Analysis Report

This report is structured as follows.

Contents

SAMPLE REPORT - Rafael Data Analysis Portfolio

Data Screening

Firstly, participants that are not from Germany or have not done grocery shopping at least once per month were excluded, reducing the dataset from 201 to 188. 17 additional participants were also excluded due to having at least one missing response. The final dataset was composed by 169 cases (N = 169).

Sample Characterization

The table below presents the characteristics of the sample with respect to the categorical variables that were present in the dataset.

		Count	Column N %
Alter	1995	7	4.1%
	1996	1	0.6%
	1997	9	5.3%
	1998	14	8.3%
	1999	17	10.1%
	2000	12	7.1%
	2001	30	17.8%
	2002	33	19.5%
	2003	25	14.8%
	2004	14	8.3%
	2005	3	1.8%
	2006	2	1.2%
	2007	1	0.6%
	2008	0	0.0%
	2009	1	0.6%
	2010	0	0.0%
	Anderes	0	0.0%
Geschlecht	Männlich	53	31.5%
	Weiblich	115	68.5%
	Divers	0	0.0%
Bildung	Kein Abschluss	2	1.2%
	Hauptschulabschluss	1	0.6%
	Mittlere Reife	13	7.7%
	Fachholschulreife	14	8.3%
	Abitur	110	65.1%
	Bachelor	21	12.4%
	Master	8	4.7%
	Dr.	0	0.0%
Wohnort	Ja	169	100.0%
	Nein	0	0.0%
Einkauf	Ja	169	100.0%
	Nein	0	0.0%

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Descriptive Statistics

The table below shows descriptive statistics of the subscales. Items with a '_rev' suffix were reverse-scored. All subscales were measured using a 1-5 Likert scale. Reliabilities of the composite scales were tested using Cronbach's Alpha (α). Reliability was acceptable for all scales (α > 0.700) (Hair et al., 2014).

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	α
I001_01	169	1	5	3.112	1.032	
I001_02	169	1	5	3.172	1.277	
I001_03	169	1	5	3.627	1.101	
I001_04	169	1	5	2.645	1.177	0.795
I001_05	169	1	5	2.716	1.201	
I001_06	169	1	5	2.988	1.058	
I001_07	169	1	5	3.012	1.205	
SB01_01	169	1	5	3.444	1.051	
SB01_02	169	1	5	3.059	1.100	
SB01_03	169	1	5	3.432	1.158	
SB01_04	169	1	5	2.988	1.464	0.867
SB01_05	169	1	5	3.136	1.000	
SB01_06	169	1	5	3.071	1.078	
SB01_07	169	1	5	3.154	1.123	
SB01_08	169	1	5	2.799	1.316	
SN01_01	169	2	5	3.817	.974	
SN01_02_rev	169	1	5	3.249	1.068	
SN01_03_rev	169	1	5	3.994	1.077	
SN01_04	169	1	5	4.320	.841	0.713
SN01_05_rev	169	1	5	3.420	1.142	
SN01_06	169	1	5	3.308	1.063	
SN01_07_rev	169	1	5	3.746	1.107	
SN01_08	169	1	5	2.698	1.122	
SV01_01	169	1	5	3.680	.902	
SV01_02	169	1	5	3.349	1.013	
SV01_03	169	1	5	3.473	.887	
SV01_04	169	1	5	3.367	1.111	0.870
SV01_05	169	1	5	4.438	.892	
SV01_06	169	1	5	3.320	1.002	
SV01_07	169	1	5	3.669	.891	
SV01_08	169	1	5	3.331	1.033	
T001_01	169	1	5	3.479	1.140	
T001_02	169	1	5	3.479	1.176	
T001_03	169	1	5	3.533	1.113	
T001_04	169	1	5	3.213	1.161	
T001_05	169	1	5	3.432	1.095	
T001_06	169	1	5	3.402	1.104	0.953
T001_07	169	1	5	3.172	1.118	
T001_08	169	1	5	3.385	1.012	
T001_09	169	1	5	3.290	1.049	
T001_10	169	1	5	3.284	1.064	
T001_11	169	1	5	3.379	1.107	
Valid N (listwise)	169					

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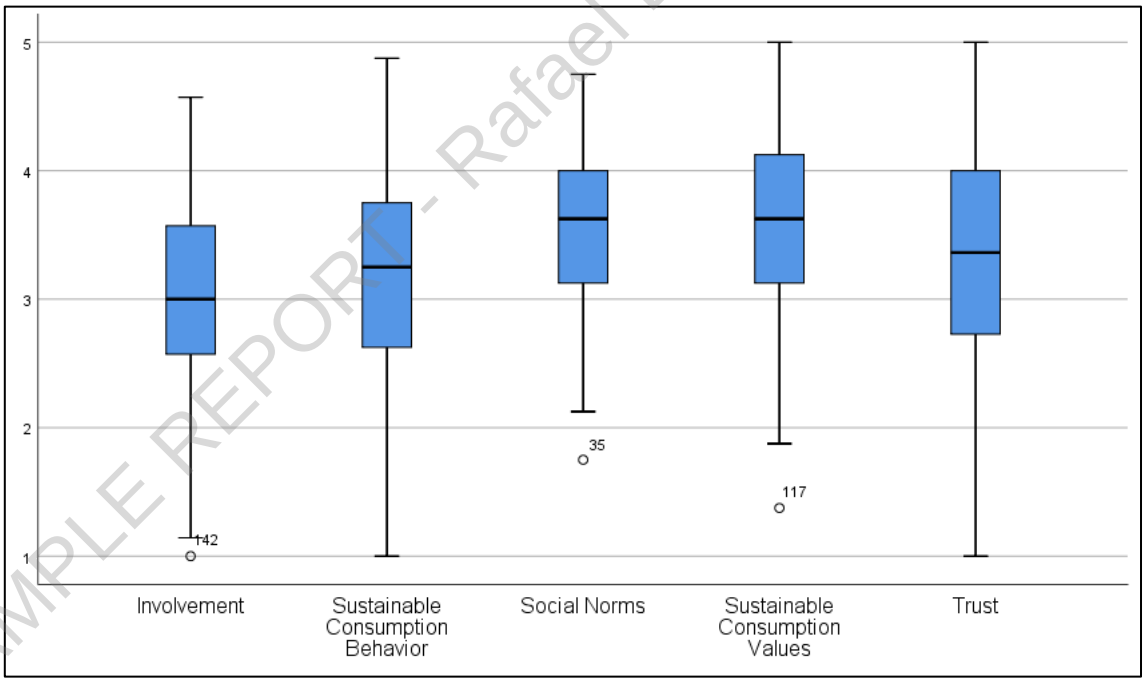
With the reliability tested, subscales were averaged to form composite scores for the total scales. Descriptive Statistics were generated for them and are shown in the Table below. Skewness and Kurtosis were between the ± 1.5 range for al scales, suggesting normal distributions (Hair et al., 2014).

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
I	169	1.000	4.571	3.039	.765	-.253	.187	-.165	.371
SB	169	1.000	4.875	3.135	.835	-.374	.187	-.357	.371
SN	169	1.750	4.750	3.569	.609	-.360	.187	-.391	.371
SV	169	1.375	5.000	3.578	.701	-.536	.187	-.038	.371
T	169	1.000	5.000	3.368	.910	-.180	.187	-.521	.371
Valid N (listwise)	169								

Boxplots of the scales demonstrate that scores are well-distributed across the 1-5 range for the five scales (Figure below).



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Regression Model

Multiple regression was used to assess the cause-effect relationships. It is a technique used to explore the relationships between a continuous dependent variable and two or more independent (or predictor) variables (Pallant, 2010). The objective of multiple regression analysis is to use the independent variables whose values are known to predict the single dependent value selected by the researcher. Each independent variable is weighted by the regression analysis procedure to ensure maximal prediction from the set of independent variables. The weights denote the relative contribution of the independent variables to the overall prediction and facilitate interpretation as to the influence of each variable in making the prediction, although correlation among the independent variables complicates the interpretative process. The set of weighted independent variables forms the regression variate, a linear combination of the independent variables that best predicts the dependent variable (Hair et al., 2014). A situation that can be tested through regression analysis is the moderation effect. It refers to the effect in which a third independent variable (the moderator variable) causes the relationship between a dependent/independent variable pair to change, depending on the value of the moderator variable. It is also known as an interactive effect and is similar to the interaction effect seen in analysis of variance methods.

This section shows the results of three regression models:

- Model 1: tested the effect of SV (Sustainable Consumption Values) on SB (Sustainable Consumption Behavior);
- Model 2: tested the effect of SV, T (Trust), SN (Social Norms) and I (Involvement) on SB;
- Model 3: tested the moderation effect of T, SN and I on the relationship between SV and SB by adding multiplicative components in the model.

The three models were significant ($p < 0.001$) (Table below). SV alone predicted 49.5% of the variance of SB ($R^2 = 0.495$). The addition of T, SN and I increased the explanatory power to 58.9% ($R^2 = 0.589$).

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.	R^2
1	Regression	57.990	1	57.990	163.818	.000[b]	0.495
	Residual	59.117	167	.354			
	Total	117.107	168				
2	Regression	68.988	4	17.247	58.782	.000[c]	0.589
	Residual	48.119	164	.293			
	Total	117.107	168				
3	Regression	69.535	7	9.934	33.619	.000[d]	0.594
	Residual	47.572	161	.295			
	Total	117.107	168				

a. Dependent Variable: SB

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b. Predictors: (Constant), SV
c. Predictors: (Constant), SV, T, SN, I
d. Predictors: (Constant), SV, T, SN, I, SV_x_I, SV_x_T, SV_x_SN

Collinearity between independent variables on the non-moderation models was absent (VIF < 10). SV, alone, showed a significant effect on SB ($\beta = 0.704$, $p < 0.001$). Its effect remained significantly positive when the other three variables were added ($\beta = 0.510$, $p < 0.001$). Involvement showed a significant effect on Sustainable Consumption Behavior ($\beta = 0.442$, $p < 0.001$). Social Norms and Trust had no significant effects on SB ($p > 0.05$).

No moderation effects were observed whatsoever for any of the interaction terms ($p > 0.05$). This suggests that the effect of Involvement on SB does not depend on Values.

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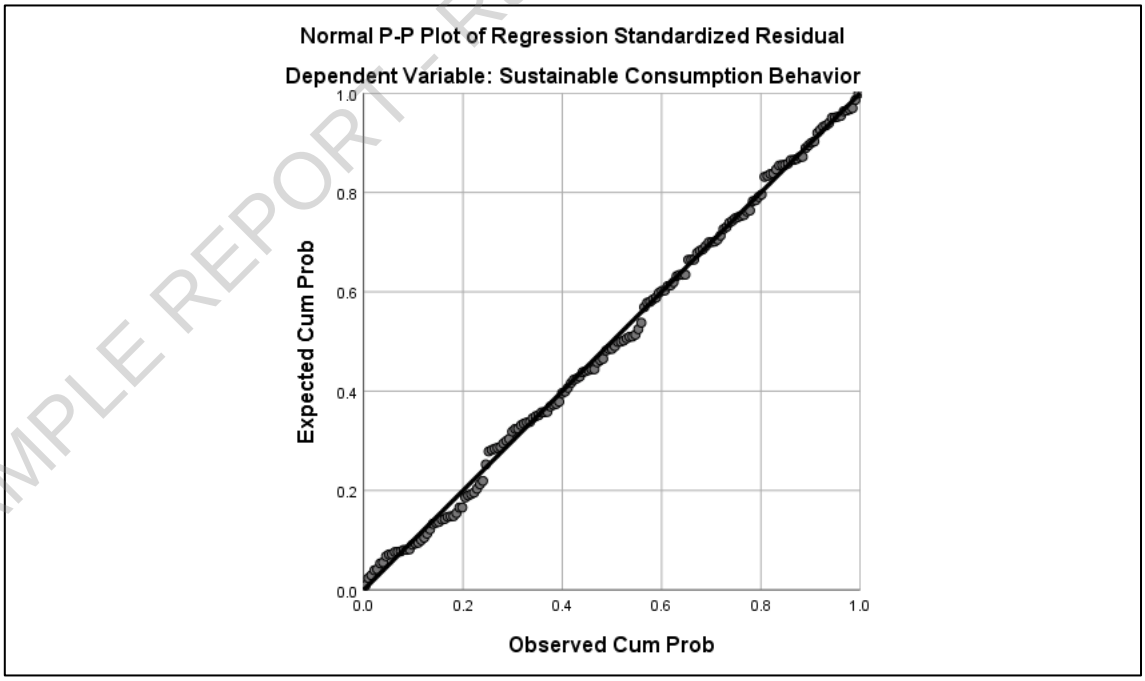
Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.136	.239		.571	.569		
	SV	.838	.065	.704	12.799	.000	1.000	1.000
2	(Constant)	-.331	.348		-.953	.342		
	SV	.510	.081	.428	6.319	.000	.546	1.833
	I	.442	.073	.405	6.051	.000	.560	1.786
	SN	.067	.070	.049	.952	.342	.960	1.042
	T	.018	.046	.020	.390	.697	.992	1.008
3	(Constant)	.387	1.842		.210	.834		
	SV	.307	.515	.258	.597	.551	.014	73.970
	I	.560	.273	.513	2.053	.042	.040	24.759
	SN	-.425	.417	-.310	-1.018	.310	.027	36.708
	T	.213	.283	.232	.752	.453	.026	37.745
	SV_x_T	-.053	.076	-.271	-.703	.483	.017	58.960
	SV_x_SN	.132	.111	.575	1.191	.235	.011	92.256
	SV_x_I	-.028	.076	-.141	-.369	.713	.017	58.025

a. Dependent Variable: SB

Lastly, violations of the assumptions of normality, linearity and homoscedasticity of residuals (errors) were examined for the regression model. The next figure shows a P-P plot, which is used to assess the normality of residuals. The observations should follow a diagonal pattern to suggest normality of residuals (Tabachnick & Fidell, 2014).



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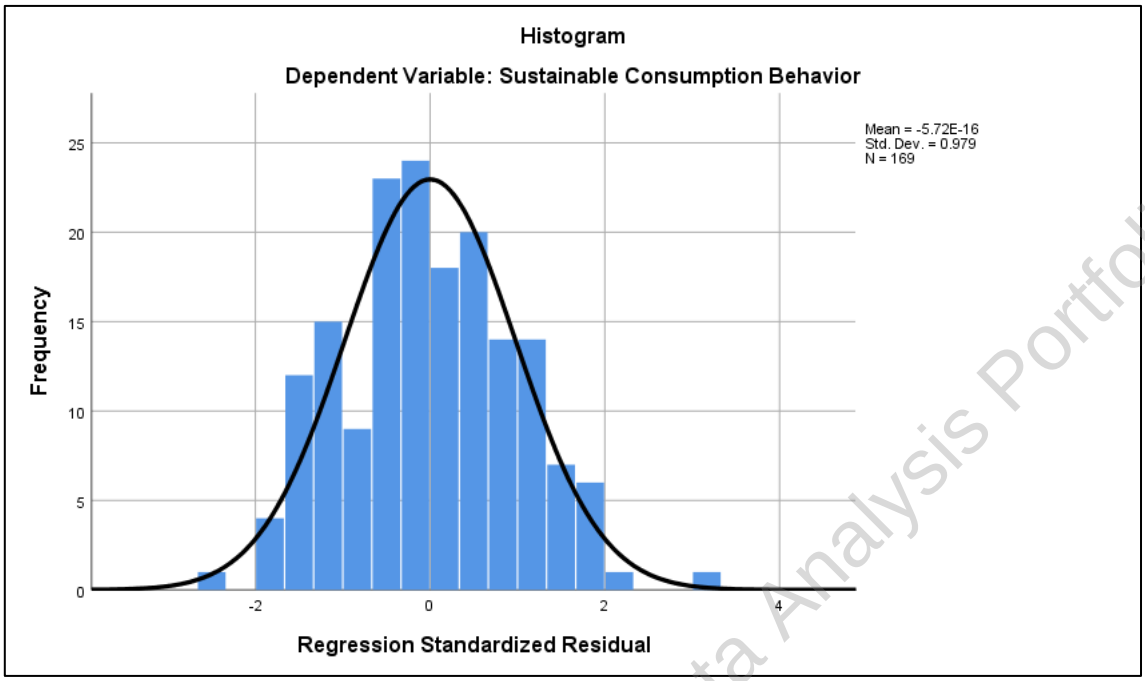
The graph suggests that no substantial violations of normality are present. This is corroborated by a histogram of residuals (Figure below).



The next figure shows a scatterplot of standardized residuals and standardized predicted values of the dependent variable. If points are well distributed along the X and Y axes, this would suggest homoscedasticity and linearity. Nonlinearity is indicated when most of the residuals are above the zero line on the plot at some predicted values and below the zero line at other predicted values. Lack of homoscedasticity is indicated if values are more dispersed for a given predicted values than at other values (Tabachnick and Fidell, 2014).

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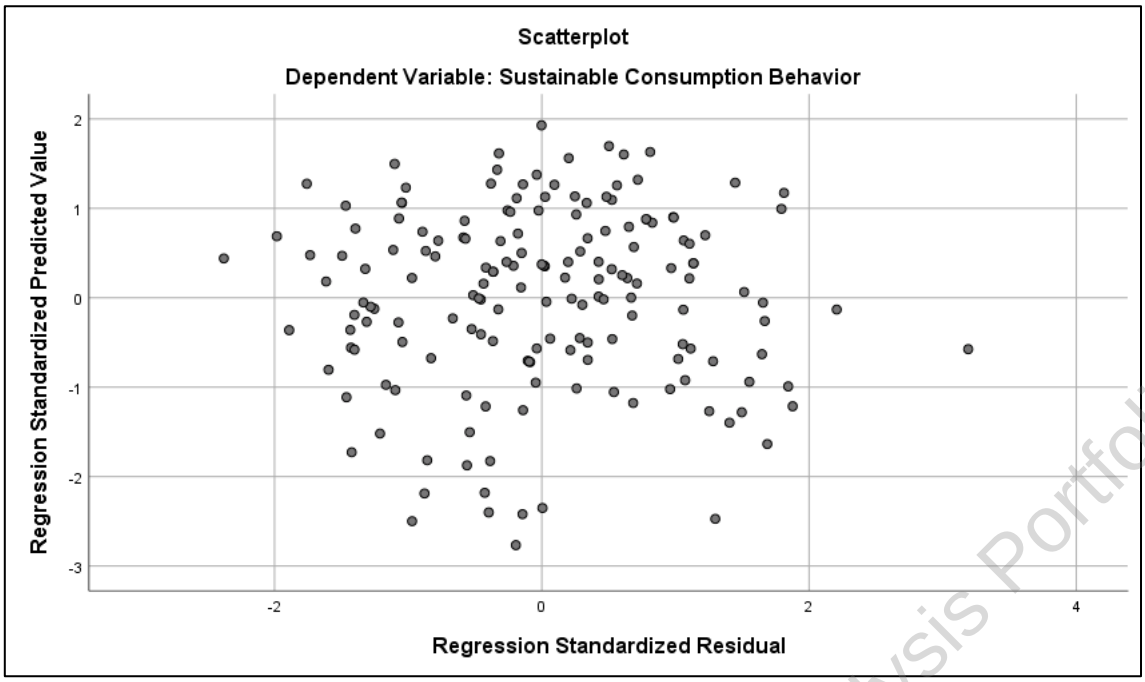

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Conclusions

The following conclusions can be drawn based on the analysis:

- Sustainable Consumption Values has a significant positive effect on Sustainable Consumption Behavior;
- Involvement has a significant positive effect on Sustainable Consumption Behavior;
- Trust has no significant effect on Sustainable Consumption Behavior;
- Social Norms has no significant effect on Sustainable Consumption Behavior;
- The effect of Involvement on Sustainable Consumption Behavior is not moderated by Sustainable Consumption Values.

Value-Behavior Gap

One may assume that the scores of sustainable value and sustainable behavior need to be similar. A Paired-Samples T-test was conducted to examine if scores of SV and SB can be considered equal or not. The results are shown below.

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Sustainable Consumption Values - Sustainable Consumption Behavior	.443	.604	.046	.351	.535	9.536	168.000	.000

The average score of Sustainable Consumption Values (M = 3.578) can be considered statistically higher than the average score of Sustainable Behavior (M = 3.153), t = 9.536, p < 0.001. This suggests there is a gap between having such values and forming the behavior.

Correlation

There are strong positive relationships between involvement and both sustainable consumption behavior and sustainable consumption values. Additionally, there's a strong positive relationship between sustainable consumption behavior and sustainable consumption values. Only a weak positive relationship exists between social norms and sustainable consumption values. No significant relationships were found between involvement and social norms, involvement and trust, sustainable consumption behavior and social norms, sustainable consumption behavior and trust, social norms and trust, and sustainable consumption values and trust.

Correlations

		Involvement	Sustainable Consumption Behavior	Social Norms	Sustainable Consumption Values	Trust
Involvement	Pearson Correlation	1	.691**	.063	.659**	.051
	Sig. (2-tailed)		.000	.418	.000	.510
	N	169	169	169	169	169
Sustainable Consumption Behavior	Pearson Correlation	.691**	1	.150	.704**	.036
	Sig. (2-tailed)	.000		.052	.000	.645
	N	169	169	169	169	169
Social Norms	Pearson Correlation	.063	.150	1	.179*	-.057
	Sig. (2-tailed)	.418	.052		.020	.463
	N	169	169	169	169	169
Sustainable Consumption Values	Pearson Correlation	.659**	.704**	.179*	1	-.004
	Sig. (2-tailed)	.000	.000	.020		.957

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	N	169	169	169	169	169
Trust	Pearson Correlation	.051	.036	-.057	-.004	1
	Sig. (2-tailed)	.510	.645	.463	.957	
	N	169	169	169	169	169

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

References

Hair, J. F., Black, W., Babin, B., & Anderson, R. (2014). *Multivariate data analysis* (Seventh). Pearson Education, Inc.

Pallant, J. (2010). *SPSS Survival Manual* (4th ed.). McGraw-Hill.

Tabachnick, B. G., & Fidell, L. S. (2014). *Using multivariate statistics / Barbara G. Tabachnick, Linda S. Fidell.*

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