specific situations. If there is a correlation between the individual discount factor and present tense usage, then it may matter into which of the two initial groups (A and B) we classify these inconsistent language users. This categorization could potentially alter the observed relationship between the individual discount factor and the use of the present tense. For example, if we compare those who naturally use the present tense (group A) to those who use it under specific circumstances (group C) or never (group B), we might find a smaller difference than when combining those who naturally use the present tense (group A) or use it only under specific circumstances (group C) compared to those who do not use the present tense (group B).

The random ordering of the sentences according to time horizons gave us leverage, as we initially did not have information about which respondents would use the present tense to refer to future events only under specific circumstances (group C). Therefore, in Table 8, we specifically compare the association between the individual discount factors and the use of the present tense among those who received the near future as the first sentence (Column 1) and those who received the near future as the last sentence (Column 2). In short, we check the association by classifying those who use the present tense sporadically (group C) to those who naturally do not use the present tense (group B) (Column 1), and then to those who naturally use the present tense (group A, Column 2).

As Table 8 indicates, the two coefficients representing the association between the individual discount factor and the use of the present tense are qualitatively identical. The differences between these coefficients (as shown in Column 3) are not statistically significant. Therefore, we conclude that the previously observed null association with the individual discount factor remains unchanged even when employing more nuanced classifications of individuals based on their use of the present tense to refer to future events.

Table 8 Association between individual discount factors (dependent variable) and frequency of use of present tense to refer to a near future event—comparison between those who received the near future sentence first versus third—unstandardized OLS

	(1) SUBSAMPLE: Near future in the FIRST sentence Group A vs. Groups B+C	(2) SUBSAMPLE: Near future in the THIRD sentence Groups A+C vs. Group B	(3) POOLED model: Containing those cases when near future sentence was FIRST/THIRD
Used the present tense [UP]	0.01	0.01	0.00
	(0.02)	(0.01)	(0.01)
Near future sentence was third sentence [THIRD], ref first sentence			0.01
			(0.01)
UP × THIRD			0.00
			(0.02)
Constant	✓	✓	✓
Control variables			
Fixed effects	✓	✓	✓
Sentence ordering	✓	✓	✓
Female	✓	✓	✓
Age	✓	✓	✓
SES dummies	✓	✓	✓
Mother's education	✓	✓	✓
Father's education	✓	✓	✓
N of observtions	652	708	1,360

Robust standard errors, clustered at the study program/classroom level in the university/high school samples, are indicated in parentheses. ** p<0.01, * p<0.05.
Fixed effects refer to study programs/classrooms in the university/high school sample.
Missing values in the control variables were coded zero to avoid losing cases. We added missingness dummies to control for the missing status.

5. Conclusion

A growing body of literature explores the mechanisms behind the association between future-time reference and future-oriented behavior—the so-called linguistic-savings hypothesis (Chen, 2013). Prior experimental work has focused on the mechanism underlying this association and tested how exogenously manipulated language use affects patience—a mechanism that may drive the association between future-time reference and future-oriented behavior. This experimental literature examined the relationship in two ways: through light-touch intervention and among bilingual speakers. However, the insights from these approaches may not be universally applicable. Our contribution to this field involves eliciting endogenous language use in reference to future events and investigating its correlation with patience.

To assess endogenous language use, we developed a novel sentence-completion task. We comprehensively tested the endogenous association between present tense use and patience across four samples comprising both high school and university students. We employed both incentivized and non-incentivized tasks to measure patience. We found no consistent association between the use of the present tense and patience. These null results are robust to incentivization and the different classifications of the present-tense users. In relation to the literature, our findings suggest that the null results observed in laboratory experiments with light-touch interventions might not stem from the subtlety of manipulation but rather reflect a general result. Concerning survey experiments, the significant associations between the language used in the survey (weak-FTR vs. strong-FTR) and patience may be attributed to the specific nature of the respondent pool, consisting of bilingual speakers.

Thus, if there is no endogenous association between present tense use and patience, our results might challenge the more restricted claim of the causal effect of future-time reference on patience, as suggested in the literature. In short, our null results indicate the need to explore further mechanisms that could underlie the association between future-time reference and future-oriented behavior. Chen (2013) suggests one potential mechanism related to the precision of beliefs. However, further theoretical work is needed to advance other promising channels, and empirical studies should test their validity.

Our study inevitably involves limitations. A key limitation stems from the novelty of the sentence-completion task—whether this is the appropriate method for eliciting natural language use is uncertain. More research is needed to identify the optimal tool for eliciting future-time reference. Additionally, while we consider socioeconomic status, gender, and age as potential confounders in our analysis, there may be others. A further limitation is that we investigated only one language. Conducting similar research with other languages would shed more light on the relationship between endogenous future-time reference and patience.

In conclusion, the observed zero correlation between endogenous language use regarding future events and patience provides a compelling basis for future research into the mechanisms that may link language use to future-oriented behavior.

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Appendix A - Measuring time preferences

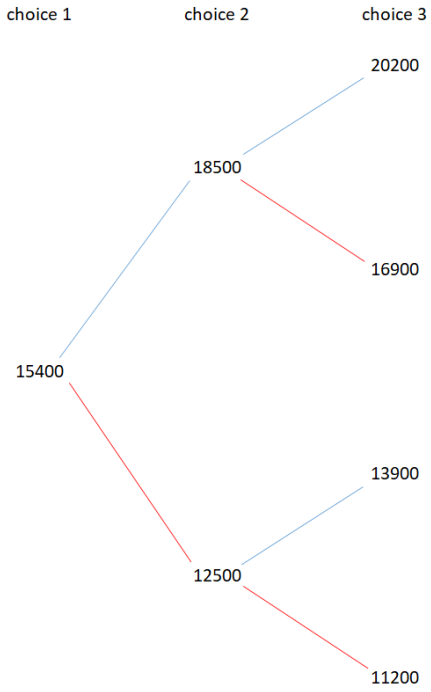

Figure A1: Structure of time preference questions. Delayed amounts are shown.[28]

Figure A1 depicts the structure of the intertemporal choice task. Respondents are required to make three decisions. First, they choose between receiving 10,000 HUF immediately or 15,400 HUF in two weeks. Choosing the immediate payment leads them upward along the blue path. Therefore, the next decision is between receiving 10,000 HUF immediately or 18,500 HUF in two weeks. Choosing the delayed amount takes the respondent to the next choice along the red path. If the respondent chooses 18,500 HUF in two weeks, then their final choice is between receiving 10,000 HUF immediately or 16,900 HUF in two weeks.

The respondent's final choice is indicative of their patience. Take, for instance, a scenario where the final choice is between 10,000 HUF immediately or 16,900 HUF in two weeks. If the respondent opts for the latter, then we know that their indifference point between the immediate and the later amount must range between 16,900 HUF and 18,500 HUF. Lacking further information, we assume that the indifference point is at the midpoint, which in this case is 17,700 HUF. This suggests that the respondent is willing to wait two weeks for an additional 7,700 HUF over the immediate 10,000 HUF. The corresponding IDF is $\frac{10,000}{17,700} = 0.57$. Table A1 details the later payoff amounts, the calculated indifference points, the extra amount required for a two-week delay, and the resulting IDF values.

[28] For simplicity, we omit the immediate 10,000 HUF, which is the same in each choice.

Later payoffs	Indifference points	Required money to wait two weeks	IDF
20200	20200	10200	0.495
18500	19350	9350	0.517
16900	17700	7700	0.565
15400	16150	6150	0.619
13900	14650	4650	0.683
12500	13200	3200	0.758
11200	11850	1850	0.844
10000	10600	600	0.943

Table A1: Time preference measurement and IDF

Appendix B – Students in both the SZTE 2022 and SZTE 2023 samples

Table B1 Associations between key measures among those who participated in the SZTE 2022 *and* SZTE 2023 sample—unstandardized OLS regression coefficients

	(1) IDF, 2023	(2) Intensity of use of present tense, 2023	(3) Used present tense referring to near future, 2023	(4) Used present tense referring to middle-distance future, 2023	(5) Used present tense referring to distant future, 2023
IDF, 2022	0.51**				
	(0.07)				
Intensity of use of present tense, 2022		0.29**			
		(0.11)			
Used present tense referring to near future, 2022			0.12		
			(0.10)		
Used present tense referring to middle-distance future, 2022				0.27**	
				(0.10)	
Used present tense referring to distant future, 2022					0.16
					(0.11)
Constant	0.48**	0.29	0.12	0.01	0.09
	(0.13)	(0.24)	(0.14)	(0.16)	(0.14)
Observations	116	109	115	114	112
R-squared	0.31	0.09	0.07	0.10	0.03

Standard errors in parentheses
** p<0.01, * p<0.05

Table B2 Association between individual discount factors (dependent variable) and use of present tense to refer to near, middle-distance, and distant future events among students in the SZTE 2023 sample who had also participated in the SZTE 2022 sample—unstandardized OLS regression coefficients

	(1)
PANEL A: Near future	
SZTE 2023, N = 115	0.02
	(0.06)
PANEL B: Middle-distance future	
SZTE 2023, N = 115	0.06
	(0.07)
PANEL C: Distant future	
SZTE 2023, N = 114	-0.04
	(0.05)
Control variables	
Fixed effects	✓
Sentence ordering	✓
Female	✓
Age	✓
SES dummies	✓
Mother's education	✓
Father's education	✓

Robust standard errors (clustered at study program/classroom level in the university/high school sample) in parentheses, ** p<0.01, * p<0.05.

Table B3 Association between individual discount factors (dependent variable) and frequency of use of present tense to refer to a future event among students in the SZTE 2023 sample who had participated in the SZTE 2022 sample—unstandardized OLS regression coefficients

	IDR
Present tense use	
No sentence	Ref.
One sentence	0.05
	(0.05)
Two sentences	0.08
	(0.11)
Three sentences	-0.09
	(0.14)
Control variables	
Fixed effects	✓
Sentence ordering	✓
Female	✓
Age	✓
SES dummies	✓
Mother's education	✓
Father's education	✓

Robust standard errors (clustered at study program) in parentheses, ** p<0.01, * p<0.05.

Online Appendix

The online appendix contains the translations of the surveys.

High School survey

Initial screen

Questionnaire on School Life and Students' Worldview

The following questions are about high school life and your worldview. The survey is conducted by the Center for Social Sciences Research. Completing the questionnaire takes about 15-20 minutes. The data is processed anonymously and in aggregate form.

Please read the following data processing information! If you agree that we can use your responses for research purposes according to this, please check the box below!

DATA PROCESSING INFORMATION for the questionnaire research conducted within the framework of the Democratic Efficacy and the Varieties of Populism in Europe (DEMOS, 822590) project

In accordance with Article 12 (1) of Regulation (EU) 2016/679 of the European Parliament and of the Council (hereinafter GDPR), the Center for Social Sciences Research informs the data subject about the data processing that occurs during the questionnaire research within the framework of the Democratic Efficacy and the Varieties of Populism in Europe (DEMOS, 822590) project.

1. We are conducting a questionnaire survey within the framework of the DEMOS project, aimed at investigating the relationship between school behavior and the perception of specific social issues. The data of participants in the research are processed for the purpose of answering this research question.
2. Scope of processed data: We will process general socio-demographic data included in the research questionnaire attached to this information in an anonymous manner.
3. The data is processed according to the explicit and voluntary consent of the data subject. Consent for data processing can be withdrawn by emailing the research leader at XXX
4. The data collected during the research is managed by the Center for Social Sciences Research: Director-General: XXX Address: XXX Tel.: XXX Email: XXX
5. The data of participants in the research may be processed until the research objective is achieved, but for no more than three years or until consent is withdrawn. Withdrawing consent does not affect the legality of data processing based on consent before its withdrawal.
6. We inform you that you can request information about the processing of your personal data at any time, and you can access your personal data processed by us. If we process your data inaccurately, please inform us, and we will correct it, or if you withdraw your consent, we will delete your data. If requested, we will provide your personal data in a machine-readable format or transfer them to another data controller upon request.
7. If you have any questions about data processing, you can contact the DEMOS project's data protection officer at the following email address: XXX
8. In the case of the unlawful processing of your data, you can turn to the National Authority for Data Protection and Freedom of Information, whose contact details are: XXX. Website: XXX Tel.: XXX In the case of unauthorized processing of your data,

you may also take your case to court. In Hungary, such a lawsuit can be initiated before the court of the data subject's residence or place of stay, according to their choice.
Budapest, April 7, 2022

Screen 1

Please mark your gender! Male / Female

Screen 2

How old are you? Please provide the number of full years. Years

Screen 3

What type of education program are you currently enrolled in? grammar school (4, 6, or 8 grades) / vocational education (providing a matriculation exam) / vocational education (without matriculation exam)

Screen 4

Which class are you in?

Screen 5

Which school do you attend? Start typing and select your school from the list that appears!

Screen 6

What town or city do you live in? Budapest / county seat / other city / town, village

Screen 7

On the next page, you will find a short story. We ask you to read the story and try to imagine what the main character might be feeling in the presented situation. Try to empathize with what this young person is going through!

Screen 8

In the 'Stupid Clothes and Shoes' group, the whole school is involved. At first, pictures were taken from the internet. Then, someone posted about one of our schoolmates, and it was a hit. And a week ago, it happened: someone secretly took a photo of my winter shoes and posted it. It became the most successful post, everyone was laughing at it. I couldn't wear anything else; I was freezing in my summer shoes, which got soaked in the slush. When buying them, I told my mom they were lame, but she wouldn't hear about the ones I had picked out ("we're not buying those for just a few weeks!"). It was terrible the day after the post. I heard the laughter in front of the school, felt the stares. Inside, I changed shoes, which made it even more ridiculous. During the breaks, I stayed in my seat. Everyone knew why. I just became more pathetic. No one came up to me. And, well, somehow, I had to get home. And the cold, slushy weather seems endless. At home, it's hopeless: "You don't have a fever, you have to go, it's a ridiculous excuse!" I'm alone. The sleeping pill box is in front of me. I'm crying.

Screen 9

Please indicate how much you agree with the following statements!

1 - I do not agree at all | 7 - I completely agree | NT - I don't know

The state should not spend money on entertainment for prisoners (TV, library, cultural programs, celebrations).

The state should not spend money on treating the illnesses of prisoners.

The state should not spend money on the care of severe alcoholics (ambulance transport, detoxification, rehabilitation programs).

People should be allowed to protect their own homes (houses, gardens) by any means from unauthorized intruders.

The right of working people to clean streets takes precedence over the right of homeless people to stay on the streets.

A country has the right to decide what religion the people it admits are.

An entertainment venue should have the right to decide not to admit Roma guests.

A community should have the right to decide to reject a facility for homeless people with mental injuries.

If an abused wife stands by her husband, then state authorities have no business with the affairs of that family.

It is not reasonable to expect people to speak about certain groups in the presence of their members as those members would like to be referred to (for example, it's okay to talk about 'Gypsies' even if an affected Roma person would not like to hear this word, or 'fags' even if a gay person would not like to hear this).

Screen 10

Please indicate how much you agree with the following statements!

1 - I do not agree at all | 7 - I completely agree | NT - I don't know

I think there's nothing wrong with students calling each other nicknames.

It really bothers me when no one defends a student who is being bullied.

Someone who bullies others is actually a coward.

It's important to help those who cannot defend themselves.

It's wrong to join those who bully others.

I find it funny to see others get upset when they are teased.

I feel bad when someone is bullied in my presence.

I highly respect someone who stands up for those who are bullied.

Screen 11

Imagine the following situation. You can now receive 10,000 HUF or a LARGER AMOUNT in two weeks. Which one do you choose? I would like 10,000 HUF now. / I would like 15,400 HUF in two weeks.

Screen 12

Imagine the following situation. You can now receive 10,000 HUF or a LARGER AMOUNT in two weeks. Which one do you choose? I would like 10,000 HUF now. / I would like XXX HUF in two weeks. *(Here XXX varied depending on the previous answer.)*

Screen 13

Imagine the following situation. You can now receive 10,000 HUF or a LARGER AMOUNT in two weeks. Which one do you choose? I would like 10,000 HUF now. / I would like XXX HUF in two weeks. *(Here XXX varied depending on the previous answer.)*

Screen 14

Using the following words, create a sentence about the future!

You do not need to use all the words to create a sentence. Although more than one sentence can be formed from the words, please form the sentence that first comes to mind. You can create a sentence by clicking on the words in the word cloud below, and they will appear in the dotted line above. The first word of the sentence has been provided for you.

At the weekend

go, to the cinema, I will, I go, then

Screen 15

Using the following words, create a sentence about the future!

You do not need to use all the words to create a sentence. Although more than one sentence can be formed from the words, please form the sentence that first comes to mind. You can create a sentence by clicking on the words in the word cloud below, and they will appear in the dotted line above. The first word of the sentence has been provided for you.

In the summer

be on vacation, at Lake Balaton, I will, I am on holiday, then

Screen 16

Using the following words, create a sentence about the future!

You do not need to use all the words to create a sentence. Although more than one sentence can be formed from the words, please form the sentence that first comes to mind. You can create a sentence by clicking on the words in the word cloud below, and they will appear in the dotted line above. The first word of the sentence has been provided for you.

In ten years

I earn, a lot of money, I will earn, then

Screen 17

In general, what would you say? Can most people be trusted, or would you rather say that we can't be too careful in human relationships?

Mark your opinion on the scale, where “0” means that we can't be too careful, and “10” means that most people are trustworthy.

How much do you trust the following?

1 - Not at all | 5 - Completely | NT - Don't know

How much do you trust your classmates?

How much do you trust your teachers?

How much do you trust your parents?

How much do you trust the police?

How much do you trust the government?

How much do you generally trust politicians?

How much do you trust the leadership of the European Union?

Screen 18

How interested are you in politics? Very interested / quite interested / barely interested / not interested at all

Screen 19

In politics, people often talk about 'left-' and 'right-wing.' Where would you place yourself on this scale, where '0' represents the left wing and '10' represents the right wing? NT - I don't know.

Screen 20

What is the highest level of education completed by your mother? If you live (or lived more) with a foster mother, then provide her level of education!

Please mark only one answer!

Did not complete elementary school. / elementary school / vocational school (with matriculation exam) / vocational school (without matriculation exam) / school with matriculation exam / BA degree / MA degree / I don’t know

Screen 21

What is the highest level of education completed by your father? If you live (or lived more) with a foster mother, then provide her level of education!

Please mark only one answer!

Did not complete elementary school. / elementary school / vocational school (with matriculation exam) / vocational school (without matriculation exam) / school with matriculation exam / BA degree / MA degree / I don’t know

Screen 22

How many books do your parents have at home in total? Do not count your textbooks, newspapers, and magazines!

Less than a shelf (approximately 0-50 books) / a shelf (approximately 50 books) / 2-3 bookshelves (max 150 books) / 4-6 bookshelves (max 300 books) / 2 bookcases (300-600 books) / 3 or more bookcases (600-1,000 books) / More than 1,000 books / I don’t know

Screen 23

Think about the past few months.

During this period, did you hurt one of your peers at school by doing any of the listed activities, whether a fellow student attending the school or even your classmate?

1 - It did not happen | 2 - Happened once or twice | 3 - Happened two or three times a month | 4 - Happened at least weekly | 5 - Happened several times a week | NT - I don't know

I called one of my schoolmates by a mocking nickname, made them a laughingstock, or offended them.

I ostracized one of my schoolmates or excluded them from my group of friends.

I hit or kicked one of my schoolmates.

I harassed one of my schoolmates over the internet or through a mobile phone.

Screen 24

What were your grades at the END OF THE LAST SEMESTER in the following subjects?

Think about the report card you received this January!

Conduct

Diligence

Hungarian language

Literature

Mathematics

Screen 25

What were your grades at the END OF LAST YEAR in the following subjects?

Think about the report card you received last summer, in June!

Conduct

Diligence

Hungarian language

Literature

Mathematics

Screen 26

Thank you for your responses! You can find out more about our research at this link.

University of Szeged samples

(The only difference between these samples was that in the second sample, the order of sentences in the sentence-completion task was randomized.)

Initial screen

Questionnaire on Future Preferences

This questionnaire is about how people think and talk about the future. Completing the questionnaire takes about five minutes. Data is processed anonymously and in aggregate.

Please read the following data protection information! If you accept that we may use your responses in the research accordingly, please check the box below!

DATA PROTECTION INFORMATION Regarding the Future Preferences Research

This Data Protection Information summarizes information that you should know about how we use and protect your personal data in accordance with the EU General Data Protection Regulation (GDPR) during the Future Preferences research.

At the University of Szeged, we place great emphasis on exploring as many factors of student success as possible and understanding them through scientific research. The purpose of the Future Preferences research is to explore how people think and talk about the future. In doing so, we want to learn more about how future plans influence student academic performance. We would like to incorporate their experiences into the organization of student studies, thus improving educational organization.

You will participate in the research through a website operated by XXX. Your personal data will not be known to XXX during the research.

The research operates under the principle that research is not conceivable without personal data, but the purpose of the research is not to produce personalized results. Your personal data stored in the NEPTUN system (NEPTUN data) will be attached to your questionnaire responses by the University of Szeged. The data linkage is done by the University of Szeged on a one-time basis. After linking (but no later than August 31, 2022), the University of Szeged will destroy the NEPTUN codes used for the research.

1. Who to contact? Regarding the data processing of the Future Preferences research, the University of Szeged is the data controller, but the specific data processing is done through the following organizational unit. University of Szeged Educational Administration Contact name: XXX Mailing address: XXX Tel.: XXX Email: XXX Website: XXX Data Protection Officer's name and contact: found in point 11.1 of this Data Protection Information. Contact us with confidence at the above contact details if you have questions related to data processing.
2. What are the main legal regulations we follow? We inform you that we process your personal data according to
   • the Regulation (GDPR) of the European Parliament and of the Council on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (2016/679), and
   • the Hungarian Act CXII of 2011 on the Right to Informational Self-Determination and on Freedom of Information (Info Act).

3. Does the University of Szeged have a Data Protection Policy? Yes. The Data Protection Policy of the University of Szeged can be accessed at the following link: http://www.u-szeged.hu/szabalyzatok
4. What data processing do we carry out? During the Future Preferences research, we perform the following data processing activities: (A table is supplied here that describes the following: What data? Why do we collect it? What is the legal basis of data processing? How long is it stored? NEPTUN code for identification purposes for the conduct of the research Voluntary consent Until the withdrawal of voluntary consent, but no later than August 31, 2022.)
   4.2. Data Linkage The data linkage is done by the University of Szeged on a one-time basis. During the data linkage, the research data is linked with the following data stored in the NEPTUN system: (A table describes the following: What data? Why do we collect it? What is the legal basis of data processing? How long is it stored? Legitimate interest Until the linkage, but no later than August 31, 2022 Date of birth, Academic performance in the first semester of the 2021/22 academic year, Academic performance in the second semester of the 2021/22 academic year, Major Financing type, Study schedule, Education level)

5. Who can access your personal data? Regarding the Future Preferences research, your personal data can be accessed by the data processing organizational unit named in point 1 of this Data Protection Information.

5.1. Internal Data Transfer We do not undertake internal data transfer.

5.2. External Data Transfer We do not undertake data transfer, either domestically or internationally. The data about you is managed only by the persons designated by the data controller mentioned in point 1, according to the purpose, legal basis, and retention period specified in point 4.

6. Do We Use Data Processors? The data processing occurs at the Educational Administration.

7. Do We Collect Personal Data About You from Other Sources? Yes. We obtain the data about you from the Neptun system, in order to link the research data.

8. Is There Any Automated Decision Making during the Data Processing? No.

9. What Are the Legal Consequences of Not Providing Data? Participation in the Future Preferences research is voluntary; not participating does not lead to any disadvantageous legal consequences, you simply do not participate in the research. In conducting the research (especially during data linking), we pay particular attention to the following points in terms of balancing interests:

Participation in the research is based on prior information and voluntary consent,

The results of the data linking will be accessible in a limited manner for a short time,

In the further process of the research, non-identifiable statistics and summaries will be used to draw conclusions.

10. What Rights Do You Have? You have the following rights regarding the Future Preferences research:

Right to Information – you can request information about the processing of your personal data. We ensure your right to information by preparing and publishing this Data Protection Information.

Right to Access – you have the right to request personal information about the personal data we manage, as well as a copy.

Right to Rectification – if you notice any inaccuracies in your personal data that we manage, you have the right to request correction.

Right to Withdraw Consent and to Erasure – voluntary consent can be withdrawn at any time. We inform you that withdrawing consent does not affect the legality of the data processing before withdrawal. If the data processing is based on voluntary consent and there is no other legal basis for processing, and following the objection to data processing based on legitimate interest, if there is no other overriding legitimate reason for further data processing, you can request the deletion of your personal data.

Right to Object – you can object to data processing based on legitimate interest at any time.

Right to Restriction – you can request the restriction of your data, for example, when you dispute the accuracy of the data being processed, until the accuracy is verified by the data controller, or for the establishment, exercise, or defense of legal claims.

Right to Remedy – if your rights are violated, you have the right to seek legal remedy.

11. What Remedies Are Available?

    11.1 You can turn to the data protection officer of the University of Szeged at the following contacts: XXX Address: University of Szeged, Rector's Office, Data Protection Office, XXX Tel.: XXX Email: XXX

    11.2. You can turn to the National Authority for Data Protection and Freedom of Information at the following contacts: National Authority for Data Protection and Freedom of Information Address: XXX Mailing address: XXX Tel.: XXX Email: XXX

    11.3. You can go to court. Depending on the nature of the unlawful data processing you experienced, you may initiate legal proceedings, even against the Authority. You can find information about the possibility, method, and forums of initiating legal proceedings at the following website: XXX

    12. Does the University of Szeged Have a Data Protection Officer? Yes. You can find the contact details of the data protection officer of the University of Szeged in section 11.1. The data protection officer serves as a contact point between you and the University of Szeged.

Screen 1

Please mark your gender! Male / Female

Screen 2

How old are you? Please provide the number of full years. Years

Screen 3

Imagine the following situation. You can now receive 10,000 HUF or a LARGER AMOUNT in two weeks. Which one do you choose? I would like 10,000 HUF now. / I would like 15,400 HUF in two weeks.

Screen 4

Imagine the following situation. You can now receive 10,000 HUF or a LARGER AMOUNT in two weeks. Which one do you choose? I would like 10,000 HUF now. / I would like XXX HUF in two weeks. *(Here XXX varied depending on the previous answer.)*

Screen 5

Imagine the following situation. You can now receive 10,000 HUF or a LARGER AMOUNT in two weeks. Which one do you choose? I would like 10,000 HUF now. / I would like XXX HUF in two weeks. *(Here, XXX varied depending on the previous answer.)*

Screen 6

Using the following words, create a sentence about the future!

You do not need to use all the words to create a sentence. Although more than one sentence can be formed from the words, please form the sentence that first comes to mind. You can create a sentence by clicking on the words in the word cloud below, and they will appear in the dotted line above. The first word of the sentence has been provided for you.

At the weekend

go, to the cinema, I will, I go, then

Screen 7

Using the following words, create a sentence about the future!

You do not need to use all the words to create a sentence. Although more than one sentence can be formed from the words, please form the sentence that first comes to mind. You can create a sentence by clicking on the words in the word cloud below, and they will appear in the dotted line above. The first word of the sentence has been provided for you.

In the summer

be on vacation, at Lake Balaton, I will, I am on holiday, then

Screen 8

Using the following words, create a sentence about the future!

You do not need to use all the words to create a sentence. Although more than one sentence can be formed from the words, please form the sentence that first comes to mind. You can create a sentence by clicking on the words in the word cloud below, and they will appear in the dotted line above. The first word of the sentence has been provided for you.

In ten years

I earn, a lot of money, I will earn, then

Screen 9

What is the highest level of education completed by your mother? If you live (or lived more) with a foster mother, then provide her level of education!

Please mark only one answer!

Did not complete elementary school. / elementary school / vocational school (with matriculation exam) / vocational school (without matriculation exam) / school with matriculation exam / BA degree / MA degree / I don’t know

Screen 10

What is the highest level of education completed by your father? If you live (or lived more) with a foster mother, then provide her level of education!

Please mark only one answer!

Did not complete elementary school. / elementary school / vocational school (with matriculation exam) / vocational school (without matriculation exam) / school with matriculation exam / BA degree / MA degree / I don’t know

Screen 11

How many books do your parents have at home in total? Do not count your textbooks, newspapers, and magazines!

Less than a shelf (approximately 0-50 books) / a shelf (approximately 50 books) / 2-3 bookshelves (max 150 books) / 4-6 bookshelves (max 300 books) / 2 bookcases (300-600 books) / 3 or more bookcases (600-1,000 books) / More than 1,000 books / I don’t know

Screen 12

How would you describe the income situation of your household? We manage well with our income through budgeting. / We are barely getting by on our income. / Month after month we have financial problems. / We live in deprivation.

Screen 13

How do you classify yourself? Lower social class / lower-middle class / middle class / upper-middle class / upper social class

Screen 14

What is the monthly net income per person in your household? Less than 28,500 Ft / Between 28,501 and 50,000 Ft / Between 50,001 and 75,000 Ft / Between 75,001 and 100,000 Ft / Between 100,001 and 150,000 Ft / Between 150,001 and 200,000 Ft / Between 200,001 and 300,000 Ft / Between 300,001 and 450,000 Ft / Above 450,0001 Ft / I don’t know / I don’t want to answer

Screen 15

Please enter your Neptun code.

Screen 16

Thank you for your answers!

Corvinus University of Budapest survey

(Here we used the same survey as at the University of Szeged, but we provided an instruction sheet to the participants. Here we only reproduce the instructions.)

Dear Participants!

Welcome to this joint research by Corvinus University of Budapest and the Centre for Economic and Regional Research! The research is led by Tamás Keller and János Kiss Hubert.

Participation in the research is completely VOLUNTARY. You can stop at any time without giving any reason. Participation takes 8-10 minutes.

After the introduction, you will have to solve some simple tasks online. It is important to note that there are no objectively right answers. Furthermore, we are not interested in the decisions of individuals but in how people in general decide in such situations.

In one of the tasks, we have to decide on the amounts that we would like to receive now or in two weeks' time. For example, respondents can choose between receiving 10,000 HUF now or 15,400 HUF in two weeks. There are three such incentive questions. Ten percent of participants who are drawn will receive the amount corresponding to one of their choices (also drawn) (minimum HUF 10,000) by bank transfer now or in two weeks (timed transfer). The transfer will be made after the experiment.

Your participation is completely ANONYMOUS. You participate in the research through the website hosted by XXX. No personal data will be requested during the game. The data will be treated confidentially and will not be disclosed to third parties. You will only be asked to enter the serial number at the bottom of the page in the online interface so that we can distinguish you and draw lots concerning to whom we pay, according to your choices.

Please remain silent and do not disturb each other while decisions are being made. No talking! If you have any questions, please raise your hand. Anyone who misbehaves will be disqualified and will forfeit any prize money.

If you have any questions, feel free to ask now or contact the experiment leaders (Tamás Keller - keller.tamas@krtk.hun-ren.hu or János Kiss Hubert - hubertjanos.kiss@uni-corvinus.hu).

By accessing the online platform, you agree that your answers will be used for our research. The questions can be found on the University of Szeged website. The first page contains information on data management; feel free to skip to the next page. A later page asks for a Neptun code. Do NOT enter the Neptun code, but the ID number below. We would appreciate it if you could also enter your average grade for the previous year, separated by a slash after the serial number (example 13 / 4.3)

Thank you for your cooperation!

The online interface is available at: XXX

ID number: