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EXAMINING THE ELECTRONIC CIGARETTE USE OUTCOME EXPECTANCIES IN TERMS OF ANXIETY SENSITIVITY AND EMOTION DYSREGULATION IN YOUNG ADULTS

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ÖZET

Koluaçık, Buse Nur, Elektronik Sigara Kullanımı Sonuç Beklentilerinin Kaygı Duyarlılığı ve Duygu Düzenleme Güçlüğü Açısından İncelenmesi. Başkent Üniversitesi, Sosyal Bilimler Enstitüsü, Klinik Psikoloji Tezli Yüksek Lisans Programı, 2025.

Elektronik sigara kullanımı sonuç beklentileri, bireylerin elektronik sigara kullanımının olumlu ya da olumsuz sonuçlarına ilişkin inançları olarak tanımlanmaktadır. Bu çalışma, genç yetişkinlerde elektronik sigara kullanımı sonuç beklentilerini kaygı duyarlılığı ve duygu düzenleme güçlüğü açısından incelemeyi ve sosyodemografik faktörler ile geleneksel sigara veya elektronik sigara kullanım davranışları arasındaki ilişkiyi araştırmayı amaçlamıştır. Örneklem 18-25 yaşları arasındaki 273 katılımcıdan (137 kadın, 136 erkek) oluşmuştur. Bu çalışma Qualtrics üzerinden yürütülmüş ve katılımcılardan bilgilendirilmiş onam formu, demografik bilgi formu, Elektronik Sigara Kullanımı Sonuç Beklentileri Ölçeği, Anksiyete Duyarlılığı İndeksi-3 ve Duygu Düzenlemede Güçlükler Ölçeği'ni doldurmaları istenmiştir. Pearson korelasyon analizi sonuçlarına göre kaygı duyarlılığının; duygu düzenleme güçlüğü, pozitif sonuç beklentileri ve negatif sonuç beklentileri ile pozitif yönde ilişkili olduğu bulunmuştur. Duygu düzenleme güçlüğünün ise pozitif sonuç beklentileri ile pozitif yönde ilişkili olduğu saptanmıştır. Ek olarak kısmi korelasyon analizi, kaygı duyarlılığı kontrol edildiğinde duygu düzenleme güçlüğü ile negatif sonuç beklentileri arasında negatif yönde bir ilişki olduğunu göstermiştir. Tek yönlü çok değişkenli varyans analizlerinin sonuçları, erkeklerin kadınlara kıyasla daha yüksek pozitif sonuç beklentilerine ancak daha düşük negatif sonuç beklentilerine sahip olduğunu göstermiştir. Ayrıca herhangi bir ürün kullanmayanların sigara kullanıcılarına ve ikili kullanıcılara kıyasla daha yüksek negatif sonuç beklentilerine ancak daha düşük pozitif sonuç beklentilerine sahip olduğu bulunmuştur. Son olarak çoklu regresyon analizlerinin sonuçlarına göre kaygı duyarlılığı hem pozitif sonuç beklentilerini hem de negatif sonuç beklentilerini pozitif yönde yordamıştır. Duygu düzenleme güçlüğü ise pozitif sonuç beklentilerini pozitif yönde yordarken negatif sonuç beklentilerini negatif yönde yordamıştır. Çalışmanın mevcut bulguları, teorik katkıları, sınırlılıkları ve klinik çıkarımları mevcut alanyazın ışığında tartışılmış; gelecekte yapılacak araştırmalar için önerilerde bulunulmuştur.

Anahtar Kelimeler: elektronik sigara kullanımı sonuç beklentileri, kaygı duyarlılığı, duygu düzenleme güçlüğü

ABSTRACT

Koluaçık, Buse Nur, Examining the Electronic Cigarette Use Outcome Expectancies in Terms of Anxiety Sensitivity and Emotion Dysregulation in Young Adults. Başkent University, Institute of Social Sciences, Clinical Psychology Master's Program with Thesis, 2025.

Electronic cigarette use outcome expectancies are defined as individuals' beliefs about the positive or negative results of using electronic cigarettes. This study aimed to examine e-cigarette use outcome expectancies in terms of anxiety sensitivity and emotion dysregulation in young adults, and to investigate the association between sociodemographic factors and conventional cigarette or e-cigarette use behaviors. The sample consisted of 273 participants (137 women, 136 men) aged between 18 and 25 years. This study was conducted through Qualtrics, and participants were asked to fill out the informed consent form, demographic information form, E-Cigarette Use Outcome Expectancies Scale, Anxiety Sensitivity Index-3, and Difficulties in Emotion Regulation Scale. According to Pearson correlation analysis, anxiety sensitivity was positively associated with emotion dysregulation, positive outcome expectancies, and negative outcome expectancies. Emotion dysregulation was found to be positively associated with positive outcome expectancies. Additionally, partial correlation analysis indicated that there was a negative relationship between emotion dysregulation and negative outcome expectancies when anxiety sensitivity was controlled. The one-way multivariate analyses of variance results showed that men had higher positive outcome expectancies and lower negative outcome expectancies compared to women. Furthermore, it was found that nonusers had higher negative outcome expectancies but lower positive outcome expectancies compared to smokers and dual users. Lastly, according to the results of multiple regression analyses, anxiety sensitivity positively predicted both positive outcome expectancies and negative outcome expectancies. Emotion dysregulation positively predicted positive outcome expectancies but negatively predicted negative outcome expectancies. The study's current findings, theoretical contributions, limitations, and clinical implications were discussed in the light of existing literature, and recommendations for future research were made.

Keywords: electronic cigarette use outcome expectancies, anxiety sensitivity, emotion dysregulation

TABLE OF CONTENTS

ACKNOWLEDGEMENTS i
ÖZET iii
ABSTRACT iv
LIST OF TABLES vii
LIST OF FIGURES viii
LIST OF ABBREVIATIONS ix
1. INTRODUCTION 1
1.1. Electronic Cigarettes 1
1.2. History of Electronic Cigarettes 3
1.3. The Essential Components of E-Liquids 4
1.3.1. Propylene glycol and vegetable glycerin (glycerol) 4
1.3.2. Flavorings 4
1.3.3. Nicotine 5
1.4. Health Effects of Electronic Cigarettes 7
1.5. Legal Regulations Regarding Electronic Cigarettes 9
1.6. Electronic Cigarette Use Outcome Expectancies 10
1.7. Anxiety Sensitivity 13
1.7.1. Anxiety sensitivity and electronic cigarette use outcome expectancies 15
1.8. Emotion Dysregulation 16
1.8.1. Emotion dysregulation and electronic cigarette use outcome expectancies 18
1.9. The Purpose and the Significance of This Study 19
1.10. Research Questions and Hypotheses 20
2. METHOD 22
2.1. Participants 22
2.2. Materials 25
2.2.1. Demographic information form 25
2.2.2. E-Cigarette Use Outcome Expectancies Scale (EUOES) 25
2.2.3. Anxiety Sensitivity Index-3 (ASI-3) 27
2.2.4. Difficulties in Emotion Regulation Scale (DERS) 27
2.3. Procedure 28

2.4. Data Analytic Strategy..... 29
3. RESULTS..... 30
3.1. Evaluating the Suitability of the Data Set for Statistical Analyses..... 30
3.2. Analyses of Demographic Variables..... 31
3.3. Descriptive Statistics for the Measures of This Study..... 33
3.4. The Results of the Pearson Correlation Analyses..... 33
3.5. The Results of the One-Way MANOVAs..... 36
3.6. The Results of the Multiple Regression Analyses..... 39
3.7. The Results of the Partial Correlation Analysis..... 41
4. DISCUSSION..... 42
4.1. Discussion of Analyses Regarding Demografic Variables..... 42
4.2. Discussion of the Findings Regarding the Tests of the Main Hypotheses..... 47
4.2.1. Discussion of analyses regarding relationships between variables..... 47
4.2.2 Discussion of analyses regarding differences between groups..... 51
4.2.3 Discussion of analyses regarding the predictive role of variables..... 54
4.3. Theoretical Contributions of the Study..... 55
4.4. Limitations of the Study and Recommendations for Future Research..... 56
4.5. Clinical Implications..... 57
5. CONCLUSION..... 60
REFERENCES..... 62
APPENDICES
APPENDIX 1: DEMOGRAPHIC INFORMATION FORM
APPENDIX 2: E-CIGARETTE USE OUTCOME EXPECTANCIES SCALE
APPENDIX 3: ANXIETY SENSITIVITY INDEX-3
APPENDIX 4: DIFFICULTIES IN EMOTION REGULATION SCALE
APPENDIX 5: ETHICS COMMITTEE APPROVAL
APPENDIX 6: RESEARCH PARTICIPATION ANNOUNCEMENT
APPENDIX 7: INFORMED CONSENT FORM

LIST OF TABLES

Page

Table 2.1. Frequencies of the Participants' Demographic Variables (N = 273)..... 22
Table 3.1. Descriptive Statistics for the Measures of This Study..... 32
Table 3.2. The Results of the Pearson Correlation Analysis..... 33
Table 3.3. The Results of the Pearson Correlation Analysis for Sub-factors of the Scales 34
Table 3.4. The Results of the Multiple Regression Analyses..... 39

LIST OF FIGURES

Page

Figure 3.1. Comparison of the Means Scores of Men and Women..... 36

Figure 3.2. Comparison of the Means Scores of Nonusers, Smokers, and Dual Users..... 38

LIST OF ABBREVIATIONS

ASI-3	Anxiety Sensitivity Index-3
CBD	Cannabidiol
DERS	Difficulties in Emotion Regulation Scale
E-Cig(s)	Electronic cigarette(s)
ENDS	Electronic nicotine delivery systems
ENNDS	Electronic non-nicotine delivery systems
EUOES	E-Cigarette Use Outcome Expectancies Scale
EVALI	E-Cigarette / vaping product use-associated lung injury
FDA	United States Food and Drug Administration
FTND	Fagerstrom Test for Nicotine Dependence
MANOVA	Multivariate Analysis of Variance
SPSS	Statistical Package for Social Sciences
THC	Tetrahydrocannabinol

1. INTRODUCTION

Tobacco use is one of the largest public health problems worldwide (Institute for Health Metrics and Evaluation, 2018) and is among the prominent causes of premature death (Kim et al., 2023; Samet, 2013). It causes the death of more than 8 million individuals all around the world annually (Institute for Health Metrics and Evaluation, 2018). In recent years, the tobacco industry has departed from the classic cigarette concept and adopted terminology compatible with positive public health such as "reducing harm". They began marketing electronic cigarettes (e-cigs), which they described as "reduced-harm products", targeting people who wanted to quit smoking (Tsikrika et al., 2023). E-cig marketers use various strategies to target marketing to individuals, especially young individuals (Ferkol et al., 2018). These strategies, such as celebrity advertising, are often implemented to normalize the consumption of e-cigs by young individuals and increase the attractiveness of e-cigs (Struik et al., 2020). Considering the increasing use of e-cigs in recent years, these efforts to market e-cigs seem to have been successful. The study conducted on the data from 48 countries estimated that there were approximately 82 million e-cig users worldwide in 2021. In the same study, the prevalence of e-cig consumption worldwide was found to be highest to lowest respectively in Europe, the Americas, the Western Pacific, Southeast Asia, Eastern Mediterranean, and African regions (Jerzyński & Stimson, 2023).

1.1. Electronic Cigarettes

Electronic cigarettes (e-cigs) are battery-powered devices that enable individuals to inhale an aerosol that usually consists of nicotine, chemical additives, and various flavorings (Christensen et al., 2014; Khambayat et al., 2023; Muposhi & Dhurup, 2016; St Claire et al., 2020). E-cigs, which are known by different names in different geographical regions or among different users, are also referred to as "e-hookahs", "vape pens", and "vapes" (Lempert et al., 2016). E-cigs can be referred to in two different ways in terms of whether they have nicotine: electronic nicotine delivery systems (ENDS) and electronic non-nicotine delivery systems (ENNDS). ENDS are e-cigs that contain nicotine, while ENNDS are e-cigs that do not contain nicotine (Banks et al., 2022). However, e-cigs are mostly referred to as ENDS in literature because they are often composed of nicotine (Walley, 2019).

E-cigs have some differences from conventional cigarettes: E-cigs do not contain tobacco, instead they contain flavored liquids which are commonly called e-liquids, and because they do not combust, they do not produce smoke but instead vapor (Polosa et al., 2017). Another difference between e-cigs and conventional cigarettes is that e-cigs have various appearances. For example, e-cigs can look like a highlighter, a USB flash drive, a pen, a mobile phone, a liquid-filled bottle, a toy, and many other object; therefore it can be difficult to distinguish from other objects (Barrington-Trimis & Leventhal, 2018; Pambuccian, 2020).

The act of inhaling conventional cigarette smoke is called smoking, and individuals who only use conventional cigarettes are referred to as "smokers" (Alexander et al., 2016). “Smokers” term both includes current and former users of conventional cigarettes who have never used e-cigs in their lives (Li et al., 2024). The act of inhaling the vapor released from e-cigs is called vaping, and individuals who only use e-cigs are often referred to as "vapers” (Christensen et al., 2014; Muposhi & Dhurup, 2016; Pepper et al., 2013). “Vapers” term includes both current and former users of e-cigs who have never used a conventional cigarette in their lives (Yang et al., 2024). Some individuals use both conventional cigarettes and e-cigs (dual use), and these individuals are referred to as “dual users” (Maglia et al., 2018). Although there are many different dual use definitions in the current literature, Maglia and colleagues (2018) defined dual use as any combination of use of e-cigs and conventional cigarettes. This definition includes the use of both products in any period, regardless of the frequency or continuity of use, in the category of "dual use". According to this definition, if a person has tried e-cigs at some point in his or her life, even if only once, and used conventional cigarettes at the same time, he or she can be included in the "dual use" category. Maglia and colleagues (2018) emphasized that defining dual use broadly in this way allows drawing more meaningful and accurate comparisons about the underlying mechanisms and health outcomes associated with dual use. Besides conventional cigarettes and e-cigs becoming increasingly widespread, there are individuals who do not use either e-cigs or conventional cigarettes in their lives, and these individuals are defined as "nonusers" (Romijnders et al., 2018).

E-cigs have many differences in design and appearance but typically consist of similar functions and ingredients (National Center for Chronic Disease Prevention and Health Promotion, 2016). Although e-cigs come in many different types, most of them consist of four common elements: the mouthpiece, atomizer, battery, and cartridge or tank containing a flavored liquid (Besaratinia & Tommasi, 2014; Choi et al., 2021; DeVito & Krishnan-

Sarin, 2018; Muposhi & Dhurup, 2016; Tapadia et al., 2022). The atomizer converts the electricity coming from the battery into heat and aerosolizes the flavored liquid inside the cartridge; in other words, it plays a role in turning the liquid into a vapor similar to cigarette smoke (Besaratinia & Tommasi, 2014; Choi et al., 2021). In some e-cig models, instead of a separate cartridge and atomizer, there is a single unit called a cartomizer, which is a combination of both (Besaratinia & Tommasi, 2014; Williams et al., 2013).

There are three main types of e-cigs, and they differ in terms of their operating mechanism. Disposable e-cigs are consumed once; once the battery or e-liquid runs out, they are discarded. Refillable e-cigs are for multiple use, can be recharged and refilled when the e-liquid runs out. E-cigs with pre-filled pods or cartridges are for multiple use, rechargeable, and the pod or cartridge can be replaced when the e-liquid runs out (Kaisar et al., 2016).

1.2. History of Electronic Cigarettes

Contrary to popular belief, e-cigs are not devices that were developed in the recent past. The first smokeless and tobacco-free e-cig was invented and patented by Herbert Gilbert in 1963 (Ker et al., 2019; Tapadia et al., 2022). However, the modern e-cigs that are used today date back to the early 2000s. The first modern e-cig was produced and patented by a Chinese pharmacist named Hon Lik in 2003 (Besaratinia & Tommasi, 2014; Pauly et al., 2007; Tapadia et al., 2022), and in approximately five years, e-cigs entered the global market (Berridge et al., 2023). After entering the global market, the increase in popularity of e-cigs has been rapid (Ker et al., 2019). From past to present, e-cigs have become more and more popular, and their brands have augmented rapidly; and today, there are over 400 different brands in the e-cig market (Allen et al., 2016).

The design of e-cigs has changed over the years (Ker et al., 2019). First-generation e-cigs are known as “ciga-likes” and manufactured to resemble the appearance of conventional cigarettes (Choi et al., 2021; Ker et al., 2019; Williams & Talbot, 2019). These e-cigs are disposable and not available for sale in today’s market. Second-generation e-cigs are referred to as “pen-style” or “tank-style”, and they have pre-filled or refillable cartridges and rechargeable batteries (Kathuria, 2022; Kotewar et al., 2023). Third-generation e-cigs are named as modifiable e-cigs (“mods”) and have higher-capacity batteries than previous generations. They contain adjustable cartridges and atomizers that give individuals the opportunity to control the aerosol's concentration and speed (Choi et al., 2021; Kathuria,

2022; Kotewar et al., 2023; Tapadia et al., 2022). In addition, this generation of e-cigs may also have sub-Ohm heating coils that allow large aerosol creation (Kathuria, 2022; Kotewar et al., 2023). The latest and fourth generation e-cigs, called "pod mods", have a rechargeable battery and a modifiable cartridge (mod) with a pre-filled or refillable e-liquid (Kathuria, 2022; López-Ojeda & Hurley, 2024). This generation of e-cigs can provide individuals with higher nicotine concentration than other generations of e-cigs (Boykan et al., 2019; Goniewicz et al., 2019). Some of the most well-known brands of this generation of e-cigs are JUUL, Suorin, and FLUM (Sullivan & Crotty Alexander, 2022). This generation of e-cigs is evolving very quickly and includes many new devices (Kotewar et al., 2023; Williams & Talbot, 2019).

1.3. The Essential Components of E-Liquids

E-liquids, which are also known as "e-juices" are mainly comprised of propylene glycol and vegetable glycerin (glycerol), flavorings, distilled water, and other additives, and they may or may not consist of nicotine (Choi et al., 2021; DeVito & Krishnan-Sarin, 2018; Kathuria, 2022; Polosa et al., 2017). In addition to these components, e-liquids may also include cannabidiol (CBD), tetrahydrocannabinol (THC), or synthetic cannabinoids (Choi et al., 2021; Kathuria, 2022).

1.3.1. Propylene glycol and vegetable glycerin (glycerol)

Propylene glycol and vegetable glycerin (glycerol) are two essential additives that are found in most e-cigs (DeVito & Krishnan-Sarin, 2018; Kathuria, 2022; Eshraghian & Al-Delaimy, 2021). Both of them are additives that are used in e-cigs to create vapor and carry various flavorings and nicotine (Kathuria, 2022; Kubica, 2023; Woodall et al., 2020).

1.3.2. Flavorings

E-cigs have a broad diversity of flavoring agents (Morris et al., 2021). These appealing flavorings are motivators, especially for young users (Thoonen & Jongenelis, 2024). Some of the commonly used e-cig flavorings are menthol, chocolate, coffee, vanilla, caramel, coffee, apple and other fruits, however, flavorings are not limited to these (Kaisar et al,

2016). There are more than 7000 different e-cig flavoring agents (Allen et al., 2016), and vapers can choose flavorings that suit their demands.

1.3.3. Nicotine

Nicotine is a strongly addictive psychoactive substance and the most pharmacologically active ingredient in tobacco products and most e-cigs (Benowitz, 2010; Han et al., 2023; Taylor et al., 2021). Although not all e-liquids have nicotine, many of the e-liquids are composed of different forms of nicotine in different concentrations (Choi et al., 2021). Nicotine in e-liquids may be found in the free base form, which is present in conventional cigarettes, or in the protonated form, which is present in nicotine salts (Talih et al., 2020). Free base nicotine was used in the early generations of e-cigs, but later free base nicotine was replaced by nicotine salt, in other words, nicotine salts are used in new e-cig devices (Harvanko et al., 2020). The difference between nicotine salts (protonated nicotine form) in e-cigs and free-base form nicotine is that nicotine salts contain approximately twice as much nicotine (Pennings et al., 2023). The reason nicotine salts are found in higher concentrations in e-liquids is that they are softer and less irritating to the throat than free-base nicotine due to the additional acids, usually benzoic acid, they contain (Althakfi & Hameed, 2024).

Although nicotine is widely used in tobacco products and e-cigs, it is a substance that can have fatal effects. A study conducted by Cameron and colleagues (2014) on nicotine concentrations in e-cigs indicated that 30-60 mg of nicotine in e-liquids is a fatal dose for adults and 10 mg of nicotine for children. Accurate labeling of the nicotine concentration in e-liquids is critically significant to prevent vapers from overdosing, which can lead to death. Even the minimal inaccurate labeling of the nicotine in e-liquids can be risky in terms of toxicity and death (Althakfi & Hameed, 2024).

Unfortunately, the discrepancy between the actual nicotine concentration in e-liquids and the labeled nicotine concentration is quite prevalent, and mislabelled nicotine concentration increases the users' possibility of intoxication (Althakfi & Hameed, 2024; Taylor et al., 2021). The review article by Althakfi and Hameed (2024) revealed that some liquids are mislabelled as having less or more nicotine concentration, or mislabelled as nicotine-free even though they contain nicotine. In a study, Goniewicz and colleagues (2013) reported that nicotine content was detected in one out of every two e-liquids in pods or

cartridges labelled as nicotine-free Another review article which was written by Taylor and colleagues (2021) and examined the nicotine content of 545 e-liquids demonstrated that nicotine content is often mislabelled with a rate between 5% and 20% and the most of the e-liquids found to have lower nicotine value than labelled nicotine value. The authors highlighted that mislabelling the nicotine level as higher than the actual value could lead to intoxication and death; similarly, mislabelling it as lower could pose a risk of overdose, as it could provide an unpredictable delivery of nicotine.

A study which was conducted by Goniewicz and colleagues (2013) and investigated the nicotine delivery of e-cigs suggested that typically 15 puffs equals the smoking of one conventional cigarette, and it leads to approximately 0.025 to 0.77 mg nicotine intake. This study indicated that 300 puffs is approximately equivalent to the nicotine content of a pack of conventional cigarettes and that 300 puffs of e-cigs containing "high nicotine" cartridges or pods provide nicotine intake of approximately 0.5 to 15.4 mg, while e-cigs containing "low" or "medium" cartridges or pods provide nicotine intake of 0.5 to 3.1 mg. Another intriguing finding of the same study is that some e-cigs are inconsistent in providing nicotine; in other words, although these e-cigs have pods or cartridges with the same nicotine content, they may deliver different amounts of nicotine to vapers each time they are used. This could increase the risk of vapers experiencing nicotine overdose or pave the way for improper use of e-cigs.

JUUL brand e-cig pods contain more nicotine concentration than nicotine concentration of many other e-cig brands (Taylor et al., 2021). JUUL contains nicotine salt (protonated nicotine) formed by combining nicotine with benzoic acid, which allows JUUL to contain higher nicotine concentrations than many other e-cigs (Omaiye et al., 2019). The study carried out by Omaiye and colleagues (2019) demonstrated that the nicotine concentration of the e-liquid in JUUL pods was higher than the nicotine concentration of other 174 e-cigs. JUUL brand e-cigs have nicotine concentrations between 57.7 and 64.1 mg/mL (Yassine et al., 2022), and a JUUL pod consists of about 40 mg of nicotine, which is nearly equivalent to one pack of conventional cigarettes (Prochaska et al., 2022). The high nicotine content of JUUL indicates that it is highly addictive and poses a risk of nicotine addiction, especially for young individuals who use JUUL frequently (Yassine et al., 2022).

Since most e-cigs contain nicotine, they carry the risk of nicotine addiction, similar to conventional cigarettes. In a study conducted by Jankowski and colleagues (2019), the addictive potential of e-cigs was examined by comparing them with conventional cigarettes. In this study, nicotine addiction measurements were taken with the Fagerstrom Test for

Nicotine Dependence (FTND), and it was revealed that e-cigs have twice as much addictive potential as conventional cigarettes in terms of nicotine addiction in young adults. Therefore, it is important that nicotine addiction prevention efforts also target e-cig use, which is becoming increasingly widespread, especially among young adults.

1.4. Health Effects of Electronic Cigarettes

Although it is widely accepted by both users and manufacturers that e-cigs are less harmful than conventional cigarettes, the scientific literature provides consistent findings of the relatively short-term harms of e-cigs (Feeney et al., 2022). However, studies on the long-term harms of e-cigs are still insufficient, and more work is still needed to assess these harms (Benowitz et al., 2021).

E-cigs cause various harms to different systems in the human body. This is mainly due to the fact that most e-liquids contain many harmful chemicals, especially nicotine. Nicotine, which is a highly addictive substance found in most e-cigs, is rapidly absorbed through the skin, gastrointestinal tract, mucous membranes, and respiratory tract and causes short-term or long-term damage to these body systems (Meo & Al Asiri, 2014). For example, nicotine damages the respiratory system by reducing nitric oxide synthesis in the lungs, causing the airways to narrow and the lungs to resist airflow. This results in the individual having difficulty breathing (Cervellati et al., 2014). In addition, inhaled nicotine can affect the gastrointestinal system, causing symptoms such as nausea and vomiting in the individual (Meo & Al Asiri, 2014).

Many e-liquids in e-cigs not only contain nicotine but also other chemicals such as propylene glycol and glycerol. Propylene glycol and glycerol, two of the main ingredients in e-liquids, are substances with a high potential to irritate the respiratory tract (Bonner et al., 2021). Propylene glycol can trigger allergic and inflammatory reactions in the human body and lead to not only the irritation of the lungs but also the eyes and skin (Choi et al., 2010). Inflammation in the lung is particularly important since all respiratory diseases are inflammation-related (Hua & Talbot, 2016). More importantly, the inflammation in the lungs caused by the vapors of e-cigs can result in severe respiratory diseases like chronic obstructive pulmonary disease (Rowell & Tarran, 2015). Furthermore, the glycerol found in e-cigs has negative effects on both the pulmonary and cardiovascular systems (Eaton et al., 2018). Flavorings in e-liquids are also associated with various health problems. The

chemical diacetyl in flavorings can cause a serious lung disease known as "popcorn lung", which means the blockage of the small airways in the lungs due to inflammation (Allen et al., 2016; Eaton et al., 2018; Kreiss et al., 2002).

Besides e-liquids, other components of e-cigs, such as atomizers or cartomizers, are also associated with adverse health effects. The heating coils of some atomizers or cartomizers contain heavy metals such as lead, chromium, and nickel that are harmful to health. Since the heating coils contain heavy metals, the aerosols of e-cigs also contain heavy metals, and inhalation of these aerosols is particularly harmful to the respiratory system (Choi et al, 2021; Grana et al, 2014; Williams et al., 2013).

In 2019, a severe lung problem associated with the consumption of e-cigs became widespread among vapers in the US. This new lung disease, which is called "e-cigarette/vaping product use-associated lung injury (EVALI)", has been related to inhaling harmful chemicals present in e-liquids, especially THC and vitamin E acetate (Mughal et al., 2020). E-cigs can alter gene expression in a similar way to conventional cigarette smoking and may create some genetic changes that are associated with the risk of lung cancer (Meo & Al Asiri, 2014; Park et al., 2014).

The use of e-cigs is also associated with negative health consequences for the cardiovascular system. A meta-analysis study conducted by Skotsimara and colleagues (2019) examining the effects of e-cigs on the cardiovascular system found that e-cigs negatively affect the proper functioning of the cells lining the inner surface of blood vessels. Moreover, the same study indicated that e-cigs have adverse cardiovascular effects such as blood clot formation, hardening of the arteries, blockage or narrowing of the coronary arteries that supply blood to the heart (Skotsimara et al., 2019).

The eye is another organ affected by the negative effects of e-cigs. The aerosols of e-cigs are known to pose a risk in terms of dryness, irritation, and redness of the eyes (Callahan-Lyon, 2014). Since the vapours of e-cigs are easily absorbed by the body, they are very harmful to eye health and have the potential to cause eye damage (Meo & Al Asiri, 2014).

E-cigs, just like conventional cigarettes, can have negative consequences on the brain. In nicotine-containing e-cigs, nicotine is quickly taken up by the brain, and this contributes to the continuation of nicotine addiction like conventional cigarettes (Sai et al., 2020). In addition, a study by Dwyer and colleagues (2009) found that people exposed to nicotine may have neuroplastic changes in the brain. In the same study, it was found that nicotine exposure during adolescence interferes with circuits in the limbic system, and this interference makes

adolescents more vulnerable to nicotine addiction, as well as increasing the likelihood of impulsivity and mood disorders in adolescents (Dwyer et al., 2009). E-cig use in adolescents is also related to diminished attention and weak impulse control, and learning difficulties (Feeney et al., 2022). The consumption of e-cigs also has potential adverse outcomes on the cognitive functions of adults. The study conducted by Xie and colleagues (2020) with data from 886,603 adults indicated that e-cig use was associated with subjective cognitive decline. Similarly, the findings of the review article by Novak and Wang (2024) suggest that e-cig use is related to impairment in individuals' cognitive functions, particularly subjective cognitive decline and impairment in memory.

Existing literature suggests that there are differences in the risks of developing disease between vapers, smokers, dual users, and nonusers. The dual use of e-cigs and conventional cigarettes, which is the most prevalent use of e-cigs among users, is more hazardous to health than using either product exclusively (Alzahrani et al., 2018). A meta-analysis study conducted by Glantz and colleagues (2024) found that dual users had a 20% to 40% higher risk of disease than smokers and suggested that e-cigs carry a higher risk for the general population, especially in terms of the risk of developing respiratory diseases. Similarly, a study by Osei and colleagues (2019) indicated that dual users have a higher risk of developing cardiovascular disease than nonusers and smokers who only use conventional cigarettes (smokers). As the majority of e-cig users already use conventional cigarettes (Sahu et al., 2023), they are likely at risk of adverse health conditions associated with dual use. Therefore, there is a need for rapid action in the practical field to prevent the adverse health consequences of dual use.

The existing literature presents consistent results on the negative health impacts of e-cigs. However, more studies are needed to better understand the impacts of e-cigs on human health.

1.5. Legal Regulations Regarding Electronic Cigarettes

The increasing consumption of e-cigs, especially among the young population around the world, has made it necessary for countries to introduce legal regulations regarding e-cigs. Towards the 2010s, as e-cigs became widespread in the United States and Europe, countries began to focus on legislation on e-cigs and tobacco products. In 2009, the Family Smoking Prevention and Tobacco Control Act was enacted in the United States, authorizing

the United States Food and Drug Administration (FDA) to regulate tobacco products, but not yet e-cigs. In 2016, the FDA assumed the authority to regulate e-cigs like all tobacco products, but even though e-cigs fall under the FDA's regulatory authority, the process for e-cig companies to get their products evaluated and approved by the FDA has been delayed until 2020. As of 2020, it has become mandatory for e-cig companies to be approved by the FDA before putting their products on the market, which means that e-cigs that are not approved by the FDA cannot be marketed (Rebuli et al., 2023; Sharpless, 2019). Despite all these attempts at regulation, there are still some e-liquids, especially e-liquids containing cannabinoids, that are not regulated by the FDA, and this means that some commonly used e-cigs may contain ingredients that have not been tested and approved for inhalation safety (Rebuli et al., 2023).

As in most countries, there are also regulations for e-cigs in Türkiye. With the Presidential Decree No. 2149 published in the Official Gazette on February 25, 2020, the import of all kinds of products, including e-cigs and electronic hookahs, as well as parts used in the consumption of these products, is banned (Official Gazette of the Republic of Türkiye, 2020). In addition, according to Law No. 4207, like tobacco products, e-cigs cannot be advertised or promoted, sold through electronic media such as television and the Internet, and cannot be transported by shipment. Despite all these regulations, e-cigs are still being sold via the Internet or other illicit ways, and the purchase and consumption of e-cigs is also observed in Türkiye, especially among young individuals (Maraşoğlu, 2019).

1.6. Electronic Cigarette Use Outcome Expectancies

Outcome expectancies are defined as a person's beliefs about the positive or negative results of engaging in a particular behavior (Bandura, 1986). In this context, “e-cig use outcome expectancies” were described by Pokhrel and colleagues (2014, 2018b) as a person's beliefs about the positive or negative results of using e-cigs. Expectations about the outcomes of an addictive behavior play a significant role in motivating engagement in that addictive behavior (Watson et al., 2012). Positive outcome expectancies serve as a motivational antecedent for the person to engage in the behavior, whereas negative outcome expectancies discourage the person from engaging in the behavior (Fishbein & Ajzen, 1977).

The widespread use of e-cigs around the world is associated with numerous factors. These factors vary from person to person, but mainly include desire to reduce or quit

conventional cigarettes, lower cost compared to conventional cigarettes, curiosity, belief that e-cigs are less harmful, the various flavors that e-cigs contain different from conventional cigarettes, being able to consume nicotine even in places where conventional cigarette smoking is prohibited, and social factors such as making new friends (Bold et al., 2020; Jongenelis et al., 2019; Kinouani et al., 2020; Kong et al., 2015; Romijnders et al., 2018; Simonavicius et al., 2017; White et al., 2015). Current literature suggests that factors related to e-cig use may also differ across different age groups. For instance, adult vapers typically use e-cigs because they believe that e-cigs will help them quit conventional cigarettes (Berg et al., 2014; Patel et al., 2016; Soule et al., 2016), while young vapers generally use e-cigs for affective reasons such as pleasure (Saddleson et al., 2016) and because they are curious about it (Kong et al., 2015). In a study conducted with young vapers and performed by Barker and colleagues (2019), it was found that expectancies about the pleasure of e-cig consumption were related to a higher likelihood of use, and expectancies about negative health concerns were related to a lower likelihood of e-cig use. Although e-cigs are seen by some individuals as a way to quit conventional cigarettes, the results of studies by Agaku and colleagues (2022) and Caraballo and colleagues (2017) indicated that the majority of individuals who consume e-cigs to stop smoking fail to cease using conventional cigarette and instead start using both products (dual use). The fact that e-cig use is an unsuccessful method of quitting smoking may be related to the fact that e-cigs can offer social, entertainment, and sensory expectations that are unique compared to conventional cigarettes and that are not related to nicotine (Pokhrel et al., 2015).

Pokhrel and colleagues (2014, 2018b) defined 4 different positive outcome expectancies (social enhancement, affect regulation, positive smoking experience, and positive sensory experience) and 4 different negative outcome expectancies (negative health consequences, negative social consequences, addiction concern, and negative sensory experience) in their studies on e-cig use outcome expectancies. Social enhancement expectancies were defined as beliefs such as e-cig use would contribute to the individual becoming more popular in the social environment and to the improvement of the individual's social image. Affect regulation was described as beliefs that e-cig use will contribute to the reduction of stress and the experience of positive emotions. Positive smoking experience refers to beliefs that e-cig use offers a preferable smoking alternative compared to conventional cigarettes, such as indoor use and safer nicotine consumption. Positive sensory experience was defined as beliefs that e-cig use will provide a pleasant smell and taste for the individual, while negative sensory experience was defined as beliefs that e-cig use will

lead to unpleasant smell and taste experiences. In addition, addiction concern was characterized as beliefs that e-cig use may lead to nicotine or e-cig addiction. Negative health consequences were described as beliefs that e-cig use will result in harm to an individual's body and both physical and mental health. Lastly, negative social consequences were defined as the beliefs that e-cig use may cause negative outcomes in an individual's social relationships and social image. A research by Pokhrel and colleagues (2014) indicated that positive outcome expectancies were associated with increased lifetime and past 30-day e-cig use in young individuals who used e-cigs and after demographic variables were controlled positive outcome expectancies found to be be related higher intention to consume e-cig in the future in young individuals who had never used e-cigs in their lives. On the other hand, in the same study, it was found that negative outcome expectancies were associated with decreased lifetime and past 30-day e-cig use in young individuals who used e-cigs and were associated with lower intentions to use e-cigs in the future in young individuals who had never used e-cigs. In addition, the results of Pokhrel and colleagues' (2014) study demonstrated that women's gender is a negative predictor for social enhancement expectancies and affect regulation expectancies; in other words, being a woman is associated with a decrease in these two positive outcome expectancies.

Although there is a limited number of studies in the current literature on the outcome expectancies of e-cig use, studies suggest that the outcome expectancies of dual users, vapers, smokers, and nonusers differ. In the qualitative study conducted by Harrell and colleagues (2019), vapers and dual users were found to have a higher positive outcome expectancy than nonusers and smokers. Dual users and vapers reported that they believed the health risks of e-cigs were lower than those of conventional cigarettes. Furthermore, vapers and dual users reported numerous benefits of e-cig use, but smokers and nonusers reported that they were skeptical about the benefits of e-cigs. Moreover, some smokers expressed doubts that e-cigs can cause sufficient relief, while some dual users particularly mentioned that e-cigs may be useful as an alternative to cigarettes in negative affect reduction (Harrell et al., 2019). In another study conducted by Latimer (2023), it was found that vapers and nonusers differed in outcome expectancies. More specifically, this research demonstrated that vapers had a greater level of positive outcome expectancies while nonusers had a greater level of negative outcome expectancies.

The relationship between young adults' e-cig use outcome expectancies and social factors has also been the subject of current research. The results of the study of Wallace and Roche (2018) showed that young individuals who frequently use e-cigs or have friends who

use e-cigs believe that e-cig use contributes to a positive social effect; in other words, they have higher social enhancement expectancies. Pokhrel and colleagues (2018a) found that social media e-cig exposure in young adults was indirectly related to current e-cig use through two different positive outcome expectancies. In clearer terms, young adults who see e-cig-related content on social media may tend to have positive outcome expectancies towards e-cigs and may believe that using e-cigs is a positive experience.

1.7. Anxiety Sensitivity

The concept of anxiety sensitivity, which was first defined by Reiss and McNally (1985) and also referred to as "fear of fear" or "fear of anxiety", means a person's intense fear of anxiety-related symptoms and sensations due to the belief that anxiety-related symptoms or sensations will have detrimental social, physical or cognitive consequences. According to Reiss and McNally (1985), intense fear of sensations or symptoms related to anxiety is based on the belief that this fear will lead to outcomes such as embarrassment, illness, or death. Reiss and McNally (1985) discussed how people develop anxiety sensitivity and emphasized that anxiety sensitivity can be caused by both genetic factors and life experiences, that is, the individual's learning history, including classical conditioning, operant conditioning, and modelling.

Reiss's (1980; 1991) Expectancy Theory underpins both the concept of anxiety sensitivity and another concept called anxiety expectation, and it is important to distinguish between these two concepts in order to understand the theoretical framework. Reiss (1980; 1991) defines expectancy as what the individual thinks the situation will result in when the feared object or event is encountered, whereas he defines sensitivity as why the individual fears the expected situation or event. In this context, the sentence "I think I will have a panic attack during the flight" is an instance of anxiety expectancy, while the sentence "Panic attacks always cause heart attacks" is an instance of anxiety sensitivity (Reiss, 1991). Individuals who believe that anxiety has little or no detrimental effects, in other words, individuals who have low levels of anxiety sensitivity, can cope with high exposure to anxiety-provoking objects or situations. On the contrary, individuals who believe that anxiety has detrimental effects, such as heart attacks, death, etc. In other words, individuals with high anxiety sensitivity are prone to have anxiety responses that are intensified by the expectation of negative consequences (Reiss et al., 1986). This is due to the fact that anxiety

sensitivity is a factor that heightens anxiety; when people with high anxiety sensitivity become anxious, they become alert about their sense of arousal, which makes their anxiety even more intense (Taylor et al., 2007).

After the introduction of the construct of anxiety sensitivity, it has been frequently discussed in the literature whether this construct is distinct from trait anxiety. Lilienfeld and colleagues (1989) skeptically questioned both empirical and conceptual distinctions between anxiety sensitivity and trait anxiety and argued that anxiety sensitivity is not differentiable from trait anxiety and that the construct known as anxiety sensitivity is better measured and explained by trait anxiety. This view was opposed by many researchers (McNally, 1989; Taylor, 1996; Taylor et al., 1991), but later in the debate, Lilienfeld and colleagues (1993) reached a consensus with other researchers that anxiety sensitivity and trait anxiety are distinct constructs. McNally (1989) explained the conceptual differences between these two concepts and suggested that trait anxiety is the general propensity of an individual to react with fear to stressors; on the other hand, anxiety sensitivity is the specific propensity of an individual to react with fear to anxiety-related sensations.

Taylor and colleagues (2007) proposed that anxiety sensitivity can be examined with 3 different sub-factors (physical concerns, cognitive concerns, and social concerns) and defined these 3 sub-factors separately. According to Taylor and colleagues (2007), physical concerns refer to the individual's belief that sensations of anxiety will lead to serious physical harm, such as cardiac arrest. Cognitive concerns mean the individual's belief that sensations of anxiety will cause serious cognitive harms, such as madness. Finally, social concerns describe an individual's belief that socially observable anxiety symptoms will result in severe social harm, such as being rejected and ridiculed.

Current literature emphasizes that anxiety sensitivity is a transdiagnostic construct that plays a role in the onset and the maintenance of various psychopathologies (Stewart, 2024), such as anxiety disorders (Hazen et al., 1994; Naragon-Gainey, 2010; Pérez Benítez et al., 2009), post-traumatic stress disorder (Simpson et al., 2006), obsessive-compulsive disorder (Raines et al., 2014), and major depressive disorder (Baek et al., 2019), opioid use disorder (Stathopoulou et al., 2021), e-cig use dependence (Zvolensky et al., 2018). Although anxiety sensitivity has been frequently studied in different psychopathologies, since the e-cig use is a relatively new field of research, more studies regarding the relationship between anxiety sensitivity and e-cig use are needed (Zvolensky et al., 2018).

Anxiety sensitivity appears to be particularly pronounced in young adulthood, a developmental stage characterized by ongoing maturation of brain regions responsible for

emotional processing and reappraisal (Baeken et al., 2014). Specifically, high anxiety sensitivity in young individuals has been related to altered connectivity between the prefrontal cortex and the amygdala, particularly in the left lateral subregion, which plays a significant role in evaluating emotional stimuli and interacting with cortical regions that process anxiety-related sensations and responses (Porta-Casteràs et al., 2020). This neural immaturity may lead to heightened emotional reactivity and a reduced capacity to effectively reappraise anxiety-related sensations (Porta-Casteràs et al., 2020). Therefore, the heightened anxiety sensitivity observed in young adults may increase their vulnerability to engage in addictive behaviors such as using e-cigs, especially when used as a maladaptive strategy to alleviate their anxiety-related negative sensations and symptoms (Zvolensky et al., 2018). Given this risk, it is critically significant to further investigate anxiety sensitivity in young adults, especially in terms of e-cig use behaviors and potential nicotine addiction.

1.7.1. Anxiety sensitivity and electronic cigarette use outcome expectancies

Anxiety sensitivity is associated with e-cig use, as well as with other addictive behaviors (McLeish et al., 2021; Powers et al., 2021; Zvolensky et al., 2019). A research conducted by Powers and colleagues (2021) demonstrated that anxiety sensitivity was positively related to both e-cig use, conventional cigarette use, and dual use of these two products. Additionally, McLeish and colleagues (2021) found that dual users had higher anxiety sensitivity and emotion dysregulation than other user groups.

In recent years, the relationship between outcome expectancies and anxiety sensitivity has attracted the curiosity of researchers and has been the subject of scientific studies in relevant literature. In a study conducted by Zvolensky and colleagues (2018), anxiety sensitivity was found to be positively related to positive outcome expectancies regarding e-cig use. Moreover, the same study demonstrated that anxiety sensitivity mediated the relationship between worry and positive outcome expectancies (Zvolensky et al., 2018). Similarly, two different studies performed by Garey and colleagues (2019) and Zvolensky and colleagues (2019) indicated that anxiety sensitivity was found to be associated with positive outcome expectancies, greater perceived risks and benefits of e-cig use, and more (but unsuccessful) e-cig cessation attempts. According to Zvolensky and colleagues (2019), positive outcome expectancies and anxiety sensitivity can operate together in many processes related to e-cig use, including the individual's perceived benefits and risks

regarding e-cig use. For instance, individuals with high anxiety sensitivity and high positive outcome expectancies may believe that e-cigs are a safe option to conventional cigarettes and e-cig use will regulate their negative affect, and may report greater perceived benefits from e-cigs than other individuals. At the same time, due to their high anxiety sensitivity, these individuals may be more hyper-vigilant and concerned about health risks and may report greater perceived risks from e-cigs than other individuals (Zvolensky et al., 2019). In summary, e-cig users with high anxiety sensitivity hold two different conflicting beliefs: they believe that e-cig use has various benefits, but they also worry about the risks that this use may pose.

1.8. Emotion Dysregulation

Emotions have many different important functions in the life of an organism, and these functions can be described differently by different theorists or researchers. According to Linehan (1993), emotions serve three distinct functions in humans: organizing and motivating action, communicating to others, and communicating to the self (e.g., alerting individuals to physical threat). Emotion regulation is essential for emotions to maintain these three functions properly (Linehan, 1993). Emotional regulation, which was first defined by Thompson (1991), refers to both the external and internal processes that include the monitoring, evaluation, and modification of an individual's emotional responses, particularly their intensity and temporal properties. This regulation may not only serve to diminish the intensity and duration of adverse emotions, but may also provide experience of positive emotions more intensely under proper conditions (Lewis et al., 2008). Similar to Thompson's (1991) definition, Gross (1998) described emotion regulation as the process that shapes which emotions people have and when and how they experience and express these emotions. Additionally, Gross (1998) argues that emotion regulation processes in humans can occur either consciously or unconsciously, automatically or controlled, and that these processes can take part in the formation of emotions.

Although there are different models and approaches to emotion regulation strategies or processes in the literature, one of the most widely accepted models is the Process Model of Emotion Regulation by Gross and Thompson (2007). Gross and Thompson (2007) proposed five distinct emotion regulation strategies in this model called situation selection (approaching or avoiding from particular situation/environment to experience desired

emotion) situation modification (directly modifying the situation to alter the emotion created by that situation/environment), attention deployment (altering the current emotion by focusing on different aspects of a particular situation/environment) cognitive change (altering perceptions and thoughts about certain situation/environment that elicits undesired emotion) and response modulation (changing the intensity, duration and experiential, behavioral or physiological components of the emotional response after the emergence of the emotion). The first four processes in this model (situation selection, situation modification, attentional deployment, and cognitive change) involve antecedent-focused strategies and precede the emotional response, whereas the fifth process (response modulation) involves response-focused strategies and comes after the emotional response (Gross & Thompson, 2007).

It is very significant for individuals to use emotion regulation strategies appropriately and effectively in terms of their psychological health (Gross & Muñoz, 1995), however, some individuals unfortunately have difficulty in utilizing emotion regulation strategies effectively. Linehan (1993) described emotion dysregulation as a combination of an inadequacy in the ability to regulate one's emotional responses, extreme and long-lasting reactions, and a high level of vulnerability to emotional stimuli. Similarly, Gratz and Roemer (2004) defined emotion dysregulation as an individual's inadequacy in controlling his/her emotional responses to a stimulus and difficulty in recognition, discrimination, or regulation of emotions. Cole (1994) suggested that emotion dysregulation can occur in two different forms as underregulation or overregulation, but both underregulation and overregulation can be present in an individual. For instance, a person may underregulate the intensity or amount of some emotions (express his/her emotions intensely), but the same person may overregulate another emotion (excessively suppress or control the expression of that emotion). Gratz and Roemer (2004) found that emotion dysregulation has six subfactors and suggested that emotion dysregulation can present in six different areas: “nonacceptance of emotional responses” (nonaccepting responses to one's own emotional state), “lack of emotional awareness” (difficulties being aware of and accept one's own emotions), “difficulties engaging in goal-directed behaviors” (difficulties focusing and performing tasks while having negative emotions), “lack of emotional clarity” (not knowing what the emotion is that the individual is experiencing), “impulse control difficulties” (having issues in managing one's own behavior when experiencing certain emotions), and “limited access to emotion regulation strategies” (the belief that the individual has few methods to efficiently regulate his/her own emotions).

So far, many studies have examined the relationship between emotion dysregulation and psychiatric disorders in the literature, and it was found that emotion dysregulation is associated with many different psychopathologies (Aslan et al., 2024). Moreover, since a great number of studies in the literature support that emotion regulation plays a key role in the emergence and maintenance of mental health disorders, emotion regulation has been suggested as a transdiagnostic concept in mental health disorders (Sloan et al., 2017). Linehan (1993) addressed emotion dysregulation disorder within the framework of borderline personality disorder and emphasized that borderline personality disorder is mainly a disorder related to inadequacy in emotion regulation processes. Psychopathologies that have been found to be associated with emotion dysregulation include, but are not limited to, mood disorders (Aslan & Baldwin, 2021; McLaughlin et al., 2011), anxiety disorders (Tsypes et al., 2013), eating disorders (Monell et al., 2018), obsessive-compulsive disorder (See et al., 2022), alcohol and substance use disorders (Fox et al., 2007; Jakubczyk et al., 2018), and e-cig dependence (Manning et al., 2020).

Similar to anxiety sensitivity, emotion dysregulation also appears to be particularly pronounced in young adulthood, a developmental stage characterized by the ongoing maturation of brain regions responsible for processing emotions and regulating emotional responses (Crone & Steinbeis, 2017). During this stage, the prefrontal cortex remains immature, which may impair young adults' cognitive control over evolutionarily older brain systems involved in emotional and reward-related processing. This neural immaturity may lead to a reduced capacity to regulate emotional responses and control impulses, thereby increasing vulnerability to addictive behaviors such as e-cig consumption (Arain et al., 2013; Oron Semper et al., 2016). Taking into account this risk, it is crucial to further examine emotion dysregulation in young adults, especially in terms of e-cig use behaviors and potential nicotine dependence.

1.8.1. Emotion dysregulation and electronic cigarette use outcome expectancies

Emotional dysregulation can facilitate the initiation and maintenance of addictive behaviors as a way of coping with negative experiences (Sideli et al., 2023). One of the addictive behaviors that emotion dysregulation may enable the initiation and maintenance of is e-cig use, however, studies on this subject in the literature are quite new and limited (Tran & Morrell, 2023). In a study conducted by McLeish and colleagues (2024) on emotion

dysregulation and e-cig use outcome expectancies, it was found that difficulties engaging in goal-directed behavior when having adverse emotions, which is a subfactor of emotion dysregulation, was associated with positive reinforcement outcome expectancies, one of the positive outcome expectancies for e-cig use. Results of the same study demonstrated that high levels of overall emotion dysregulation were associated with negative reinforcement outcome expectancies, which is one of the positive outcome expectancies. In other words, e-cig users with higher overall emotion dysregulation were found to be more likely to believe that e-cigs would help affect regulation and reduce their negative emotions (McLeish et al., 2024). Similarly, in a study conducted by Brockenberry and colleagues (2022) examining the relationship between e-cig use outcome expectancies and emotion dysregulation, it was found that emotion regulation is positively related to negative affect reduction outcome expectancies, which is one of the positive outcome expectancies.

The association of e-cig use outcome expectancies and emotion dysregulation is quite similar to those of conventional cigarette use outcome expectancies and emotion dysregulation. Similar to the results of the research on e-cig use outcome expectancies, a study performed by Johnson and colleagues (2008) indicated that negative reinforcement outcome expectancies (also called negative affect reduction outcome expectancies) of conventional cigarette users were positively correlated with their emotion dysregulation levels and anxiety sensitivity levels, and emotion dysregulation and anxiety sensitivity also had a positive association with each other. Additionally, Gonzalez and colleagues (2009) found that smokers with greater levels of negative affect reduction outcome expectancies, which is one of the positive outcome expectancies, are more likely to have higher levels of emotion dysregulation. Despite this similarity, there is a small body of research on the association of e-cig use outcome expectancies and emotion dysregulation, and therefore, this should be recognized when evaluating the findings of existing studies, and the results should be carefully evaluated.

1.9. The Purpose and the Significance of This Study

This study aimed to examine e-cig use outcome expectancies in terms of anxiety sensitivity and emotion dysregulation in young adults, and to investigate the association between sociodemographic factors and conventional cigarette or e-cig use behaviors. The review of the literature revealed that the studies on this topic were very limited, yet the results

of this limited number of studies consistently supported that emotion dysregulation and anxiety sensitivity are related to e-cig use outcome expectancies (Brockenberry et al., 2022; Garey et al., 2019; McLeish et al., 2024; Zvolensky et al., 2018, 2019). In the existing literature, no study has investigated this topic specifically with a Turkish sample. Therefore, the current study was the first study to address e-cig use outcome expectancies in terms of anxiety sensitivity and emotion dysregulation in Turkish young adults. Addressing this gap in the literature is of critical importance, as cultural and societal differences may influence the psychological factors underlying the increasingly widespread use of e-cigs among young adults. Moreover, addressing this gap could contribute to validating and extending the limited number of previous research findings and could provide a basis for future studies on this important topic.

Understanding Turkish young adults' beliefs about e-cig use and the factors, such as anxiety sensitivity and emotion dysregulation, that may underlie these beliefs may provide important insights into the increasing use of e-cigs and the associated risk of addiction. Therefore, the current study is very important for a better understanding of an increasingly widespread public health problem and for the development of clinical interventions.

1.10. Research Questions and Hypotheses

This study was conducted to answer 7 research questions and test 9 hypotheses. The research questions and the hypotheses are listed below:

1) Is use status associated with gender, education level, and income level?

Hypothesis 1: It is expected that use status is associated with gender, education level, and income level.

2) Is there an association between age, daily amount of e-cig use, and daily amount of conventional cigarette use?

Hypothesis 2: It is expected that age, daily amount of e-cig use, and daily amount of conventional cigarette use are positively associated with each other.

3) Are there differences between genders in terms of the daily amount of e-cig use and the daily amount of conventional cigarette use?

Hypothesis 3: Men are expected to have higher daily amount of e-cig and conventional cigarette use than women.

4) Is there an association between emotion dysregulation, anxiety sensitivity, and e-cig use outcome expectancies?

Hypothesis 4: It is expected that as emotion dysregulation and anxiety sensitivity increase, positive outcome expectancies also increase, whereas as emotion dysregulation and anxiety sensitivity decrease, negative outcome expectancies increase.

5) Are there differences between men and women in e-cig use outcome expectancies, anxiety sensitivity, and emotion dysregulation?

Hypothesis 5: It is expected that men and women differ in e-cig use outcome expectancies, anxiety sensitivity, and emotion dysregulation.

6) Are there differences between dual users, smokers, and nonusers in e-cig use outcome expectancies, anxiety sensitivity, and emotion dysregulation?

Hypothesis 6: Dual users are expected to have higher positive outcome expectancies than nonusers and smokers, whereas nonusers are expected to have higher negative outcome expectancies than smokers and dual users.

Hypothesis 7: Smokers and dual users are expected to have higher anxiety sensitivity and emotion dysregulation than nonusers.

7) Do emotion dysregulation and anxiety sensitivity predict e-cig use outcome expectancies?

Hypothesis 8: It is expected that emotion dysregulation and anxiety sensitivity predict positive outcome expectancies.

Hypothesis 9: It is expected that emotion dysregulation and anxiety sensitivity predict negative outcome expectancies.

2. METHOD

2.1. Participants

To calculate the total sample size of the current study, an a priori power analysis was utilized using G*Power 3.1 (Faul et al., 2009). Since 4 different statistical analyses were used to test the hypotheses, the analysis with the highest total sample size in G*power was used as a basis for determining the sample size of this study. The analysis with the largest sample size was the one-way MANOVA. In the a priori power analysis of multiple regression, effect size f^2 was calculated as .06, alpha error probability value was .05, power estimation was .95, the number of groups was 3, response variables were 4, and according to these values, the total sample size was found to be 186. However, taking into account the possibility of participants dropping out of the research or meeting the exclusion criteria, a total of 281 participants were reached.

All participants had to meet the inclusion criteria of being between 18 and 25 years of age. Smokers, dual users, and nonusers were included in this study. “Nonusers” included individuals who do not use either e-cigs or conventional cigarettes in their lives (Romijnders et al., 2018). “Smokers” are both current and former users of conventional cigarettes who have never used e-cigs in their lives (Li et al., 2024). “Dual users” consist of individuals who use the combination of e-cig and conventional cigarettes at any time in their lives (Maglia et al., 2018). If an individual had tried an e-cig at some point in his/her life, even if only once, and had been using conventional cigarettes at the same time, this individual was included in the "dual users" group in this study (Maglia et al., 2018).

Using only e-cigs was the exclusion criterion of this study; thus, individuals who only use e-cigs (vapers) were not included in this study. There are some reasons why using only e-cigs was determined by the exclusion criterion: This study is based on the definition of "dual use" by Maglia and colleagues (2018), which is the most common definition in the literature. They defined dual use very broadly, and this broad definition of dual use severely limits the access to individuals who only use e-cigs (vapers) in this study. In addition, since e-cigs are a relatively new nicotine product compared to conventional cigarettes, individuals who currently only use e-cigs are likely to have been conventional cigarette users in the past and to have tried e-cigs while using conventional cigarettes. Moreover, access to e-cigs is quite limited due to legal regulations in Türkiye (Official Gazette of the Republic of Türkiye,

2020). For this reason, most e-cig users cannot access electronic cigarettes regularly and turn to conventional cigarettes from time to time. In line with all these reasons, it was thought that it would not be possible to reach a sufficient number of individuals who only use e-cigs in the Turkish sample under today's conditions.

In the present study, having a psychiatric diagnosis was not an exclusion criteria. There are several reasons for this situation: One of the first reasons is that emotion dysregulation and anxiety sensitivity are accepted as transdiagnostic constructs in the relevant literature (Sloan et al., 2017; Stewart, 2024). In addition, this study was the first to examine e-cig use outcome expectancies in terms of anxiety sensitivity and emotion dysregulation in Turkish young adults. Thus, considering the high rate of psychiatric diagnoses in young adults in the Turkish population today (Cengiz & Topuzoğlu, 2022), excluding all participants with a diagnosis may severely limit the generalizability of the current findings by reducing the external validity of the study. Moreover, since there was no hypothesis that included any comparison between clinical and non-clinical groups in this study, it was not considered necessary to exclude participants with a psychiatric diagnosis from the dataset.

In the current study, 281 participants voluntarily agreed to complete the survey. 4 participants, who only use e-cigs (vapers), were excluded from the data set since they met the exclusion criteria of the study. Afterwards, 4 participants were deleted from the data set since they were outliers; thus, analyses were continued with data from the remaining 273 participants (for more information, see the "3. RESULTS" section). Of the 273 participants, 137 were women (50.2%) and 136 were men (49.8%). The age range of participants was 18-25, with a mean score of 23.18 (*SD* = 1.96). Additionally, 91 of the participants were nonusers (33.3%), 91 were smokers (33.3%), and 91 were dual users (33.3%). Table 2.1. presented demographic characteristics in detail.

Table 2.1. *Frequencies of the Participants' Demographic Variables (N = 273)*

	n	%
Gender		
Woman	137	50.2
Man	136	49.8
Education Level		
Secondary school graduate	1	0.4
High school graduate	90	33
Associate degree graduate	17	6.2

Bachelor's degree graduate	144	52.7
Master's degree graduate	21	7.7
Income Level		
Low	36	13.2
Lower-middle	53	19.4
Middle	138	50.5
Upper-middle	42	15.4
High	4	1.5
Psychiatric Diagnosis		
Yes	25	9.2
No	248	90.8
Psychotropic Medication Use		
Yes	13	4.8
No	260	95.2
E-cig / Conventional Cigarette Use Status		
Nonusers	91	33.3
Smokers	91	33.3
Dual users	91	33.3
Duration of Conventional Cigarette Use		
0 – 5 months 29 days	24	8.8
6 months - 11 months 29 days	12	4.4
12 months - 23 months and 29 days	17	6.2
24 months - 35 months 29 days	18	6.6
3 years and above	111	40.7
Duration of E–cig Use		
0 – 5 months 29 days	63	23.1
6 months - 11 months 29 days	13	4.8
12 months - 23 months and 29 days	7	2.6
24 months - 35 months 29 days	5	1.8
3 years and above	3	1.1
Daily Amount of E-cig Use		
0 - 500 puff	82	30
501 - 1000 puff	2	0.7

1001 - 1500 puff	1	0.4
1501 - 2000 puff	2	0.7
More than 2000 puff	4	1.5
Daily Amount of Conventional Cigarette Use		
0 - 5 cigarette	58	21.2
6 - 10 cigarette	46	16.8
11 - 15 cigarette	26	9.5
16 - 20 cigarette	33	12.1
More than 20 cigarette	19	7
E-cig Use Status of Close Social Environment		
Yes	157	57.5
No	116	42.5
Conventional Cigarette Use Status of Close Social Environment		
Yes	230	84.2
No	43	15.8

2.2. Materials

2.2.1. Demographic information form

The participants were asked to fill out this form, which aimed to obtain demographic information. This form contained questions about participants' ages, genders, education levels, income levels, presence of psychiatric diagnoses, use of psychotropic medications, e-cig use and conventional cigarette use status, duration of e-cig use and conventional cigarette use, daily amount of e-cig use and conventional cigarette use, and conventional cigarette and e-cig use status of their close social environment (Appendix 1).

2.2.2. E-Cigarette Use Outcome Expectancies Scale (EUOES)

This scale, which aims to measure e-cig use outcome expectancies of individuals between the ages of 18 and 25, was developed by Pokhrel and colleagues (2014), later revised by Pokhrel and colleagues (2018b), and adapted to Turkish by Selekoğlu Ok and colleagues (2020). The original version of the scale consists of 46 items and 8 sub-factors, and all scale items consist of a 10-point Likert-type scale ranging from 0 (not at all likely)

to 9 (very likely). This scale consists of 4 positive outcome expectancies sub-factors called social enhancement, affect regulation, positive smoking experience, and positive sensory experience, and 4 negative outcome expectancies sub-factors called negative health consequences, negative social consequences, addiction concern, and negative sensory experience (Pokhrel et al., 2014; 2018b). The original scale's Cronbach's alpha coefficients for the sub-factors of positive outcome expectancies were .94 for social enhancement, .94 for affect regulation, .92 for positive smoking experience, and .91 for positive sensory experience, respectively; for the sub-factors of negative outcome expectancies, they were 94. for negative health consequences, .87 for negative social consequences, .87 for addiction concern, and .93 for negative sensory experience, respectively.

The total score of the scale is calculated by summing the scores of the subfactors; however, two different scores, called a positive outcome expectancy score and a negative outcome expectancy score, can also be calculated. In this regard, the scores that the participants can obtain from this scale range from 0 to 414 points (Pokhrel et al., 2018b).

The Turkish version of this scale also has 46 items and 8 subfactors, and the results of the factor analysis revealed that the Turkish version of the scale has the same factor structure as the original version (Selekoğlu Ok et al., 2020). Selekoğlu Ok and colleagues (2020) found that the Cronbach's alpha coefficients of the scale for the sub-factors of positive outcome expectancies were .94 for social enhancement, .94 for affect regulation, .83 for positive smoking experience, and .87 for positive sensory experience, respectively; for the sub-factors of negative outcome expectancies, they were .94 for negative health consequences, .89 for negative social consequences, .83 for addiction concern, and .94 for negative sensory experience, respectively, and .86 for the whole scale.

In the current research, Cronbach's alpha coefficients of were found to be .94 for social enhancement, .94 for affect regulation, .84 for positive smoking experience, and .81 for positive sensory experience, .93 for negative health consequences, .90 for negative social consequences, .83 for addiction concern, and .93 for negative sensory experience, respectively. Additionally, Cronbach's alpha coefficients were found to be .93 for the positive outcome expectancies subscale, .90 for the negative outcome expectancies subscale, and .88 for the whole scale. In this study, this scale was examined in terms of two sub-factors, namely positive outcome expectancies and negative outcome expectancies, in line with the commonly used approach in the literature (Alanazi et al., 2023; Latimer, 2023) (Appendix 2).

2.2.3. Anxiety Sensitivity Index-3 (ASI-3)

This scale was initially developed by Taylor and colleagues (2007) and adapted to Turkish by Mantar and colleagues (2010). The original version of the scale consists of 18 items and 3 sub-factors called physical concerns, social concerns, and cognitive concerns, and all scale items consist of a 5-point Likert-type scale ranging from 0 (very little) to 4 (very much). Cronbach's alpha coefficients of the original scale were found to be .79 for physical concerns, .84 for cognitive concerns, and .79 for social concerns (Taylor et al., 2007). The total score of the scale is calculated by summing the scores of the subfactors, and the scores that the participants can obtain from this scale range from 0 to 72 points (Taylor et al., 2007).

The Turkish version of this scale also has 18 items and 3 sub-factors, and the results of the factor analysis revealed that the Turkish version of the scale has the same factor structure as the original version (Mantar et al., 2010). Mantar and colleagues (2010) found that Cronbach's alpha coefficients were .89 for physical concerns, .88 for cognitive concerns, .82 for social concerns, and .93 for the whole scale.

In the current research, Cronbach's alpha coefficients were found to be .86 for physical concerns, .84 for cognitive concerns, .84 for social concerns, and .92 for the whole scale (Appendix 3).

2.2.4. Difficulties in Emotion Regulation Scale (DERS)

This scale was initially developed by Gratz and Roemer (2004) and adapted to Turkish by Rugancı and Gençöz (2010). The original version of the scale consists of 36 items, and 6 sub-factors called lack of awareness of emotional responses (awareness), lack of clarity of emotional responses (clarity) nonacceptance of emotional responses (nonacceptance), limited access to effective strategies (strategy), difficulties in controlling impulsive behavior when experiencing negative affect (impulse), and difficulties in engaging in goal-directed behavior when experiencing negative affect (goal). Cronbach's alpha coefficients of the original scale were found to be .84 for clarity, .89 for goals, .86 for impulse, .85 for nonacceptance, .88 for strategy, .80 for awareness, and .94 for the whole scale (Gratz & Roemer, 2004). All scale-items consist of a 5-point Likert-type scale ranging from 1 (almost never) to 5 (almost always) (Gratz & Roemer, 2004).

The Turkish version of this scale also has 36 items, and 6 subfactors, and the results of the factor analysis revealed that the Turkish version of the scale has the same factor structure as the original version; however 10th item is not included in the statistical analysis (Rugancı & Gençöz, 2010). Rugancı and Gençöz (2010) explained that the reason for not including the 10th item in the analysis was that the item was not consistent with the original factor structure of the scale. In the Turkish version of the scale, this item (item 10) was more related to acceptance of emotions rather than awareness, and this item also negatively affected the reliability coefficients. The total score of the scale is obtained by summing the scores given to each item separately after the reverse items (items 1, 2, 6, 7, 8, 17, 20, 22, 24, and 34) are recoded. Since the 10th item was not included in the analysis, total scores that can be obtained from the scale range from 1 to 175 points. In the study, which was conducted by Rugancı and Gençöz (2010), it was found that the Cronbach's alpha coefficients of clarity was .82, goals was .90, impulse was .90, nonacceptance was .83, strategy was .89, awareness was .75, and the whole scale was .94.

In the current study, Cronbach's alpha coefficients were found to be .78 for clarity, .81 for goals, .83 for impulse, .89 for nonacceptance, .88 for strategy, .76 for awareness, and .94 for the whole scale. Although the scale is adapted to Turkish with 36 items, the 10th item is not included in the statistical analyses, so in the current study, the analyses were conducted on a total of 35 items (Appendix 4).

2.3. Procedure

First of all, in order to conduct this current study, the necessary permissions via e-mail were obtained from the authors of the scales, which were used as measurement tools in the study. The data collection phase of this study began after obtaining ethical approval from the Başkent University Social and Human Sciences Scientific Research and Publication Ethics Committee (Appendix 5). The convenience sampling method was utilized in the current research, and the research participation announcement was shared on social media platforms such as Telegram, WhatsApp to invite participants. This announcement provided information such as the purpose of this research, the name of the researcher and master thesis supervisor, participant inclusion criteria, and a QR code for participation (Appendix 6). Individuals who volunteered to participate in this study were able to access the survey from the link or QR code in this announcement. This study was conducted through Qualtrics,

which is an online survey platform, and informed consent (Appendix 7), demographic information form, EUOES, ASI-3, and DERS were asked to be filled out by the participants, respectively. Participants were thanked for their interest in the study, and the recorded data set was downloaded from Qualtrics in order to perform statistical analyses.

2.4. Data Analytic Strategy

Statistical analyses of the data collected in this research were carried out through the Statistical Package for Social Sciences (SPSS) 27.0.1.0 Program. Before starting statistical analysis, it was checked whether there were any participants who met the exclusion criteria. To avoid impacting the accuracy of the statistical analyses results, it was checked whether the same participant completed the survey more than once. It was found that no one completed the survey more than once. For the same purpose, the time duration of completing the survey of each participant was checked to identify participants who randomly answered the survey in a very short time. It was found that no one completed the survey in an unusually short time, suggesting that participants did not complete the survey randomly. Data cleaning was done, and missing data, univariate, and multivariate outliers were handled. Skewness and kurtosis values were calculated and checked to determine whether the data set was normally distributed. The internal consistency reliabilities of the scales used in this study were tested by evaluating the Cronbach's alpha values of each scale. Descriptive statistics were carried out to explore the characteristics of the dataset. Then, statistical analyses were performed to test the 9 different hypotheses of the study. Before proceeding to the testing of the main hypotheses of the study, statistical analyses were conducted to examine the participants' demographic information in detail. In this regard, Hypothesis 1 was tested using Pearson's chi-square and Fisher's exact tests, Hypothesis 2 with Pearson correlation analysis, and Hypothesis 3 with a one-way MANOVA. Subsequently, the main hypotheses were tested: Hypothesis 4 was tested by a Pearson correlation analysis; Hypothesis 5, Hypothesis 6, and Hypothesis 7 by two separate one-way MANOVAs; and Hypothesis 8 and Hypothesis 9 by two separate standard multiple regression analyses. Furthermore, a partial correlation analysis was conducted as an additional analysis.

3. RESULTS

3.1. Evaluating the Suitability of the Data Set for Statistical Analyses

Before conducting statistical analyses, the suitability of the dataset for statistical analyses was examined. In this regard, first, it was examined whether there was missing data in the dataset, and it was confirmed that there was no missing data. Then, z-scores were calculated to identify univariate outliers, and the data of 4 participants outside the range of -3.29 to +3.29 were deleted from the data set (Tabachnick & Fidell, 2019). Since identification and removal of multivariate outliers are a requirement for multiple regression and MANOVA analyses (Tabachnick & Fidell, 2019), the Mahalanobis distance was calculated to identify multivariate outliers. The Mahalanobis distance calculation for multiple regression was calculated according to the criteria of $\chi^2 > 13.81$ and $p < .001$ (Tabachnick & Fidell, 2019), and the results indicated that there was no multivariate outlier for multiple regression analysis. In addition, the Mahalanobis distance for MANOVA analyses was calculated according to the criteria of $\chi^2 > 18.46$ and $p < .001$ (Tabachnick & Fidell, 2019), and as a result of this calculation, it was concluded that there was no multivariate outlier for MANOVA analyses. After deleting outliers, analyses were continued with data from the remaining 273 participants.

To test the normal distribution assumption, the skewness and kurtosis values of the scores obtained from the scales that were used in this study were calculated. Skewness and kurtosis values were determined differently by different researchers; for example, according to Tabachnick and Fidell (2013), skewness and kurtosis values between -1.5 and +1.5 indicate that the data set meets the normal distribution assumption. However, there are also statisticians who argue that skewness and kurtosis values should be determined more strictly for the normal distribution assumption (George & Mallery, 2001; Hair et al., 2022; Leech et al., 2005). In this regard, they described the values between -1 and +1 for skewness and kurtosis as "excellent values" and suggested that if the skewness and kurtosis values are between -1 and +1, the normal distribution assumption can be accepted (George & Mallery, 2001; Hair et al., 2022; Leech et al., 2005). In the current study, skewness and kurtosis values were taken as -1 and +1, and it was found that the skewness and kurtosis values of all scores obtained from the scales were in the range of -1 and +1, and therefore it was concluded that the data set met the assumption of normal distribution.

3.2. Analyses of Demographic Variables

Various statistical analyses were performed to examine the demographic information of the participants in detail. Firstly, a 2x3 Pearson's chi-square test for association was performed to examine the relationship between gender (men and women) and use status (nonusers, smokers, and dual users). The results demonstrated that there was a significant association between gender and use status, $\chi^2(2, N = 273) = 12.51$, $p = .002$. The effect size, which was measured by Cramér's V, was found to be .21, indicating a small-to-moderate association between these variables (Pallant, 2020). The contingency table indicated that 43.1% of women and 23.5% of men were nonusers, 26.3% of women and 40.4% of men were smokers, and 30.7% of women and 36% of men were dual users. Post-hoc analysis of adjusted residuals (z) was used to examine whether there was a statistical difference between the groups. MacDonald and Gardner (2000) suggested that a Bonferroni correction should be made for the z critical value for multiple comparisons in contingency tables with a large number of cells, such as 2x3, 3x3, or 3x4, in the chi-square test. For 2x3 contingency tables, the z critical value after Bonferroni correction was determined to be +/-2.65 (MacDonald & Gardner, 2000). Therefore, when evaluating multiple comparisons in the current analysis, z values greater than +2.65 or less than -2.65 were considered statistically significant differences. In this regard, post-hoc analysis of the adjusted residuals demonstrated that there was a significant difference between men and women in the nonusers group. Women were more likely to be nonusers ($z = 3.42$) while men were less likely ($z = -3.42$). However, no significant difference between men and women was found in the smokers group (women $z = -2.48$, and men $z = 2.48$) or the dual users group (women $z = -.94$, and men $z = .94$).

Afterwards, a 3x5 Pearson's chi-square test for association was planned to examine the relationship between use status and education level, but, since 20% of cells had expected frequencies less than 5, Fisher's exact test was utilized instead (Freeman & Campbell, 2007). The test results showed that there was no significant association between use status and education level ($p = .86$). Similarly, since 20% of cells had expected frequencies less than 5, a 3x5 Fisher's exact test was conducted to assess the relationship between use status and income level. However, no significant association was found between use status and income level ($p = .17$). In line with Pearson's chi-square test and two separate Fisher's exact tests results, Hypothesis 1 was partially supported.

Then, in testing Hypothesis 2, a Pearson correlation analysis was performed to examine the relationships between age, daily amount of e-cig use, and daily amount of conventional cigarette use. The results showed that age had no significant relationship with daily amount of e-cig use (r = -.03, p = .61) and daily amount of conventional cigarette use (r = .00, p = .99). Similarly, no significant relationship was found between daily amount of e-cig use and daily amount of conventional cigarette use (r = .09, p = .13). In line with these results, Hypothesis 2 was rejected.

Lastly, a one-way MANOVA was performed to examine whether there were differences between men and women in terms of daily amount of e-cig use and daily amount of conventional cigarette use. The gender was the independent variable, and the daily amount of e-cig use and the daily amount of conventional cigarette use were the dependent variables. Box's M test results revealed that the homogeneity of variance-covariance matrix assumption was violated (p < .001); thus, Pillai's Trace value was reported as suggested by Tabachnick and Fidell (2019). The results of the multivariate tests yielded that there was a significant difference between genders in the combination of the dependent variables, *Pillai's Trace* = .13, F(2, 270) = 21.26, p < .001, η_p^2 = .13. The univariate tests of each dependent variable were evaluated separately. For daily amounts of conventional cigarette use, Levene's test results demonstrated that the homogeneity of variance assumption was not met [F(1, 271) = 52.38, p < .001]. Since the recommended test to be used when this assumption is violated is the Welch test, which is robust to heterogeneous variances (Kohr & Games, 1974; Welch, 1951), the daily amount of conventional cigarette use was examined by using the Welch test. Welch's test results showed that there was a significant difference between men and women in terms of the daily amount of conventional cigarette use [F(1, 210.87) = 42.47, p < .001, η^2 = .13]. Pairwise comparisons indicated that men consumed more conventional cigarettes daily (M = 11.46, SD = 10.89) than women (M = 4.50, SD = 6.05). On the other hand, Levene's test results revealed that the homogeneity of variance assumption was met for the daily amount of e-cig use [F(1, 271) = .43, p = .51]. However, according to the univariate test results, it was found that men and women did not differ in terms of daily amount of e-cig use [F(1, 271) = .13, p = .71, η_p^2 = .00]. In line with these results, Hypothesis 3 was partially supported.

3.3. Descriptive Statistics for the Measures of This Study

Means, standard deviations, and minimum and maximum values for 273 participants' scores of positive outcome expectancies, negative outcome expectancies, anxiety sensitivity, and emotion dysregulation were reported in Table 3.1.

Table 3.1. *Descriptive Statistics for the Measures of This Study*

	M	*SD*	*Minimum*	*Maximum*
Positive Outcome Expectancies (EUOES)	46.37	42.66	.00	182.00
Negative Outcome Expectancies (EUOES)	75.99	33.63	.00	150.00
Anxiety Sensitivity (ASI-3 Total)	29.75	15.27	.00	72.00
Physical Concerns (ASI-3)	10.30	5.80	.00	24.00
Cognitive Concerns (ASI-3)	11.26	6.37	.00	28.00
Social Concerns (ASI-3)	8.18	5.16	.00	20.00
Emotion Dysregulation (DERS Total)	86.96	23.15	36.00	150.00
Goal (DERS)	15.54	4.59	5.00	25.00
Strategy (DERS)	19.65	7.04	8.00	40.00
Nonacceptance (DERS)	13.46	5.87	6.00	30.00
Impulse (DERS)	14.34	5.19	6.00	29.00
Clarity (DERS)	11.52	3.78	5.00	23.00
Awareness (DERS)	12.43	3.77	5.00	25.00

3.4. The Results of the Pearson Correlation Analyses

In testing Hypothesis 4, a Pearson correlation analysis was conducted to investigate the relationships between positive outcome expectancies, negative outcome expectancies, anxiety sensitivity, and emotion dysregulation. The results indicated that positive outcome expectancies were significantly and positively correlated with anxiety sensitivity (r = .34, p < .001) and emotion dysregulation (r = .23, p < .001), but significantly and negatively correlated with negative outcome expectancies (r = -.13, p < .05). Additionally, emotion dysregulation was significantly and positively correlated with anxiety sensitivity (r = .42, p < .001). Finally, it was found that negative outcome expectancies were significantly and positively correlated with anxiety sensitivity (r = .19, p < .001). However, the results showed that there was no significant relationship between negative outcome expectancies and

emotion dysregulation (r = -.05, p = .38). In line with these results, Hypothesis 4 was partially supported. Table 3.2. presented correlations between the variables.

Table 3.2. *The Results of the Pearson Correlation Analysis*

Variables	1	2	3	4
1. Positive Outcome Expectancies (EUOES)	-			
2. Negative Outcome Expectancies (EUOES)	-.13*	-		
3. Anxiety Sensitivity (ASI-3 Total)	.34***	.19***	-	
4. Emotion Dysregulation (DERS Total)	.23***	-.05	.42***	-

Note. *p < .05 (2-tailed), ***p < .001 (2-tailed).

The relationships between the sub-factors of the scales used in this study were examined by conducting a Pearson correlation analysis. The results showed that positive outcome expectancies positively correlated with physical concerns (r = .29, p < .001), cognitive concerns (r = .31, p < .001), social concerns (r = .29, p < .001), goal (r = .16, p < .01), strategy (r = .25, p < .001), nonacceptance (r = .28, p < .001), impulse (r = .26, p < .001), and clarity (r = .13, p < .001); but negatively correlated with negative outcome expectancies (r = -.13, p < .05). Negative outcome expectancies positively correlated with physical concerns (r = .21, p < .001), cognitive concerns (r = .15, p < .05), and social concerns (r = .14, p < .05). In addition, physical concerns positively associated with cognitive concerns (r = .68, p < .001), social concerns (r = .62, p < .001), goal (r = .27, p < .001), strategy (r = .32, p < .001), nonacceptance (r = .29, p < .001), impulse (r = .25, p < .001), and clarity (r = .18, p < .01). Similarly, cognitive concerns positively related to social concerns (r = .66, p < .001), goal (r = .30, p < .001), strategy (r = .47, p < .001), nonacceptance (r = .41, p < .001), impulse (r = .37, p < .001), and clarity (r = .25, p < .001). Social concerns were found to be positively associated with goal (r = .34, p < .001), strategy (r = .41, p < .001), nonacceptance (r = .38, p < .001), impulse (r = .33, p < .001), and clarity (r = .19, p < .01). Goal was positively correlated with strategy (r = .65, p < .001), nonacceptance (r = .47, p < .001), impulse (r = .58, p < .001), and clarity (r = .35, p < .001). The results indicated that strategy was positively related to nonacceptance (r = .74, p < .001), impulse (r = .77, p < .001), clarity (r = .53, p < .001), and awareness (r = .13, p < .05). Additionally, it was found that nonacceptance is associated with impulse (r = .70, p < .001), and clarity (r = .50, p < .001). Impulse was found to be positively correlated with clarity (r = .53, p < .001) and awareness (r = .18, p < .01). Lastly, clarity was positively related to awareness (r = .18, p < .01). Table 3.3. presented correlations in detail.

Table 3.3. *The Results of the Pearson Correlation Analysis for Sub-factors of the Scales*

Variables	1	2	3	4	5	6	7	8	9	10	11
1. Positive Outcome Expectancies (EUOES)	-										
2. Negative Outcome Expectancies (EUOES)	-.13*	-									
3. Physical Concerns (ASI-3)	.29***	.21***	-								
4. Cognitive Concerns (ASI-3)	.31***	.15*	.68***	-							
5. Social Concerns (ASI-3)	.29***	.14*	.62***	.66***	-						
6. Goal (DERS)	.16**	-.01	.27***	.30***	.34***	-					
7. Strategy (DERS)	.25***	-.06	.32***	.47***	.41***	.65***	-				
8. Nonacceptance (DERS)	.28***	-.00	.29***	.41***	.38***	.47***	.74***	-			
9. Impulse (DERS)	.26***	-.05	.25***	.37***	.33***	.58***	.77***	.70***	-		
10. Clarity (DERS)	.13*	-.04	.18**	.25***	.19**	.35***	.53***	.50***	.53***	-	
11. Awareness (DERS)	-.01	-.05	-.02	.05	-.04	.03	.13*	.11	.18**	.44***	-

Note. *$p < .05$ (2-tailed), **$p < .01$ (2-tailed), ***$p < .001$ (2-tailed).

3.5. The Results of the One-Way MANOVAs

In testing Hypothesis 5, a one-way MANOVA was performed to investigate whether there were differences between genders in e-cig use outcome expectancies, anxiety sensitivity, and emotion dysregulation. The gender, which had two different levels (men and women), was the independent variable, and positive outcome expectancies, negative outcome expectancies, anxiety sensitivity, and emotion dysregulation were the dependent variables.

The homogeneity of variance-covariance matrices assumption was tested by Box's M test, and the results demonstrated that this assumption was violated ($p < .001$); thus, Pillai's Trace value was reported as suggested by Tabachnick and Fidell (2019). The results of the multivariate tests yielded that there was a significant difference between genders in the combination of the dependent variables, *Pillai's Trace* = .07, $F(4, 268) = 5.14$, $p < .001$, $\eta_p^2 = .07$.

Afterwards, the univariate tests of each dependent variable were evaluated separately. For positive outcome expectancies, Levene's test results demonstrated that the homogeneity of variance assumption was violated [$F(1, 271) = 5.89$, $p = .01$]. Since the recommended test to be used when this assumption is not met is the Welch test, which is robust to heterogeneous variances (Kohr & Games, 1974; Welch, 1951), positive outcome expectancies were examined by using the Welch test. Welch's test results revealed that there was a significant difference between genders in terms of positive outcome expectancies [$F(1, 259.21) = 10.13$, $p = .002$, $\eta^2 = .03$]. Pairwise comparisons revealed that men had higher positive outcome expectancies ($M = 54.49$, $SD = 46.10$) than women ($M = 38.31$, $SD = 37.40$).

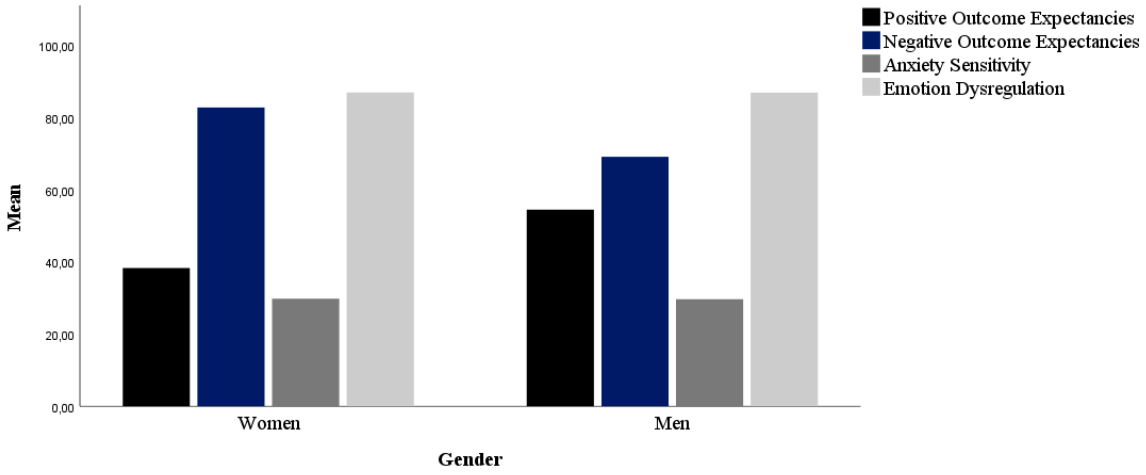
For negative outcome expectancies, Levene's test results indicated that the homogeneity of variance assumption was met [$F(1, 271) = 1.37$, $p = .24$]. The results yielded that there was a significant difference between genders in terms of negative outcome expectancies [$F(1, 271) = 11.74$, $p < .001$, $\eta_p^2 = .04$]. Pairwise comparisons revealed that women had higher negative outcome expectancies ($M = 82.81$, $SD = 30.60$) than men ($M = 69.12$, $SD = 35.23$).

According to Levene's test results, the homogeneity of variance assumption was met for both the anxiety sensitivity [$F(1, 271) = 1.28$, $p = .25$] and the emotion dysregulation [$F(1, 271) = .04$, $p = .82$]. However, the analysis results demonstrated that men and women

did not differ in terms of the anxiety sensitivity [$F(1, 271) = .00$, $p = .93$, $\eta_p^2 = .00$] and the emotion dysregulation [$F(1, 271) = .00$, $p = .99$, $\eta_p^2 = .00$].

In line with these results, Hypothesis 5 was partially supported. Figure 3.1. represents the comparison of the mean scores of men and women.

Figure 3.1. *Comparison of the Means Scores of Men and Women*



In testing Hypothesis 6 and Hypothesis 7, a one-way MANOVA was performed to investigate whether there were differences between nonusers, smokers, and dual users in e-cig use outcome expectancies, anxiety sensitivity, and emotion dysregulation. The use status, which had three different levels (nonusers, smokers, and dual users), was the independent variable, and positive outcome expectancies, negative outcome expectancies, anxiety sensitivity, and emotion dysregulation were the dependent variables.

Box's M test was performed to examine the homogeneity of variance-covariance matrices assumption, and it was found that the assumption was violated ($p = .02$). Therefore, as Tabachnick and Fidell (2019) suggested, Pillai's Trace value was used when evaluating the multivariate tests. The results of the multivariate tests indicated that there was a significant difference between nonusers, smokers, and dual users in the combination of the dependent variables, *Pillai's Trace* = .22, $F(8, 536) = 8.53$, $p < .001$, $\eta_p^2 = .11$.

Afterwards, the univariate tests of each dependent variable were assessed separately. For positive outcome expectancies, Levene's test results demonstrated that the homogeneity of variance assumption was not met [$F(2, 270) = 3.10$, $p = .04$]. However, the univariate test results revealed that the main effect of the use status was found to be significant for positive outcome expectancies [$F(2, 270) = 17.38$, $p < .001$, $\eta_p^2 = .11$]. The most

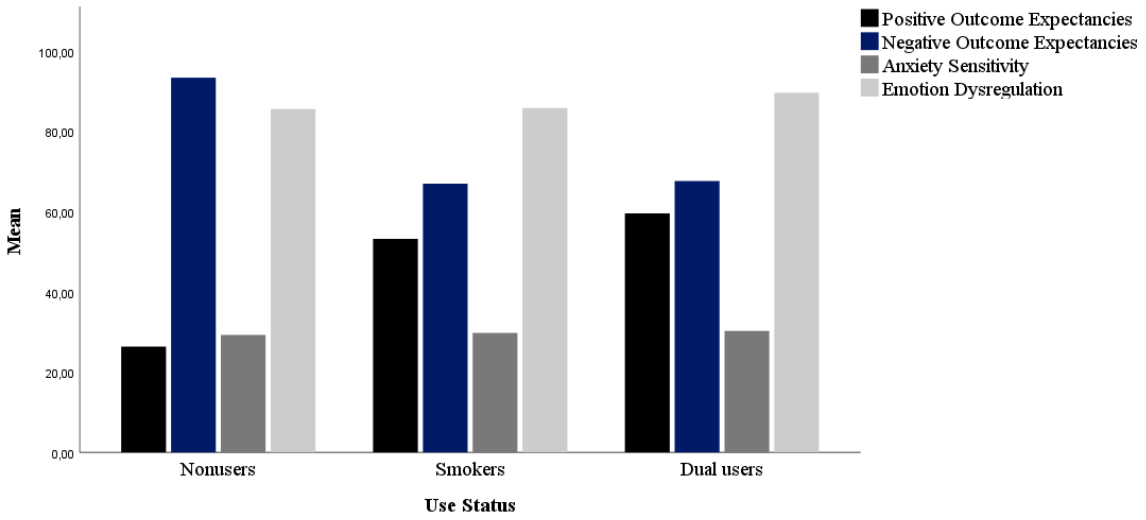
recommended post-hoc test when the assumption of homogeneity of variance is not met is the Games-Howell test, which is more powerful than other post-hoc tests for unequal variances and better controls Type-1 error (Games & Howell, 1976; Sauder & DeMars, 2019). Therefore, the Games-Howell test was used when evaluating multiple comparisons of use status groups. Games-Howell test indicated that there was a significant difference between nonusers and smokers ($p < .001$) and between nonusers and dual users ($p < .001$) in terms of the positive outcome expectancies. Smokers ($M = 53.20$, $SD = 44.79$) and dual users ($M = 59.54$, $SD = 39.02$) were found to have higher positive outcome expectancies than nonusers ($M = 26.36$, $SD = 36.65$). On the other hand, the results revealed that smokers and dual users did not differ in terms of the positive outcome expectancies ($p = .56$).

For negative outcome expectancies, Levene's test results were also statistically significant [$F(2, 270) = 5.39$, $p = .00$], which means the homogeneity of variance assumption was violated. According to the univariate test results, the main effect of the use status was found to be significant for negative outcome expectancies [$F(2, 270) = 20.93$, $p < .001$, $\eta_p^2 = .13$]. Games-Howell test indicated that there was a significant difference between nonusers and smokers ($p < .001$) and between nonusers and dual users ($p < .001$) in terms of negative outcome expectancies. It was found that nonusers ($M = 93.38$, $SD = 35.42$) had higher negative outcome expectancies than smokers ($M = 66.96$, $SD = 32.81$) and dual users ($M = 67.62$, $SD = 25.06$). However, the results revealed that smokers and dual users did not differ in terms of negative outcome expectancies ($p = .98$).

Levene's test results yielded that the homogeneity of variance assumption was met for both the anxiety sensitivity [$F(2, 270) = 2.38$, $p = .09$] and the emotion dysregulation [$F(2, 270) = .78$ $p = .45$]. However, the analysis results showed that nonusers, smokers, and dual users did not differ in terms of anxiety sensitivity [$F(2, 270) = .09$, $p = .91$, $\eta_p^2 = .00$] and emotion dysregulation [$F(2, 270) = .88$, $p = .41$, $\eta_p^2 = .00$].

In line with these results, Hypothesis 6 was partially supported, but Hypothesis 7 was rejected. Figure 3.2. represented the comparison of the mean scores of nonusers, smokers, and dual users.

Figure 3.2. *Comparison of the Means Scores of Nonusers, Smokers, and Dual Users*



3.6. The Results of the Multiple Regression Analyses

In testing Hypothesis 8, a standard multiple regression analysis was performed to test whether emotion dysregulation and anxiety sensitivity predicted positive outcome expectancies. In this analysis, emotion dysregulation and anxiety sensitivity were used as predictor variables, and positive outcome expectancies were used as a predicted variable. Before examining the predictive power of the multiple regression model, the assumptions of this analysis were checked. VIF values of collinearity statistics were below 10, and tolerance values were higher than 0.10; thus, it was validated that the assumption of no multicollinearity between predictor variables was met (Tabachnick & Fidell, 2007). The assumption of the independence of residuals was tested by the Durbin-Watson value, and the value was found to be 1.57. Since this value was within the range of 1 to 3, the independence of residuals assumption was confirmed (Field, 2009). Then, a modified Breusch-Pagan test was utilized to test the homoscedasticity assumption, and the results demonstrated that none of the models were statistically significant. Thus, the assumption of homoscedasticity in the multiple regression model was met. Based on these assumption checks, it was concluded that the data set was suitable for conducting multiple regression analysis.

The results revealed that the model was significant and it explained 12% of the variance in the positive outcome expectancies [$F(2,270) = 20.45$, $p < .001$, $R^2_{adj} = .12$]. The results indicated that emotion dysregulation ($\beta = .13$, $t = 2.12$, $p = .03$) and anxiety

sensitivity (β = .28, t = 4.49, p < .001) significantly and positively predicted positive outcome expectancies. In line with these results, Hypothesis 8 was supported. The results of the multiple regression analysis were reported in Table 3.4.

In testing Hypothesis 9, another multiple regression analysis was conducted to test whether emotion dysregulation and anxiety sensitivity predicted negative outcome expectancies. In this analysis, emotion dysregulation and anxiety sensitivity were used as predictor variables, and negative outcome expectancies were used as a predicted variable. VIF values of collinearity statistics were below 10, and tolerance values were higher than 0.10, suggesting that there was no multicollinearity between predictor variables (Tabachnick & Fidell, 2007). The Durbin-Watson value was found to be 1.71, and since it was within the range of 1 to 3, the independence of residuals assumption was met (Field, 2009). Additionally, a modified Breusch-Pagan test was performed to test the homoscedasticity assumption, and the results indicated that none of the models were statistically significant. Based on these assumption checks, it was concluded that all assumptions were met.

The multiple regression analysis results showed that the model was statistically significant and it explained 5% of the variance in negative outcome expectancies [F(2,272) = 8.89 , p < .001, R^2_{adj} = .05]. The results indicated that emotion dysregulation significantly and negatively predicted negative outcome expectancies (β = -.17, t = -2.61, p = .01). On the other hand, anxiety sensitivity was found to be a significant and positive predictor of negative outcome expectancies (β = .27, t = 4.18, p < .001). In line with these results, Hypothesis 9 was supported. The results of the multiple regression analysis were reported in Table 3.4.

Table 3.4. *The Results of the Multiple Regression Analyses*

Variables	β	*SE*	*t*	*p*	*CI* (%95)	
					Lower Bound	Upper Bound
Positive Outcome Expectancies						
Emotion Dysregulation	.13*	.11	2.12	.03	.01	.47
Anxiety Sensitivity	.28***	.17	4.49	<.001	.44	1.13
Negative Outcome Expectancies						
Emotion Dysregulation	-.17*	.09	-2.61	.01	-.43	-.06
Anxiety Sensitivity	.27***	.14	4.12	<.001	.31	.87

Note. *p < .05, ***p < .001. β: Standardized Coefficients Beta, *SE*: Standard Error, *t*: t-statistics, *p*: significance value, *CI* 95%: Confidence Intervals.

3.7. The Results of the Partial Correlation Analysis

As reported above, the Pearson correlation analysis results showed that there was no relationship between emotion dysregulation and negative outcome expectancies (r = -.05, p = .38), but the multiple regression results showed that emotion dysregulation negatively predicted negative outcome expectancies (β = -.17, t = -2.61, p = .01). These results seem contradictory, suggesting that an uncontrolled variable (e.g. anxiety sensitivity) may have masked the association of the two variables in Pearson correlation analysis (Cohen et al., 2003; Pedhazur, 1997; Tabachnick & Fidell, 2013). In this regard, a partial correlation analysis was performed to assess the association of emotion dysregulation and negative outcome expectancies while controlling for anxiety sensitivity. The results revealed that there was a significant negative relationship between emotion dysregulation and negative outcome expectancies when anxiety sensitivity was controlled (r = -.15, p = .01), uncovering a relationship that was not evident in the zero-order correlation.

4. DISCUSSION

The current research was conducted to examine e-cig use outcome expectancies in terms of anxiety sensitivity and emotion dysregulation in young adults, and to investigate the association between sociodemographic factors and conventional cigarette or e-cig use behaviors. In this context, data were collected from participants between the ages of 18 and 25, and a series of statistical analyses were utilized to test the hypotheses. This section presents the discussion and interpretation of the findings regarding the hypotheses of this study in the context of the relevant literature. Moreover, theoretical contributions and limitations of the study, recommendations for future research, and clinical implications of the current study are also addressed in this section.

4.1. Discussion of Analyses Regarding Demografic Variables

A series of statistical analyses was utilized to examine the participants' demographic data. Initially, a Pearson's chi-square test was performed, and it was found that gender was associated with use status. This association was observed only among men and women in the nonusers group but not in the smokers and dual users groups. More specifically, the results indicated that women were more likely to be nonusers while men were less likely. This finding is remarkably consistent with the literature, which has demonstrated that men are less likely than women to be nonusers of any tobacco product (conventional cigarettes, e-cigs, heated tobacco products, etc.) both globally and in Türkiye (Akçalı et al., 2016; Donkor & Mehmet, 2019; Göney et al., 2019; Grunberg et al., 1991; Kundu et al., 2023; Parkinson et al., 2009; West, 2017). The finding of the current study regarding this difference between genders can be explained by sociocultural factors and gender roles. Türkiye reflects a cultural model that incorporates both collectivist and individualist values (Kagitcibasi, 2005). According to this dual cultural orientation, people in Turkish society may be influenced both by their relationships and social expectations (relatedness), and by their personal autonomy and individual choices (autonomy). However, the extent to which individuals lean toward individualistic or collectivistic tendencies may also differ by gender. Women are generally more likely to prioritize relationships and relatedness, whereas men tend to value autonomy and independence (Prince-Gibson & Schwartz, 1998; Schwartz & Rubel, 2005). Therefore, compared to men, women may be more likely to be nonusers due

to internalized relational values and sociocultural expectations in Türkiye. In societies where collectivist values are present, even to a limited degree, the consumption of conventional cigarettes, e-cigs, or other tobacco products by women may be deemed socially undesirable. People can hold negative attitudes toward women engaging in behaviors such as using e-cigs or conventional cigarettes, and such behaviors often lead to social stigmatization (Inman et al., 2017; Kundu et al., 2023; Mandil et al., 2010; Parkinson et al., 2009). Conversely, men are more likely to view their use of tobacco products as socially acceptable by others in society, including their family or friends (Parkinson et al., 2009). Additionally, in such societies, women are subjected to roles assigned to them that trivialize their personal desires and goals and prioritize their responsibilities to other individuals in the group (e.g., their children or partners). They are expected to conform more strictly to societal norms (Dutta et al., 2022; Rajkumar, 2023). In this context, women's obligation to protect the social image of both themselves and the group they belong to (e.g., their family) may discourage them from using conventional cigarettes or e-cigs throughout their lives. However, both the collectivist and individualist aspects of Türkiye's cultural structure should be recognized when evaluating this finding. While some women may refrain from using e-cigs or conventional cigarettes to gain social acceptance or maintain a sense of belonging (relatedness), others may avoid such behavior in line with their internalized personal values or autonomous decisions (autonomy).

Then, two separate Fisher's exact tests were conducted, and surprisingly, it was found that use status was not associated with either education level or income level. These findings were inconsistent with findings in the relevant literature. The findings of studies conducted so far consistently show that individuals with lower income and lower education levels are more likely to use conventional cigarettes, e-cigs, or other tobacco products (Benjakul et al., 2023; Casetta et al., 2017; Gilman et al., 2008; Harlow et al., 2019; Pesko et al., 2018; Simon et al., 2018; Springer et al., 2018; Tomioka et al., 2020). More specifically, the studies in existing literature revealed that conventional cigarette and e-cig use were highest among individuals without a high school diploma compared to other education levels (Barsha et al., 2023; Huang et al., 2016; Kurti et al., 2016). Similarly, studies found that conventional cigarette and e-cig use were highest among low-income individuals or groups compared to those with lower-middle and above income levels (Gu et al., 2023; Sreeramareddy & Manoharan, 2022; Tauras, 2024). A possible explanation for this discrepancy between this study and other studies could be related to the characteristics of the current sample. In this study, the majority of participants had at least a high school diploma, and the number of

individuals reporting a low income level was quite low. This limited variability in income and education levels may have reduced the likelihood of finding significant relationships between these variables and use status in the current sample.

Subsequently, a Pearson correlation analysis was utilized, and it was found that age was not associated with the daily amount of e-cig use and the daily amount of conventional cigarette use. These findings were inconsistent with the studies in the existing literature. A study conducted by Temourian and colleagues (2022) indicated that each 1-unit increase in age was associated with a 4% increase in the daily amount of e-cig use. Similarly, in another study, it was found that the daily amount of conventional cigarette use (cigarettes per day) increased with age, and this relationship persisted up to the 55-64 age group (Fat, 2013). The inconsistency between the current findings and other studies' findings may be explained by the characteristics of the present study's sample and the limited number of studies in the relevant literature. Previous studies have generally examined the association of age and daily amount of conventional cigarette/e-cig use on samples with a wider age range (Fat, 2013; Temourian et al., 2022), and some studies have even evaluated this relationship by combining age groups with similar characteristics into a single category, such as 16-25, 55-64, etc. (Fat, 2013). In contrast, the sample of this study was limited to individuals between the ages of 18 and 25. The limited age range may be a possible explanation for the nonsignificant relationship between age and the daily amount of conventional cigarette / e-cig use. Additionally, the number of studies investigating this relationship in the literature remains quite limited. Therefore, future research is needed to validate whether there is a relationship between these variables.

The results of the Pearson correlation analysis demonstrated that there was no association between the daily amount of e-cig use and the daily amount of conventional cigarette use. A study by Krebs and colleagues (2016) found that as the daily amount of conventional cigarette use increases, the daily amount of e-cig use also increases. These findings are inconsistent with the findings of the current study. However, there are very few research in the literature examining the relationship between the daily amount of conventional cigarette use and the daily amount of e-cig use. Although more research is needed to understand the association of these variables, there are several possible explanations that can be considered for the current findings. Firstly, cigarettes and e-cigs may not always be used as direct alternatives to each other. Individuals who use conventional cigarettes daily often smoke due to habit or a nicotine addiction (Aslam et al., 2024; Myers, 2001). On the other hand, daily e-cig use among young adults is driven by factors such as

curiosity, preference for different flavors, lower cost, belief that e-cigs are less harmful, and social motivations such as making new friends or gaining popularity (Bold et al., 2020; Jongenelis et al., 2019; Kinouani et al., 2020; Kong et al., 2015; Romijnders et al., 2018; Simonavicius et al., 2017; White et al., 2015). The fact that young adults may use these products for different purposes and in various contexts could limit the possibility of establishing a direct relationship between the daily amount of use of both products. Secondly, the current finding can be explained by the legal regulations regarding e-cig in Türkiye. As mentioned earlier, unlike conventional cigarettes, access to e-cigs is quite limited due to legal restrictions (Official Gazette of the Republic of Türkiye, 2020). These restrictions and sales conditions make e-cigs less accessible than conventional cigarettes, which can directly affect both the continuity and amount of e-cig use. Therefore, in Türkiye, even if an individual smokes a high number of conventional cigarettes per day, it may not be possible for them to use e-cigs at a similar rate. This situation may reduce the likelihood of finding a relationship between the daily amount of conventional cigarette use and the daily amount of e-cig use in the present study. Finally, the reason why there was no relationship between these two variables in the current study may be attributed to methodological limitations. Since the daily use amounts of both conventional cigarettes and e-cigs were measured by self-report, participants may have misremembered the amounts and reported inaccurately. Compared to conventional cigarettes, measuring "puffs" in e-cigs is more ambiguous; thus, it may be difficult for participants to estimate and report daily amount of e-cig use accurately.

Afterwards, a one-way MANOVA was conducted, and it was found that the daily amount of conventional cigarette use of men was found to be higher than that of women. Consistent with the current findings, previous studies have found that the daily amount of conventional cigarette use was higher among men than women (Bauer et al., 2007; Chinwong et al., 2018; Reid et al., 2017). The fact that women smoke fewer cigarettes per day than men can be explained by evolutionary and social factors. A study indicated that for women, good smell / body odor is the most important physical factor when evaluating both themselves and others (especially for mate selection). Women also reported that body odor is a more important factor in terms of attraction than appearance and many other social factors (Herz & Inzlicht, 2002). Additionally, women pay more attention to odors in their daily lives, and the odor is more significant for them than for men (Guarneros et al., 2015; Hedner et al., 2010). The fact that women are more concerned and sensitive to smelling good than men may be an explanation for their lower daily amount of conventional cigarettes. Its

smoke contains thousands of different chemicals, including tar and volatile organic compounds that adhere to fabrics and persist as “third-hand smoke”. These chemicals, along with the smoke from combusted cigarettes, embed in clothes, hair, and indoor surfaces, releasing unpleasant odors (Matt et al., 2008, 2017, 2019; Schick et al., 2014). Women may smoke fewer cigarettes per day than men because of the unpleasant odors that spread with cigarette smoke and get on their clothes and hair.

The one-way MANOVA results showed that men and women did not differ in terms of the daily amount of e-cig use. In literature, no study has been found examining the daily amount of e-cig use in terms of gender; therefore, the present finding can be considered an important finding that will make a novel contribution to the relevant literature. Although the daily amount of e-cig use (puffs per day) was not examined, one study revealed that women and men had the same number of e-cig use episodes per day (Hopkins & Al-Hamdani, 2021). However, this finding does not provide sufficient information about the daily total number of puffs of women and men. The findings of the current study can be interpreted according to several different factors. Firstly, according to e-cig users, e-cig use is associated with less smoke odor and a more favorable taste in the mouth compared to conventional cigarettes (Dalrymple et al., 2022). This is because e-cig vapor does not contain chemicals such as tar, unlike conventional cigarettes. Additionally, e-cig vapor diffuses faster and does not cause a long-lasting bad odor like conventional cigarettes (Czogala et al., 2014). Regardless of gender, these properties of e-cigs may encourage individuals to use these products at similar daily amounts. Secondly, e-cigs promise positive social outcomes and ease of use for most young adults today, regardless of gender. They are frequently preferred among young adults since they are cheaper compared to conventional cigarettes, and they provide individuals a new social environment and gain popularity (Bold et al., 2020; Jongenelis et al., 2019; Kinouani et al., 2020; Kong et al., 2015; Romijnders et al., 2018; Simonavicius et al., 2017; White et al., 2015). All of these factors are thought to lead to the emergence of similar e-cig habits among young women and men adult users. Finally, as mentioned above, the similarity in daily amount of e-cig use between genders may be a result of self-reported puff rates. Since determining puff amounts is more difficult than determining conventional cigarette amounts, both genders may have misleadingly reported similar puff rates. Therefore, the current findings should be interpreted with caution, taking this methodological limitation into account. In conclusion, although this study revealed that the daily amount of e-cig use among young adults does not differ by gender, it should be noted that the findings should be supported by experimental studies conducted on a larger scale and in different populations.

In addition, more studies are needed on the role of the popularity of e-cigs among young adults and their social impacts in shaping both men's and women's e-cig use habits.

4.2. Discussion of the Findings Regarding the Tests of the Main Hypotheses

4.2.1. Discussion of analyses regarding relationships between variables

The Pearson correlation analyses were conducted, and it was found that positive outcome expectancies were positively related to anxiety sensitivity. Specifically, positive outcome expectancies were found to have a positive relationship with physical concerns, cognitive concerns, and social concerns. In line with the current finding, other studies in the literature found that positive outcome expectancies regarding e-cig use were positively associated with anxiety sensitivity (Garey et al., 2019; Zvolensky et al., 2018, 2019). Individuals' increased tendency to have high positive outcome expectancies as anxiety sensitivity increases may be explained by their belief that e-cig use will result in positive outcomes, such as reducing their anxiety-related negative sensations and symptoms (Zvolensky et al., 2019). Individuals with high physical concerns may have higher positive outcome expectancies, believing e-cig use can reduce their anxiety-related physical sensations, such as rapid heartbeat or sweating. Similarly, people with high cognitive concerns might hold higher positive outcome expectancies regarding e-cig use, believing e-cig use prevents cognitive harms, such as thoughts of losing control in anxiety-provoking situations. Lastly, individuals with high social concerns may have higher positive outcome expectancies, assuming that using e-cigs can help them avoid social harms such as social rejection.

Findings of the current research suggested that negative outcome expectancies were also positively associated with anxiety sensitivity. Specifically, negative outcome expectancies were found to have a positive relationship with physical concerns, cognitive concerns, and social concerns. Although this finding seems contradictory to the current study's finding regarding the relationship between positive outcome expectancies and anxiety sensitivity, it is quite consistent with the findings in the existing literature. Previous studies had demonstrated that individuals with high anxiety sensitivity hold two different conflicting beliefs: they may hold higher positive outcome expectancies, believing that e-cig use has various benefits, but they may also hold higher negative outcome expectancies, worrying about the risks that this use can pose (Zvolensky et al., 2018, 2019). Individuals'

increased tendency to have higher negative expectancies as anxiety sensitivity increases can be explained by their heightened vigilance and concerns about health risks, leading them to perceive greater risks from e-cigs than other individuals (Zvolensky et al., 2019). Individuals with high physical concerns may hold higher negative outcome expectancies, believing that e-cig use may worsen their anxiety-related sensations, such as breathing harder, and may cause serious physical harms, such as lung cancer. Similarly, people with high cognitive concerns might hold higher negative outcome expectancies, assuming that e-cig use may heighten the risk of experiencing cognitive difficulties in anxiety-provoking situations. Lastly, individuals with high social concerns may have higher negative outcome expectancies, believing that using e-cigs can lead to social harms, such as being judged, rejected, and embarrassed, or damaging their social image. The current findings suggest that individuals with high anxiety sensitivity's heightened sensitivity to anxiety-related sensations and symptoms can simultaneously strengthen both their positive and negative outcome expectancies regarding e-cig use.

The Pearson correlation analysis indicated that there was a negative relationship between positive outcome expectancies and negative outcome expectancies. Parallel with this finding, other studies also revealed a negative association between these variables (Pokhrel et al., 2014, 2018b). This finding that as an individual's positive outcome expectancies for e-cig use increase, negative outcome expectancies decrease can be interpreted as an indication of the theoretically independent and opposing nature of these two concepts. Due to the opposing nature of the concepts, it is often observed that as individuals' positive outcome expectancies for e-cig use, such as positive sensory experience and social enhancement, increase, negative outcome expectancies, such as addiction concerns, negative sensory experience, and negative social results, decrease.

The results demonstrated that positive outcome expectancies were positively related to emotion dysregulation. More specifically, positive outcome expectancies were found to have a positive relationship with the goal, strategy, nonacceptance, impulse, and clarity sub-dimensions of emotion dysregulation. Consistent with these findings, previous research also indicated a positive association of emotion dysregulation and positive outcome expectancies regarding e-cig use (Brockenberry et al., 2022; McLeish et al., 2024). One possible explanation for these findings is that individuals with higher levels of emotion dysregulation are more likely to engage in addictive behaviors such as e-cig use because these behaviors can help them regulate or reduce their emotional distress (Chrétien et al., 2025; Sideli et al., 2023; Tran & Morrell, 2023). For instance, individuals who have difficulties in engaging in

goal-directed behavior when experiencing adverse emotions can see e-cig use as a way to temporarily reduce emotional distress that interferes with their goal-oriented actions, such as their daily tasks or responsibilities. People who have limited access to effective emotion regulation strategies may use e-cigs as a dysfunctional emotion regulation strategy that provides temporary relief. Similarly, those who have difficulty accepting their negative emotional responses may perceive e-cig use as a way to tolerate these emotional discomforts. Additionally, people who have higher impulse control difficulties when experiencing negative emotions may impulsively use e-cigs to escape from their negative emotions. Lastly, those experiencing a lack of emotional clarity, meaning difficulty in identifying and labeling specifically what the emotion is currently experienced, may use e-cigs to cope with this emotional uncertainty. Consequently, individuals with different types of emotion dysregulation may believe more strongly that e-cig use has potential benefits and will result in positive outcomes. On the other hand, in this study, positive outcome expectancies were not found to be associated with awareness sub-dimensions of emotion dysregulation. The fact that awareness, a subtype of emotion dysregulation, is not related to positive outcome expectancies can be interpreted as follows: Individuals who have difficulties being aware of their emotions may not clearly perceive their emotional distress. Therefore, they may not have positive outcome expectancies, such as e-cig use can help reduce their emotional distress.

In the present research, no relationship between negative outcome expectancies and emotion dysregulation was found. Furthermore, negative outcome expectancies were not found to be associated with any sub-dimensions of the emotion dysregulation. Very few studies examined the relationship between these variables. These studies have found a positive association between the variables but used different scales than the scale used in this study (EUOES) to measure e-cig use outcome expectancies (McLeish et al., 2024; Zvolensky et al., 2021). Thus, these methodological differences may be a possible explanation for the inconsistencies between the current and previous findings. Although future research is needed to validate whether there is a relationship between these variables, the current findings can be explained by several factors. Firstly, individuals with high levels of emotion dysregulation often seek temporary emotional relief and use strategies that provide short-term relief, such as suppressing emotions (Aldao et al., 2010; Cheshure et al., 2020). Since these individuals may see e-cig use as a way to provide temporary emotional relief, they may not develop a belief that e-cig use will have negative consequences. Additionally, emotion dysregulation may prevent individuals from realizing the negative

impacts of their emotional states on their behavior (Aldao et al., 2010). Therefore, even if individuals with high emotion dysregulation use e-cigs as a result of their negative emotions, such as anxiety or sadness, they may not be sufficiently aware of the negative outcomes of e-cig use.

In the Pearson correlation analysis, a positive relationship was found between anxiety sensitivity and emotion dysregulation. Specifically, all sub-dimensions of anxiety sensitivity were found to be positively associated with goal, strategy, nonacceptance, impulse, and clarity sub-dimensions of emotion dysregulation. In line with these findings, previous studies have also indicated that anxiety sensitivity was positively associated with emotion dysregulation (Mohsenabadi et al., 2025; Ouimet et al., 2016; Paulus et al., 2017). These findings can be explained as follows: Individuals with high levels of difficulties in engaging goal-directed behavior, limited accessibility to emotion regulation strategies, nonacceptance of their negative emotional responses, poor impulse control, or a lack of emotional clarity may experience increased sensitivity to anxiety-related sensations and symptoms. These difficulties in emotion regulation may impair individuals' ability to effectively cope with or reappraise the anxiety-related sensations they experience (Gross & Jazaieri, 2014). This may lead individuals to interpret these sensations as more threatening than they actually are and to believe that these sensations could lead to physical, cognitive, or social harm (Cisler et al., 2010; Taylor et al., 2007). However, in the present research, it was found that the awareness sub-dimension of emotion dysregulation was not associated with any sub-dimensions of anxiety sensitivity. A possible explanation for this finding is that individuals who lack emotional awareness may also have difficulty recognizing anxiety-related sensations. Since these individuals have difficulty recognizing the emotional responses they experience, they may be less likely to consider that their anxiety-related sensations could result in harmful physical, cognitive, or social consequences.

Finally, the results showed that all sub-dimensions of ASI-3 were associated with each other. Similarly, almost all sub-dimensions of DERS were found to be related to each other. Since the scales measure different components of the same theoretical construct, it is common for sub-dimensions of the same scale to be related. These findings are quite consistent with the original structure of the scales (Gratz & Roemer, 2004; Mantar et al., 2010; Rugancı & Gençöz, 2010; Taylor et al., 2007).

4.2.2 Discussion of analyses regarding differences between groups

Two separate one-way MANOVA analyses were performed, and the results of the first analysis indicated that men had higher positive outcome expectancies but lower negative outcome expectancies than women. These findings are remarkably consistent with the existing literature, which has demonstrated that men have higher positive outcome expectancies, while women have higher negative outcome expectancies, such as the belief that e-cig use may lead to addiction (AlSayyad et al., 2024; Mattingly et al., 2023; Pokhrel et al., 2014; Rapp et al., 2021; Wamamili et al., 2021). The current findings can be explained by gender differences in risk-taking behaviors and health anxiety. Women may experience higher health anxiety and are more likely to perceive health-related negative outcomes than men (Kirmizi et al., 2021; Roy & Bhanu, 2024). Additionally, men are more prone to engage in risk-taking behavior than women (Brand et al., 2023; Byrnes et al., 1999; Charness & Gneezy, 2012; Gowen et al., 2019). Conversely, women are less likely to engage in risky and addictive behaviors since they see negative consequences (e.g., negative health outcomes) as more likely than men and believe that these behaviors can bring less pleasure (Harris & Jenkins, 2006). Gender differences in the tendency to engage in risky or addictive behaviors are also related to evolutionary processes. Men have engaged in more risky behaviors, such as hunting and fighting, to gain access to new resources and areas and to achieve reproductive success. Women, on the other hand, have avoided risks and engaged in processes that require more investment to survive, increase their reproductive success, and care for their offspring (Campbell, 1999; Salas-Rodríguez et al., 2021). In this context, in the current study, women's greater belief that e-cig use might result in negative outcomes, such as addiction, could be due to their higher health anxiety and risk aversion. Men's greater belief that e-cig use might result in positive outcomes may reflect their higher tendency toward risk-taking behaviors.

Furthermore, the analysis results demonstrated that men and women did not differ in terms of emotion dysregulation and anxiety sensitivity. These findings were inconsistent with the findings of previous studies, which have shown women were more likely to have higher emotion dysregulation and anxiety sensitivity compared to men (Anderson et al., 2016; Stewart et al., 1997). A possible explanation for current findings regarding gender could be the developmental characteristics of the sample: The research in the literature have revealed that there are age differences as well as gender differences in both emotion dysregulation and anxiety sensitivity (Mahoney et al., 2015; Martin & Ochsner, 2016;

Robertson & Hopko, 2009). A study indicated that the difficulties in regulating emotions typically decrease as individuals grow older (Martin & Ochsner, 2016). Older adults tend to utilize more functional emotion regulation strategies compared to young adults (Doerwald et al., 2016; Eldesouky & English, 2018). Similarly, anxiety sensitivity decreases as individuals grow older. Compared to young adults, older adults tend to reappraise the anxiety-related sensations as a natural aging process, and thus, become less sensitive to these sensations (Mahoney et al., 2015; Robertson & Hopko, 2009). However, the sample of the current study comprised solely of individuals aged between 18 and 25. All participants were at the same developmental stage called young adulthood, which is a period with typical emotional and psychological challenges, and high vulnerability for risky behaviors (Hutchison et al., 2016; Sethi, 2024). Therefore, in this study, young adults may have similar patterns of emotion dysregulation and anxiety sensitivity regardless of gender.

The second MANOVA analysis showed that nonusers have higher negative outcome expectancies, but lower positive outcome expectancies than smokers and dual users. In line with these findings, previous studies revealed that nonusers are more likely to believe e-cig use might lead to negative outcomes such as illnesses or addiction, negative social image (Gorukanti et al., 2017; Harrell et al., 2019; Latimer, 2023). Additionally, the studies showed that dual users and smokers are more likely to believe the health risks of e-cigs are lower than conventional cigarettes, and they have higher positive outcome expectancies, such as believing e-cig use helps regulate their negative emotions (Gorukanti et al., 2017; Harrell et al., 2019; Latimer, 2023). These findings can be explained by several factors. Firstly, nonusers may have more knowledge about the harms of addictive products such as e-cigs or conventional cigarettes, and may find these products less "appealing" since they have not experienced them. This situation may lead nonusers to make more risk-focused evaluations about these products (Latimer, 2023; Pepper & Brewer, 2014; Sussman et al., 2016; Tan & Bigman, 2014). Moreover, nonusers generally may have more health literacy than e-cig or conventional cigarette users and may have adopted a healthy lifestyle (Zhang et al., 2024). Both a lack of experience with nicotine use and a preference for a healthier lifestyle may have led nonusers to expect more negative outcomes from e-cig use. On the other hand, higher positive outcome expectancies of smokers and dual users can be attributed to nicotine's neurobiological impacts. Nicotine, a component found in conventional cigarettes and frequently found in e-cigs, affects the brain's reward system by activating the mesolimbic and mesocortical pathways, leading to the release of dopamine and noradrenaline (Chiamulera & West, 2018; Inguscio et al., 2021). These neurotransmitters,

which can be released by the use of nicotine products, play a significant role in reinforcement and arousal (Berridge, 2008; Bromberg-Martin et al., 2010; Kaźmierczak & Nicola, 2022). Smokers and dual users have used nicotine-containing products before; thus, both smokers and dual users are likely to have experienced temporary arousal, pleasure, and emotional relief after nicotine use, as a result of its neurobiological impact on the brain's reward circuitry. Therefore, smokers and dual users may be more likely than nonusers to believe that e-cig use will result in positive outcomes, such as negative affect reduction.

Surprisingly, no significant difference was found between smokers and dual users in terms of positive and negative outcome expectancies. These findings are inconsistent with previous research, which indicated that dual users have higher positive outcome expectancies regarding e-cig use than smokers (Harrell et al., 2019; Peltier et al., 2020). A possible explanation for this inconsistency between the current findings and previous findings can be methodological differences between the studies. The measurement methods used in the studies by Harrell and colleagues (2019) and Peltier and colleagues (2020) are different from those in the current study. Unlike these two studies, the current study used the EUOES to measure outcome expectancies for e-cig use, and some items on this scale directly address e-cig use in comparison with conventional cigarette use (e.g., "Make it harder to quit cigarettes" or "My family approves of my smoking"). These items may have led both smokers and dual users to evaluate e-cigs in relation to conventional cigarettes. Since both of the groups have used conventional cigarettes before, these items may have influenced their responses. This situation may have limited the ability of the scale to measure outcome expectancies specific to e-cigs and masked the group differences in both negative outcome expectancies and positive outcome expectancies. Since EUOES is the only scale measuring e-cig use outcome expectations for which validity and reliability studies have been conducted in Türkiye (Selekoğlu Ok et al., 2020), this finding should be examined by future research.

Lastly, the results of the second MANOVA analysis showed that nonusers, smokers, and dual users did not differ in terms of emotion dysregulation and anxiety sensitivity. These findings were inconsistent with the findings of previous studies, which have indicated that dual users have higher anxiety sensitivity and emotion dysregulation than other groups (McLeish et al., 2021; Zvolensky et al., 2024). A possible explanation for these inconsistencies is the developmental characteristics of this study's sample. As mentioned earlier, all participants were at the same developmental stage called young adulthood, which is a period with typical emotional and psychological challenges and high vulnerability for

risky behaviors (Hutchison et al., 2016; Sethi, 2024). Therefore, in this study, young adults may have similar patterns of emotion dysregulation and anxiety sensitivity regardless of use status.

4.2.3 Discussion of analyses regarding the predictive role of variables

Two separate multiple regression analyses were conducted, and in the first analysis, it was found that both anxiety sensitivity and emotion dysregulation positively predict positive outcome expectancies. In parallel with these findings, previous studies also showed that both of these variables have a predictive role on positive outcome expectancies (Manning et al., 2021; McLeish et al., 2024; Zvolensky et al., 2018, 2021). One possible explanation for these findings, as mentioned earlier, is that individuals with higher anxiety sensitivity may perceive e-cig use as a way to alleviate their anxiety-related sensations; thus, they may hold higher positive outcome expectancies. Individuals who believe that anxiety-related sensations will result in physical, cognitive, or social harms may believe that e-cig use helps them manage their anxiety and negative thoughts (Zvolensky et al., 2019). Similarly, individuals with higher emotion dysregulation may use e-cigs as a dysfunctional coping mechanism to regulate their negative emotions. This situation may increase their likelihood of holding positive outcomes expectancies regarding e-cig use (Brockenberry et al., 2022; Chrétien et al., 2025; Sideli et al., 2023).

In the second multiple regression analysis, it was found that emotion dysregulation negatively predicts negative outcome expectancies. This finding is quite similar to previous findings, which have shown that emotion dysregulation has a predictive role on negative outcome expectancies regarding e-cig use (McLeish et al., 2024; Zvolensky et al., 2021). However, the present multiple regression finding seems inconsistent with the Pearson's correlation finding of this study, which indicates no association of emotion dysregulation and negative outcome expectancies. This inconsistency can be explained by the fundamental differences between these two statistical analyses. The correlation matrix in Pearson correlation analyses only shows the simple linear relationship between two variables, without controlling for the roles of other variables (Cohen et al., 2003). Therefore, in Pearson correlation analysis, the relationship between the variables may be masked by third/other uncontrolled variables (e.g., anxiety sensitivity). However, the multiple regression analysis controls the role of other variables in the model; thus, this analysis allows for observing the

unique role of the predictor variable (emotion dysregulation) on the outcome variable (negative outcome expectancies) (Pedhazur, 1997). Thus, the regression analysis often uncovers associations that may be missed by simple Pearson correlation analysis (Tabachnick & Fidell, 2013). In light of these explanations, to better understand the inconsistency between the analysis, a partial correlation analysis was conducted. Supporting these explanations, a partial correlation analysis also revealed that when anxiety sensitivity was controlled, there was a negative association between emotion dysregulation and negative outcome expectancies. In this regard, the inconsistency between the two current analyses' findings highlights the complexity of the association between emotion dysregulation and negative outcome expectancies and the power of multiple regression in disentangling these associations. Future studies could investigate the role of different variables that might mediate or moderate the relationship between emotion dysregulation and negative outcome expectancies. Finally, the current finding that emotion dysregulation negatively predicts negative outcome expectancies can be interpreted as follows: Individuals who have low levels of emotion dysregulation may cope with their negative emotions more effectively. As a result of managing negative emotions better, they may not use e-cigs to reduce their emotional distress. Therefore, these individuals may hold higher negative outcome expectancies, perceiving e-cig use as a potentially harmful and ineffective coping strategy.

Lastly, the results of the second analysis showed that anxiety sensitivity positively predicts negative outcome expectancies. In line with this finding, previous research have also found that anxiety sensitivity has a predictive role on negative outcome expectancies (Manning et al., 2021; Torres, 2022). A possible explanation for this finding, as mentioned earlier, is that individuals who have higher anxiety sensitivity are more likely to worry about the risks of e-cig use. These individuals may tend to believe that e-cig use may worsen their anxiety-related sensations and may lead to physical, cognitive, or social harms (Zvolensky et al., 2018, 2019).

4.3. Theoretical Contributions of the Study

It is thought that the current study makes several critical contributions to the existing literature regarding e-cig use. Firstly, studies examining the psychological factors, such as anxiety sensitivity and emotion dysregulation, underlying the increasing prevalence of e-cig

use among young adults are quite limited and relatively new. In this regard, it is believed that the findings of the current study offer novel insights into how these psychological factors may shape the young adults' beliefs about the benefits and risks of e-cig use.

As this is the first study conducted in Türkiye that has examined e-cig use outcome expectancies in terms of anxiety sensitivity and emotion dysregulation, it could relatively help to fill a significant gap in the national literature. Furthermore, most previous studies have been conducted in Western cultures; thus, this study may contribute to cross-cultural understanding in this area as it provides data from a Turkish sample. This may help increase the generalizability of the findings to different cultural contexts.

Lastly, since research in this field is still in its early stages, the current study lays the groundwork for future research by contributing to the development of new theoretical perspectives to better understand addictive behaviors, such as e-cig use among young adults.

4.4. Limitations of the Study and Recommendations for Future Research

Despite the novel contributions of this study to the field, it also has several limitations. First of all, the use of convenience sampling in this study limits the generalizability of the findings to the broader young adult population. Additionally, in terms of demographic characteristics of the sample, the fact that most of the participants had a high school diploma or higher, were at a middle income level, and their total e-cig use period was less than 1 year constitutes a limitation in terms of the generalizability of the findings. It is recommended that future research recruit larger, more diverse, and representative samples that are evenly distributed in terms of these variables to increase the generalizability of the findings.

Another limitation is that the data for all variables in this study are self-reported, which may lead to biases such as social desirability or recall bias (Althubaiti, 2016; Gorin & Stone, 2001; Kreitchmann et al., 2019). It is suggested that future studies use additional methods such as behavioral observations or reports from multiple informants to minimize biases associated with self-report measures (Alexander et al., 2017).

In this research, data were collected online via Qualtrics. Considering that participants accessed the survey link via technological devices such as computers, phones, tablets, etc., the stimuli associated with the technological devices may have caused the participants to be distracted while completing the survey. Similarly, the large number of items in the data collection tools may have caused participants to become tired and distracted. Therefore, it is

recommended that future studies use shorter scales or alternative data collection methods and collect data in an environment that will facilitate participants' focus on the study.

Additionally, as mentioned above, it is thought that retrospective measurement of daily amount of e-cig use and conventional cigarette use may have led participants to misremember or inaccurately report their usage (Schwarz, 2007). To increase the accuracy of the data, it is recommended that future studies utilize ecological momentary assessment techniques, unlike the retrospective measurement used in this study (Shiffman et al., 2008).

Another limitation is that it has a cross-sectional and correlational design; therefore, it is not possible to make inferences about causal relationships between variables. Thus, future studies are suggested to use longitudinal and experimental designs to examine the causal relationships between e-cig use outcome expectancies, anxiety sensitivity, and emotion dysregulation.

Finally, as stated in the method section, only nonusers, smokers, and dual users were included in this study. Since it is not possible to reach a sufficient number of vapers due to current legal restrictions in Türkiye, vapers were not included in the study. This situation limited the more comprehensive evaluation of positive and negative outcome expectancies for e-cig use among different user groups. In the future, if exclusively e-cig use becomes widespread in Türkiye or new legal regulations make access to e-cigs easier, it is recommended that researchers include vapers in their studies to more comprehensively examine e-cig use outcome expectancies across different user groups.

4.5. Clinical Implications

The findings from this study have several significant clinical implications that should be taken into account by clinicians who work with young adults. Based on the current study's findings, clinicians working with individuals with high anxiety sensitivity should be aware that these individuals may hold beliefs that e-cig use will lead to beneficial outcomes and may use e-cigs as a means of lessening their anxiety-related sensations. In this regard, clinicians could utilize cognitive-behavioral interventions to help these individuals reduce their positive outcome expectancies and develop more functional coping strategies instead of using e-cigs (Webb et al., 2023). At the same time, clinicians should remain vigilant for the possibility of the development of nicotine dependence in these individuals and monitor early signs of addictive behavior patterns.

Similarly, as the present findings suggest, individuals with high emotion dysregulation are more likely to perceive e-cig use as an effective way to cope with their negative emotions. Mental health professionals should teach individuals who have difficulties in emotion regulation functional coping mechanisms for emotional distress, so that they are less likely to engage in e-cig use as a way of coping with their negative emotions. These interventions could also play a preventive role in reducing the risk of e-cig use developing into addiction.

Additionally, according to the current findings, individuals with high anxiety sensitivity may also show excessive concern that e-cig use will lead to physically, cognitively, or socially harmful consequences. Clinicians can provide psychoeducation to these individuals about the potential harms of e-cigs, helping them to more realistically assess the harms that e-cigs may cause and reduce their excessive concerns about e-cig use.

Furthermore, the findings of this study regarding gender differences are also of clinical importance. Mental health professionals working with men should keep in mind that men are more likely than women to engage in risk-taking behaviors such as e-cig use (Brand et al., 2023; Byrnes et al., 1999; Charness & Gneezy, 2012; Gowen et al., 2019). In treatment, lists could be prepared regarding the harmful consequences that e-cig use can cause in an individual's life in order to reduce men's positive outcome expectancies. For the same purpose, it could be recommended that clinicians who work with men use motivational interviewing and cognitive restructuring techniques (Caponnetto et al., 2019; Webb et al., 2023). On the other hand, the current findings suggest that women have more negative outcome expectancies, but this may not be a condition that requires clinical intervention. Negative outcome expectancies may act as a protective factor, making women less likely to initiate or continue using e-cigs (Barker et al., 2019; Fishbein & Ajzen, 1977). Therefore, clinicians are recommended to reinforce rather than change women's beliefs that e-cig use may have negative consequences, unless these beliefs lead to excessive health anxiety. Consequently, the current findings highlight the importance of gender-specific interventions to prevent e-cig use.

Lastly, based on the current finding that smokers and dual users have higher positive outcome expectancies compared to nonusers, clinicians should develop treatment programs to help these individuals quit e-cig use and reduce the risk of e-cig use resulting in nicotine addiction. In this regard, they can utilize evidence-based psychotherapy approaches such as motivational interviewing techniques and cognitive behavioral therapy, and if necessary, refer individuals to physicians for planning comprehensive medical treatment (nicotine

replacement therapy, pharmacological treatment, etc.) depending on the individual's risk of addiction (Caponnetto et al., 2019; Webb et al., 2023).

Overall, this study provides valuable implications for preventing nicotine addiction and enhancing addiction treatment approaches for young adults. The findings of this study reveal that understanding the psychological factors underlying e-cig use in young adults, such as anxiety sensitivity, emotion dysregulation, and outcome expectancies, plays a significant role in developing effective interventions for addiction. Mental health professionals could integrate the current findings into addiction prevention and treatment programs by addressing dysfunctional emotion regulation strategies, restructuring e-cig use positive outcome expectancies, and reinforcing e-cig use negative outcome expectancies when necessary. Furthermore, the gender-specific and user-group differences reported in this study reveal the need for individualized approaches to both preventing e-cig use and treating those who have already developed addiction. Incorporating current findings into clinical practice will allow interventions to be not only evidence-based but also tailored to the gender and use status of the individual. This individualized approach is thought to play a critical role in preventing e-cig use, reducing the risk of addiction, and increasing the individual's compliance with treatment.

5. CONCLUSION

The purpose of this study was to investigate e-cig use outcome expectancies in terms of anxiety sensitivity and emotion dysregulation in young adults. The main findings of the current study are listed below:

1. Women were found to be more likely to be nonusers, while men were less likely.
2. Men were found to consume more conventional cigarettes daily than women. On the other hand, no difference was found between men and women in terms of the daily amount of e-cig use.
3. There was a negative relationship between positive outcome expectancies and negative outcome expectancies.
4. Anxiety sensitivity was found to be positively associated with emotion dysregulation, positive outcome expectancies, and negative outcome expectancies.
5. Emotion dysregulation was found to be positively associated with anxiety sensitivity.
6. There was a negative relationship between emotion dysregulation and negative outcome expectancies when anxiety sensitivity was controlled.
7. Men found to have higher positive outcome expectancies but lower negative outcome expectancies than women.
8. Nonusers found to have higher negative outcome expectancies but lower positive outcome expectancies.
9. Anxiety sensitivity was found to positively predict both positive outcome expectancies and negative outcome expectancies.
10. Emotion dysregulation positively predicted positive outcome expectancies, but negatively predicted negative outcome expectancies.

Since this is the first study conducted in Türkiye that has examined e-cig use outcome expectancies in terms of anxiety sensitivity and emotion dysregulation, it is thought to help fill a significant gap in the national literature. Additionally, as studies on this subject are quite limited in the existing literature, the current study offers novel insights into how these psychological factors may shape the young adults' beliefs about the benefits and risks of e-cig use.

This study sheds light on the practices of mental health professionals by emphasizing the importance of individualized intervention approaches based on gender and use status in preventing e-cig use and reducing addiction risk in young adults. Furthermore, the current

study may contribute to the development of effective clinical practices for preventing addiction risk in young adults by highlighting that addressing anxiety sensitivity and emotion dysregulation plays a critical role in reducing their beliefs about the potential benefits of e-cig use.

Future studies are suggested to select samples with a broader age range to examine potential developmental differences in e-cig use outcome expectancies, emotion dysregulation, and anxiety sensitivity. Finally, to improve the generalizability of the findings, future research is recommended to include larger, more diverse, and more representative samples from different cultures.

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APPENDICES

APPENDIX 1: DEMOGRAPHIC INFORMATION FORM

1) Yaşınız (Lütfen sayıyla belirtiniz) : _____

2) Cinsiyetiniz:

Kadın ☐ Erkek ☐ Belirtmek istemiyorum ☐

3) Eğitim düzeyiniz (Son aldığınız diplomaya göre işaretleyiniz.)

İlkokul mezunu ☐
Ortaokul mezunu ☐
Lise mezunu ☐
Önlisans mezunu ☐
Lisans mezunu ☐
Yüksek lisans mezunu ☐
Doktora mezunu ☐

4. Gelir düzeyiniz:

Düşük gelir ☐
Düşük – orta gelir ☐
Orta gelir ☐
Orta – yüksek gelir ☐
Yüksek gelir ☐

5. Daha önce bir psikiyatrik bozukluk tanısı aldınız mı?

Evet ☐ (Evet ise belirtiniz: ……) Hayır ☐

6. Şu an bir psikiyatrik ilaç kullanıyor musunuz?

Evet ☐ (Evet ise belirtiniz: ……) Hayır ☐

7. Aşağıdaki seçeneklerden sizi en iyi tanımlayanı seçiniz.

A) Hayatımda hiç sigara ve elektronik sigara kullanmadım.

B) Şu an sadece sigara kullanıyorum ve daha önce hiç elektronik sigara kullanmadım.

C) Şu an sadece elektronik sigara kullanıyorum ve daha önce hiç sigara kullanmadım.

D) Daha önce sigara kullandığım dönemde elektronik sigara da kullanmayı denedim. Ancak şu an elektronik sigara kullanmıyorum, sadece sigara kullanıyorum.

E) Daha önce elektronik sigara kullandığım dönemde sigara da kullanmayı denedim. Ancak şu an sigara kullanmıyorum, sadece elektronik sigara kullanıyorum.

F) Şu an sigara ve elektronik sigarayı dönüşümlü olarak (dönem dönem elektronik sigara, dönem dönem sigara) kullanıyorum.

G) Daha önce sadece sigara kullandım ancak şu an sigara kullanmıyorum.

H) Daha önce sadece elektronik sigara kullandım ancak şu an elektronik sigara kullanmıyorum.

I) Daha önce ikisini de kullandım ancak şu an ikisini de kullanmıyorum.

8. Toplam sigara kullanım süreniz nedir?

0 – 5 ay 29 gün ☐
6 ay – 11 ay 29 gün ☐
12 ay – 23 ay 29 gün ☐
24 ay – 35 ay 29 gün ☐
3 yıl ve üzeri ☐

9. Toplam elektronik sigara kullanım süreniz nedir?

0 – 5 ay 29 gün ☐
6 ay – 11 ay 29 gün ☐
12 ay – 23 ay 29 gün ☐
24 ay – 35 ay 29 gün ☐
3 yıl ve üzeri ☐

10. Elektronik sigara kullandığınız dönemde günde ortalama kaç puff kullanıyorsunuz? Lütfen sayıyla yazınız. (Daha önce sadece 1 kere elektronik sigara kullandıysanız 1 kerelik kullanım deneyiminizi düşünerek puff sayısını belirtiniz.) …… puff

11. Günde ortalama kaç adet sigara içiyorsunuz? Lütfen sayıyla yazınız. (Sigarayı bıraktıysanız bu soruyu sigara içtiğiniz dönemi göz önünde bulundurarak cevaplayınız.) …..... adet

12. Yakın çevrenizde (akraba, arkadaş, romantik partner, vb) elektronik sigara kullanan bireyler var mı?

Evet ☐ Hayır ☐ (Evet ise kim/kimler olduğunu belirtiniz (Örneğin: kardeşim ve arkadaşım) : ……

13. Yakın çevrenizde (akraba, arkadaş, romantik partner vb) sigara kullanan bireyler var mı?

Evet ☐ Hayır ☐ Evet ise kim/kimler olduğunu belirtiniz (Örneğin: kardeşim ve arkadaşım) : ……

APPENDIX 2: E-CIGARETTE USE OUTCOME EXPECTANCIES SCALE

Bu tezde kullanılan Elektronik Sigara Kullanımı Sonuç Beklentileri Ölçeği, telif hakkı sahibi tarafından kamuya açık olarak paylaşılmayan bir ölçektir. Bu nedenle ölçeğin tam metni eklerde yer almamaktadır. Ölçek içeriği hakkında bilgi, talep edilmesi hâlinde telif hakkı sahibi tarafından sağlanabilir.

APPENDIX 3: ANXIETY SENSITIVITY INDEX-3

Lütfen her maddede sizin için en uygun olduğunu düşündüğünüz sayıyı daire içerisine alınız. Eğer herhangi bir madde şimdiye kadar hiç yaşamadığınız bir şeyle ilgiliyse (örn: toplum içinde bayılmak), böyle bir deneyimi yaşamanız hâlinde nasıl hissedebileceğinizi temel alarak cevaplayınız. Bunun dışında, tüm maddeleri kendi deneyiminizi temel alarak cevaplayınız. Her madde için sadece bir sayıyı daire içerisine almaya dikkat ediniz ve lütfen tüm maddeleri cevaplayınız.

	Çok Az	**Az**	**Biraz**	**Fazla**	**Çok Fazla**
1. Sinirli görünmemek benim için önemlidir.	0	1	2	3	4
2. Kafamı bir işe veremediğim zaman, aklımı kaçırıyorum diye endişelenirim.	0	1	2	3	4
3. Kalbimin hızlı çarpması beni korkutur.	0	1	2	3	4
4. Midem rahatsız olduğunda, ciddi bir hastalığım olabilir diye endişelenirim.	0	1	2	3	4
5. Zihnimi bir işe verememek beni korkutur.	0	1	2	3	4
6. Başkalarının yanında titrediğimde, insanların benim için neler düşüneceğinden korkarım.	0	1	2	3	4
7. Göğsüm sıkıştığında, düzgün bir şekilde soluk alamayacağımdan korkarım.	0	1	2	3	4
8. Göğsümde ağrı hissettiğimde, kalp krizi geçireceğim diye endişelenirim.	0	1	2	3	4
9. Diğer insanlar huzursuzluğumu fark edecek diye endişelenirim.	0	1	2	3	4
10. Kendimi tuhaf ya da boşlukta gibi hissettiğimde, ruhsal bir hastalığım olabileceğinden endişelenirim.	0	1	2	3	4

11. İnsanların önünde yüzümün kızarması beni korkutur.	0	1	2	3	4
12. Kalbimin teklediğini fark ettiğimde, bende ciddi bir sorun olabileceğinden endişelenirim.	0	1	2	3	4
13. Topluluk önünde terlemeye başladığımda, insanların hakkımda olumsuz düşünmelerinden korkarım.	0	1	2	3	4
14. Düşüncelerim hızlanır gibi olduğunda, aklımı kaçırıyorum diye endişelenirim.	0	1	2	3	4
15. Boğazım sıkılmış gibi hissettiğimde, boğularak öleceğimden endişelenirim.	0	1	2	3	4
16. Net (berrak biçimde) düşünmekte zorluk çekersem, bende bir sorun olabileceğinden endişelenirim.	0	1	2	3	4
17. Toplum içinde bayılmanın benim için korkunç bir şey olduğunu düşünürüm.	0	1	2	3	4
18. Zihnimde boşluk hissettiğimde, bende korkunç bir sorun olmasından endişelenirim.	0	1	2	3	4

APPENDIX 4: DIFFICULTIES IN EMOTION REGULATION SCALE

Aşağıdaki cümlelerin size ne sıklıkla uyduğunu, altta belirtilen 5 dereceli ölçek üzerinden değerlendiriniz. Her bir cümle için size uygunluk yüzdesini de dikkate alarak yalnızca tek bir rakamı yuvarlak içine alarak işaretleyiniz.

Bazen (%11 - %35) **Çoğu zaman** (%66 - %90)

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5

Hemen hemen hiç (%0 - %10) **Yaklaşık yarı yarıya** (%36 - %65) **Hemen hemen her zaman** (%91 - %100)

	Hemen hemen hiç	**Bazen**	**Yaklaşık yarı yarıya**	**Çoğu zaman**	**Hemen hemen her zaman**
1. Ne hissettiğim konusunda netimdir.	1	2	3	4	5
2. Ne hissettiğimi dikkate alırım.	1	2	3	4	5
3. Duygularım bana dayanılmaz ve kontrolsüz gelir.	1	2	3	4	5
4. Ne hissettiğim konusunda hiçbir fikrim yoktur.	1	2	3	4	5
5. Duygularıma bir anlam vermekte zorlanırım.	1	2	3	4	5
6. Ne hissettiğime dikkat ederim.	1	2	3	4	5

7. Ne hissettiğimi tam olarak bilirim.	1	2	3	4	5
8. Ne hissettiğimi önemserim.	1	2	3	4	5
9. Ne hissettiğim konusunda karmaşa yaşarım.	1	2	3	4	5
10. Kendimi kötü hissetmeyi kabullenebilirim.	1	2	3	4	5
11. Kendimi kötü hissettiğimde böyle hissettiğim için kendime kızarım.	1	2	3	4	5
12. Kendimi kötü hissettiğim için utanırım.	1	2	3	4	5
13. Kendimi kötü hissettiğimde işlerimi bitirmekte zorlanırım.	1	2	3	4	5
14. Kendimi kötü hissettiğimde kontrolden çıkarım.	1	2	3	4	5
15. Kendimi kötü hissettiğimde uzun süre böyle kalacağıma inanırım.	1	2	3	4	5
16. Kendimi kötü hissetmemin yoğun depresif duyguyla sonuçlanacağına inanırım.	1	2	3	4	5

17. Kendimi kötü hissettiğimde duygularımın yerinde ve önemli olduğuna inanırım.	1	2	3	4	5
18. Kendimi kötü hissederken başka şeylere odaklanmakta zorlanırım.	1	2	3	4	5
19. Kendimi kötü hissederken kontrolden çıktığım duygusu yaşarım.	1	2	3	4	5
20. Kendimi kötü hissediyor olsam da çalışmayı sürdürebilirim.	1	2	3	4	5
21. Kendimi kötü hissettiğimde bu duygumdan dolayı kendimden utanırım.	1	2	3	4	5
22. Kendimi kötü hissettiğimde eninde sonunda kendimi daha iyi hissetmenin bir yolunu bulacağımı bilirim.	1	2	3	4	5
23. Kendimi kötü hissettiğimde zayıf biri olduğum duygusuna kapılırım.	1	2	3	4	5

24. Kendimi kötü hissettiğimde de davranışlarım kontrolüm altındadır.	1	2	3	4	5
25. Kendimi kötü hissettiğim için suçluluk duyarım.	1	2	3	4	5
26. Kendimi kötü hissettiğimde konsantre olmakta (dikkatimi toplamakta) zorlanırım.	1	2	3	4	5
27. Kendimi kötü hissettiğimde davranışlarımı kontrol etmekte zorlanırım.	1	2	3	4	5
28. Kendimi kötü hissettiğimde daha iyi hissetmem için yapabileceğim hiçbir şey olmadığına inanırım.	1	2	3	4	5
29. Kendimi kötü hissettiğimde böyle hissettiğim için kendimden rahatsız olurum.	1	2	3	4	5
30. Kendimi kötü hissettiğimde kendimle ilgili olarak çok fazla endişelenmeye başlarım.	1	2	3	4	5

31. Kendimi kötü hissettiğimde kendimi bu duyguya bırakmaktan başka çıkar yol olmadığına inanırım.	1	2	3	4	5
32. Kendimi kötü hissettiğimde davranışlarım üzerindeki kontrolümü kaybederim.	1	2	3	4	5
33. Kendimi kötü hissettiğimde başka bir şey düşünmekte zorlanırım.	1	2	3	4	5
34. Kendimi kötü hissettiğimde duygumun gerçekte ne olduğunu anlamak için zaman ayırırım.	1	2	3	4	5
35. Kendimi kötü hissettiğimde kendimi daha iyi hissetmem zaman alır.	1	2	3	4	5
36. Kendimi kötü hissettiğimde duygularım dayanılmaz olur.	1	2	3	4	5

APPENDIX 5: ETHICS COMMITTEE APPROVAL

Evrak Tarih ve Sayısı: 20.01.2025-420983

1993

T.C.

BAŞKENT ÜNİVERSİTESİ REKTÖRLÜĞÜ

Akademik Değerlendirme Koordinatörlüğü

20.01.2025

Sayı : E-62310886-605-420983
Konu : Buse Nur Koluaçık'ın Etik Onayı

SOSYAL BİLİMLER ENSTİTÜSÜ MÜDÜRLÜĞÜNE

İlgi : 24.12.2024 tarih ve 412252 sayılı yazınız.

Enstitünüz Klinik Psikoloji (Tezli) Yüksek Lisans Programı öğrencisi Buse Nur Koluaçık'ın, Doç. Dr. Burçin Akın Sarı danışmanlığında yürüteceği, "Examining the Electronic Cigarette Use Outcome Expectancies in Terms of Anxiety Sensitivity and Emotion Dysregulation in Young Adults" başlıklı tez çalışması değerlendirilmiş ve bilgilerinize ekte sunulmuştur.

Prof. Dr. Sadegül AKBABA ALTUN
Kurul Başkanı

Ek: Değerlendirme Formu

Bu belge, güvenli elektronik imza ile imzalanmıştır.

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Evrak Tarih ve Sayısı: 20.01.2025-420983

Sayı : 17162298.600- 13
Konu : Tez Çalışması

6 Ocak 2025

İlgili Makama

Üniversitemiz Sosyal Bilimler Enstitüsü Klinik Psikoloji (Tezli) Yüksek Lisans Programı öğrencisi Buse Nur Koluaçık'ın, Doç. Dr. Burçin Akın Sarı danışmanlığında yürüteceği, "Examining the Electronic Cigarette Use Outcome Expectancies in Terms of Anxiety Sensitivity and Emotion Dysregulation in Young Adults" başlıklı tez çalışması değerlendirilmiş ve yapılmasında bir sakınca olmadığı tespit edilmiştir.

Bilgilerinize saygılarımızla sunarız.

Başkent Üniversitesi Sosyal ve Beşeri Bilimler ve Sanat Alan Araştırma Kurulu

Ad, Soyad	Değerlendirme	İmza
Prof. Dr. Gözen Güner Aktaş	Olumlu/~~Olumsuz~~	
Prof. Dr. Sadegül Akbaba Altun	Olumlu/~~Olumsuz~~	
Prof. Dr. Fatih Çetin	Olumlu/~~Olumsuz~~	
Prof. Dr. Hasan Tahsin Fendoğlu	Olumlu/Olumsuz	
Prof. Dr. Filiz Kalelioğlu	Olumlu/~~Olumsuz~~	
Prof. Dr. Hidayet Hale Künüçen	Olumlu/Olumsuz	
Prof. Dr. Özcan Yağcı	Olumlu/~~Olumsuz~~	

APPENDIX 6: RESEARCH PARTICIPATION ANNOUNCEMENT

BİLİME KATKIDA BULUNMAK İSTER MİSİNİZ?

Başkent Üniversitesi Klinik Psikoloji Yüksek Lisans Programı öğrencisi Psk. Buse Nur Koluaçık tarafından Doç. Dr. Burçin Akın Sarı danışmanlığında bir tez çalışması yürütülmektedir.

Bu çalışma elektronik sigara kullanımı sonuç beklentilerini, kaygı duyarlılığı ve duygu düzenleme güçlüğü açısından incelemeyi amaçlamaktadır.

Bu çalışmaya katılmak için

☑ **18 - 25 yaş arasında olmanız gerekmektedir.**

Katılımınız için teşekkür ederiz.

APPENDIX 7: INFORMED CONSENT FORM

Sayın Katılımcı,

Bu çalışma, Başkent Üniversitesi Klinik Psikoloji Yüksek Lisans Programı öğrencisi Psk. Buse Nur Koluaçık tarafından Doç. Dr. Burçin Akın Sarı danışmanlığında yürütülen bir tez çalışmasıdır. Bu çalışma, elektronik sigara kullanımı sonuç beklentilerini, kaygı duyarlılığı ve duygu düzenleme güçlüğü açısından incelemeyi amaçlamaktadır. Bu çalışmaya katılmak için 18 – 25 yaş arasında olmanız gerekmektedir.

Bu çalışma çevrimiçi olarak gerçekleştirilecektir ve katılım tamamen gönüllülük esasına dayanmaktadır. Çalışmaya katılmayı kabul etmeniz durumunda form ve ölçekler doldurmanız istenecektir. Tüm soruları yanıtlamanız yaklaşık 20 dakika sürecektir.

Bu çalışmada kimliğinizi açığa çıkaracak hiçbir bilgi talep edilmeyecektir. Sorulara vereceğiniz tüm yanıtlar tamamen gizli tutulacak, başka bir üçüncü şahısla paylaşılmayacak, sadece araştırmacılar tarafından değerlendirilecek ve sadece bilimsel amaçlarla kullanılacaktır. Bu çalışmada kişisel rahatsızlık yaratabilecek ve potansiyel risk oluşturabilecek herhangi bir soru bulunmamaktadır. Ancak soruları yanıtlama sırasında kendinizi rahatsız hissederseniz, herhangi bir gerekçe sunmadan bu çalışmadan çekilebilirsiniz. Çalışmadan çekilmeye karar vermeniz durumunda tüm yanıtlarınız tamamen silinecek ve size herhangi bir yaptırım uygulanmayacaktır.

Bu çalışma hakkında herhangi bir sorunuz veya endişeniz varsa ya da çalışma hakkında daha fazla bilgi almak istiyorsanız Psk. Buse Nur Koluaçık ile iletişime geçebilirsiniz. Değerli katılımınız için şimdiden teşekkür ederiz.

Bu formda yer alan tüm bilgileri okudum, anladım ve bu çalışmaya gönüllü olarak katılmayı onaylıyorum. ☐

Bu formda yer alan tüm bilgileri okudum, anladım ve bu çalışmaya gönüllü olarak katılmayı onaylamıyorum. ☐