

GENERATIONAL SHADES OF GREEN: HOW FUTURE ANXIETY SHAPES ENVIRONMENTAL AND FRUGAL CONSUMPTION?^{*}

YEŞİLİN KUŞAKLARARASI TONLARI: GELECEK KAYGISI ÇEVRECİ VE TUTUMLU TÜKETİMİ NASIL ŞEKİLLENDİRİYOR?

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Abstract

The purpose of this study is to examine the effect of future anxiety on environmental and frugal consumption behaviors in the context of X, Y, and Z generations. A comprehensive empirical examination was conducted to assess the research model, encompassing a range of analytical methodologies, which are exploratory and confirmatory factor analyses, structural equation modeling, and multigroup analysis. The study was conducted using a sample size of 990 valid surveys. The results show that the future anxiety variable is conceptualized as consisting of two different factors: "future uncertainty anxiety – the anxiety associated with the uncertainty of one's future" and "self-proving anxiety – the anxiety that the individual will not be able to gain respectability and achieve certain goals in life, particularly in the later stages of their life". Moreover, it was found that future uncertainty anxiety had a moderate positive effect on environmental and

* This study was funded by Scientific Research Projects Coordination Unit of Istanbul University (Project number 33446) for the PhD thesis "A research on the investigation of the effect of the future anxiety on proenvironmental and technological consumption in terms of generations X, Y, Z".

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How to cite this article/Atif için: Baloğlu Sevinç S, Kurtuluş S, Dirsehan T. (2025). Generational Shades of Green: How Future Anxiety Shapes Environmental and Frugal Consumption?. *Marmara Üniversitesi İktisadi ve İdari Bilimler Dergisi*, 47(2), 266-285. DOI: 10.14780/muiibd.1606393

frugal consumption behaviors, whereas self-proving anxiety had a moderate negative effect. As a result of multigroup analysis, the structural relationships change in the context of generations.

Keywords: Future Anxiety, Environmental Consumption Behavior, Frugal Consumption Behavior, Generations, Multigroup Analysis

JEL Classification: F18, M30, M31

Öz

Bu çalışmanın amacı gelecek kaygısının çevreci ve tutumlu tüketim davranışları üzerindeki etkisini X, Y ve Z kuşakları bağlamında incelemektir. Araştırma modelini değerlendirmek için keşifsel ve doğrulayıcı faktör analizleri, yapısal eşitlik modellemesi ve çoklu grup analizi gibi bir dizi analitik metodolojiyi kapsayan kapsamlı bir ampirik inceleme yapılmıştır. Çalışma, 990 geçerli anketten oluşan bir örneklem büyütülüğü kullanılarak gerçekleştirilmiştir. Sonuçlar, gelecek kaygısı değişkeninin “gelecek belirsizliği kaygısı – bireyin geleceğinin belirsizliği ile ilişkili kaygısı” ve “kendini ispatlama kaygısı – bireyin özellikle hayatının ilerleyen dönemlerinde saygınlık kazanamayacağı ve hayatı belirli amaçları gerçekleştirememiş olacağıyla ilgili kaygısı” olmak üzere iki farklı faktörden oluşan şekilde kavramsallaştırlabileceğini göstermektedir. Ayrıca, gelecek belirsizliği kaygısının çevreci ve tutumlu tüketim davranışlarını orta düzeyde olumlu yönde, kendini ispatlama kaygısının ise orta düzeyde olumsuz yönde etkilediği saptanmıştır. Çoklu grup analizleri sonucunda yapısal etkilerin kuşaklara göre farklılığı görülmüştür.

Anahtar Kelimeler: Gelecek Kaygısı, Çevreci Tüketim Davranışı, Tutumlu Tüketim Davranışı, Kuşaklar, Çoklu Grup Analizi

JEL Sınıflandırması: F18, M30, M31

1. Introduction

Consumption has reached unsustainable levels globally (Jaiswal & Kant, 2018) as a result of technological developments, the increasing global population (Chekima et al., 2016), and rapid economic growth. It directly leads to the overuse of natural resources and thus global warming, soil, air, and water pollution, ozone depletion (Biswas & Roy, 2015; Jaiswal & Kant, 2018), greenhouse effect (Kaiser et al., 1999), flora and fauna damage, acid rain and deforestation (Chekima et al., 2016).

Furthermore, the widespread use of electronic devices and premature replacement of products, such as mobile phones, before the end of their useful life has resulted in the disposal of many still-functioning electronic products (Goosey, 2009). These scraps, termed e-waste (electronic waste) (Nixon et al., 2009), are the largest waste category of the 21st century, posing a serious threat to human health and the environment (Schmidt, 2002). The negative consequences have led to the emergence and spread of epidemics and have threatened human health, both physically, such as cancer, and psychologically, such as depression. With increasing public concern about environmental issues, people have not only begun to alter their attitudes, behaviors, and consumption patterns (Biswas & Roy, 2015; Sheng et al., 2019) but also to engage in environmentally conscious behaviors such as green purchasing, reusing existing products, recycling, reducing energy waste and frugality (Steg & Vlek, 2009; Zhao et al., 2014; Liobikiené & Juknys, 2016).

Rahimah et al. (2018) observed a significant positive correlation between death anxiety and environmental behavior, suggesting a strong association between these two variables. Conversely, Cao et al. (2022) found a negative correlation between anxiety and purchasing behavior. Omar et al. (2021) investigated the relationships among anxiety, consumption values, and organic food purchases

and found that anxiety significantly affects panic buying. Kemp et al. (2021) revealed that fear and anxiety are associated with bulk buying. Although there are studies that show that anxiety affects consumers' purchasing behavior (e.g., Rahimah et al., 2018; Cao et al., 2022), there are limited studies in the literature that examine all three generations in the context of future anxiety, environmental and frugal consumption behavior. Given that anxiety affects consumer decision making, purchasing, and consumption behavior (Kemp et al., 2021), it is important to examine the impact of anxiety, which has increased further with Covid-19, on environmental and frugal behavior in order to develop sustainable policies on this issue.

Consumers are often segmented based on factors such as age, life stage, gender, income, and geography (Schewe & Noble, 2000). Although the age can be useful in creating market segments, considering that generations are similarly affected by external events (Schewe et al., 2000), it may not be sufficient in explaining the motivations of each segment (Parment, 2013). According to generational cohort theory, different generations exhibit varying attitudes and behaviors due to their unique values (Moore & Carpenter, 2008; Jackson et al., 2011). Thus, consumers' purchasing and consumption motivations will also be taken into consideration, given that generations share similar values when it comes to market segmentation. Having detailed information about the targeted generation enables marketing professionals to make more accurate and effective decisions, establishing good relationships with consumers and gaining their trust. In accordance with the literature review and the identified gap, the main purpose of this study is to determine the effect of individuals' future anxiety levels on their environmental and frugal consumption. Within the scope of the study, the relationship between anxiety and behavior was examined in the context of X, Y, and Z generations over the age of 18.

2. Literature Review and Hypothesis Development

2.1. Environmental Consumption Behavior

Consumers who have become aware and conscious of the serious extent of environmental degradation (Chen, 2011; Hsu et al., 2017) have begun to change their attitudes, behaviors, and approaches to consumption (Kim & Chung, 2011; Biswas & Roy, 2015) in pursuit of environmental sustainability (Jaiswal & Kant, 2018) and have turned to green products (Hsu et al., 2017; Chaudhary & Bisai, 2018) for purposes such as minimizing their carbon footprint (Chaudhary & Bisai, 2018).

The reduction of environmental and ecosystemic damage is contingent upon the practice of green consumption (OECD, 2008), which refers the inclination to procure environmentally conscious products or services that cause the least harm to the environment (Young et al., 2010). As usage behavior is one of the key descriptors of environmental behavior (Zhao et al., 2014), it is necessary to focus on consumption for the environment (Niva & Timonen, 2001). Considering that consumers' purchasing behavior directly impacts environmental issues (Paavola, 2001), it is apparent that consumers should assume a pivotal function in the formulation of product policies that are oriented towards environmentalism. A rise in consumer environmental awareness is expected to result in an

increase in demand for eco-friendly products. In order to effectively reach the market segment of environmentally conscious consumers, it is essential to identify their distinct characteristics.

2.2. Frugal Consumption Behavior

Frugality, a key behavioral feature of a sustainable lifestyle (Tapia-Fonllem et al., 2013; Evers et al., 2018), is a consumption vision that can slow down the process of environmental damage (Bove et al., 2009). Frugality, which is associated with the practice of exercising restraint in the acquisition and utilization of economic resources (Todd & Lawson, 2003; Goldsmith & Flynn, 2015), is defined by De Young (1986) as avoiding waste when using resources and ensuring that they are managed prudently. Frugal consumers voluntarily (Lastovicka et al., 1999; Goldsmith & Flynn, 2015) act moderately not only in their purchases but also in the use and disposal of products (Evers et al., 2018), and they focus on fulfilling needs rather than satisfying wants and desires (Evans, 2011).

Studies investigating technological consumption behavior (e.g., Young et al., 2010; Chiu, 2012) generally aim to reveal technological product purchase intentions and/or behaviors, including hedonic and impulse buying, and the factors affecting them. The identification of these factors can facilitate the prediction of consumer wants and needs, leading to increased sales of technological products. Given the correlation between increased sales of technological products and subsequent increases in e-waste, it is imperative to adopt a more frugal approach to the consumption of electronic products. This is necessary to mitigate the potential adverse impacts on the environment and public health. Therefore, this study aims to analyze individuals' frugal behavior in technological consumption, refraining from purchasing technological products unless necessary instead of focusing on technological product purchasing behavior.

2.3. Future Anxiety

Anxiety, which is usually triggered by a preliminary fear (Clark & Beck, 2021), is associated with dangerous future events where an undesirable and specific situation is highly probable (Finlay-Jones & Brown, 1981). Although the basis of anxiety is cognitive thoughts, these thoughts are directed toward the perception of danger and threat (Beck, 1991). Anxiety, which occurs as a result of threat perception (Burns, 2016), is the anticipation of future dangers (Dupлага & Grysztar, 2021) and the physical, cognitive, behavioral, and emotional reactions of the body (Clark & Beck, 2021) to protect itself against possible danger and to get away from the danger as fast as possible (Robichaud & Dugas, 2020).

In parallel with the previous studies showing that anxiety affects the consumer decision-making process, purchasing and consumption behaviors (Nava et al., 1997; Rahimah et al., 2018; Omar et al., 2021; Kemp et al., 2021; Yilmaz & Arslan, 2021), this study predicts that future anxiety will affect environmental and frugal consumption behaviors. Therefore, the relevant hypotheses are the following:

H1: Future anxiety has an impact on environmental consumption behavior.

H2: Future anxiety has an impact on frugal consumption behavior.

2.4. Generations

External events such as technological innovations, economic changes, political ideologies, wars, and social unrest that may affect society (Strauss & Howe, 1997; Schewe & Noble, 2000) cause generations to develop a unique peer personality or generational characteristics (Kupperschmidt, 2000). This situation causes generations to shape their behaviors, values, beliefs, and attitudes (Ryder, 1965; Kupperschmidt, 2000) and consequently, their purchasing and consumption behaviors (Howe & Strauss, 2000; Norum, 2003; Parment, 2013).

Although younger generations have more environmental concerns (Diamantopoulos et al., 2003) and higher degree of intention to purchase environmentally friendly products (Chekima et al., 2016; Li et al., 2016), it has been observed that as the generations get older, they both behave more environmentally friendly in consumption (Searle & Gow, 2010; Gordon-Wilson & Modi, 2015) and behave more frugally (Pepper et al., 2009; Bove et al., 2009; Goldsmith & Flynn, 2015). At this point, the relevant hypothesis is the following:

H3: The impact of future anxiety on environmental and frugal consumption behaviors differs by generation.

2.5. Research Model

It has been predicted that the level of anxiety (Jin et al., 2007; Baxter et al., 2013; Kim & Niederdeppe, 2013; Jungmann & Witthöft, 2020) and future anxiety (Usher et al., 2020; Dupлага & Grysztar, 2021) will increase during pandemic periods, and thus this increase will cause consumption behaviors to change (Nava et al., 1997; Omar et al., 2021; Kemp et al., 2021).

At this point, this study endeavors to investigate the impact of future anxiety on environmental and frugal consumption behaviors among individuals from Generation X, Generation Y, and Generation Z. A conceptual framework was developed based on hypotheses derived from an extensive review of the extant literature and empirical findings from previous studies. Furthermore, the research examines the direct relationships between future anxiety and both environmental and frugal consumption behaviors while exploring potential variations in these associations across different generational cohorts. The research model designed in line with the objectives of the study is presented in Figure 1.

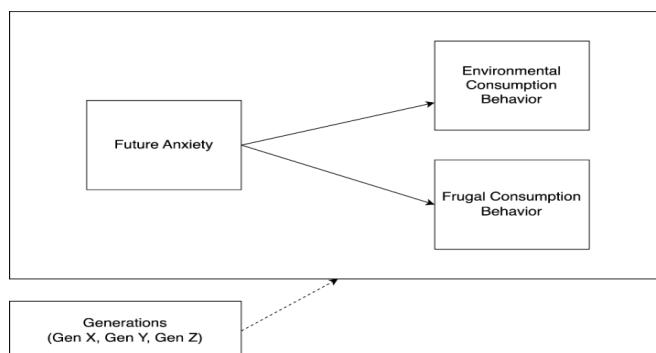


Figure 1: Research Model

3. Methodology

3.1. Participants and Procedure

The population of the research consists of consumers from Generation X, Y, and Z over the age of 18. Markert (2004) stated that there are inconsistencies in the dates used to define generations in the literature. Based on the relevant literature and within the scope of the study, it is assumed that Generation X comprises individuals born between 1965 and 1982, Generation Y encompasses those born between 1983 and 1995, and Generation Z represents those born in 1996 or later.

The sample was selected through quota sampling to ensure that the sample of three generations could represent the main population with all its characteristics, and it was tried to collect the same amount of data for each generation (Kurtuluş, 2010). A total of 990 usable questionnaires were collected through the online survey method in line with the predetermined quotas. The demographic characteristics of the respondents for each of the three generations are detailed in Table 1.

Table 1: Demographic Characteristics of the Participants

	Generation X		Generation Y		Generation Z		Total sample	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
	345	34.85	325	32.83	320	32.32	990	100.00
Gender								
Female	199	57.68	159	48.92	152	47.50	510	51.52
Male	146	42.32	166	51.08	168	52.50	480	48.48
Education								
Primary Sch.	29	8.41	9	2.77	1	0.31	39	3.94
Secondary Sch.	0	5.80	9	2.77	15	4.69	44	4.44
High Sch.	71	20.58	41	12.62	237	74.06	349	35.25
Vocational Sch.	34	9.86	24	7.38	18	5.63	76	7.68
Bachelor	125	36.23	165	50.77	48	15.00	338	34.14
Master	49	14.20	57	17.54	1	0.31	107	10.81
Doctorate	17	4.93	20	6.15	0	0.00	37	3.74
Occupation								
Public servant	76	22.03	89	27.38	5	1.56	170	17.17
Private sector	120	34.78	152	46.77	44	13.75	316	31.92
Housewife	50	14.49	8	2.46	1	0.31	59	5.96
Student	1	0.29	16	4.92	242	75.63	259	26.16
Self-employment	32	9.28	21	6.46	6	1.88	59	5.96
Tradesmen	24	6.96	26	8.00	6	1.88	56	5.66
Retired	40	11.59	1	0.31	0	0.00	41	4.14
Unemployed	2	0.58	12	3.69	16	5.00	30	3.03
Household income								
≤ 2500 TL	7	2.03	7	2.15	20	6.25	34	3.43
2501 – 4500 TL	35	10.14	48	14.77	66	20.63	149	15.05

4501 – 6500 TL	71	20.58	76	23.38	96	30.00	243	24.55
6501 – 8500 TL	50	14.49	68	20.92	60	18.75	178	17.98
8501 – 10500 TL	41	11.88	31	9.54	25	7.81	97	9.80
10501 TL ≤	112	32.46	76	23.38	35	10.94	223	22.53
not specified	29	8.41	19	5.85	18	5.63	66	6.67

Within the sample, 34.9% of respondents are categorized as Generation X, 32.8% as Generation Y, and 32.3% as Generation Z. Gender distribution is nearly balanced, with 51.5% identifying as female and 48.5% as male. Marital status indicates that 43.2% of participants are married, whereas 56.8% are single. In terms of educational attainment, 8.4% have completed primary education, 35.3% have completed high school, 41.8% hold a bachelor's or associate's degree, and 14.6% have pursued postgraduate studies. Occupational analysis reveals that the predominant segments of the sample comprise private sector employees (31.9%), students (26.2%), and public sector employees (17.2%). Regarding household income, the most frequently reported brackets are 4501–6500 TL (24.6%) and 10501 TL and above (22.5%).

3.2. Measures

The study adapted multi-item measures from existing literature and modified them to suit the context. Within the scope of the research, the Future Attitude Scale developed by Zaleski (1996) was utilized to determine consumers' levels of future anxiety. Additionally, to measure the ultimate environmental consumption behavior, the Declared Purchase Scale developed by Junior et al. (2015) was used. Due to the absence of a scale specifically developed to examine frugality in the context of technological products, the Frugal Purchasing Scale developed by Pepper et al. (2009) was adapted for technological products. To ensure content and face validity, the original English-language scales were initially translated into Turkish, subsequently back-translated into English, and finally retranslated into Turkish by linguists, thereby confirming substantial similarity in expressions between the original and Turkish versions. Two pilot studies ($N_s = 30, 100$) were conducted to trial, evaluate, and refine the items and scales as needed. Through pre-test and pilot analyses, expressions that were difficult to understand by the participants and/or that could confuse the participants were identified, and the scales were revised in line with expert opinions to ensure that the expressions in question were correctly understood. The measures were evaluated on a five-point Likert scale, with values ranging from 1 (strongly disagree) to 5 (strongly agree) unless otherwise specified.

4. Results

The software program SPSS 24 was used for the purpose of descriptive statistics, internal consistency, and EFA. Also, the software program AMOS 24 was used for the purpose of CFA and structural model testing.

To ensure that the measurement instruments accurately capture the theoretical construct of interest, the construct validity of the scales was tested using exploratory (EFA) and

confirmatory (CFA) factor analyses (Çokluk et al, 2010; Durmuş et al, 2011). The data collected in the field study were randomly divided into two equal groups using SPSS 24. An EFA was conducted on the data from the initial group, followed by a CFA on the data from the subsequent group (Karagöz, 2019).

For each scale, EFAs were executed, and the variables were found to be homogeneous and convenient for performing factor analyses. In the future anxiety scale, five buffer variables containing positive statements were not included in the analyses in accordance with the suggestion of Zaleski (1996). In addition, variables with MSA (Measures of Sampling Adequacy) values below 0.50, common factor variance values below 0.50, factor loadings below 0.70, and variables that prevented obtaining theory-consistent results were removed from the analysis in turn, and the EFA was repeated each time. When Cronbach's Alpha coefficient was examined, it was seen that not only future uncertainty anxiety ($\alpha=.851$) but also self-proving anxiety ($\alpha=.816$) had good internal consistency as well as future anxiety scale ($\alpha=.872$). Moreover, both environmental ($\alpha=.939$) and frugal consumption behaviors ($\alpha=.824$) had good internal consistencies.

Moreover, the theoretical structure of the future anxiety ($\chi^2=75.949$; $df=25$; $\chi^2/df=3.038<5.00$; $RMSEA=.064<.08$; $CFI=.974>.95$; $TLI=.962>.95$; $IFI=.974>.95$; $NFI=.962>.95$), environmental consumption behavior ($\chi^2=173.299$; $df=43$; $\chi^2/df=4.030<5.00$; $RMSEA=.078<.08$; $CFI=.963>.95$; $TLI=.953>.95$; $IFI=.963>.95$; $NFI=.952>.95$) and frugal consumption behavior ($\chi^2=8.034$; $df=2$; $\chi^2/df= 4.017<5.00$; $RMSEA=.078<.08$; $CFI=.992>.95$; $TLI=.975>.95$; $IFI=.992>.95$; $NFI=.989>.95$) scales were accorded with data thus construct validity was achieved (Meydan & Şeşen, 2015). Table 2 shows the EFA and CFA Results.

Table 2: EFA and CFA Results

Code	Loadings	Variance Explained	α	AVE	CR
Future Uncertainty Anxiety (FUA)					
A16	.809	35.110%	.851	.531	.848
A17	.793				
A3	.760				
A1	.718				
A2	.713				
Self-Proving Anxiety (SPA)					
A28	.796	29.070%	.816	.523	.812
A25	.763				
A26	.752				
A27	.744				
Total		64.180%	.872		
Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy = 0.876					
Bartlett's Test of Sphericity = 1965.316 $p=0.000$ ($df=36$) ** $p < 0.01$					

Environmental Consumption Behavior (ECB)					
EC11	.833				
EC12	.823				
EC10	.821				
EC3	.813				
EC7	.794				
EC14	.788				
EC1	.779				
EC6	.775				
EC9	.765				
EC8	.738				
EC2	.737				
Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy = 0.953					
Bartlett's Test of Sphericity = 3632.355 p=0.000 (df=55) **p < 0.01					
Frugal Consumption Behavior (FCB)					
FC3	.837				
FC5	.811				
FC1	.799				
FC2	.798				
Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy = 0.796					
Bartlett's Test of Sphericity = 703.144 p=0.000 (df=6) **p < 0.01					

Results show that future anxiety is divided into two factors. The initial factor is designated as "future uncertainty anxiety" due to its incorporation of expressions such as "My future is uncertain," which exemplifies the anxiety associated with the uncertainty of one's future. The second factor is designated as "self-proving anxiety" due to its inclusion of expressions such as "I am afraid that after several years I will evaluate my life as purposeless," that signifies the anxiety associated with the concern that the individual will be unable to gain respectability and accomplish specific objectives throughout the course of their life, particularly in the later stages. The literature supports the fact that the Future Anxiety Scale in this study consists of two sub-factors and fewer questions (Worthington & Whittaker, 2006; Zaleski et al., 2019), which is in line with a study conducted in Turkey using the same scale (Yılmaz & Arslan, 2021). Based on the new factor structures, the main H1 and H2 hypotheses were divided into subhypotheses as follows.

H1: Future anxiety has an impact on environmental consumption behavior.

H1a: Future uncertainty anxiety has an impact on environmental consumption behavior.

H1b: Self-proving anxiety has an impact on environmental consumption behavior.

H2a: Future uncertainty anxiety has an impact on frugal consumption behavior.

H2b: Self-proving anxiety has an impact on frugal consumption behavior.

4.1. Measurement Model

Structural equation modeling was used to test the relationships between the variables in the research model, and analyses were conducted on the entire dataset (n=990). In this study, the two-stage

approach proposed by Jöreskog and Sörbom (1996) was adopted in which the measurement and structural models were tested separately. Firstly, the measurement model was tested. Once the model showed appropriate goodness of fit values, discriminant and convergent validity were examined. After establishing the validity and reliability of the measurement model, a structural model was tested to examine the relationships among latent variables. Additionally, multigroup analysis was applied to assess the final structural model across generational groups.

In terms of discriminant validity, it was ensured that the correlation estimates between the factors did not exceed 0.85 (Kline, 2016). Additionally, the square root of the AVE value calculated for each latent variable was greater than the correlation coefficient between the latent variables (Malhotra, 2010; Hair et al., 2014).

Based on the model fit values obtained from the CFA, it can be concluded that the model is consistent with the data ($\chi^2=914.994$; $df=246$; $\chi^2/df=3.719 < 5.00$; $RMSEA=.052 < .08$; $CFI=.947 > .90$; $TLI=.940 > .90$; $IFI=.947 > .90$; $NFI=.929 > .90$). To determine the validity of the measurement model, discriminant and convergent validity were additionally examined. The correlation matrix representing the relationships between the variables in the measurement model, AVE and square roots of AVE values (\sqrt{AVE}) for discriminant validity, the Composite Reliability (CR) values for convergent validity, mean and standard deviation values of the variables are presented in Table 3.

Table 3: Reliability and Discriminant Validity of the Measurement Model

Construct	CR	AVE	FUA	SPA	ECB	FCB
FUA	.855	.542	.736			
SPA	.815	.527	.669***	.726		
ECB	.939	.583	.117**	-.053	.764	
FCB	.832	.553	.135***	-.002	.216***	.744

p<0.010; * p<0.001

\sqrt{AVE} values are indicated in bold

Table 4 shows that discriminant validity is ensured as the \sqrt{AVE} values for each variable are lower than the correlation coefficients with other variables. Additionally, construct reliability is ensured as all CR values are higher than 0.70 (Hair et al., 2014). All variables in the measurement model and the values of the relationships between them are presented in Table 4.

Table 4: Measurement Model Regression Coefficients for Relationships between Variables

	Standardized Coefficient	Standard Error	p
A16 <- FUA	.740		
A17 <- FUA	.687	.050	***
A3 <- FUA	.814	.049	***
A1 <- FUA	.704	.052	***
A2 <- FUA	.728	.048	***
A28 <- SPA	.727		
A25 <- SPA	.589	.047	***

A26 <- SPA	.762	.054	***
A27 <- SPA	.807	.049	***
EC11 <- ECB	.815		
EC12 <- ECB	.792	.033	***
EC10 <- ECB	.806	.034	***
EC3 <- ECB	.793	.036	***
EC7 <- ECB	.776	.037	***
EC13 <- ECB	.740	.036	***
EC1 <- ECB	.768	.037	***
EC6 <- ECB	.741	.035	***
EC9 <- ECB	.736	.037	***
EC8 <- ECB	.716	.036	***
EC2 <- ECB	.709	.036	***
FC3 <- FCB	.771		
FC5 <- FCB	.746	.039	***
FC1 <- FCB	.722	.040	***
FC2 <- FCB	.734	.047	***

*** p<0.001

The standardized factor loadings of all observed variables, except G17 and G25, are greater than 0.70. As these values are close to the limit and the AVE and CR values of these variables are high, they were kept in the model (Özkan, 2017).

4.2. Testing the Structural Model

After determining the validity and consistency of the measurement model, the structural model was tested to examine the structural relationships among the latent variables. Based on the model fit values, it can be concluded that the structural research model is consistent with the data ($\chi^2=940.600$; $df=247$; $\chi^2/df=3.808 < 5.00$; $RMSEA=.053 < .08$; $CFI=.945 > .90$; $TLI=.939 > .90$; $IFI=.945 > .90$; $NFI=.927 > .90$). Path analysis was utilized to test the hypotheses. Standardized path coefficients were considered when interpreting the relationships between variables (Hair et al., 2014). The structural equation modeling results are demonstrated in Table 5.

Table 5: Structural Equation Modeling Results

Path	Standardized Coefficient	Estimated Value	Standard Error	Critical Ratio	p
FUA → ECB	.295	.333	.061	5.465	***
FUA → FCB	.275	.234	.049	4.797	***
SPA → ECB	-.256	-.258	.055	-4.696	***
SPA → FCB	-.195	-.149	.044	-3.388	***

*** p<0.001

It is confirmed that both future uncertainty anxiety and self-proving anxiety significantly affect both environmental and frugal consumption behaviors (p<0.001). Therefore, H1a, H1b, H2a, and H2b are accepted, and consequently, H1 and H2 are also accepted. Although the observed effects are

statistically significant, they are relatively modest in magnitude. It was found that future uncertainty anxiety and self-proving anxiety explained the environmental ($R^2=5.1\%$) and frugal ($R^2=4.2\%$) consumption behaviors at very low rates. Yilmaz and Arslan (2021) also found a positive but small effect of future anxiety on sustainable consumption awareness without affecting purchase intention.

4.3. Multigroup Analysis

During the testing of measurement invariance, which is a prerequisite for multigroup analysis (Horn & McArdle, 1992), the measurement model was restricted step by step. To demonstrate structural equivalence, the Unconstrained Model, in which all parameters are fixed for each group, was first tested. The parameter sets were logically ordered and tested in a progressively restrictive manner. At this point, Model 1 (only the factor loadings are constrained), Model 2 (factor loadings, factor variances and covariances are constrained), and Model 3 (factor loadings, variances, covariances, and error variances are constrained), which are classified as weak, strong and strict equivalence tests respectively (Meredith, 1993), were tested separately (Byrne, 2016).

Table 6: Summary of Goodness-of-Fit Statistics for Tests of Multigroup Invariance and Model Comparisons

Models	χ^2	df	χ^2/df	CFI	RMSEA	SRMR	Model Comparison		
							$\Delta\chi^2$	Δdf	ΔCFI
Generation X	557.479	246	2.266	.920	.061	.0496			
Generation Y	496.132	246	2.017	.939	.056	.0480			
Generation Z	500.271	246	2.034	.940	.057	.0463			
Unconstrained Model	1571.770	741	2.121	.932	.034	.0541	-	-	-
Model 1	1623.895	781	2.079	.931	.033	.0552	52.125	40	.001
Model 2	1626.609	787	2.067	.932	.033	.0566	2.714	6	.001
Model 3	1841.084	835	2.205	.918	.035	.0587	214.475	48	.014

The goodness of fit values for the Unconstrained Model, Generations X, Y, and Z were found to be within acceptable limits (Table 6). It can be concluded that there are no significant differences between the measurements for each generation, and that configural invariance is achieved in terms of groups. This can be expressed as the same conceptual structure existing for all three generations.

Since the change in CFI values between the Unrestricted Model and Model 1 ($\Delta CFI = 0.001$) is less than 0.01, it can be concluded that the factor loadings of the scale items remain unchanged between groups (metric invariance). Therefore, weak equivalence has been achieved (Meredith, 1993). Since the change in CFI values between Model 1 and Model 2 ($\Delta CFI = 0.001$) is less than 0.01, it can be concluded that factor loadings, factor variances, and covariances don't change between groups, and strong equivalence is achieved (Byrne, 2016). For the test of strict equivalence, the CFI values of Model 2 and Model 3 were compared. Meade et al. (2008) stated that a ΔCFI value smaller than 0.02 will not negatively affect measurement invariance. In this case, the change in CFI values ($\Delta CFI = 0.014$) is within this range.

As measurement invariance is maintained, comparisons between the three generations are meaningful. Table 7 presents the regression coefficients (β), estimated values, standard errors, critical values, and significance values (p) of structural relationships for each generation resulting from multigroup analysis.

Table 7: Path Analysis Results for Generations

Generation	Path	Standardized Coefficient	Estimated Value	Standard Error	Critical Ratio	p
X	FUA \rightarrow ECB	.149	.160	.092	1.751	.080†
	FUA \rightarrow FCB	.213	.164	.068	2.399	.016*
	SPA \rightarrow ECB	-.079	-.087	.095	-.918	.359
	SPA \rightarrow FCB	-.187	-.147	.071	-2.066	.039*
Y	FUA \rightarrow ECB	.405	.467	.112	4.156	***
	FUA \rightarrow FCB	.331	.273	.085	3.222	.001**
	SPA \rightarrow ECB	-.442	-.450	.102	-4.424	***
	SPA \rightarrow FCB	-.169	-.123	.074	-1.650	.099†
Z	FUA \rightarrow ECB	.245	.274	.107	2.571	.010*
	FUA \rightarrow FCB	.246	.223	.093	2.396	.017*
	SPA \rightarrow ECB	-.007	-.007	.095	-.071	.943
	SPA \rightarrow FCB	-.095	-.076	.083	-.921	.357

†p<0.100; *p<0.050; **p<0.010; *** p<0.001

For Generation X, future uncertainty anxiety moderately positively affects both environmental ($\beta=0.149$, $p<0.100$) and frugal ($\beta=0.213$, $p<0.050$) consumption behaviors. Moreover, self-proving anxiety moderately negatively affects frugal consumption behavior ($\beta=-0.187$, $p<0.050$). However, there is no significant effect of self-proving anxiety on environmental consumption behavior ($p=0.359$). Furthermore, the explanation ratios for environmental ($R^2= 1.4\%$) and frugal ($R^2= 3.1\%$) consumption behaviors are significantly low.

For Generation Y, future uncertainty anxiety moderately positively affects both environmental ($\beta=0.405$, $p<0.001$) and frugal ($\beta=0.331$, $p<0.010$) consumption behaviors, while self-proving anxiety moderately negatively affects both environmental ($\beta=-0.442$, $p<0.001$) and frugal ($\beta=-0.169$, $p<0.100$) consumption behaviors. Furthermore, the explanation ratios for environmental ($R^2= 11.5\%$) and frugal ($R^2= 6.2\%$) consumption behaviors are significantly low.

For Generation Z, future uncertainty anxiety moderately positively affects both environmental ($\beta=0.245$, $p<0.050$) and frugal ($\beta=0.246$, $p<0.050$) consumption behaviors. However, there is no significant effect of self-proving anxiety on not only environmental ($p=0.943$) but also frugal ($p=0.357$) consumption behaviors. Furthermore, the explanation ratios for environmental ($R^2= 5.8\%$) and frugal ($R^2= 3.8\%$) consumption behaviors are significantly low. Consequently, the influence of future anxiety on environmental and frugal consumption behaviors varies across generations (H3 accepted).

5. Discussion and Conclusion

The nature of future anxiety has varied among individuals, influencing their consumption behavior in diverse ways. In the contemporary era, the future anxiety caused by the social and environmental problems in our world that have started to affect people negatively has revealed environmental consumption behavior and frugality awareness. This awareness also influences the technological consumption behaviors of individuals due to future concerns regarding the environmental problems caused by e-waste generated by developing technology. Additionally, the impact of future anxiety on consumption behaviors differs across generations formed by individuals with similar characteristics due to the conditions of the period they live in. As individuals' future uncertainty increases, they exhibit both more environmentally friendly and more frugal behaviors.

Future anxiety comprises two dimensions: future uncertainty anxiety and self-proving anxiety. The literature supports the fact that the Future Anxiety Scale in this study consists of two sub-factors and fewer questions, which is in line with a study conducted in Turkey using the same scale (Yilmaz & Arslan, 2021). It is important for a scale to be as short as possible while maintaining validity, meeting psychometric standards, and motivating people to respond honestly and freely (Worthington & Whittaker, 2006). As the Future Anticipation Scale is time-consuming (Zaleski et al., 2019), shortening it is necessary.

Based on the analysis results, individuals who are more concerned about future uncertainty tend to exhibit more environmentally friendly consumption behavior and consume technological products more frugally. There are also studies indicating that environmental anxiety (e.g., Vess & Arndt, 2008; Fritzsche & Häfner, 2012) and environmental behavior (e.g., Rahimah et al., 2018) increase as death anxiety increases. When consumers believe that death resulting from causes such as ecological catastrophe can be postponed or prevented, they may engage in preventive actions, such as green consumption, to protect the environment (Rahimah et al., 2018). During the pandemic, individuals' economic conditions influenced their level of anxiety (Dupлага & Grysztar, 2021; Paredes et al., 2021). Additionally, unstable economic conditions in the country and concerns about the future can affect individuals' consumption behavior (Nava et al., 1997; Kemp et al., 2021), causing them to avoid spending on perceived unnecessary or luxury items (Nava et al., 1997). This behavior can be described as acting more frugally. It can be concluded that future uncertainty anxiety has a positive effect on environmental consumption behavior and frugal consumption behavior specific to technological products, which is consistent with the literature.

Companies that account for consumers' heightened uncertainty regarding the future may strategically highlight product longevity, repairability, energy efficiency, and recyclability to assuage both financial and ecological concerns. Such measures not only yield long-term cost advantages but also reduce environmental impacts, thereby appealing to consumers seeking economic stability and environmental stewardship. Moreover, the adoption of buy-back programs, recycling initiatives, or upcycling efforts can further foster more judicious technology usage. The research indicates that Generation Y responds strongly to feelings of uncertainty, often translating these concerns into green

and frugal consumption practices. Businesses can therefore highlight the economic and environmental benefits of sustainable offerings to address Generation Y's heightened anxiety about the future. Non-governmental organizations (NGOs) can develop different strategies for each generation, guided by their underlying anxieties. Environmental campaigns, for instance, can channel younger individuals' future uncertainty anxiety into constructive activities and community-based efforts.

On the other hand, when self-proving anxiety increases, both environmental and frugal consumption behaviors decrease. Individuals may engage in ostentatious consumption to gain social approval and enhance their image by acquiring products that signal their status to society (O'Cass & McEwen, 2004). At this juncture, individuals who are concerned about proving themselves are expected to engage in anti-frugal behaviors such as replacing phones with new models before the end of their lifespan, rather than adopting environmental behaviors. It can be concluded that the negative effect of the increase of self-proving anxiety on the frugal consumption behavior in terms of environmental and technological products is consistent with the literature. However, the fact that self-proving anxiety does not affect the environmental consumption behavior of Generation X individuals can be explained by the fact that Generation X individuals are self-confident (Eisner, 2005) and consequently, they do not turn to environmentalism, which they have already adopted, with self-proving anxiety. The results indicate that self-proving anxiety does not influence environmental and frugal consumption behavior in Generation Z individuals. Generation Z is distinguished by its environmental and social consciousness, a trait that has been shaped by their upbringing amidst environmental crises (Williams & Page, 2011). This context provides a rationale for the observation that self-proving anxiety does not influence the behavior of Generation Z. At this point, it is imperative that government agencies, NGOs, and corporations disseminate information regarding the detrimental effects of electronic waste on the environment to consumers on a more regular basis. In the context of the ongoing effects of the pandemic, it is evident that raising consumer awareness of the relationship between environmental pollution and the acceleration of the spread of epidemics (Ritz, 2010; Razzaq et al., 2020) will lead to a more frugal and environmentally conscious approach to consumption. By positioning sustainability as a marker of prestige and a driver of brand loyalty—rather than as a compromise in quality—organizations can effectively engage both fiscally cautious consumers and those motivated by social status. Generation Z consumers interested in prestige may exhibit conspicuous consumption. In this context, businesses may leverage the concept of status symbolism, positioning sustainable goods and services as exclusive and socially responsible, thereby harnessing self-proving motives in a more favorable direction. Furthermore, for those motivated by social approval or image, NGOs can encourage “green leadership” roles, volunteering, or social accolades tied to environmental or frugal behavior, thus making sustainable actions a source of pride and social recognition.

5.1. Limitations and Future Research

No product group was the focus of the study in terms of green consumer behavior. Instead, consumers were asked to evaluate their general green consumption behavior. Consequently, in future studies, one or more specific green products can be selected for comparison.

The concept of frugal consumption behavior has been explored within the context of technological products. This research can be extended to encompass a wider range of product categories in future studies. Additionally, future studies could investigate whether the observed patterns of frugal consumption behavior in the literature are driven by materialistic factors such as price consciousness or voluntary simplicity.

Although generational groups have begun to exhibit similar characteristics on a global scale, socio-economic conditions and cultural characteristics of the country of residence cause differentiation between generations in terms of concerns and behaviors on a country basis. Therefore, future studies may benefit from cross-country comparisons based on data collected from different countries.

Given the low R^2 values, the addition of well-chosen variables grounded in theory has the potential to significantly enhance explanatory power. In the context of sustainability research, attitudinal and value-based predictors, such as environmental concern, perceived consumer effectiveness, and materialism, are frequently cited. Moreover, contextual forces, including subjective norms and cultural orientation, have the capacity to shape or dampen the direct effect of personal anxiety on environmentally relevant behaviors. Finally, product-specific and knowledge-based factors can elucidate why some anxious consumers still update devices rapidly or forgo green practices due to limited awareness of environmental harms. These additions could lead to richer insights into the mechanisms driving environmental and frugal consumption behaviors and better overall model fit.

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