

Toward Healthy Snack Choices
The Impact of Self-Regulation and Financial Incentives
on Consumers' Food Intake

D I S S E R T A T I O N
of the University of St. Gallen,
Graduate School of Business Administration,
Economics, Law, and Social Sciences (HSG)
to obtain the title of
Doctor Oeconomiae

submitted by

Alexandra Christine Leny Glas

from

Zurich

Approved on the application of

Prof. Dr. Thomas Rudolph

and

Prof. Dr. Peter Kenning

Shaker Verlag GmbH, Aachen 2011

The University of St. Gallen, Graduate School of Business Administration, Economics, Law and Social Sciences (HSG) hereby consents to the printing of the present dissertation, without hereby expressing any opinion on the views herein expressed.

St. Gallen, October 26, 2010

The President:

Prof. Ernst Mohr, PhD

St. Galler Schriften zum Handelsmanagement
herausgegeben von Prof. Dr. Thomas Rudolph

Band 6

Alexandra Christine Leny Glas

Toward Healthy Snack Choices

The Impact of Self-Regulation and Financial Incentives
on Consumers' Food Intake

Shaker Verlag
Aachen 2012

Bibliographic information published by the Deutsche Nationalbibliothek

The Deutsche Nationalbibliothek lists this publication in the Deutsche Nationalbibliografie; detailed bibliographic data are available in the internet at <http://dnb.d-nb.de>.

Zugl.: St.Gallen, Univ., Diss., 2010

Umschlagphoto:© iStockphoto.com/ssstep

Forschungszentrum für Handelsmanagement
Universität St.Gallen
Dufourstr. 40a
CH - 9000 St.Gallen
Tel: +41-(0)71-224 2856
Fax: +41-(0)71-224 2857
<http://www.irm.unisg.ch>

Copyright Shaker Verlag 2012

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior permission of the publishers.

Printed in Germany.

ISBN 978-3-8440-0527-1
ISSN 1867-2760

Shaker Verlag GmbH • P.O. BOX 101818 • D-52018 Aachen
Phone: 0049/2407/9596-0 • Telefax: 0049/2407/9596-9
Internet: www.shaker.de • e-mail: info@shaker.de

VORWORT

Die vorliegende Dissertation ist während meiner Tätigkeit als wissenschaftliche Mitarbeiterin am Forschungszentrum für Handelsmanagement an der Universität St. Gallen entstanden. An dieser Stelle möchte ich all denjenigen danken, die zum Gelingen dieser Arbeit beigetragen und mich in den letzten Jahren unterstützt haben.

Mein herzlicher Dank gebührt meinem Doktorvater Prof. Dr. Thomas Rudolph. Er hat mich in allen Phasen der Dissertation begleitet und in konstruktiven Diskussionen entscheidende Impulse gegeben. Sein Vertrauen in meine Arbeitsweise sowie die Entfaltungsmöglichkeiten am Lehrstuhl und der gewährte wissenschaftliche Freiraum waren mir stets ein Ansporn und haben wesentlich zum erfolgreichen Abschluss dieser Arbeit beigetragen.

Ebenso bedanke ich mich bei Prof. Dr. Peter Kenning, der als Ko-Referent den Fortschritt des Dissertationsprojektes an entscheidenden Stellen durch seinen thematischen und persönlichen Input sowie zielführenden Anregungen im Vorfeld der empirischen Untersuchung massgeblich unterstützte.

Ferner gilt mein besonderer Dank Prof. Dr. Stephan Meier. Er hat mir die Experimental-Denkweise näher gebracht und in zahlreichen Diskussionen die Stossrichtung meines Dissertationsthemas gelenkt.

Dank gilt des Weiteren Herrn Andreas Allenspach und seinem gesamten Team beim Migros-Genossenschafts-Bund, durch deren umfassende und unermüdliche Unterstützung meine empirische Datenerhebung überhaupt erst möglich gemacht wurde. An dieser Stelle sei auch dem Bundesamt für Gesundheit (BAG) gedankt für die finanzielle Unterstützung des Forschungsprojektes. Herrn Steffen Volk, Direktor Waldhotel Arosa, danke ich für das Wettbewerb-Sponsoring.

Meinen Kollegen und Freunden am Institut verdanke ich neben der schönen gemeinsamen Zeit in St.Gallen vielfältige Unterstützung bei der Anfertigung dieser Arbeit. Dr. Daniel Wentzel danke ich ganz herzlich für die stete Diskussionsbereitschaft und methodische Unterstützung. Dr. Christian Schmitz gilt mein Dank für die zahlreichen Ideen bei der Durchführung des Experiments. Lydia Ebersbach, Antonia Erz und Dr. Beata Lis danke ich für die motivierende Zusammenarbeit und die stete Hilfsbereitschaft.

Petra Hanselmann, Sibylle Diewald, Denise Jud und Ngan Tran danke ich für ihre fortwährende Freundschaft. Sie haben mich stets daran erinnert, dass es auch ein Leben nebst Hypothesen, Datenanalysen und Journals gibt.

Mein grösster Dank gilt abschliessend meinen Eltern Leny und Jaap Glas und meiner Schwester Elisabeth. Sie haben mich auf meinem bisherigen Lebensweg immer vorbehaltlos unterstützt, haben an mich geglaubt und mich in meinen Entscheidungen stets bestärkt. Ihnen widme ich diese Arbeit.

ABSTRACT

The prevalence of overweight and obesity is at an alarming rate, also in Switzerland. Of the many factors associated with rising obesity, food industry marketing practices that are linked with increased consumption are among the most criticized factors (e.g., Seiders and Petty 2004, p. 154). Therefore, marketers of food items in the entire food chain, from primary producers to retailers, are eager to position themselves as health friendly in response to consumers' growing health consciousness.

Many people want to resist temptations and have good intentions to eat healthily but in the end fail to act on their intentions. Why is it so difficult to act on intentions or maintain attempts for changing health behavior, even for people who seem to be motivated? This so-called intention-behavior-gap has recently started to attract substantial attention and currently is one of the most researched aspects of health behavior.

The present study provides the first integrated analysis of the two topics self-regulation and financial incentives within the food domain. The aim of this thesis is to analyze the impact of self-regulation strategies and financial incentives in overcoming unhealthy snacking habits. In a 2x2-factorial design, the two motivational approaches are experimentally tested. Furthermore, it is examined which of these approaches have a stronger influence and whether interactions might accrue. Thereby, not only the perceived self-reported behavior is surveyed, but also the actual consumed snacking behavior is observed.

The results reveal that both self-regulation strategies and financial incentives positively reinforce consumers' choice of healthy snacks. Moreover, the results indicate that the combined effect seems to be overlapping rather than additive suggesting that financial incentives are possibly internalized by individuals, indicating that intrinsic and extrinsic interventions are interrelated.

Based on this analysis, the aim of this study is to derive implications to enhance healthier food choices. Thereto, along a road map a number of marketing tools are developed to conceptualize possible activities for the actors of the food industry following a holistic sustainable approach.

ZUSAMMENFASSUNG

Die Verbreitung von Übergewicht und Adipositas ist besorgniserregend, auch in der Schweiz. Von den vielen Faktoren, die im Zusammenhang mit Übergewicht stehen, werden die Marketingaktivitäten der Lebensmittelindustrie besonders stark kritisiert (Seiders and Petty 2004, p. 154). Daher ist es im Interesse von Marketingverantwortlichen der Food Industrie ihre Produkte und Services dem steigenden Gesundheitsbewusstsein der Konsumenten anzupassen.

Viele Menschen sind sich ihres ungesunden Ernährungsverhaltens sehr wohl bewusst. Dennoch verändern sie ihr Verhalten nicht. Weshalb reicht eine Intention, sich gesund zu ernähren, nicht aus, dieses Verhalten tatsächlich auszuführen? Diese Intention-Verhaltens-Lücke gilt es zu analysieren.

Die vorliegende Arbeit liefert erstmals eine integrierte Untersuchung der beiden Themenfelder Selbst-Regulation und finanzielle Anreize im Ernährungsbereich. Im Rahmen eines 2x2-faktoriellen Experimentaldesigns wird getestet, inwieweit Selbst-Regulationsstrategien und finanzielle Anreize sowie deren Kombination dazu beitragen können, die ungesunden Snack-Gewohnheiten zu überwinden. Dabei wird nicht nur das wahrgenommene Verhalten abgefragt, sondern es wird auch das tatsächliche Verhalten in Form von konsumierten Produkten beobachtet.

Die Ergebnisse zeigen, dass sowohl Selbst-Regulationsstrategien und finanzielle Anreize gesundes Snackverhalten unterstützen. Darüber hinaus zeigen die Ergebnisse, dass die Kombination beider Faktoren nicht wirksamer ist als die der beiden Einzelfaktoren. Dieser Befund deutet darauf hin, dass die Verhaltenswirksamkeit beider Faktoren über denselben Prozess verläuft.

Basierend auf dieser Analyse ist es das Ziel, Handlungsimplikationen abzuleiten, um die Motivation der Konsumenten für ein gesundes Ernährungsverhalten zu steuern. Hierzu wurden basierend auf einer Roadmap zahlreiche Marketinginstrumente entwickelt, um Gestaltungsoptionen für die verschiedenen Akteure der Food-Industrie zu konzeptionalisieren. Dabei wurde ein holistischer, nachhaltiger Ansatz verfolgt.

TABLE OF CONTENTS

LIST OF FIGURES.....	V
LIST OF TABLES.....	VII
1 INTRODUCTION.....	9
1.1 Research Problem.....	9
1.1.1 The Prevalence of Obesity	10
1.1.2 Economic Costs of Overweight and Obesity in Switzerland	15
1.1.3 Causes of Obesity.....	16
1.1.4 State of Research and Further Research Requirements	18
1.1.5 Relevance of the Proposed Research.....	20
1.2 Research Purpose	23
1.2.1 Aim of the Research and Guiding Research Questions	23
1.2.2 Scientific Understanding	24
1.2.3 Contributions	25
1.3 Dissertation Structure	25
2 LITERATURE REVIEW AND THEORETICAL BACKGROUND.....	27
2.1 Introduction	27
2.2 Research on Eating Behavior Change.....	29
2.2.1 Health Belief Model	29
2.2.2 Transtheoretical Model.....	32
2.2.3 Social Cognitive Theory.....	34
2.2.4 Theory of Planned Behavior.....	36
2.2.5 Summary of the Leading Theories of Behavior Change.....	41
2.3 Motivation for Healthy Eating and Habit.....	42
2.4 Self-Regulation as an Enhancement of Goal Pursuit	47
2.5 Financial Incentives as Goal Pursuit Motivation	53
2.6 Summary.....	55
3 HYPOTHESES DEVELOPMENT AND CONCEPTUAL MODEL	57
3.1 Development of Research Questions	57
3.2 Hypotheses and Conceptual Model.....	59
3.2.1 The Impact of TPB Antecedents on Healthy Snack Behavior	59
3.2.2 The Impact of Habit on Healthy Snack Behavior	61

3.2.3	The Impact of Self-Regulation on Healthy Snack Behavior.....	62
3.2.4	The Impact of Financial Incentives on Healthy Snack Behavior.....	66
3.2.5	Crowding Out and Crowding In Effects.....	67
3.2.6	The Mediating Role of Self-Esteem.....	68
3.2.7	Conceptual Model	70
3.3	Summary.....	72
4	METHOD.....	74
4.1	Scientific Approach	74
4.1.1	Introduction to Experimental Research.....	74
4.1.2	Validity Criteria.....	76
4.1.3	Control Techniques	77
4.2	Research Design	80
4.3	Recruitment of Participants.....	81
4.4	Research Procedure	82
4.5	Measurement	88
4.5.1	Operationalization of the Independent Variables.....	90
4.5.1.1	Antecedents of the Theory of Planned Behavior.....	90
4.5.1.2	Snacking Habit.....	91
4.5.2	Operationalization of the Interventions.....	92
4.5.2.1	Self-Regulation Strategy.....	92
4.5.2.2	Financial Incentive.....	94
4.5.3	Operationalization of the Manipulation Checks.....	95
4.5.4	Operationalization of the Dependent Variables	95
4.5.4.1	Calorie Intake.....	96
4.5.4.2	Perceived (Self-Reported) Snack Behavior.....	97
4.5.5	Operationalization of the Covariates	97
4.5.5.1	Health Knowledge	97
4.5.5.2	Risk Perception.....	98
4.5.5.3	Outcome Expectancies.....	98
4.5.5.4	Involvement	98
4.5.5.5	Demographic and Biometric Information.....	99
4.5.6	Operationalization of the Mediator Variable.....	99

5 RESULTS.....	100
5.1 Pretest	100
5.2 Power Analysis.....	100
5.3 Characteristics of the Sample	101
5.4 Construct Measurement.....	108
5.4.1 Fit Indices of Measurements	108
5.4.2 Independent Variables	115
5.4.3 Dependent Variable.....	118
5.4.4 Control Variables.....	120
5.4.5 Mediator Variable.....	122
5.5 Randomization and Descriptive Data.....	124
5.5.1 Randomization Check	124
5.5.2 Descriptive Data	124
5.6 Manipulation and Confound Checks.....	126
5.7 Hypotheses Testing	127
5.7.1 Prediction of Behavioral Intentions and Behavior	127
5.7.1.1 Multiple Regression Analysis.....	127
5.7.1.2 Results of Multiple Regression Analysis.....	128
5.7.1.3 Discussion.....	130
5.7.2 Main and Interaction Effects	131
5.7.2.1 Factorial Analysis of Variance (ANOVA)	132
5.7.2.2 Assumption of ANOVA	135
5.7.2.3 Planned Contrasts	135
5.7.2.4 Analysis of Covariance.....	136
5.7.2.5 Results of Main and Interaction Effects	137
5.7.2.6 Discussion.....	144
5.7.3 Moderation Effects	146
5.7.3.1 Hierarchical Moderated Regression Analyses.....	146
5.7.3.2 Results of the Hierarchical Regression Analyses	147
5.7.3.3 Discussion.....	152
5.7.4 Mediation Analyses.....	153
5.7.4.1 Series of Regression Analyses.....	153
5.7.4.2 Results of Mediation Analyses	154
5.7.4.3 Discussion.....	156

6	SUMMARY OF RESULTS AND THEORETICAL CONTRIBUTION ...	157
6.1	Summary of Results	157
6.2	Theoretical Contribution	161
6.2.1	Contribution to Literature on Motivation for Healthy Eating	161
6.2.2	Contribution to Literature on Self-Regulation Strategies	162
6.2.3	Contribution to Literature on Financial Incentive.....	163
6.2.4	Contribution to Literature on Crowding In Effect.....	163
7	MANAGERIAL IMPLICATIONS	165
7.1	Building a Sustainable Response	166
7.2	A Holistic Approach to Overcome Overweight and Obesity.....	167
7.3	Practice Examples	170
7.3.1	Coop	171
7.3.2	Educational Health Services Zurich	174
7.3.3	Federal Office of Public Health FOPH	176
7.3.4	Hilcona	179
7.3.5	McDonald's	181
7.3.6	Migros.....	183
7.3.7	Valora – avec.....	186
7.3.8	Conclusion.....	187
7.4	The Power of Marketing to Manage Healthy Eating	187
7.5	Road Map to Close the Intention-Behavior Gap.....	190
7.5.1	Step 1: Identifying the Problem.....	191
7.5.2	Step 2: Developing Solutions to the Identified Problem.....	197
7.5.3	Step 3: Implementing Solutions to the Problem.....	205
7.5.4	Step 4: Assessing Effectiveness and Making Refinements.....	206
8	LIMITATIONS AND FURTHER RESEARCH.....	207
9	CONCLUSION.....	209
	REFERENCES	211
	APPENDIX: BODY MASS INDEX AND WAIST CIRCUMFERENCE	240
	CURRICULUM VITAE	241

List of Figures

Figure 1: Obese Population Aged 15 and Older.....	12
Figure 2: Development of Overweight in Switzerland	14
Figure 3: Procedural Logic of the Dissertation	24
Figure 4: Dissertation Structure.....	26
Figure 5: Explanatory and Change Theories	28
Figure 6: Theory of Planned Behavior	38
Figure 7: Conceptual Model of the Dissertation	71
Figure 8: Control Techniques.....	78
Figure 9: Experimental Groups	80
Figure 10: Procedure of the Experiment	83
Figure 11: Snack Products Offered During the Experiment	87
Figure 12: Measurements	90
Figure 13: Self-Regulation Intervention.....	93
Figure 14: Financial Incentive Intervention – Red Voucher.....	94
Figure 15: Financial Incentive Intervention – Green Voucher.....	95
Figure 16: Response Rate of the Data Collection	102
Figure 17: Procedure to Assess the Indicator-Based Measurements	114
Figure 18: Choice of a Healthy Snack.....	125
Figure 19: Main Effect: Self-Regulation.....	137
Figure 20: Main Effect: Financial Incentive	138
Figure 21: Interaction Diagram	139
Figure 22: Main Effects: Habit/Self-Regulation and Habit/Financial Incentive....	141
Figure 23: Interaction Diagram	142
Figure 24: Influence of Habit on Calorie Intake per Experimental Condition.....	143
Figure 25: Hierarchical, Moderated Regression Analyses	147
Figure 26: Mediation Model.....	154

Figure 27: Testing the Mediation Effect of Self-Esteem (Self-Regulation)	155
Figure 28: Testing the Mediation Effect of Self-Esteem (Incentive).....	156
Figure 29: Obesity Map with Environmental Drivers and Actors	169
Figure 30: Roadmap to Implement Healthy Snacking Behavior	191
Figure 31: Obesity Drivers and Actors on the Food Market.....	192
Figure 32: Habit-Intention Matrix	195
Figure 33: Intervention Funnel to Overcome Overweight and Obesity.....	196
Figure 34: Synergy Gearwheel.....	198
Figure 35: Suggestions for Improving Snacking Behavior.....	201

List of Tables

Table 1: Overweight and Obese Population Aged 15 Years and Older	11
Table 2: Overweight and Obesity in Switzerland (1992-2007)	13
Table 3: Chronic Diseases Due to Overweight and Obesity	15
Table 4: Total Costs of Overweight and Obesity in Switzerland.....	16
Table 5: Studies Applying the HBM to Eating Behavior.....	31
Table 6: Studies Applying the TTM to Eating Behavior	33
Table 7: Studies Applying the SCT to Eating Behavior	36
Table 8: Studies Applying the TPB to Eating Behavior	40
Table 9: Summary of Theories/Models: Focus and Key Concepts.....	41
Table 10: Studies Applying Habit Strength to Eating Behavior	46
Table 11: Studies Applying Self-Regulation Strategies to Eating Behavior	52
Table 12: Summary of Hypotheses H ₁ -H ₁₁	73
Table 13: Control Techniques Used in this Study.....	79
Table 14: Skew and Kurtosis.....	103
Table 15: Gender and Household Distribution of the Participants	104
Table 16: Participants' Age, Education and Income Distribution.....	105
Table 17: Body Mass Index and Waist Circumference of the Participants	106
Table 18: Physical Exercise Distribution of the Participants	107
Table 19: Sample by Condition	107
Table 20: Fit Indexes (First Generation)	111
Table 21: Fit Indexes (Second Generation).....	113
Table 22: Indicators of the Construct Snacking Habit	116
Table 23: Indicators of the Construct Attitude	117
Table 24: Indicators of the Construct Intention.....	117
Table 25: Indicators of the Construct Perceived Behavioral Control	118
Table 26: Indicator of the Construct Subjective Norm	118

Table 27: Indicators of the Construct Self-Reported Behavior.....	119
Table 28: Fit Indexes of Independent Variables and Dependent Variable	119
Table 29: Indicators of the Construct Health Knowledge	120
Table 30: Indicators of the Construct Risk Perception.....	121
Table 31: Indicators of the Construct Expected Outcome	121
Table 32: Indicators of the Construct Involvement.....	122
Table 33: Indicators of the Construct Self-Esteem	122
Table 34: Fit Indexes of the Control and Mediator Variables.....	123
Table 35: Randomization Check	124
Table 36: Means, Standard Deviations, and Correlations	125
Table 37: Manipulation Checks.....	127
Table 38: Prediction of Intention.....	128
Table 39: Prediction of Self-Reported Behavior	129
Table 40: Results of Hypotheses H_{1A-D} - H_{2A-C}	130
Table 41: Results of the Two Factorial Analysis of Variance	138
Table 42: Results of the Planned Contrasts in the Experiment	140
Table 43: Results of Planned Contrasts of Habit and Scenarios	143
Table 44: Results Hypotheses H_3, H_4, H_6, H_7, H_9	144
Table 45: Moderated Multiple Regression: Self-Regulation	149
Table 46: Moderated Multiple Regression: Financial Incentive	150
Table 47: Results of Hypotheses H_6 and H_8	152
Table 48: Results Hypotheses H_{10} and H_{11}	156
Table 49: Summary of Hypotheses H_1 - H_{11}	161
Table 50: Experts from Practice	171
Table 51: Definitions and Examples of the Three Levels of Interventions	197
Table 52: International Body Mass Index Classification	240
Table 53: International Waist Circumference Classification	240