SENA KILINÇ

THE EFFECTS OF SMOKING RESTRICTIONS ON CLASS ATTENDANCE AND LIFE SATISFACTION: EVIDENCE FROM A TURKISH UNIVERSITY

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A Master's Thesis

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Ankara
June 2024

To my family

THE EFFECTS OF SMOKING RESTRICTIONS ON CLASS ATTENDANCE AND LIFE SATISFACTION: EVIDENCE FROM A TURKISH UNIVERSITY

The Graduate School of Economics and Social Sciences
of
İhsan Doğramacı Bilkent University

by

SENA KILINÇ

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ANKARA

June 2024

THE EFFECTS OF SMOKING RESTRICTIONS ON CLASS ATTENDANCE AND LIFE SATISFACTION: EVIDENCE FROM A TURKISH UNIVERSITY
By Sena Kılınç

I certify that I have read this thesis and have found that it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Economics.

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ABSTRACT

THE EFFECTS OF SMOKING RESTRICTIONS ON CLASS ATTENDANCE AND LIFE SATISFACTION: EVIDENCE FROM A TURKISH UNIVERSITY

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M.A., Department of Economics
Advisor: Assoc. Prof. Dr. Çağla Ökten

June 2024

We investigate the effect of smoking regulations on a university campus regarding attendance frequency, life satisfaction, and campus satisfaction among university students. A private university in Turkey implemented a campus-wide smoke-free policy, which prohibited smoking on campus except in designated areas at least 150 meters from faculty buildings. In our theoretical framework, we analyze a simple game for smoker and nonsmoker students with different types. In order to analyze the testable implications, we conducted an online survey with retrospective questions to third and fourth-year students. 406 students responded to our survey**.** In the empirical methodology, we model attendance frequency as a function of various factors, including individual fixed effects driven by intrinsic motivation for attendance, faculty fixed effects affected by faculty-related attendance policies, a time effect that may impact attendance trends, and a heterogeneous policy effect based on time and distance to smoking areas. As an alternative approach to the first one, instead of modelling individual fixed effects and adjusting for them through first differencing, we employ a difference-in-differences model. Our findings indicate that attendance increased and the smoking intensity among students decreased after the implementation of the policy for smoker students. Remarkably, the results obtained through the alternative approach align with those of the primary methodology. Also, the findings are consistent with the theoretical framework.

JEL Classification: I1, I23, I28, I31.
Keywords: Smoking regulation, Tobacco control policies, Life satisfaction, Smoking, Health behavior, College student

ÖZET

SİGARA KISITLAMASININ DERSE DEVAM VE YAŞAM MEMNUNİYETİ ÜZERİNDEKİ ETKİLERİ: BİR TÜRK ÜNİVERSİTESİ ÖRNEĞİ

Kılınç, Sena
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Üniversite öğrencilerinin derslere devam sıklığı, yaşam memnuniyeti ve kampüs memnuniyeti açısından üniversite kampüsünde sigara içme düzenlemelerinin etkisini araştırdık. Türkiye'deki özel bir üniversite, kampüs genelinde, fakülte binalarından en az 150 metre uzaktaki belirlenmiş alanlar dışında kampüste sigara içilmesini yasaklayan bir sigara yasağı politikası uyguladı. Teorik çerçevemizde sigara içen ve içmeyen öğrencilere yönelik basit bir oyunu farklı türlerde analiz ederek, test edilebilir sonuçları analiz etmek amacıyla üçüncü ve dördüncü sınıf öğrencilerine geriye dönük sorular içeren çevrimiçi bir anket gerçekleştirdik. Anketimize 406 öğrenci yanıt verdi. Ampirik metodolojide, katılım sıklığını, katılım için içsel motivasyonun yönlendirdiği bireysel sabit etkiler, fakülte ile ilgili devam politikalarından etkilenen fakülte sabit etkileri, devam eğilimlerini etkileyebilecek bir zaman etkisi ve heterojen bir değişkenlik dahil olmak üzere çeşitli faktörlerin bir fonksiyonu olarak modelledik. Birinci yaklaşıma alternatif bir yaklaşım olarak, bireysel sabit etkileri modellemek ve ilk fark alma yoluyla bunlara göre ayarlama yapmak yerine, farkların farkı modelini kullandık. Bulgularımız, sigara içen öğrencilere yönelik politikanın uygulanmasından sonra katılımın arttığını ve öğrenciler arasında sigara içme yoğunluğunun azaldığını göstermektedir. Dikkat çekici bir şekilde, alternatif yaklaşımla elde edilen sonuçlar birincil metodolojinin sonuçlarıyla uyumludur. Bununla beraber, bulgular teorik çerçeveyle de uyumludur.

JEL Sınıflandırması: I1, I23, I28, I31.

Anahtar kelimeler: Sigara düzenlemesi, Tütün kontrol politikaları, Yaşam memnuniyeti, Sigara içme, Sağlık davranışları, Üniversite öğrencileri

.

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CHAPTER 1

PRELIMINARIES

1.1 Introduction

Smoking behaviors and smoking-related behaviors have become concerns in the field of economics, with attention to gender dynamics (Bauer, Gohlmann, Sinning 2007), social interactions (Cutler, Glaeser 2010), and individual risk attitudes (Adams, Bose, Rustichini 2014). Therefore, numerous studies have explored the impact of smoking restrictions on both smoking behavior and the academic outcomes of students (Cannonier, Burke, Steward 2019). The findings of earlier studies on the effects of smoking restrictions on smoking intensity in post-secondary institutions and universities present a mixed picture since while some findings report reduced intensity of smoking (Seo, Macy, Torabi, Middlestadt 2011), others suggest that designated smoking areas increase the reward of smoking, resulting in higher intensity of smoking. (Lochbihler, Miller, Etcheverry 2014). Moreover, research indicates a general improvement in the GPA of college students resulting from smoking restrictions on the university campus (Cannonier et al., 2019). On the other hand, when a restricted smoking policy increased within a university, the specific mechanisms leading to improved students' GPA remained unclear. Additionally, there exist several studies that highlight a link between the smoking intensity of students and class absenteeism among 15 to 16-year-old European youth. In another study, authors have found that smoking more than five cigarettes per day is associated with decreased class attendance due to sickness, and the relationship is found to be consistent across gender and age groups of students (Perelman, Leao, Kunst 2019). All in all, several post-secondary institutions have implemented tobacco control policies to reduce and prevent smoking. As evidence, these programs have proven to

be effective in decreasing the risk of smoking among students in Korea (Kim, Jang, Yoo, JeKarl, Chung, Cho 2020).

This study aims to fill the gap in the current literature by analyzing the impact of smoking restrictions on class attendance, and the study utilizes a natural experiment from a private university in Turkey. Although smoking restrictions on a university campus have been linked to better academic outcomes (Cannonier et al., 2019), the underlying mechanisms that can lead to such an improvement have not been studied before. In this study, we study two possible mechanisms class attendance and life satisfaction that can lead to better academic outcomes for students.

A private university in Turkey implemented a campus-wide smoke-free policy on 29 September for the 2022-2023 academic year. The newly implemented policy prevents smoking on campus, aiming to reduce the intensity of smoking within the university, and, except in designated areas that are at least 300 meters away from faculty buildings, individuals are not allowed to smoke. In the study, a survey was designed to assess the policy's effect on class attendance and life satisfaction among undergraduate students, inspired by the Turkish Statistical Institute's (TURKSTAT) micro-level dataset but tailored to university students. Life satisfaction and intensity questions utilized a Likert scale (Likert, 1932). Retrospective questions were categorized into "before policy" and “after policy” in the methodology section to evaluate the temporal impact on attendance changes. Our results indicate that scholarship status, GPA, monthly expenses, and attendance are significantly lower for smoker students compared to non-smoker students. Male students exhibit a higher intensity of smoking compared to female students, consistent with observed gender differences in the literature. Pre-policy, non-smoker students expressed greater satisfaction with the distance to smoking areas compared to smokers. Post-policy, as anticipated, smoker students' satisfaction with distance decreased. However, non-smoking female students faced increased costs associated with the policy and exhibited an increase in class attendance. This suggests a diminished motivation for socialization for non-smoker female students with their smoker friends due to the increased distance to smoking areas post-policy. We find a positive and marginally significant effect on the attendance of smokers, with no effect on the attendance of non-smokers and this finding is align with the framework.

1.2 Related Literature

Several studies have examined the restricted smoking consumption on university and college campuses and its impact on students. Cannonier, Burke, and Steward (2019) conducted a study at a medium-sized public university in the United States with a restricted smoking consumption policy, examining the health and academic outcomes of smoking. Surveys were administered to inquire about students' past smoking and drug habits. Additionally, questions regarding GPA, health, ethnicity, age, and other outcomes were posed to measure various aspects. In the study, Ordinary Least Squares (OLS) were utilized to examine the causal effects by using smoking behavior as the dependent variable. To measure the post-policy and pre-policy period, those surveyed in 2012-2013 served as the control group, and others surveyed in 2016 served as the treatment group. The design of the empirical method allowed us to observe the behavior of outcomes such as health and academics in the pre and post-policy periods. According to the findings in this study, a significant decrease in smoking consumption was observed following the implementation of the restricted smoking area policy. Moreover, academic outcomes (cumulative GPA and term GPA) improved positively after the policy, but no significant change was observed in students' health (Cannonier, 2019).

Cutler and Glaeser (2010) analyzed the influence of peer smoking decisions on an individual's choice to smoke and discussed the empirical implications of social interactions in the context of smoking. The key findings indicate that external factors reducing the likelihood of one person smoking also decrease the probability of their peers smoking. About 40% reduction in the probability of an individual smoking has been identified in the analysis when a spouse quits smoking due to a workplace smoking regulation. In addition, there exists a higher variance in smoking rates across states and metropolitan areas due to endogeneity in the variables and social interaction of the individuals. Therefore, significant social multipliers in the study indicate a more substantial impact of smoking regulations at higher levels of aggregation. The results emphasize the indirect effects of policy interventions on peer smoking habits and suggest more significant impacts at higher levels of implementation. Overall,

workplace bans reduce individual smoking and influence the smoking behavior of the worker's spouse (Cutler et al., 2010).

In another study, Odermatt and Stutter (2015) investigated how smoking bans and cigarette prices generally affect subjective well-being. The research was conducted in 40 European countries between 1990 and 2011. One of them is smoking bans, and the other is cigarette taxes. In addition to policy variables, individual-level data were employed in empirical analyses. This analysis, conducted in European countries surveyed, also used individuals' life satisfaction scale as the dependent variable. In this study, where life satisfaction was used as the dependent variable in the empirical strategy, smoking ban, cigarette price, other tobacco policies, beer tax, GDP per capita, unemployment rate, and inflation rate were utilized as independent variables and tested using Ordinary Least Squares (OLS). The study found that high cigarette prices decrease life satisfaction, but no direct impact on well-being was observed with smoking bans. However, it was observed that individuals predisposed to smoking experienced an increase in their life satisfaction levels (Odermatt, Stutter 2015).

Decicca, Kenkel, Mathios, Shin and Lim (2008) introduced a new direct measure of state anti-smoking sentiment and integrated it with micro-data on youth smoking. The cross-sectional models revealed two consistent patterns, one controlling for state anti-smoking sentiment and the other indicating that cigarette prices exhibit a weak and statistically insignificant impact on smoking participation. In contrast, state anti-smoking sentiment itself may significantly influence youth smoking. Longitudinal analyses, including state-fixed effects, confirm these findings. Notably, indirect proxies for anti-smoking sentiment used in previous studies inadequately control for state differences. The results challenge the prevailing belief among health policymakers that youth smoking is highly price-responsive, suggesting that economic factors may have a more pronounced role in cessation and daily consumption decisions rather than initiation. The study advocates for further research merging anti-smoking sentiment measures with youth and adult smoking datasets to enhance understanding and inform future policy considerations (Decicca, Kenkel, Mathios, Shin, Lim 2008).

Seo, Macy, Torabi and Middlestadt (2011) utilized both cross-sectional and longitudinal data to assess the impact of a campus-wide smoke-free air policy on college students' smoking behaviors and attitudes. In the study, undergraduate students from Indiana University and Purdue University were surveyed before and after one of the campuses implemented a tobacco-free policy in January 2008. The results indicated positive outcomes observed at Indiana University, where the policy was implemented, compared to Purdue University. The implementation of the policy at Indiana University was associated with a significant decrease in current smoking prevalence among students, greater reductions in the amount smoked among continuing smokers, and positive changes in perceptions of peer smoking. These findings align with previous studies on smoke-free policies in various settings. Additionally, Indiana students demonstrated increased favorable attitudes toward tobacco regulation over time. Despite limitations such as sample demographics and potential selection bias, the study suggests that even without active enforcement, the awareness generated by signage, media coverage, and other promotional efforts may positively change smoking behaviors and attitudes on college campuses. Results found in the study indicate further policies for administrators in the universities to consider strict smoking regulations and tobacco control policies (Seo, Macy, Torabi, Middlestadt 2011).

Nyman, Jivani, Jazwa, Heath, Redmon, Sinha, Hayat and Eriksen (2022) analyze the impact of smoking regulations and comprehensive tobacco policies on students from post-secondary institutions. The American Cancer Society's Tobacco-Free Generation Campus Initiative recently awarded grants to 106 institutions aiming to implement comprehensive, 100% tobacco-free policies. Nyman et al. focused on five institutions that received the grant, and they found a significant decrease in cigarette smoking and exposure to secondhand smoke after the policy was implemented. On the other hand, they have found that there has been an increase in the use of electronic nicotine delivery systems. In conclusion, this study addresses the importance of tailored messaging support for quitting and enforcement approaches for maximizing the effect of strict smoking regulations and tobacco-free policies (Nyman, Jivani, Jazwa, Heath, Redmon, Sinha, Hayat, Eriksen 2022).

1.3 Framework

1.3.1 Conceptual Framework

In animal studies, it is shown that nicotine is more rewarding in the presence of other animals compared to alone. In the human studies which take place on designated smoking areas at university campuses, it was found that smoking with other individuals increases the reward of smoking, and students are looking forward to spending time in designated smoking areas (Lochbihler et al., 2014). Therefore, besides being an addictive good, smoking also increases social interaction among individuals. In addition, individual choices are influenced by peers such as neighbours and friends. Peers affect the decision to drop out, unemployment, and many other decision processes (Cutler, Glaeser 2010). Peers affect health-related behaviors such as drinking since it is this kind of behavior perceived as more rewarding in the presence of others. It is also confirmed that peers are a source of information to each other about what is acceptable in society (Cutler et al., 2010). All in all, the peer effect affects the consumption of addictive goods. Therefore, policies impacting social interactions have both direct and indirect effects on an individual's behavior since, due to peer effect, the behavior affects people around. Cutler et al. (2010) suggested that policy interventions such as creating designated areas will affect individuals' choice to smoke and, therefore, affect individuals beside them. All in all, peer effect affects the consumption of addictive goods, so designated smoking areas within a university campus will affect both smoking students and non-smoking students. Therefore, when it is harder for students to smoke, smoking and socialization become costlier, and the price of smoking on a university campus increases. From the behavioral approach, Murphy, Correia, and Barnett (2007) suggested class attendance and studying are not perceived as enjoyable activities for students but these activities increase the future return, therefore, class attendance and studying are associated with delayed reinforcement (Murphy, Correia, Barnett 2007). Students discounting future returns, such as career outcomes, are not likely to engage in behaviors that are necessary for future success, and they are likely to allocate their behaviors toward more immediately rewarding addictive activities like consuming alcohol or smoking (Murphy et al., 2007). To sum up, when smoking becomes costlier, students' consumption may be shaped by their peers, how much they discount future success and addiction level.

1.3.2 Theoretical Framework

The assumption is that designated smoking areas have increased the cost of socialization between students. One can argue that designated areas may also decrease the cost of allowing students to smoke together since it has been found that designated smoking areas can increase socialization by allowing students to smoke together while increasing the perceived reward of smoking (Miller et al., 2014). In the period preceding the implementation of the current policy, students utilized designated smoking areas for smoking. However, following the introduction of the new policy, there has been a reduction in these designated areas. Moreover, these designated spaces have considerably increased the distance between them and the academic faculties. Therefore, we can infer that social costs have increased. In other words, designated smoking areas are likely to decrease social interaction between students since, in the pre-policy period, people were allowed to smoke near faculty buildings; however, in the post-policy period, designated areas have moved away from faculty. Due to the time constraints of lecture breaks and the long way to smoking areas, the price of smoking, in other words, the price of socialization, is increased. Due to the increased price of the cost of social life, it is expected that the students increased their lecture attendance.

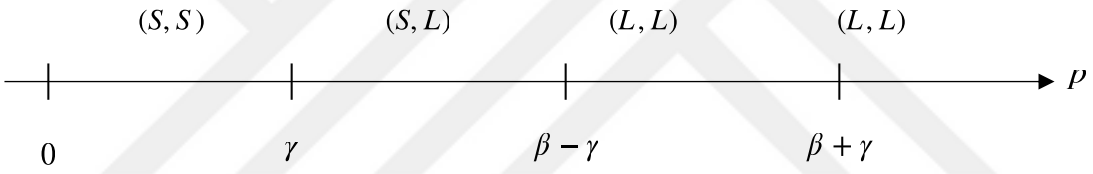
We consider a coordination game played between a smoker and a non-smoker, where the payoffs are demonstrated below:

NONSMOKER / SMOKER	Lecture Attendance (L)	Socialization (S)
Lecture Attendance (L)	γ, γ	$0, -p$
Socialization (S)	$\beta - p, 0$	$\beta - p + \gamma, -p + \gamma$

Figure 1: The game matrix

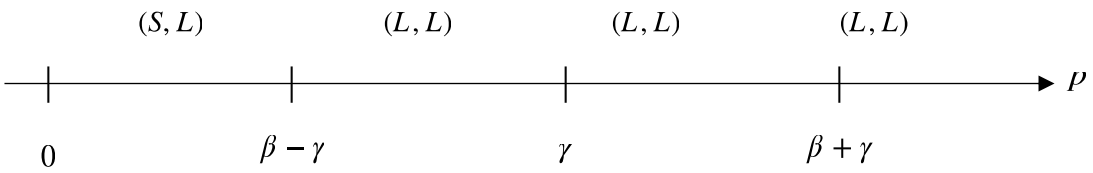
p denotes price of socialization and $p \geq 0$, A denotes the payoff that students get from socializing or lecture attendance, γ is coordination desire where $\gamma \geq 0$. β denotes the smoking intensity of students and $\beta \geq 0$. Firstly, Smokers are row player and Nonsmokers are column player of the game. By the Best Response analysis, there are 3 different Nash equilibria satisfying different conditions for those equilibria to hold. We have four different observations; the first one is (L, S) is never a Nash equilibrium of this game. Second, (L, L) is a Nash equilibrium if and only if $p \geq \beta - \gamma$. Third, (S, L) is a Nash equilibrium if and only if $p \geq \gamma$ and, $p \leq \beta - \gamma$. Fourth, (S, S) is a Nash equilibrium if and only if $p \leq \gamma$ and, $p \leq \beta + \gamma$. According to the equilibrium points, we investigate the effect of an increase in p on those points. We have three cases for different smoking intensity of students.

Case 1 (High Smoking Intensity): $\beta > 2\gamma$ i.e. $\beta - \gamma > \gamma$



When $\beta > 2\gamma$, the intervals and corresponding equilibrium points are given in the above figure. If p increases from p_1 to p_2, i.e., $p_1 \in (\gamma, \beta - \gamma)$ and $p_2 \in (\beta - \gamma, \infty)$, smokers reduce their smoking intensity in equilibrium and nonsmokers do not. However, if p increases from p_0 to p_1, i.e., $p_0 \in (0,\gamma)$ and

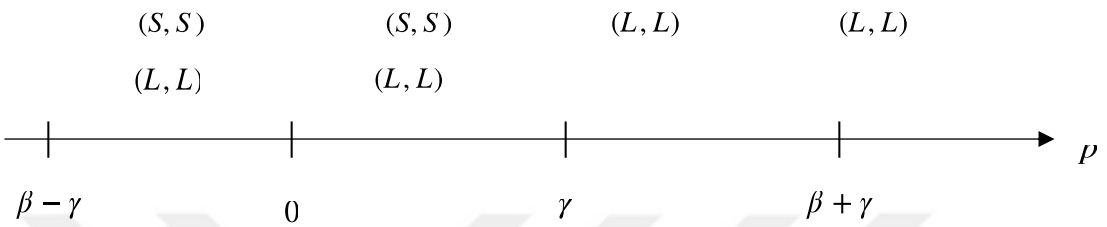
Case 2 (Moderate Smoking Intensity): $\beta \in (\gamma,2\gamma)$ i.e. $\beta - \gamma < \gamma$



Similarly, the intervals and corresponding equilibrium point is given in the above figure when $\beta \in (\gamma,2\gamma)$. If p increases from p_1 to p_2, i.e., $p_1 \in (\beta - \gamma, \gamma)$ and, $p_2 \in (\gamma, \beta + \gamma)$, neither smokers nor nonsmokers decrease their smoking intensity

since both players choose to attend lectures in equilibrium. The only case when smokers choose to socialize when $p \in (0,\beta-\gamma)$. If p increases from higher than $\beta-\gamma$, nonsmokers decrease their smoking intensity.

Case 3 (Low Smoking Intensity): $\beta < \gamma$ i.e. $\beta - \gamma < 0$



By the design of the game, p cannot be lower than 0, so p cannot be set such that $p \in (\beta-\gamma,0)$. Therefore, we eliminate that interval. When smoking intensity is lower, both (S,S) and (L,L) can be equilibrium if p is set between 0 and γ. If the university sets p higher enough, (L,L) is always equilibrium when the smoking intensity is higher.

In conclusion, for (L,L) to be an equilibrium, p should be at least higher than $\beta-\gamma$, and. Similarly, p should be at least higher than γ for (L,L) to be unique equilibrium when smoking intensity is low.

The game is consistent with the additive nature of smoking. The university increased the cost of socialization by increasing the distance between faculty buildings and designated smoking areas; therefore, in the empirical analysis, we expect to see smoker students increased their attendance to lectures as well as nonsmoker students if p is set such that $p \geq \beta-\gamma$ in the high smoking intensity case. In the moderate smoking intensity case, we expect to see an increase in the attendance for the smoker students while nonsmokers do not respond such change when p increases.

CHAPTER 2

DATA, POLICY AND DESCRIPTIVE ANALYSIS

2.4 Policy Description

During the 2021-2022 academic year, smoking areas were determined as sidewalks near university buildings. However, in order to move towards a smoke-free campus, further restrictions were placed in the 29th September 2022-2023 academic year. With the new extended policy, smokers are only allowed to smoke in several designated areas at least 300 meters from faculty buildings. In addition, the policy also limits other tobacco products and e-cigarettes. Hence, the policy reduced smoking areas and increased the distance to smoking areas from university facilities.

2.5 Survey Design

The dataset used for the analysis consists of survey data collected from a mid-sized private university in Ankara, Turkey. The survey is designed to provide information on the socio-demographic characteristics of smokers versus non-smokers and class attendance and life satisfaction before and after the implementation of smoking restrictions. 406 respondents participated in the survey. The life satisfaction questions are inspired by the Turkish Statistical Authority's micro-level dataset but tailored to university students. Respondents were asked about their age, gender, faculty,

scholarship situation, GPA, monthly expenses, enrollment year, and previous residence location. In addition to the students' life satisfaction within the university campus, several questionnaires were used to assess whether the policy change in the university has affected students' campus life satisfaction and, consequently, their attendance at lectures. At the beginning of the survey, overall life satisfaction questions were posed to respondents, and a Likert scale was utilized for both life satisfaction and intensity questions (Likert, 1932). In the life satisfaction questions, a five-point scale was employed, with (2) Dissatisfied, (3) Neutral, and (4) Satisfied as intermediate options between (1) Very Dissatisfied and (5) Very Satisfied. A question to capture how students perceive their future was included to assess their situation in five years, with answers ranging from (1) Significantly better to significantly worse (5), where (2) slightly better, (3) no significant change, and (4) slightly worse were intermediate options. It is important to note that a devastating earthquake occurred in Turkey on February 6, 2023, leading to a shift in university education from face-to-face to online for one semester. Students were asked to respond to the survey for the fall semester of 2021-2022 and the fall semester of 2022-2023 to account for the impact of this earthquake, where both semesters were conducted face-to-face. In the retrospective questions, life satisfaction questions comparing both semesters have been asked in addition to attendance frequency questions. The attendance frequency of each semester was asked on a scale where (1) represents rarely showing up to lectures and (5) represents showing up almost every lecture. Retrospective life satisfaction questions consist of overall life satisfaction, social life satisfaction, health services satisfaction, exhibition and festival satisfaction, food producing facilities satisfaction, satisfaction from the quality of education, transportation services satisfaction, satisfaction from the infrastructure of the university, satisfaction from security staff and satisfaction from the distance of designated smoking areas in addition to smoking intensity and exercise intensity in two different periods.

2.6 Potential Biases

In the study, biases can be encountered due to survey design, which relies on retrospective questions. Retrospective questions inquire about past time. Therefore, individuals might need help recalling past events or behavior. Due to the nature of the retrospective question, bias in the data collection process occurs if the individual

cannot recall accurate information from the past. Also, the Likert scale (Likert, 1932) is utilized during the data collection process which the scale is ordinal and consists of 5 points where (5) stands for “Very Satisfied” and (1) stands for “Very Dissatisfied” with (2) “Satisfied”, (3) “Neutral”, (4) “Dissatisfied” in between. Previous research has found that the ordering of responses on the Likert scale, particularly from “Very Satisfied” to “Very Dissatisfied” or vice versa, can significantly influence the responses of the respondent, which may result in a potential bias (Friedman et al., 1993). Another potential bias may stem from students not being satisfied with the university campus being more likely to respond to the survey to assert their dissatisfaction, especially for the designated smoking areas. A specific incentive approach is employed to prevent sample selection bias and eliminate biases resulting from this situation. In the university where the survey is conducted, students participating in the experiments and surveys for research purposes can receive credits, which can also be reflected on their transcript. This incentive is for students who are both satisfied and dissatisfied with the university campus since it can attract the participation of all types of students, especially students who hold negative and positive opinions about the university campus.

2.7 Descriptive Statistics

Retrospective life satisfaction questions included satisfaction with sports activities, health services, university exhibitions, festivals and concerts, infrastructure, security staff, food facilities, transportation, and satisfaction with designated smoking areas' distance. However, the central questions in the survey were the attendance frequency in both semesters and the students’ smoking behaviors. Table 1 represents the descriptive statistics for smoker and non-smoker students.

Table 1: Descriptive Statistics

	Nonsmoker	**Smoker**	**Obs.**	**Difference (1)-(2)**
	(1) Mean (SD)	(2) Mean (SD)		(3) Estimate
Outcomes:				
Scholarship	4.163	4.027	406	0.244

	(0.084)	(0. 080)		
GPA	2.956 (0.040)	2.643 (0.049)	406	0.313***
Monthly Expense	9070.796 (523.862)	11694.44 (673.341)	406	-2623.648**
Future Satisfaction	3.946 (0.070)	3.944 (0.077)	406	0.002
Overall Life Satisfaction	3.181 (0.062)	3.072 (0.062)	406	0.109
Emotional Wellbeing	2.862 (0.075)	2.755 (0. 078)	406	0.107
Sport Facilities Satisfaction	3.433 (0. 073)	3.244 (0.095)	406	0.189
Policy Satisfaction	3.827 (0.089)	1.983 (0.103)	406	1.844***
Financial Wellbeing	2.942 (0.080)	2.883 (0.091)	406	0.059
Social Life Satisfaction	2.584 (0.079)	2.583 (0.090)	406	0.000

Notes: Statistically significant: *** 1% level; ** 5% level, * 10% level. Standard errors in parenthesis.

There exist 226 non-smokers and 180 smokers in the sample, and as a percentage, 55.67% are non-smokers, and the remaining are smokers. In Table 1, the estimates of the true difference between smokers and non-smokers' CGPA, monthly expense and policy satisfaction are significant. Note that scholarship status is rated between (1) and (5), where 1 represents no scholarship and (5) represents a merit-based scholarship (For detailed descriptive information on scholarship, see appendix). It is interesting to note that non-smoker students have a higher CGPA than smokers. The GPA of non-smoker students is significantly higher than that of the smoker ones, which is relevant to the earlier findings (Cannonier et al., 2019). Thus, the academic outcome of non-smoker students is higher than that of the smoker ones. In the next row, the monthly expense of students with a significant mean can be observed, where smoker students spend much more than non-smokers. Note that the monthly expense of the students was recorded in Turkish Lira, so the difference is equal to 82.95 US Dollars monthly for smoker and non-smoker students. The student's emotional well-being, financial well-being, and life satisfaction are observed in the following rows.

Other satisfaction measures are insignificant except for policy satisfaction, and there is no significant difference between smoker and non-smoker students. However, for the policy satisfaction row, smoker students are less happy with the policy than non-smoker ones, which is expected since the cost of smoking on campus has increased due to the implemented policy. Future satisfaction, overall life satisfaction, sports facilities satisfaction, financial well-being, and social life satisfaction show no difference between the subgroup of smoker and non-smoker students.

Table 2: Descriptive Statistics on satisfaction and attendance before and after policy

	Non-Smoker	**Smoker**	**Obs.**	**Difference (1)-(2)**
	(1) Mean (SD)	(2) Mean (SD)		(3) Estimate
Outcomes:				
Life Satisfaction 2022-2023	3.057 (0.070)	2.900 (0.070)	406	0.157
Life Satisfaction 2021-2022	2.986 (0.079)	2.822 (0.080)	406	0.164
Attendance 2022-2023	4.278 (0.057)	3.833 (0.065)	406	0.445***
Attendance 2021-2022	4.194 (0.065)	3.661 (0.089)	406	0.533***
Activity Satisfaction 2022-2023	2.659 (0.074)	2.588 (0.080)	406	0.070
Activity Satisfaction 2021-2022	2.561 (0.077)	2.622 (0.088)	406	-0.060
Health Service Satisfaction 2022-2023	3.238 (0.080)	3.150 (0.091)	406	0.088
Health Service Satisfaction 2021-2022	3.216 (0.080)	3.155 (0.094)	406	0.061
Festival Satisfaction 2022-2023	2.314 (0.078)	2.327 (0.090)	406	-0.013
Festival Satisfaction 2021-2022	2.380 (0.079)	2.338 (0.094)	406	0.041
Food Facilities Satisfaction 2022-2023	2.570 (0.074)	2.577 (0.085)	406	-0.006
	2.800	2.666	406	0.134

Food Facilities Satisfaction 2021-2022				
	(0.076)	(0.084)		
Security Staff Satisfaction 2022-2023	3.455	3.333	406	0.122
	(0.081)	(0.092)		
Security Staff Satisfaction 2021-2022	3.535	3.316	406	0.218
	(0.079)	(0.095)		
Education Satisfaction 2022-2023	3.584	3.483	406	0.100
	(0.075)	(0.082)		
Education Satisfaction 2021-2022	3.615	3.433	406	0.181
	(0.075)	(0.079)		
Transportation Satisfaction 2022-2023	3.066	3.005	406	0.060
	(0.082)	(0.089)		
Transportation Satisfaction 2021-2022	3.172	3.027	406	0.144
	(0.079)	(0.085)		
Infrastructure Satisfaction 2022-2023	3.433	3.444	406	-0.108
	(0.072)	(0.084)		
Infrastructure Satisfaction 2021-2022	3.495	3.544	406	-0.048
	(0.072)	(0.082)		
Smoking Area Satisfaction 2022-2023	3.606	1.916	406	1.689***
	(0.095)	(0.101)		
Smoking Area Satisfaction 2021-2022	3.384	2.838	406	0.546***
	(0.091)	(0.106)		

Notes: Statistically significant: *** 1% level; ** 5% level, * 10% level. Standard errors in parenthesis.

For a more comprehensive examination of descriptive statistics on attendance and life satisfaction, students' satisfaction levels across different semesters are presented in Table 2. Turning attention to attendance data for both the 2021-2022 and 2022-2023 fall semesters, a clear trend emerges: non-smoker students consistently display significantly higher attendance rates than smoker students. Exploring other satisfaction metrics such as health center satisfaction, infrastructure satisfaction, and security staff satisfaction among subgroup reveals no significant differences. As anticipated, satisfaction with the distance of designated smoking areas exhibits a significant difference within subgroups, with non-smoker students expressing greater contentment with the distance. A closer examination of satisfaction with the distance of smoking areas across semesters reveals an interesting pattern that is non-smoker students express greater satisfaction when smoking areas are situated farther away,

indicating a preference for a more stringent policy implemented during the 2022-2023 period. In contrast, smoker students demonstrate a decrease in satisfaction levels during the 2022-2023 fall semester compared to the previous year, 2021-2022.

Table 3: Descriptive Statistics

	Low-Intensity	**High-Intensity**	**Obs.**	**Difference (1)-(2)**
	(1) Mean (SD)	(2) Mean (SD)		(3) Estimate
Outcomes:				
Scholarship	4.030 (0.108)	4.025 (0.119)	180	0.005
GPA	2.721 (0.064)	2.546 (0.075)	180	0.174*
Monthly Expense	11250 (897.175)	12250 (1021.525)	180	-1000
Future Satisfaction	3.810 (0.108)	4.112 (0. 108)	180	-0.302**
Overall Life Satisfaction	3.160 (0.074)	2.962 (0.104)	180	0.197
Emotional Wellbeing	2.740 (0.101)	2.775 (0.123)	180	-0.035
Sport Facilities Satisfaction	3.390 (0.127)	3.062 (0. 141)	180	0.327*
Policy Satisfaction	2.250 (0.145)	1.650 (0.136)	180	0.600**
Financial Wellbeing	3.010 (0.122)	2.725 (0.135)	180	0.285
Social Life Satisfaction	2.690 (0.115)	2.450 (0.142)	180	0.240

Notes: Statistically significant: *** 1% level; ** 5% level, * 10% level. Standard errors in parenthesis.

The same analysis was also conducted on smokers, where smokers were divided into two, high-intensity and low-intensity smokers. 100 students are light smokers, and the remaining are heavy smokers. It is observed that there are also differences between a heavy smoker and a light smoker. In Table 3, comparing non-smoker and smoker

differences, the GPA of light smokers is significantly higher than that of heavy smokers. At the same time, there is no significant difference in monthly expenses. However, there is a significant difference in the Future Satisfaction row. Future Satisfaction captures how students perceive their future within a range of significantly better (5), slightly better (4), no change (3), slightly worse (2) and significantly worse (1). Interestingly, heavy smokers are hopeful for the future more than light smokers. By theoretical analysis, Becker et al. (1991) suggested that poorer and younger individuals are likely to discount the future more when perceived as myopic since they do not care about the consequences of their actions. In this context, it is expected that heavy smokers will be more hopeful about the future and, adjust their behavior in a more optimistic behavior and smoke more compared to individuals who are more concerned about their future. Lastly, as expected, heavy smokers are less satisfied with the policy than light smokers. A t-test was conducted on retrospective questions between light and heavy smokers for more detailed descriptive statistics. It is observed that the difference between life satisfaction in the academic year 2022-2023 is significantly different within the two groups, where heavy smokers are less satisfied with their lives.

Table 4: Descriptive Statistics on satisfaction and attendance before and after policy

	Low Intensity	**High Intensity**	**Obs.**	**Difference (1)-(2)**
	(1) Mean (SD)	(2) Mean (SD)		(3) Estimate
Outcomes:				
Life Satisfaction 2022-2023	3.040 (0.094)	2.725 (0.105)	180	0.315**
Life Satisfaction 2021-2022	2.850 (0.110)	2.787 (0.116)	180	0.062
Attendance 2022-2023	3.860 (0.091)	3.800 (0.093)	180	0.060
Attendance 2021-2022	3.740 (0.127)	3.562 (0.123)	180	0.177
Activity Satisfaction 2022-2023	2.790 (0.103)	2.337 (0.120)	180	0.452***
Activity Satisfaction 2021-2022	2.740	2.475	180	0.265

	(0.116)	(0.134)		
Health Service Satisfaction 2022-2023	3.290	2.975	180	0.315*
	(0.124)	(0.130)		
Health Service Satisfaction 2021-2022	3.270	3.012	180	0.257
	(0.130)	(0.133)		
Festival Satisfaction 2022-2023	2.560	2.037	180	0.522***
	(0.125)	(0.123)		
Festival Satisfaction 2021-2022	2.570	2.050	180	0.520***
	(0.132)	(0.128)		
Food Facilities Satisfaction 2022-2023	2.610	2.537	180	0.072
	(0.111)	(0.133)		
Food Facilities Satisfaction 2021-2022	2.770	2.537	180	0.232
	(0.110)	(0.128)		
Security Staff Satisfaction 2022-2023	3.520	3.100	180	0.420**
	(0.125)	(0.135)		
Security Staff Satisfaction 2021-2022	3.540	3.037	180	0.502***
	(0.126)	(0.139)		
Education Satisfaction 2022-2023	3.660	3.262	180	0.397**
	(0.100)	(0.131)		
Education Satisfaction 2021-2022	3.500	3.350	180	0.150
	(0.110)	(0.114)		
Transportation Satisfaction 2022-2023	3.130	2.850	180	0.280
	(0.120)	(0.132)		
Transportation Satisfaction 2021-2022	3.180	2.837	180	0.342**
	(0.114)	(0.126)		
Infrastructure Satisfaction 2022-2023	3.550	3.312	180	0.237
	(0.110)	(0.129)		
Infrastructure Satisfaction 2021-2022	3.610	3.462	180	0.147
	(0.110)	(0.124)		
Smoking Area Satisfaction 2022-2023	2.310	1.425	180	0.885***
	(0.150)	(0.104)		
Smoking Area Satisfaction 2021-2022	3.040	2.587	180	0.452**
	(0.142)	(0.155)		

Notes: Statistically significant: *** 1% level; ** 5% level, * 10% level. Standard errors in parenthesis.

Analyzing students' life satisfaction during the 2021-2022 fall semester reveals that light smokers exhibit significantly higher life satisfaction levels than smokers. The observed distinction in satisfaction levels can be attributed to various factors. One

plausible explanation is the university's decision during the 2021-2022 semester to implement designated smoking areas along sidewalks, aiming to discourage students from smoking in close proximity to faculty buildings. This is in line with the literature since it is suggested that people who are likely to be depressive smoke more (Bauer et al., 2007). Additionally, it is observed that heavy smokers are significantly different from light smokers in terms of satisfaction with activities on university campuses. It is also an expected outcome because activities are associated with social life, and smoking is perceived as socialization for students. Therefore, with a restrictive policy, students became less satisfied with activities. The same argument applies to festival satisfaction, where heavy smokers are not satisfied with the university festivals for two periods. Different from smoker and non-smoker comparison, heavy smokers are not happy with security staff as much as light smokers. Securities around campus are fining students who are smoking out of designated smoking areas, and disciplinary action is taken for those students, and heavy smokers are likely to receive a smoking fine rather than a light smoker. Therefore, it is expected that heavy smokers will complain about security staff at the university campus. Also, heavy smokers are not satisfied with the education in the 2022-2023 fall semester compared to light smokers. Additionally, the satisfaction level of the designated area significantly differs between heavy and light smokers. In all significantly different satisfaction metrics between light smokers and heavy smokers, the satisfaction level of heavy smokers is less than that of light smokers. This finding is in line with the literature; life satisfaction was found to be negatively associated with smoking (Grant et al., 2009).

Furthermore, out of the 406 surveyed students, 196 are male, and 210 are female. Among these students, there are 115 female smokers and 111 male smokers. In the fall semester of 2021-2022, 55.6% of the students are non-smokers, whereas 28.3% of them female students. The bar chart below shows the smoking intensity of male and female students in two different periods. We plotted two different bar charts to distinguish students whose faculty buildings are farther away from designated smoking areas from students whose faculty buildings are closer to smoking areas than the mean distance. The percentage of female low-smoker students is more than that of male students in two periods when the faculty building is closer than the median distance. However, when the faculty building is further away from the designated

smoking area, more than the median distance, we observe that the percentage of female low smokers is smaller than males. We also observe a similar pattern for moderate smokers when the distance is smaller than the mean distance. However, even when the distance is greater than the mean distance, the percentage of female moderate smokers is higher than that of male students. When the distance is smaller than the mean distance, the percentage of male students is higher for high-intensity smokers, and the case is the opposite when the distance is higher than the mean distance. Moreover, the case is the same for students whose smoking intensity is very high. In conclusion, where the distance is greater in both men and women, there is a decrease in very high smoking intensity between periods. There is also a decrease in high intensity in female students within semesters.

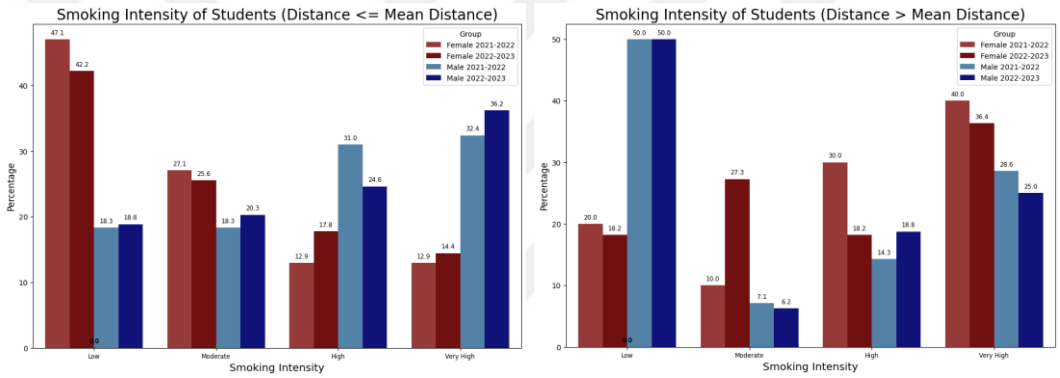


Figure 2: Descriptive bar charts for the smoker students

Note: The bar charts represent smoker students' smoking intensity, and separate graphs show students whose faculty building is greater or smaller than the median distance. The mean distance is 293 meters.

One possible explanation for this phenomenon lies in the gender differences identified by Bauer et al. (2007) regarding smoking behavior. The study in Germany indicates that females tend to smoke less than males, a pattern attributed to core characteristics. The empirical analysis conducted by Bauer et al. (2007) suggests that most of these gender differences can be elucidated by the distinct behaviors exhibited by females and males. Due to the findings above, the level of smoking intensity of genders motivates an analysis within genders. Slight changes happened within two periods regarding smoking intensity and number of smokers.

The survey included questions about students' earlier locations in the quest for a more comprehensive understanding of demographic information. In analyzing the pre-university origin of the surveyed students, it is observed that 207 students originate from either the Ankara or Konya sub-regions, aligning with expectations given the university's location in Ankara. Subsequently, the majority come from the Istanbul, İzmir, Aydın, and Manisa sub-regions, and the remaining students are attending the university from various cities; the detailed location of students can be observed in the Appendix, Table 9. Moreover, out of 406 students surveyed, 204 reside in dormitories, living independently or with friends, while the remaining 202 live with their families. Among those residing with their families, 87 are smokers, compared to 93 among those not living with their families. Despite this marginal difference, there is a tendency for students not living with their families to have a higher prevalence of smoking. One possible explanation for this trend is that parents generally hold a negative attitude towards smoking, which may dissuade their children from smoking.

Additionally, the analysis used the decision tree method to understand better the general picture of descriptive statistics and which inputs affect attendance change. The change between the 2021-2022 fall semester and the 2022-2023 fall semester was calculated to predict the change in class attendance within the semesters. The variables that predict attendance change are identified as the attendance of the fall semester of the 2021-2022 academic year, satisfaction with the distance of the smoking areas, GPA, and education satisfaction through the implemented feature selection algorithm. The algorithm utilizes data from the 2021-2022 fall semester that includes attendance, change in satisfaction with distance from designated smoking areas between the 2021-2022 fall semester and 2022-2023 fall semester, and GPA to predict attendance changes of the students. An encoding has been executed to explain further the variables used to make the prediction. If the value belonging to the 2021-2022 fall semester is greater than the 2022-2023 fall semester, it is encoded as 1; if it is less than the 2022-2023 fall semester value, it is encoded as two; and finally, if the values are equal, it is encoded as 0. This encoding only affects the change in distance satisfaction from the selected features, but the encoding has been executed on all variables in the codebase.

70% of the dataset serves as the training set, with the remaining 30% as the test set, and the accuracy of the decision tree is calculated as 0.74 by the algorithm itself, which is considered satisfactory. The node on top of the tree represents the class attendance for the training sample in the 2021-2022 semester. The tree is divided into two: the left-sided arrow is “True” if the condition given in the node is correct, and the right-sided arrow is “False” if the condition is wrong. The left node following the left arrow represents class attendance intensity ranging between 1 and 3 in the 2021-2022 semester, and the right leaf indicates an intensity of 4 or 5, indicating frequent class attendance.

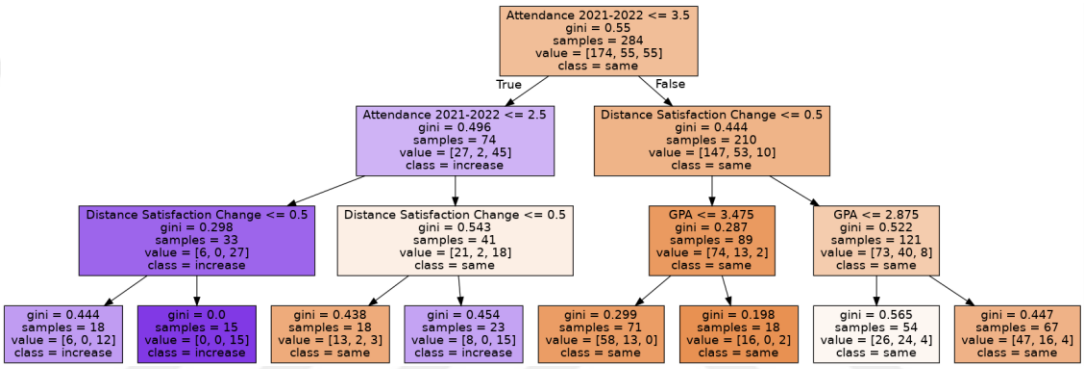


Figure 3: Decision Tree

Note that the algorithm trained on the dataset corresponds to 284 data instances. The vector “value” stands for the change in class attendance between two semesters, where the first entry represents no change in class attendance, the second represents a decrease in class attendance, and the last represents an increase in class attendance. The “class” denotes the entry with the highest value in the “value” vector. In the context of the decision tree algorithm, “Gini” refers to the Gini impurity, which measures how often an element from a set chosen randomly would be mislabeled. In this context, Gini is a standard criterion for the best split for each note. The lower Gini can be interpreted as more effective in terms of separating the nodes of the tree. Gini impurity typically ranges between 0 and 0.5 and tends to be higher when the elements of the tree are more spread out. Unfortunately, the sample size is small, and a small sample size can lead to impurity in the decision tree.

In the first node of the decision tree, the attendance level remained the same for 174 students, decreased for 55 students, and increased for the remaining 55 students

during the 2022-2023 academic year. On the left-hand side of the decision tree, out of 74 students whose attendance intensity ranged between 1 and 3, attendance increased for 45 students and remained the same for 27 students. Two students' attendance frequency remained unchanged, ranging between 1 and 3. Among these 74 students, 33 have an attendance frequency ranging between 1 and 2, and 41 have an attendance frequency ranging between 1 and 3. For the 33 students whose intensity ranges between 1 and 2, 27 experienced an increase in the attendance level during the 2022-2023 academic year, while for 6 of them, the attendance level stayed the same. Regarding the 41 students whose intensity ranges between 1 and 3, attendance frequency stayed the same for most of them, while it increased for 18. For the students whose attendance level is between 1 and 2, distance satisfaction from designated smoking areas changed for 18 of them and stayed the same for 15 of them. Even though their satisfaction with the policy varies, most students experienced an increased attendance level in the 2022-2023 academic year. Notably, all the students who were satisfied with the policy change saw an increase in attendance. At the same time, it remained the same for the students whose satisfaction with designated smoking areas did not change. Similarly, for the students whose attendance frequency ranges between 1 and 3, satisfaction with the policy did not change for 18 of them and changed for 23 of them. Among the students whose satisfaction level changed, most increased their attendance frequency in the 2022-2023 academic year. However, for the students whose satisfaction level did not change, the majority had their attendance level remain the same. Returning to the first node at the top of the decision tree, for the 210 students whose attendance frequency ranges between 4 and 5, meaning that the students already have high attendance frequency in the 2021-2022 academic year, there was no significant change in their attendance frequency. However, for 10 of them, attendance frequency increased. Similarly, to the left-hand side of the decision tree, on the right-hand side, satisfaction with the distance of designated smoking areas changed for 121 students and remained the same for 89 students. Unlike the left-hand side, most people's attendance frequency in the 2022-2023 academic year remained the same. Moreover, of the students whose satisfaction with the policy did not change, 71 had a CGPA lower or equal to 3.475 out of 4.00, and 18 had a CGPA higher than 3.475. Among the 71 students whose CGPA is lower than 3.475, 13 decreased their attendance frequency in the 2022-2023 academic year, and none of the students decreased their attendance level whose CGPA is over 3.475. For the 121 students

whose satisfaction with the policy changed, most did not experience a change in attendance level, but for 40 of them, attendance decreased. Even though most students' attendance levels remained the same, the number of students whose attendance level decreased is significantly higher than those whose satisfaction level did not change. Among the 121 students whose satisfaction level changed, 54 have a CGPA lower or equal to 2.875 out of 4.00, and 67 have a CGPA higher than 2.875. Among those 54 students, 26 did not change their attendance frequency, but 24 decreased their attendance level. Similarly, among the 67 students, 47 did not change their attendance frequency, but 16 decreased their attendance level, while 4 increased their attendance.

All in all, for students whose attendance was lower in the academic year 2021-2022, the attendance level increased. It almost stayed the same for students whose attendance frequency was already higher. This can be observed by looking at the leaves on the left and right sides. The left side shows students with lower attendance intensity, and the right side shows students with higher attendance intensity. Also, another critical remark is that among the students whose attendance level is lower compared to others, the ones whose satisfaction from the designated smoking areas has changed (Distance Satisfaction Change > 0.5) increased their attendance level in the 2022-2023 academic year, which is in line with the framework since it is expected to see that the policy increased the attendance level of the students. Moreover, the extended decision tree in the appendix can be examined for a detailed analysis, and the tree unfolds similarly.

CHAPTER 3

IDENTIFICATION AND RESULTS

3.1 Identification Strategy

In the identification strategy section, the aim is to introduce identification strategy and verify the validity of identification strategy. For empirical purposes, retrospective questions have been categorized into “before policy” and “after policy” to evaluate the temporal impact on student attendance change. Before the policy implementation, the distance to smoking areas was homogenous and close to zero.

Table 5: Faculty names and distance to designated smoking areas

Faculty	Distance	Student
Faculty of Applied Science	170	13
Faculty of Art, Design and Architecture	150	33
Faculty of Business Administration	280	22
Faculty of Economics, Administrative and Social Sciences	290	191
Faculty of Engineering	430	80
Faculty of Humanities and Letters	290	23
Faculty of Law	210	15
Faculty of Music and Performing Arts	140	1
Faculty of Science	215	28
Total		406

After the policy implementation, the distance between the faculty buildings and designated smoking areas increased. However, the distance varies among faculty buildings. Table 5 presents increased distance from a faculty to a designated smoking area due to policy along with number of students from that faculty in our sample. The variation in increased distance to designated smoking areas results in a heterogeneous treatment effect for students based on their faculties as the price increase of addictive good in our model is contingent on the distance to the designated smoking areas. The underlying assumption is that by calculating the attendance change of students between two semesters, we can estimate whether the increased distance to designated smoking areas has a causal effect on student attendance. We model student attendance as a function of individual fixed effect stemming from intrinsic individual motivation for attendance, faculty fixed effect due to faculty related policies on attendance, a time effect that may influence student attendance over time and a heterogeneous policy effect based on time and distance to smoking areas. The following equation incorporates our assumptions:

$$a_{ist} = \alpha_i + \gamma_s + \lambda_t + \delta F_s d_t + \epsilon_{ist} \tag{7}$$

Where i denotes individual, s denotes faculty and t denotes period where $t \in \{0,1\}$ and $t = 0$ denotes before policy and $t = 1$ denotes after policy. a is the attendance, γ represents faculty fixed effect and α represents individual fixed effect. λ is time fixed effect and $d_t = 0$ if $t = 0$ and $d_t = 1$ if $t = 1$. Finally, F is the distance of designated smoking areas to faculty buildings in t=1. When we first difference the equation (7) we get:

$$a_{is1} - a_{is0} = (\lambda_1 - \lambda_0) + \delta F_s + \eta_{is} \tag{8}$$

Therefore, the first differenced equation (7) accounts for individual and faculty fixed effects and δ is the causal effect of increased distance on attendance. In the conditional probability case, it is easier to see that:

$$\mathbb{E}[a_{is1} \mid d_t = 1] = \alpha_i + \gamma_s + \lambda_1 + \delta \tag{9}$$

$$\mathbb{E}[a_{is0} \mid d_t = 0] = \alpha_i + \gamma_s + \lambda_0 \quad (10)$$

Notice that (9)-(10) gives $(\lambda_1 - \lambda_0) + \delta$, where $(\lambda_1 - \lambda_0)$ is a constant which measures the effect of time on attendance and δ is the causal effect of distance on attendance change.

Caner, Derebasoglu and Okten (2023) measure the causal effect of higher education attainment by using exposure of university expansion policy by exploiting the spatial and temporal variations. In this study, as an alternative specification similar to Caner et al. (2023), instead of modeling individual fixed effects and accounting for them via first differencing, we estimate the following difference in differences model.

$$a_{ist} = \gamma_s + \beta_1 d_t + \beta_2 F_s d_t + \beta_3 w_i + \varepsilon_{ist} \quad (11)$$

The linear probability model investigates the heterogenous impact of smoking policy by the distance of the designated smoking areas to faculty buildings. γ_s denotes faculty fixed effect W denotes gender which is a binary variable and $w = 1$ if the individual is female and $w = 0$ if the individual is male. All other variables represent the same variable from above equations. For the verification of identification strategy, we aim to show that the policy is uncorrelated with the factors that might affect attendance are not correlated with the policy. To do this, satisfaction measures can be used that has effect on attendance frequency of students.

3.2 Results

We first estimate equation (8). The constant in the regression accounts for a fixed effect. Therefore, attendance change is also estimated by using the constant only to see the effect of time on attendance change. According to equation 8, the estimated constant in the regression is the OLS estimate, which is the effect of time on change in attendance. Therefore, it is possible to observe whether attendance decreases or increases after the policy implementation. When attendance change is regressed on constant, it is regressed on alone, which is actually the time effect. The estimation is done for all students and then for smokers and nonsmokers to see whether there is a

difference between smokers and nonsmoker students in terms of attendance change. The constant is significant and positive for the whole sample, meaning that attendance has increased in the post-policy period. Since the variable distance is constructed within the study, it is open to manipulation. However, attendance increases post-policy even without using distance as an explanatory variable. For nonsmoker students, there is no significance, but for smoker students, the constant itself is significant and positive, which supports the above argument. However, if we only rely on a constant to measure the effect of policy on attendance change, this variable would measure both the effect of policy and the effect of time since we only have two periods. Hence, it is essential to differentiate the effect of policy according to the heterogeneity of distance to smoking areas to identify the effect of policy without the confounding effect of time. When distance is added to estimation according to equation 8, we observe that distance is positive and significant. Hence, attendance increased for students further away from designated smoking areas in the post-policy period. We observe the coefficient on the constant term, which is the effect of time for students since distance is zero (in other words, if distance has not increased in the policy period, the coefficient on constant would measure the effect of only time). One possible explanation for a negatively significant constant is that smoker students would attend classes less than they would do if the policy had not been implemented. Therefore, the policy is beneficial for increasing the attendance of the smoker students. Therefore, the distance of designated smoking areas has a causal effect on the attendance change of the smoker students. As implied by the theoretical framework, when the cost of socialization increased i.e., the price of socialization set higher; smoker students increase their attendance. However, we observe no significance for the whole sample and nonsmoker students. One implication according to theoretical framework is that the case is moderate smoking intensity case. In the moderate smoking intensity case, nonsmoker students increase increase their attendance as a result of an increment in the price of socialization.

Table 6: Regression results

	(1)	(2)	(3)	(4)	(5)	(6)
	Whole Sample		**Nonsmoker**		**Smoker**	
Dependent Variable	Attendance Change	Attendance Change	Attendance Change	Attendance Change	Attendance Change	Attendance Change

Distance		0.000916		0.000265		0.00268**
		(0.000655)		(0.000823)		(0.00116)
Constant	0.123**	-0.146	0.0841	0.00114	0.172**	-0.554*
	(0.0532)	(0.200)	(0.0692)	(0.266)	(0.0829)	(0.325)
Observations	406	406	226	226	180	180
R-squared	0.000	0.005	0.000	0.000	0.000	0.029

Notes: Statistically significant: *** 1% level; ** 5% level, * 10% level. Standard errors in parenthesis.

Additionally, equation (11) is estimated as an alternative identification. The methodology is similar to Caner et al. (2023), Card (1992), Duflo (2001), Berlinski et al. (2009) and Müller and Wrohlich (2020). The estimation is done for the whole sample, including nonsmoker and smoker students. In this estimation methodology, the individual characteristics are modelled instead of making the first difference. Distance is the heterogeneous treatment and differs across faculty buildings. Therefore, we add faculty dummies to the estimation. For nonsmoker students, no significant coefficient exists. However, we observe that the interaction variable where distance interacts with a post-policy period is significant and positive. One can interpret that coefficient as the attendance frequency of smoker students increased in the post-policy period. This methodology's results align with the first methodology, where equation (8) is estimated. Therefore, it is also consistent with our theoretical framework.

Table 7: Regression results

	(1)	(2)	(3)
	Whole Sample	**Nonsmoker**	**Smoker**
Dependent Variable	Attendance	Attendance	Attendance
Post Policy	-0.0735	0.105	-0.554
	(0.262)	(0.325)	(0.434)
Distance*Post Policy	0.000669	-6.6405	0.00268*
	(0.000858)	(0.00100)	(0.00155)
Female	-0.0340	-0.0621	-0.120
	(0.0766)	(0.0955)	(0.119)
Constant	3.767***	4.117***	2.830***
	(0.149)	(0.169)	(0.289)
Observations	812	452	360
R-squared	0.025	0.036	0.063

Notes: Faculty dummies and dummy for university duration of students (in year) are included. Statistically significant: *** 1% level; ** 5% level, * 10% level. Standard errors in parenthesis.

The same equations are estimated with *Smoking Intensity* as a dependent variable to measure the increased distance's effect on smoking intensity in students. Smoking Intensity is only observed for the students who are smokers. Therefore, the estimations are done within the smoker students. In the first estimation of Table 8, the constant is not significant, and the smoking intensity of students does not change between the two periods. When we include distance in equation 2, we observe that the coefficient on this term is negative and significant, implying that smoking intensity decreases for students with higher distance to smoking areas in the post-policy period. Therefore, we conclude that attendance frequency increased and smoking intensity decreased for the smoker students, which also aligns with the theoretical framework.

Table 4: Regression results

	(1)	(2)
	Smoker	
Dependent Variable	Smoking Intensity Change	Smoking Intensity Change
Distance		-0.00206**
		(0.00101)
Constant	-0.0389	0.519*
	(0.0715)	(0.281)
Observations	180	180
R-squared	0.000	0.023

Notes: Statistically significant: *** 1% level; ** 5% level, * 10% level. Standard errors in parenthesis.

In Table 9, while the smoking intensity varies for smoker students, it is 0 for Nonsmoker students. Therefore, regression is done for smoker students only. We observe that interaction of distance with policy variable is negative though insignificant which is consistent with our result in Table 8. In other words, policy seems to have decreased smoking intensity of smokers, which is also expected by the theoretical framework.

Table 9: Regression results

	(1)
	Smoker
Dependent Variable	Smoking Intensity

Policy	0.519
	(0.486)
Distance*Post Policy	-0.00206
	(0.00174)
Female	-0.615***
	(0.133)
Constant	1.806***
	(0.324)
Observations	360
R-squared	0.151

Notes: Faculty dummies and dummy for university duration of students (in year) are included. Statistically significant: *** 1% level; ** 5% level, * 10% level. Standard errors in parenthesis.

Table 10 verifies the identification strategy by illustrating the correlation between attendance-affecting factors and distance, reflecting policy influence.

Table 10: Exogeneity of policy

Dependent Variable	Distance
Monthly Expense	0.062
	(0.936)
University Duration	-0.316
	(1.406)
Overall Life Satisfaction	-0.625
	(2.666)
Emotional Wellbeing	-0.737
	(0.898)
Financial Wellbeing	0.455
	(0.835)
Experience Satisfaction	0.198
	(2.985)
Social Life Satisfaction	1.467
	(1.135)
Future Satisfaction	-0.681
	(0.831)
Life Satisfaction	1.349
	(0.829)
Activities Satisfaction	0.540
	(0.588)
Festival Satisfaction	0.726
	(0.657)
Food Facilities Satisfaction	1.104
	(2.035)
Education Satisfaction	-0.694
	(0.529)
Security Satisfaction	-0.634
	(0.515)
Infrastructure Satisfaction	-0.509
	(0.588)
Sport Facilities Satisfaction	0.505
	(0.992)
Health Service Satisfaction	-0.123

	(0.841)
Exercise Intensity	-0.893 (1.096)
Scholarship	0.603 (0.786)
Transportation Satisfaction	-0.324 (0.843)
Policy Satisfaction	0.738 (0.562)
Wi-Fi Satisfaction	-0.825 (-0.825)
Distance Satisfaction	0.300 (1.107)
Smoking Intensity	-0.129 (0.596)
GPA	2.737* (1.347)
Observations	406

Notes: Each specification controls for a constant in addition to independent variable and each cell denotes coefficient estimate from the regression analysis. Dependent and independent variables are given in the associated column and row. Note that Distance divided by 100 and Monthly Expense is divided by 1000 due to high volume of variable. The number of observations is 9 (number of faculty in the university). Statistically significant: *** 1% level; ** 5% level, * 10% level. Standard errors in parenthesis.

In Table 10, we examine the exogeneity of policy. We show that factors that might affect attendance are uncorrelated with the policy. However, GPA is significant at the margin. For ethical reasons, the survey did not include a specific question about the student's GPA for two semesters. Therefore, we do not have the exact GPA for the given semesters, but we have an interval for the latest GPA achieved.

Also, we estimated several placebo regressions by our identification methods using the satisfaction measures level of the students and observed no significance. For detailed estimation results, please see Appendix.

Finally, according to first identification, we found that as distance increases, change of distance satisfaction between two periods increases for the whole sample but we do not observe any other significance for distance.

Table 18: Estimation for distance satisfaction by first method

	(1)	(2)	(3)	(4)	(5)	(6)
	Whole Sample		**Nonsmoker**		**Smoker**	
Dependent Variable	Distance Change Satisfaction	Distance Change Satisfaction	Distance Change Satisfaction	Distance Change Satisfaction	Distance Change Satisfaction	Distance Change Satisfaction

Distance		0.00188*		-0.000906		0.00184
		(0.00110)		(0.00135)		(0.00180)
Constant	-0.286***	-0.837**	0.221*	0.504	-0.922***	-1.420***
	(0.0892)	(0.334)	(0.114)	(0.439)	(0.127)	(0.502)
Observations	406	406	226	226	180	180
R-squared	0.000	0.007	0.000	0.002	0.000	0.006

We observe that there is no significance for life satisfaction when we estimate the same equation.

Table 19: Estimation for life satisfaction by first method

	(1)	(2)	(3)	(4)	(5)	(6)
	Whole Sample		**Nonsmoker**		**Smoker**	
Dependent Variable	Life Satisfaction Change	Life Satisfaction Change	Life Satisfaction Change	Life Satisfaction Change	Life Satisfaction Change	Life Satisfaction Change
Distance		0.000245		0.00119		-0.00144
		(0.000820)		(0.00108)		(0.00138)
Constant	-0.0739	-0.146	-0.0708	-0.443	-0.0778	0.311
	(0.0665)	(0.250)	(0.0912)	(0.350)	(0.0973)	(0.386)
Observations	406	406	226	226	180	180
R-squared	0.000	0.000	0.000	0.005	0.000	0.006

The coefficient for the satisfaction from designated smoking areas is negative and significant for whole sample and smoker students as expected, but we do not observe any other significance for nonsmoker students.

Table 28: Estimation for distance satisfaction by alternative method

	(1)	(2)	(3)
	Whole Sample	**Nonsmoker**	**Smoker**
Dependent Variable	Distance satisfaction	Distance satisfaction	Distance satisfaction
Post Policy	-0.912**	0.313	-1.420**
	(0.392)	(0.493)	(0.579)
Distance * Post Policy	0.00213*	-0.000292	0.00184
	(0.00128)	(0.00152)	(0.00207)
Female	0.155	0.0177	0.138
	(0.114)	(0.144)	(0.158)
Constant	3.321***	3.546***	2.363***
	(0.157)	(0.166)	(0.312)
Observations	812	452	360
R-squared	0.047	0.039	0.128

Notes: Faculty dummies and dummy for university duration of students (in year) are included. Statistically significant: *** 1% level; ** 5% level, * 10% level. Standard errors in parenthesis.

The estimation result of life satisfaction by using alternative method is similar to first method. We do not observe a significance for any coefficient.

Table 29: Estimation for life satisfaction by alternative method

	(1)	(2)	(3)
	Whole Sample	**Nonsmoker**	**Smoker**
Dependent Variable	Life satisfaction	Life satisfaction	Life satisfaction
Post Policy	0.113	0.360	-0.311
	(0.282)	(0.399)	(0.425)
Distance * Post Policy	-0.000131	-0.000925	0.00144
	(0.000924)	(0.00123)	(0.00152)
Female	0.0166	0.0639	-0.0591
	(0.0822)	(0.116)	(0.116)
Constant	2.962***	3.055***	2.588***
	(0.113)	(0.135)	(0.228)
Observations	812	452	360
R-squared	0.006	0.018	0.024

Notes: Faculty dummies and dummy for university duration of students (in year) are included. Statistically significant: *** 1% level; ** 5% level, * 10% level. Standard errors in parenthesis.

3.3 Heterogeneity Analysis

Equation (8) and equation (11) are estimated for male and female separately to conduct heterogeneity analysis within genders.

Table 11: Heterogeneity analysis for first identification strategy

WOMEN						
	(1)	(2)	(3)	(4)	(5)	(6)
	Whole Sample		**Nonsmoker**		**Smoker**	
Dependent Variable	Attendance change	Attendance change	Attendance change	Attendance change	Attendance change	Attendance change
Distance		0.00194**		0.00103		0.00349**
		(0.000979)		(0.00131)		(0.00156)
Constant	0.233***	-0.284	0.252**	-0.0377	0.211**	-0.665
	(0.0694)	(0.270)	(0.0963)	(0.380)	(0.100)	(0.404)
Observations	210	210	115	115	95	95
R-squared	0.000	0.019	0.000	0.005	0.000	0.051
MEN						
	(1)	(2)	(3)	(4)	(5)	(6)
	Whole Sample		**Nonsmoker**		**Smoker**	
Dependent Variable	Attendance change	Attendance change	Attendance change	Attendance change	Attendance change	Attendance change

Distance		0.00131		0.00144		0.00280
		(0.000982)		(0.00119)		(0.00187)
Constant	0.00510	-0.416	-0.0901	-0.589	0.129	-0.687
	(0.0807)	(0.327)	(0.0971)	(0.423)	(0.136)	(0.563)
Observations	196	196	111	111	85	85
R-squared	0.000	0.009	0.000	0.013	0.000	0.026

Notes: Statistically significant: *** 1% level; ** 5% level, * 10% level. Standard errors in parenthesis.

In Table 11, regression is estimated for men and women separately. We observe that for women, the constant is significant in all groups, and the coefficient for Distance is significant for the whole sample and smoker students. This finding for women aligns with the original estimation, and there is no significance for the men, but the coefficients' signs are consistent with the main findings. The insignificant coefficients may be due to the number of observations since when we restrict the sample, the number of observations decreases dramatically. In Table 12, smoking intensity change decreases with the Distance for women, similar to the main findings. Also, the sign of the coefficients is similar for men, but we observe insignificant coefficients.

Table 12: Heterogeneity analysis for first identification strategy

WOMEN		
	(1)	(2)
	Smoker	
Dependent Variable	Smoking Intensity change	Smoking Intensity change
Distance		-0.00296**
		(0.00138)
Constant	0.0947	0.837**
	(0.0886)	(0.357)
Observations	95	95
R-squared	0.000	0.047
MEN		
	(1)	(2)
	Smoker	
Dependent Variable	Smoking Intensity change	Smoking Intensity change
Distance		-0.000470
		(0.00158)
Constant	-0.188*	-0.0510
	(0.113)	(0.474)
Observations	85	85
R-squared	0.000	0.001

Notes: Statistically significant: *** 1% level; ** 5% level, * 10% level. Standard errors in parenthesis.

Table 13 represents the results for alternative identification both for men and women. Even if there is no significance of the given variables, the sign of the coefficients are the same with the main findings.

Table 13: Heterogeneity analysis for alternative identification strategy

	(1)	(2)	(3)	(4)	(5)	(6)
	Women	Men	Women	Men	Women	Men
	Whole Sample		**Nonsmoker**		**Smoker**	
Dependent Variable	Attendance	Attendance	Attendance	Attendance	Attendance	Attendance
Post Policy	-0.126	-0.416	0.195	-0.589	-0.665	-0.687
	(0.363)	(0.419)	(0.437)	(0.555)	(0.586)	(0.664)
Distance*Post Policy	0.00134	0.00131	0.000205	0.00144	0.00349	0.00280
	(0.0013)	(0.00126)	(0.00150)	(0.00156)	(0.00226)	(0.00221)
Constant	3.376***	4.048***	4.142***	4.076***	1.983***	3.548***
	(0.262)	(0.190)	(0.298)	(0.217)	(0.604)	(0.364)
Observations	420	392	230	222	190	170
R-squared	0.057	0.048	0.082	0.052	0.161	0.131

Notes: Faculty dummies and dummy for university duration of students (in year) are included. Statistically significant: *** 1% level; ** 5% level, * 10% level. Standard errors in parenthesis.

The sign of the coefficients is the same for women compared to main findings in Table 14. We observe that Post Policy has negative coefficient for men but it is insignificant and the rest of the table is similar to main results.

Table 14: Heterogeneity analysis for alternative identification strategy

	(1)	(2)
	Women	Men
	Smoker	
Dependent Variable	Smoking Intensity	Smoking Intensity
Post Policy	0.837	-0.0510
	(0.654)	(0.791)
Distance*Post Policy	-0.00296	-0.000470
	(0.00253)	(0.00263)
Constant	1.734**	1.651***
	(0.674)	(0.434)

Observations	190	170
R-squared	0.162	0.123

Notes: Faculty dummies and dummy for university duration of students (in year) are included. Statistically significant: *** 1% level; ** 5% level, * 10% level. Standard errors in parenthesis.

The coefficients in Tables 11, 12, 13, and 14 are consistent with the estimation results. However, there is variability within genders since we observed that female students responded to change more than male encounters.

CHAPTER 4

CONCLUDING REMARKS

Several restrictions were placed on a university campus in the 29th September 2022-2023 academic year. Restrictions narrowed common smoking spots and moved them further away from faculty buildings. As smoking areas moved further away from faculties, smoking became more costly for students. In addition, since smoking is perceived as a socialization tool (Cutler et al., 2010), socialization areas have decreased on campus, as smoking is associated with socialization and interaction between students on university campuses. We designed a game setting to show how the price of socialization affects lecture attendance and socialization of students having different smoking intensities. Using a natural experiment, we analyze the testable implications of the game, such as for which group of students' attendance increased or stayed the same. We received responses from 406 students through a retrospective survey administered to students in the fall semester of 2024. In the questionnaire, we asked questions about life satisfaction inspired by TURKSTAT's survey questions. Together with this, we asked students how the number of cigarettes they consume daily changed between the 2021-2022 and 2022-2023 fall semesters. We found several differences between nonsmoker and nonsmoker students regarding life satisfaction, campus satisfaction and policy satisfaction. We also did a similar analysis between light smokers and heavy smokers. We found that heavy smokers are less satisfied with their lives compared to light smokers, which aligns with the literature. In addition, the decision tree algorithm is used to predict the attendance change of students; according to the decision tree, attendance level increased for the students whose attendance was lower in the academic year 2021-2022. Moreover, students whose satisfaction with the smoking areas has changed increased their attendance levels.

We conducted an empirical study. In empirical methodology, attendance frequency is modelled as a function of various factors, which include individual fixed effects, faculty fixed effects affected by faculty-related attendance policies, a time effect that may impact attendance trends, and a heterogeneous policy effect based on time and distance to smoking areas. Additionally, the differences-in-differences model was employed. Analyses are conducted within the whole sample and for smokers and nonsmokers only. The findings of the first method suggest that smoker students experienced a positive change in their attendance level as the distance increased. However, there is no evidence that attendance changed for nonsmoker students. In the alternative approach, after the policy implementation, the probability of attending classes increased for the 2022-2023 fall semester period when the distance to designated smoking areas increased for the smoker students. The findings are consistent with the theoretical approach.

In terms of smoking ban policy implications within the campus, we conclude that the attendance level of smoker students increased when the distance between smoking areas increased. Still, no effect is observed for nonsmoker students.

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APPENDIX

Figure 4: Extended Decision Tree

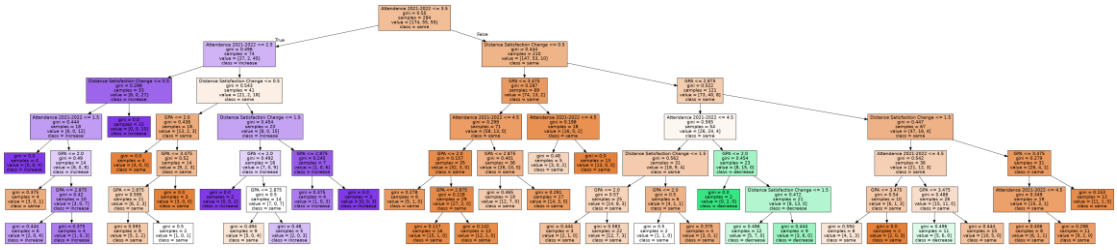

Table 15: Scholarship Status by Smoking Status

Type of Scholarship	Smoking Status		
	Non-smoker	Smoker	Total
50% Scholarship	79	75	154
Comprehensive Scholarship	54	25	79
Full Scholarship	13	10	23
Merit Scholarship	16	4	20
No scholarship	53	51	104
Talent-Based Scholarship	1	0	1
Total	216	165	406

Table 16: Earlier Location of Students

Highschool Location	Smoking Status		
	Nonsmoker	Smoker	Total
Antalya sub-region, Adana sub-region, Hatay sub-region	10	14	24
Ankara sub-region, Konya sub-region	106	84	190
Zonguldak sub-region, Kastamonu sub-region, Samsun sub-region	14	7	21
Tekirdağ sub-region, Balıkesir sub-region	4	3	7
Trabzon sub-region	4	1	5
Bursa sub-region, Kocaeli sub-region	14	6	20
İzmir sub-region, Aydın sub-region, Manisa sub-region	20	17	37
Gaziantep sub-region, Şanlıurfa sub-region, Mardin sub-region	2	2	4
I did not attend high school in Turkey	4	8	12
Erzurum sub-region, Ağrı sub-region	1	2	3
Kırıkkale sub-region, Kayseri sub-region)	16	4	20
Malatya sub-region, Van sub-region	3	1	4
Istanbul sub-region	18	16	34
Total	216	165	406

Table 17: Residence of students by smoking status

Smoking Status	Residence				
	Dormitory	Family home	Living alone at home	Shared home with friends	Total
Non-smoker	88	110	12	6	216
Smoker	55	80	17	13	165
Total	143	190	29	19	406

Placebo Regressions for the First Identification Strategy

Table 20: Placebo regressions (first method)

	(1)	(2)	(3)	(4)	(5)	(6)
	Whole Sample		**Nonsmoker**		**Smoker**	
Dependent Variable	Activity Satisfaction Change	Activity Satisfaction Change	Activity Satisfaction Change	Activity Satisfaction Change	Activity Satisfaction Change	Activity Satisfaction Change
Distance		0.000403		-0.000587		0.00164
		(0.000699)		(0.000963)		(0.00110)
Constant	0.0394	-0.0789	0.0973	0.281	-0.0333	-0.478
	(0.0567)	(0.213)	(0.0810)	(0.312)	(0.0776)	(0.307)
Observations	406	406	226	226	180	180
R-squared	0.000	0.001	0.000	0.002	0.000	0.012

Table 21: Placebo regressions (first method)

	(1)	(2)	(3)	(4)	(5)	(6)
	Whole Sample		**Nonsmoker**		**Smoker**	
Dependent Variable	Health Services Satisfaction Change	Health Services Satisfaction Change	Health Services Satisfaction Change	Health Services Satisfaction Change	Health Services Satisfaction Change	Health Services Satisfaction Change
Distance		-0.000538		-0.000609		-0.000649
		(0.000414)		(0.000588)		(0.000618)
Constant	0.00985	0.168	0.0221	0.213	-0.00556	0.170
	(0.0336)	(0.126)	(0.0496)	(0.190)	(0.0435)	(0.173)
Observations	406	406	226	226	180	180
R-squared	0.000	0.004	0.000	0.005	0.000	0.006

Table 22: Placebo regressions (first method)

(1)	(2)	(3)	(4)	(5)	(6)

	Whole Sample		**Nonsmoker**		**Smoker**	
Dependent Variable	Festival Satisfaction Change	Festival Satisfaction Change	Festival Satisfaction Change	Festival Satisfaction Change	Festival Satisfaction Change	Festival Satisfaction Change
Distance		-0.000369		-0.00109		0.00112
		(0.000530)		(0.000716)		(0.000857)
Constant	-0.0419	0.0667	-0.0664	0.276	-0.0111	-0.314
	(0.0430)	(0.162)	(0.0605)	(0.232)	(0.0605)	(0.240)
Observations	406	406	226	226	180	180
R-squared	0.000	0.001	0.000	0.010	0.000	0.010

Table 23: Placebo regressions (first method)

	(1)	(2)	(3)	(4)	(5)	(6)
	Whole Sample		**Nonsmoker**		**Smoker**	
Dependent Variable	Food Facilities Satisfaction Change	Food Facilities Satisfaction Change	Food Facilities Satisfaction Change	Food Facilities Satisfaction Change	Food Facilities Satisfaction Change	Food Facilities Satisfaction Change
Distance		-0.000951*		-0.000645		-0.00102
		(0.000536)		(0.000770)		(0.000776)
Constant	-0.167***	0.112	-0.230***	-0.0284	-0.0889	0.188
	(0.0436)	(0.163)	(0.0649)	(0.249)	(0.0547)	(0.217)
Observations	406	406	226	226	180	180
R-squared	0.000	0.008	0.000	0.003	0.000	0.010

Table 24: Placebo regressions (first method)

	(1)	(2)	(3)	(4)	(5)	(6)
	Whole Sample		**Nonsmoker**		**Smoker**	
Dependent Variable	Security Satisfaction Change	Security Satisfaction Change	Security Satisfaction Change	Security Satisfaction Change	Security Satisfaction Change	Security Satisfaction Change
Distance		0.000233		0.000415		0.000407
		(0.000404)		(0.000564)		(0.000618)
Constant	-0.0369	-0.105	-0.0796*	-0.209	0.0167	-0.0935
	(0.0328)	(0.123)	(0.0475)	(0.183)	(0.0435)	(0.173)
Observations	406	406	226	226	180	180
R-squared	0.000	0.001	0.000	0.002	0.000	0.002

Table 25: Placebo regressions (first method)

	(1)	(2)	(3)	(4)	(5)	(6)
	Whole Sample		**Nonsmoker**		**Smoker**	

Dependent Variable	Education Satisfaction Change	Education Satisfaction Change	Education Satisfaction Change	Education Satisfaction Change	Education Satisfaction Change	Education Satisfaction Change
Distance		0.000417		0.000401		0.000914
		(0.000559)		(0.000724)		(0.000964)
Constant	0.00493	-0.118	-0.0310	-0.156	0.0500	-0.197
	(0.0453)	(0.170)	(0.0609)	(0.234)	(0.0679)	(0.269)
Observations	406	406	226	226	180	180
R-squared	0.000	0.001	0.000	0.001	0.000	0.005

Table 26: Placebo regressions (first method)

	(1)	(2)	(3)	(4)	(5)	(6)
	Whole Sample		**Nonsmoker**		**Smoker**	
Dependent Variable	Transport. Satisfaction Change	Transport. Satisfaction Change	Transport. Satisfaction Change	Transport. Satisfaction Change	Transport. Satisfaction Change	Transport. Satisfaction Change
Distance		7.4305		-4.2305		0.000696
		(0.000503)		(0.000678)		(0.000822)
Constant	-0.0690*	-0.0908	-0.106*	-0.0930	-0.0222	-0.210
	(0.0408)	(0.154)	(0.0570)	(0.220)	(0.0579)	(0.230)
Observations	406	406	226	226	180	180
R-squared	0.000	0.000	0.000	0.000	0.000	0.004

Notes: Faculty dummies and dummy for university duration of students (in year) are included. Statistically significant: *** 1% level; ** 5% level, * 10% level. Standard errors in parenthesis.

Table 27: Placebo regressions (first method)

	(1)	(2)	(3)	(4)	(5)	(6)
	Whole Sample		**Nonsmoker**		**Smoker**	
Dependent Variable	Infrast. Satisfactio n Change	Infrast. Satisfaction Change	Infrast. Satisfactio n Change	Infrast. Satisfaction Change	Infrast. Satisfactio n Change	Infrast. Satisfaction Change
Distance		0.000515		0.000334		0.000764
		(0.000442)		(0.000580)		(0.000751)
Constant	-0.0788**	-0.230*	-0.0619	-0.166	-0.100*	-0.307
	(0.0359)	(0.135)	(0.0488)	(0.188)	(0.0529)	(0.210)
Observations	406	406	226	226	180	180
R-squared	0.000	0.003	0.000	0.001	0.000	0.006

Notes: Faculty dummies and dummy for university duration of students (in year) are included. Statistically significant: *** 1% level; ** 5% level, * 10% level. Standard errors in parenthesis.

Placebo Regressions for the Alternative Identification Strategy

Table 30: Placebo regressions (alternative method)

	(1)	(2)	(3)
	Whole Sample	**Nonsmoker**	**Smoker**
Dependent Variable	Activities satisfaction	Activities satisfaction	Activities satisfaction
Post Policy	-0.143	0.143	-0.478
	(0.295)	(0.400)	(0.475)
Distance * Post Policy	0.000622	-0.000147	0.00164
	(0.000968)	(0.00123)	(0.00170)
Female	0.0986	0.175	0.0139
	(0.0862)	(0.117)	(0.130)
Constant	2.443***	2.481***	2.250***
	(0.118)	(0.135)	(0.256)
Observations	812	452	360
R-squared	0.006	0.025	0.021

Notes: Faculty dummies and dummy for university duration of students (in year) are included.
Statistically significant: *** 1% level; ** 5% level, * 10% level. Standard errors in parenthesis.

Table 31: Placebo regressions (alternative method)

	(1)	(2)	(3)
	Whole Sample	**Nonsmoker**	**Smoker**
Dependent Variable	Health service satisfaction	Health service satisfaction	Health service satisfaction
Post Policy	0.202	0.275	0.170
	(0.315)	(0.428)	(0.505)
Distance * Post Policy	-0.000654	-0.000810	-0.000649
	(0.00103)	(0.00132)	(0.00181)
Female	-0.0129	-0.0253	-0.00480
	(0.0918)	(0.125)	(0.138)
Constant	3.424***	3.389***	3.589***
	(0.126)	(0.144)	(0.272)
Observations	812	452	360
R-squared	0.029	0.011	0.078

Notes: Faculty dummies and dummy for university duration of students (in year) are included.
Statistically significant: *** 1% level; ** 5% level, * 10% level. Standard errors in parenthesis.

Table 32: Placebo regressions (alternative method)

	(1)	(2)	(3)
	Whole Sample	**Nonsmoker**	**Smoker**
Dependent Variable	Festival satisfaction	Festival satisfaction	Festival satisfaction
Post Policy	-0.0296	0.102	-0.314
	(0.315)	(0.414)	(0.512)
Distance * Post Policy	-4.1805	-0.000540	0.00112
	(0.00103)	(0.00128)	(0.00183)
Female	0.0779	-0.0958	0.349**
	(0.0918)	(0.121)	(0.140)
Constant	2.452***	2.616***	1.936***
	(0.126)	(0.140)	(0.275)
Observations	812	452	360
R-squared	0.013	0.046	0.057

Notes: Faculty dummies and dummy for university duration of students (in year) are included.
Statistically significant: *** 1% level; ** 5% level, * 10% level. Standard errors in parenthesis.

Table 33: Placebo regressions (alternative method)

	(1)	(2)	(3)
	Whole Sample	**Nonsmoker**	**Smoker**
Dependent Variable	Food facilities satisfaction	Food facilities satisfaction	Food facilities satisfaction
Post Policy	0.126	0.00594	0.188
	(0.296)	(0.401)	(0.470)
Distance * Post Policy	-0.000999	-0.000755	-0.00102
	(0.000969)	(0.00124)	(0.00168)
Female	-0.0722	-0.239**	0.144
	(0.0863)	(0.117)	(0.129)
Constant	2.856***	2.985***	2.440***
	(0.119)	(0.135)	(0.253)
Observations	812	452	360
R-squared	0.013	0.028	0.050

Notes: Faculty dummies and dummy for university duration of students (in year) are included.
Statistically significant: *** 1% level; ** 5% level, * 10% level. Standard errors in parenthesis.

Table 34: Placebo regressions (alternative method)

	(1)	(2)	(3)
	Whole Sample	**Nonsmoker**	**Smoker**
Dependent Variable	Education satisfaction	Education satisfaction	Education satisfaction
Post Policy	-0.0866	-0.112	-0.197
	(0.287)	(0.396)	(0.451)
Distance * Post Policy	0.000311	0.000260	0.000914
	(0.000939)	(0.00122)	(0.00161)
Female	0.117	0.172	0.0286
	(0.0836)	(0.116)	(0.123)
Constant	3.415***	3.477***	3.132***
	(0.115)	(0.134)	(0.242)
Observations	812	452	360
R-squared	0.028	0.038	0.038

Notes: Faculty dummies and dummy for university duration of students (in year) are included.
Statistically significant: *** 1% level; ** 5% level, * 10% level. Standard errors in parenthesis.

Table 35: Placebo regressions (alternative method)

	(1)	(2)	(3)
	Whole Sample	**Nonsmoker**	**Smoker**
Dependent Variable	Transportation satisfaction	Transportation satisfaction	Transportation satisfaction
Post Policy	-0.0395	-0.00612	-0.210
	(0.310)	(0.431)	(0.482)
Distance * Post Policy	-0.000100	-0.000320	0.000696
	(0.00101)	(0.00133)	(0.00173)
Female	-0.0700	-0.0445	-0.112
	(0.0903)	(0.126)	(0.132)
Constant	3.290***	3.301***	3.270***
	(0.124)	(0.145)	(0.259)
Observations	812	452	360
R-squared	0.025	0.018	0.061

Notes: Faculty dummies and dummy for university duration of students (in year) are included.
Statistically significant: *** 1% level; ** 5% level, * 10% level. Standard errors in parenthesis.

Table 36: Placebo regressions (alternative method)

	(1)	(2)	(3)
	Whole Sample	**Nonsmoker**	**Smoker**
Dependent Variable	Infrastructure satisfaction	Infrastructure satisfaction	Infrastructure satisfaction
Post Policy	-0.123	0.0189	-0.307
	(0.283)	(0.378)	(0.461)
Distance * Post Policy	0.000152	-0.000258	0.000764
	(0.000928)	(0.00117)	(0.00165)
Female	-0.245***	-0.297***	-0.171
	(0.0826)	(0.110)	(0.126)
Constant	3.618***	3.666***	3.478***
	(0.114)	(0.128)	(0.248)
Observations	812	452	360
R-squared	0.039	0.065	0.056

Notes: Faculty dummies and dummy for university duration of students (in year) are included.
Statistically significant: *** 1% level; ** 5% level, * 10% level. Standard errors in parenthesis.

Table 37: Placebo regressions (alternative method)

	(1)	(2)	(3)

	Whole Sample	**Nonsmoker**	**Smoker**
Dependent Variable	Security satisfaction	Security satisfaction	Security satisfaction
Post Policy	-0.0445	-0.0982	-0.0935
	(0.320)	(0.427)	(0.521)
Distance * Post Policy	2.57e-05	5.93e-05	0.000407
	(0.00105)	(0.00132)	(0.00186)
Female	0.0443	-0.0973	0.244*
	(0.0933)	(0.125)	(0.143)
Constant	3.520***	3.657***	3.060***
	(0.128)	(0.144)	(0.280)
Observations	812	452	360
R-squared	0.019	0.024	0.051

Notes: Faculty dummies and dummy for university duration of students (in year) are included.
Statistically significant: *** 1% level; ** 5% level, * 10% level. Standard errors in parenthesis.