Temporal aspects of theme park choice behavior: modeling variety seeking, seasonality and diversification to support theme park planning

Citation for published version (APA):

DOI:
10.6100/IR542240

Document status and date:
Published: 01/01/2000

Document Version:
Publisher’s PDF, also known as Version of Record (includes final page, issue and volume numbers)

Please check the document version of this publication:

- A submitted manuscript is the version of the article upon submission and before peer-review. There can be important differences between the submitted version and the official published version of record. People interested in the research are advised to contact the author for the final version of the publication, or visit the DOI to the publisher's website.
- The final author version and the galley proof are versions of the publication after peer review.
- The final published version features the final layout of the paper including the volume, issue and page numbers.

Link to publication

General rights
Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal.

If the publication is distributed under the terms of Article 25fa of the Dutch Copyright Act, indicated by the “Taverne” license above, please follow below link for the End User Agreement:
www.tue.nl/taverne

Take down policy
If you believe that this document breaches copyright please contact us at:
openaccess@tue.nl
providing details and we will investigate your claim.
Temporal Aspects of Theme Park Choice Behavior

Modeling variety seeking, seasonality and diversification to support theme park planning

PROEFSCHRIFT

ter verkrijging van de graad van doctor aan de Technische Universiteit Eindhoven, op gezag van de Rector Magnificus, prof.dr. M. Rem, voor een commissie aangewezen door het College voor Promoties in het openbaar te verdedigen op vrijdag 8 december 2000 om 16.00 uur

door

Astrid Dorothea Ada Maria Kemperman

geboren te Valkenswaard
Dit proefschrift is goedgekeurd door de promotoren:

prof.dr. H.J.P. Timmermans

en

prof.dr. D.R. Fesenmaier
ACKNOWLEDGEMENTS

Writing a thesis cannot be done without the help of other people and organizations. I would like to thank all those who have contributed to this research project for their efforts. However, there are some persons that deserve special attention.

This research project is part of the FUTRO research program, a cooperation of Eindhoven University of Technology, Tilburg University and Wageningen Agricultural University, concerned with fundamental research on time-space dynamics in tourism and recreation. This research program was funded by the Dutch Organization for Scientific Research (NWO). NWO is gratefully acknowledged for their funding and for providing travel grants that allowed me to meet other researchers and discuss my work with them.

I would like to express my gratitude to Harry Timmermans, my first advisor. From the beginning of this research project Harry has supported me in all possible ways. He always encouraged me to work independently and left enough room to make my own choices. Harry has a great ability to encourage people in a very positive and relaxing manner to get the best out of their research while always keeping in mind the person behind the researcher. I admire Harry for being such a great scientific researcher, and I feel honored to work with him.

Also, I am grateful to my second advisor Daniel Fesenmaier. He carefully reviewed the manuscript and provided valuable comments on my research project along the way. His support is much valued.

I am also indebted to Aloys Borgers and Harmen Oppewal. They were always there to help me out with questions I had regarding my research project and both made valuable contributions. Aloys’ ability to clarify theoretical and methodological problems is really appreciated. Also, I would like to thank Irene Borgers for the data entry. Harmen introduced me to the techniques of conjoint
analysis, gave good suggestions on my research and especially helped me out with
the design strategies.

Special thanks also go to Jordan Louviere, former head of the Marketing
department at the University of Sydney, Australia, and the other members of this
department for their kind hospitality during the four semesters that I was able to
spent there.

Also I would like to express thanks to my former room-mates for many years,
Marc Stemerding and Eric Molin for always creating a pleasant, stimulating work
environment and for setting a good example. I have been very fortunate to work in
the Urban Planning Group. All (former) members of the Urban Planning Group
contributed in their own unique way in creating a pleasant and motivating work
environment. The fact that one needs in addition to intellectual stimulation, also
physical training is emphasized by the ‘sport group’. Together, we have spent many
pleasant lunch breaks exercising, and I would like to thank them all for this
enjoyable relaxation. Furthermore, I would like to thank Peter van der Waerden and
Leo van Veghel for their technical assistance. Mandy van de Sande-van Kasteren is
much appreciated for being such a very nice person and an excellent secretary,
whose assistance has been most helpful over the past years.

Also, I would like to thank all of my friends for their interest in my work and
for all the pleasant social activities we undertook. Special thanks to Ingrid Janssen
and Daniëlle Snellen for being my ‘paranimfen’.

The support of my relatives is highly appreciated. I like to thank my dear big
sister Hellen, Wil, Sophie and Simone for their interest and support in many ways,
Hans and Nynke for giving the good example, Guus and Bernie for their help,
especially with the renovation of our house and looking after Jasper which gave me
more time to finish this thesis, and my dear parents, who always have stimulated me
in pursuing my education and raised me to be an independent person.

Finally, I would like to thank the two persons most dearest to me, my
husband Benedict Dellaert and our son Jasper. Spending time with Jasper was
always a very welcome change when writing this thesis. Benedict’s enormous
unconditional support, encouragement and infinite patience has been most important
in finishing this thesis. I dedicate this book to Benedict and Jasper.

Astrid Kemperman,
Eindhoven, September 2000
CONTENTS

ACKNOWLEDGEMENTS i

CONTENTS iii

LIST OF TABLES ix

LIST OF FIGURES xi

1 INTRODUCTION 1

2 THEME PARKS 11

2.1 Introduction 11
2.2 Definitions 12
2.3 The theme park over the years 14
2.4 Components of theme park planning 16
2.5 The theme park product 18
2.6 An analysis of the theme park environment 22

2.6.1 Economic environment 22
2.6.2 Socio-cultural environment 22
2.6.3 Physical environment 23
2.6.4 Transportation 23
2.6.5 Infrastructure 24
2.6.6 Accommodation and other tourist facilities and services 24
2.6.7 Institutional elements 25
5  MODELING AND MEASURING THEME PARK CHOICE

BEHAVIOR

5.1  Introduction 75

5.2 Theoretical foundations of choice modeling 76
  5.2.1 Discrete choice theory 77
  5.2.2 Strict utility models 77
  5.2.3 Random utility models 78
  5.2.4 The multinomial logit model 80

5.3 Measurement approaches 82
  5.3.1 Revealed choice modeling approaches in tourism 83
  5.3.2 Stated preference and choice modeling approaches in tourism 84

5.4 Strengths and weaknesses of modeling approaches 88

5.5 Conjoint modeling approaches 91
  5.5.1 Elicitation of influential attributes 91
  5.5.2 Specification of relevant attribute levels 92
  5.5.3 Choice of measurement task 93
  5.5.4 Selection of experimental design 94
  5.5.5 Constructing the questionnaire 97
  5.5.6 Analyzing the results 98
  5.5.7 External validity of conjoint models 100

5.6 Limitations of traditional conjoint choice approaches 101

5.7 Conclusion 103

6  MODELING SEASONALITY AND VARIETY SEEKING IN

THEME PARK CHOICE 105

6.1 Introduction 105

6.2 Models of variety seeking 106
  6.2.1 Inventory-based variety seeking models 107
  6.2.2 Non-inventory-based models of variety seeking behavior 112
  6.2.3 BHT-model 118

6.3 Evaluation 121

6.4 Conclusions 123
# Temporal aspects of theme park choice behavior

## 7 A CONJOINT CHOICE MODEL OF SEASONALITY AND VARIETY SEEKING

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.1 Introduction</td>
<td>125</td>
</tr>
<tr>
<td>7.2 Definitions and assumptions</td>
<td>126</td>
</tr>
<tr>
<td>7.3 Model specification</td>
<td>127</td>
</tr>
<tr>
<td>7.4 Experimental design approach</td>
<td>130</td>
</tr>
<tr>
<td>7.5 Conclusion</td>
<td>134</td>
</tr>
</tbody>
</table>

## 8 VARIETY SEEKING AND SEASONALITY IN THEME PARK CHOICES OF TOURISTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.1 Introduction</td>
<td>137</td>
</tr>
<tr>
<td>8.2 Experiment 1: theme park type choice</td>
<td>138</td>
</tr>
<tr>
<td>8.2.1 Attribute elicitation</td>
<td>139</td>
</tr>
<tr>
<td>8.2.2 Experimental design</td>
<td>140</td>
</tr>
<tr>
<td>8.2.3 The choice task</td>
<td>142</td>
</tr>
<tr>
<td>8.2.4 Sample descriptives</td>
<td>142</td>
</tr>
<tr>
<td>8.2.5 Analysis</td>
<td>143</td>
</tr>
<tr>
<td>8.2.6 Results</td>
<td>145</td>
</tr>
<tr>
<td>8.3 Experiment 2: choice of specific theme parks</td>
<td>152</td>
</tr>
<tr>
<td>8.3.1 Selection of parks</td>
<td>152</td>
</tr>
<tr>
<td>8.3.2 Experimental design</td>
<td>153</td>
</tr>
<tr>
<td>8.3.3 The choice task</td>
<td>155</td>
</tr>
<tr>
<td>8.3.4 Analysis</td>
<td>155</td>
</tr>
<tr>
<td>8.3.5 Results</td>
<td>156</td>
</tr>
<tr>
<td>8.4 Implications for theme park planning</td>
<td>165</td>
</tr>
<tr>
<td>8.5 Conclusion</td>
<td>166</td>
</tr>
</tbody>
</table>

## 9 MODELING DIVERSIFICATION IN THEME PARK ACTIVITY CHOICE

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.1 Introduction</td>
<td>169</td>
</tr>
<tr>
<td>9.2 Measuring diversification</td>
<td>172</td>
</tr>
<tr>
<td>9.3 Modeling the number of activities</td>
<td>174</td>
</tr>
</tbody>
</table>
9.4 Modeling timing, duration, sequence and composition of activities 175
  9.4.1 Timing and duration models 176
  9.4.2 Types of hazard models 180
  9.4.3 Important modeling issues 183
9.5 An ordered logit model approach to modeling theme park activity choices 186
  9.5.1 Structure of the ordered logit model 187
  9.5.2 Modeling timing, duration, sequence and composition of the set of chosen activities 190
9.6 Conclusion 191

10 DIVERSIFICATION IN VISITOR ACTIVITY CHOICE IN A THEME PARK 193
10.1 Introduction 193
10.2 The conjoint choice experiment 194
  10.2.1 Attribute elicitation 194
  10.2.2 Experimental design 197
  10.2.3 Hypothetical choice task 197
10.3 Sample descriptives 199
10.4 Analysis 201
  10.4.1 The ordered logit model 203
  10.4.2 Poisson regression model 204
10.5 Results 205
  10.5.1 Number of activities chosen 206
  10.5.2 Activity duration 210
  10.5.3 Timing of activity choices 219
  10.5.4 Sequence of chosen activities 228
  10.5.5 Composition of the set of activities chosen 232
10.6 Planning implications 236
10.7 Conclusion 238

11 CONCLUSIONS AND DISCUSSION 239
Temporal aspects of theme park choice behavior

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>REFERENCES</td>
<td>251</td>
</tr>
<tr>
<td>AUTHOR INDEX</td>
<td>267</td>
</tr>
<tr>
<td>SUBJECT INDEX</td>
<td>271</td>
</tr>
<tr>
<td>SAMENVATTING (DUTCH SUMMARY)</td>
<td>277</td>
</tr>
<tr>
<td>CURRICULUM VITAE</td>
<td>287</td>
</tr>
</tbody>
</table>
LIST OF TABLES

Table 2.1 Percentage of population visiting a theme park by age and sex in The Netherlands in 1995 28
Table 2.2 The top-twenty of most visited attractions in The Netherlands in 1995 28
Table 2.3 The age distribution of the Dutch population, 1999-2005 31
Table 2.4 Challenges for the theme park planner 33
Table 5.1 Coding schemes 98
Table 6.1 Selective review and evaluation of variety seeking models 122
Table 7.1 Example of a $2^{NT}$ experimental design 132
Table 7.2 Example of the choice sets 133
Table 8.1 Attributes and levels for the theme park type experiment 139
Table 8.2 Sample characteristics 143
Table 8.3 Coding of attributes theme park type experiment 145
Table 8.4 Parameter estimates for the theme park types and their significance 146
Table 8.5 Model comparisons theme park type experiment 148
Table 8.6 The attributes, their levels and type of parks for experiment 2 153
Table 8.7 Coding of attributes specific theme park experiment 155
Table 8.8 Parameter estimates for the specific parks and their significance 157
Table 8.9 Parameter estimates for the variety seeking and loyalty behavior effects between specific parks 158
Table 8.10 Model comparisons 159
Table 10.1 The activities and attributes with their levels 196
Table 10.2 Sample characteristics 200
Temporal aspects of theme park choice behavior

Table 10.3  Coding of the attributes and their levels  202
Table 10.4  Significant parameter estimates for the Poisson regression  207
Table 10.5  Model comparison  208
Table 10.6  Probabilities for the number of activities chosen for various models  209
Table 10.7  Parameter estimates for the ordered logit models for activity duration  212
Table 10.8  Performances of the ordered logit duration models  213
Table 10.9  Parameter estimates for the ordered logit models for activity timing  220
Table 10.10  Performances of the ordered logit timing models  222
Table 10.11  Model performances  234
Table 10.12  Availability effects  235
# List of Figures

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>Theme park planning components</td>
<td>17</td>
</tr>
<tr>
<td>2.2</td>
<td>The three levels of the theme park product</td>
<td>21</td>
</tr>
<tr>
<td>3.1</td>
<td>Site design planning steps</td>
<td>45</td>
</tr>
<tr>
<td>3.2</td>
<td>Process for preparing a theme park development plan</td>
<td>47</td>
</tr>
<tr>
<td>4.1</td>
<td>Conceptual model of theme park visitor choice behavior</td>
<td>62</td>
</tr>
<tr>
<td>4.2</td>
<td>Theoretical framework for variation in choice behavior</td>
<td>67</td>
</tr>
<tr>
<td>4.3</td>
<td>A model framework of theme park choice behavior</td>
<td>71</td>
</tr>
<tr>
<td>5.1</td>
<td>An overview of preference and choice measurement approaches</td>
<td>83</td>
</tr>
<tr>
<td>5.2</td>
<td>Example of a conjoint profile of a hypothetical theme park</td>
<td>86</td>
</tr>
<tr>
<td>5.3</td>
<td>Example of a conjoint choice set</td>
<td>94</td>
</tr>
<tr>
<td>8.1</td>
<td>Example of a choice task for the theme park type experiment</td>
<td>141</td>
</tr>
<tr>
<td>8.2</td>
<td>Choice probabilities for the park types in spring versus summer</td>
<td>150</td>
</tr>
<tr>
<td>8.3</td>
<td>Choice probabilities for the park types chosen at choice occasion $t$ conditional on the park types chosen at occasion $t-1$</td>
<td>151</td>
</tr>
<tr>
<td>8.4</td>
<td>Example of a choice task for experiment 2</td>
<td>154</td>
</tr>
<tr>
<td>8.5</td>
<td>Choice probabilities for the specific parks in spring versus summer</td>
<td>161</td>
</tr>
<tr>
<td>8.6</td>
<td>Choice probabilities for the amusement parks chosen at occasion $t$ conditional on the amusement parks chosen at occasion $t-1$</td>
<td>162</td>
</tr>
<tr>
<td>8.7</td>
<td>Choice probabilities for the zoos chosen at occasion $t$ conditional on the zoos parks chosen at occasion $t-1$</td>
<td>163</td>
</tr>
</tbody>
</table>
**Temporal aspects of theme park choice behavior**

<table>
<thead>
<tr>
<th>Figure 8.8</th>
<th>Choice probabilities for the cultural/educational parks chosen at occasion $t$ conditional on the cultural/educational parks chosen at occasion $t-1$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 9.1</td>
<td>Modeling diversification</td>
</tr>
<tr>
<td>Figure 9.2</td>
<td>Illustration of hazard $h(t)$, density $f(t)$, cumulative distribution $F(t)$ and survivor $S(t)$ functions</td>
</tr>
<tr>
<td>Figure 9.3</td>
<td>Hazard function distributions</td>
</tr>
<tr>
<td>Figure 10.1</td>
<td>Example of a hypothetical choice situations</td>
</tr>
<tr>
<td>Figure 10.2</td>
<td>Estimated hazard rates for the duration of the theaters</td>
</tr>
<tr>
<td>Figure 10.3</td>
<td>Estimated hazard rates for the duration of the life entertainment by fantasy characters</td>
</tr>
<tr>
<td>Figure 10.4</td>
<td>Estimated hazard rates for the duration of the attractions</td>
</tr>
<tr>
<td>Figure 10.5</td>
<td>Estimated hazard rates for the duration of the food and retail outlets</td>
</tr>
<tr>
<td>Figure 10.6</td>
<td>Estimated probabilities for the duration of the theaters</td>
</tr>
<tr>
<td>Figure 10.7</td>
<td>Estimated probabilities for the duration of the life entertainment by fantasy characters</td>
</tr>
<tr>
<td>Figure 10.8</td>
<td>Estimated probabilities for the duration of the attractions</td>
</tr>
<tr>
<td>Figure 10.9</td>
<td>Estimated probabilities for the duration of the food and retail outlets</td>
</tr>
<tr>
<td>Figure 10.10</td>
<td>Estimated hazard rates for the timing of the theaters</td>
</tr>
<tr>
<td>Figure 10.11</td>
<td>Estimated hazard rates for the timing of the life entertainment by fantasy characters</td>
</tr>
<tr>
<td>Figure 10.12</td>
<td>Estimated hazard rates for the timing of the attractions</td>
</tr>
<tr>
<td>Figure 10.13</td>
<td>Estimated hazard rates for the timing of the food and retail outlets</td>
</tr>
<tr>
<td>Figure 10.14</td>
<td>Estimated probabilities for the timing of the theaters</td>
</tr>
<tr>
<td>Figure 10.15</td>
<td>Estimated probabilities for the timing of the life entertainment by fantasy characters</td>
</tr>
<tr>
<td>Figure 10.16</td>
<td>Estimated probabilities for the timing of the attractions</td>
</tr>
<tr>
<td>Figure 10.17</td>
<td>Estimated probabilities for the timing of the food and retail outlets</td>
</tr>
<tr>
<td>Figure 10.18</td>
<td>Estimated probabilities for the activities per half hour period during the day</td>
</tr>
<tr>
<td>Figure 10.19</td>
<td>Relative number of visitors during the day</td>
</tr>
</tbody>
</table>
Figure 10.20 Estimated probabilities for the activities per half hour period during the day, corrected for the relative number of visitors in the park 231
Temporal aspects of theme park choice behavior
1 INTRODUCTION

The latest figures of the World Tourist Organization show that in the new millennium tourism\(^1\) will be the single largest industry in the world. According to the WTO, international tourism receipts rose by 8% in 1997 to an approximate turnover of 436 billion dollar (US), representing almost one-third of the value of world trade in the services sector. Theme parks are star players in the tourism industry, and play a special and important role in generating tourism demand. Theme parks are the main motivators for tourism trips to many destinations and core elements of the tourism product. For example, in recent articles in the Journal of Travel Research (e.g., Kau Ah-Keng, 1994; Zoltak, 1998a) it has been argued that many of the Asian countries such as China, Thailand and Malaysia are now actively promoting the construction of major theme parks in their countries to increase tourism revenues. Moreover, Hong Kong announced the opening of the fifth Disneyland in 2005 (Economist, 1999). Previously, many regions and countries in Europe have supported the growth of theme parks as an attractive option to increase direct economic input. The type of theme parks nowadays available to the public covers a wide variety of businesses ranging from the well known large scale theme or leisure parks with ‘white knuckle’ rides, to historic properties, museums and art galleries, religious sites, industrial plants, zoos, and wildlife parks.

Thus, theme parks have grown rapidly in number and importance during the last decades. Competition in the theme park market is growing also. Not only in terms of an increasing number of parks, but also relative to other uses of leisure

\(^1\) Definition of tourism: ‘Tourism is the temporary movement of persons to destinations outside their normal home and workplace for leisure, business and other purposes, the activities undertaken during the stay and the facilities created to cater for the needs of tourists’ (WTO, 1989).
Temporal aspects of theme park choice behavior

time such as those created by the introduction of new technologies like multimedia. Furthermore, theme parks increasingly compete for space and accessibility. The occupation of space that parks require increases due to the need for more spectacular attractions and the need for more space to exploit economic scale advantages. This leads to parks investing substantially in new entertainment and facilities, and in relatively unexplored areas such as accommodation, which also require additional space.

The question is, given an ever increasing number of parks and many parks expanding their activities, how do the parks survive? This question is especially pressing in the Western European context, where the theme park business is facing demographic changes in the form of a greying population, visitors that demand more quality, and visitors that are more thoughtful and discriminating about how the available resources of free time and disposable income are used. In fact, the theme park market in Western Europe seems to be reaching its saturation point and the parks have to cater for visitors who are getting more and more experienced and demanding. These visitors are becoming more selective in terms of both the destinations they choose to visit and the activities they want to undertake once they have arrived at the destination. Given these trends of growing theme park supply, environmental constraints and increasingly discriminating consumer demand, it can be concluded that theme parks, to survive in this competitive market, must optimize their long-term strategy.

In the Netherlands, where there are more theme parks per capita than in any other country in Western Europe, the situation is very urgent. Approximately 53 percent of the Dutch population visited a theme park in 1994, and the top-twenty of most visited theme parks attracted 22 million visitors (NBT, 1996). This makes the Dutch the most enthusiastic theme park visitors in Europe, but very likely also the most discriminating ones.

In general, the developments in the theme park market ask for facilities and services that are adjusted to the changing tastes and preferences of the tourism consumer, and are integrated in the total development of an area. Also, theme parks have to attract large groups of visitors to be economic successful. Therefore, in the theme park planning process, especially at the site planning level, understanding existing and potential visitor streams is essential. It is important for park managers and planners to know what consumers like and dislike, what makes them visit or not visit particular parks, and when they want to visit a park. Successful theme park
planning also requires accurate forecasts of total demand. It can be concluded that it is necessary that theme park planners have advance knowledge of the likely effects of planning strategies and investments that they consider. There is a need for models and measurement methods that allow the prediction of theme park visitors’ choice behavior when planning theme park facilities.

This thesis aims at providing tools for such planning research. One of the essential parts of this research is understanding the decisions that theme park visitors make. It is clear that better insight into visitor choice behavior can help devise competitive planning strategies and explore new opportunities in the market. Therefore, there must be an increasing focus in theme park planning on marketing research and the decision process of consumers. Marketing research techniques can support the evaluation of potential theme park rides, facilities and exhibits in terms of their expected impact on theme park demand and on visitor activity patterns in the parks. However, if theme park planners wish to understand the decisions that theme park visitors make, to increase the demand for facilities and optimize visitor behavior in the park, there must also be a clear theoretical framework to analyze theme park visitor choice processes. Currently such a framework is not available. Therefore, this thesis proposes such a framework for theme park planning research.

The proposed framework of theme park choice behavior includes the three basic aspects of theme park choices and a time dimension. First, the participation choice reveals whether or not a tourist wants to visit a theme park at all. If a consumer decides to visit a theme park, the participation choice is followed by one or more destination choices. Then, when the consumer arrives at the selected theme park, several activities are chosen during the visit in the park.

Timing is also an important dimension in the framework and serves to capture the temporal aspects influencing theme park visitor choice behavior. Specifically, we argue that in destination choices over time seasonality and variety seeking have a significant influence. This means that visitors are inclined to seek some degree of variety when choosing between parks and that their preferences for different parks vary across seasons. Furthermore, we argue that visitors tend to seek diversification in their activity choices within theme parks, which means that they choose a number of different activities during a day visit to a park.

In general terms, tourist choice behavior over time can be described in terms of the distinction between repeat choice of the alternative previously chosen versus the choice of any other alternative not chosen on the previous choice occasion. To
explain variation in choice behavior we distinguish between derived varied behavior and intentional varied behavior (McAlister and Pessemier, 1982). In derived varied behavior switching between alternatives is not the goal in itself and not actively sought after by the visitor, whereas, in intentional varied behavior the process of switching between alternatives is a goal in itself. In this thesis, seasonality is addressed as a possible situational reason for derived varied behavior, whereas variety seeking and diversification are studied as intentional varied behavior. Consistent with the marketing literature, the difference between the latter two is that variety seeking is defined as temporal behavior implied by variety in the sequence of theme park destination choices over time, whereas diversification is defined as structural variation in behavior assuming that theme park visitors choose a bundle of different attractions, facilities, etcetera, at one specific theme park visit. Thus, diversification is the variety that takes place within a set of choice alternatives that is within a well-defined and specific time period (i.e. a day visit to a park), while variety seeking occurs over longer periods of time (i.e. between different visits to a park).

Most studies of variety seeking behavior emphasize the importance of the distinction between intentional and derived varied behavior. However, only few studies (e.g., Kahn and Raju, 1991) tried to make this distinction. Models based on time diary or real-world panel data do not allow for this distinction between intentional and derived varied behavior and threaten the validity of the obtained variety seeking parameters because the various reasons for variety seeking cannot be disentangled (Kahn, Kalwani and Morrison, 1986). An approach to deal with this measurement problem is to use experimental choice data rather than revealed choice data (e.g., McAlister, 1982; Givon, 1985). The use of experimental choice data maximizes identification possibilities for the utility function and the precision with which parameters can be estimated. Experimental settings are less affected by various motivational and situational effects than revealed choice data, which may result in a better measurement of variety seeking.

Therefore, in this thesis we use the so-called conjoint choice modeling approach to describe and predict tourist choice behavior. This approach has been applied successfully as a technique in a variety of other areas in tourism research (Louviere and Timmermans, 1990; Crouch and Louviere, 2000). The conjoint choice approach offers an alternative to choice models that are based on overt, real world behavior. In a conjoint choice experiment, respondents are presented with
hypothetical goods or services that are systematically constructed by the researcher on the basis of a statistical experimental design. The researcher has control over the attributes and their correlations. It is assumed that individuals' preference or utility functions can be derived from observations of their choices under hypothetical situations. The approach provides quantitative measures of the relative importance of attributes influencing people’s preferences and choices. The impact of different planning initiatives on consumer choices can be simulated. Also, it can forecast future demand for new products.

Although these models have been used successfully in many different contexts, they also have some drawbacks. Current conjoint choice approaches assume that individuals' utilities and preferences for choice alternatives remain invariant over time. In the context of theme park choice this means that the probability that a consumer visits a given theme park does not change over time. Another limitation of current conjoint choice approaches is the assumption that tourists’ choices among alternatives are separate and independent. Furthermore, traditional conjoint choice models do not allow for durations of activities. These assumptions may not be reasonable when visitor preferences for activities within a theme park vary over different moments of the day. For example, a top attraction in a theme park may be visited early on in visitors' activity patterns to allow for repeat visits, or visits to relatively less attractive attractions may be used to fill up time between more carefully planned visits to more attractive attractions.

In summary, the conjoint choice modeling approach offers a promising approach to measure and predict tourist choice behavior to support theme park planning decisions. However, current conjoint choice models are restricted because they do not allow one to adequately model three important aspects of theme park choice behavior: variety seeking, seasonality and diversification.

Therefore, the main objective of this thesis is to develop and test a choice modeling approach that includes the temporal aspects variety seeking, seasonality and diversification and that allows one to evaluate the impact of planning decisions before they are implemented. More specifically, choice models and conjoint experimental design techniques are proposed that reflect the possibilities that (i) theme park visitors seek variety in their destination choices over time; (ii) visitors differ in their preferences for theme parks per season; and (iii) visitors tend to seek diversification in their activity choices throughout a day visit in a park.

To achieve this goal, two studies are carried out. First, a conjoint choice
approach is developed and tested to model seasonality and variety seeking between various theme parks. Participation choice is also included in this study. Secondly, a conjoint choice modeling approach is introduced that allows one to test for diversification in visitors’ activity choices in a theme park.

The specific aim of the first study is to examine the existence and nature of seasonality and variety seeking behavior in consumer choice of theme parks. A conjoint choice model of seasonality and variety seeking is developed and tested that includes three basic components: (i) the utility derived from the attributes of an alternative, (ii) the utility derived from seasonality, and (iii) the utility derived from variety seeking behavior. The study involves two different choice experiments: experiment 1 describes generic theme park types and some of their attributes and tests for seasonality and variety seeking behavior within type of parks, and experiment 2 deals with specific, existing theme parks in the Netherlands and tests for effects between park types.

The proposed seasonality and variety seeking choice model differs from previous conjoint choice models in that it does not assume that individuals’ preferences for choice alternatives remain invariant over time. The model captures variety seeking behavior in terms of a pattern of variety seeking effects. This pattern represents the impact of the previous choice on the present choice of a theme park. The seasonality parameters give insight into the different preferences that consumers have for parks by season.

The model also differs from most variety seeking models in that it allows one to make a distinction between intentional and derived varied behavior. This distinction is emphasized in most definitions of variety seeking behavior, and is also important in our definitions of variety seeking and seasonality, but few other models explicitly make this distinction (Kahn, Kalwani and Morrison, 1986).

The specific aim of the second study is to model diversification in theme park activity choice behavior. Diversification in theme park activity choices can be defined by five aspects, the number of activities chosen by visitors during a day visit in a park, the time spent on each of the activities, the timing of the activity choices, the sequence of activities chosen, and the composition of the set of activity choices.

Duration and timing of visitors’ activity choices in a theme park are both modeled by using an ordered logit model that is based on duration data observed in a conjoint allocation task. The use of ordered logit to describe duration data was originally introduced by Han and Hausman (1990) and allows one to predict the
Introduction

probability that a certain event will occur (in the case of activity timing), or that a
certain event duration will end (in the case of activity duration) in a given period of
time, conditional on the fact that the event has not occurred, or did not end, before
that time period. We apply the model in the context of theme park activity choices
to predict the time tourists spend on each of the activities available in the park, and
to predict tourists’ choices for various activities in the theme park in defined time
periods throughout the day. The modeling approach for activity duration also
provides information on the composition of the set of activity choices. The
composition follows from availability effects estimated on the activity duration data.
Availability effects indicate the influence of the presence or absence of particular
alternatives in a choice set on the probability of choosing another alternative. These
effects contain information on the competition between the alternatives and show
which activities are complements and which activities are substitutes. Therefore,
they indicate how theme park visitors compose sets of activities that they are likely
to choose throughout a day visit in a park. The sequence in activities chosen by the
visitors in the park can be derived from the models estimated for activity timing. A
Poisson regression model for count data is estimated to predict the number of
activities a visitor is likely to choose during a day visit in the park.

All models are estimated using experimental design data based on visitors’
choices in hypothetical scenarios of activities available in a major existing theme
park in the Netherlands. This approach supports the estimation of the proposed
models in which each of the aspects defining diversification is described as a
function of characteristics of the activities, visitors and context. The findings show
the activity patterns of visitors in a theme park that are most likely to occur, and
indicate to what extent theme park visitors seek diversification in their activity
choice behavior.

This thesis is organized as follows. In chapter 2, the role and position of
theme parks as key elements in the tourism industry are outlined. Furthermore, the
basic components of a theme park development plan are discussed, together with
several trends in the theme park market. The consequences of these trends for the
planning of theme parks are discussed. It is concluded that the challenges that theme
park planners face ask for methods that support the planning process within and
across various levels of planning.

Therefore, in chapter 3, the potential support of planning processes is
outlined in more detail. It is shown that, especially at the site planning level, it is
crucial to understand and predict consumers' preferences and choice behavior.

Any successful development of methods and models requires a conceptual framework of the process under investigation. In chapter 4, we propose such a framework for the choice behavior of theme park visitors. The framework identifies three types of theme park choices: participation choice, destination choice, and activity choice. Timing is also an important aspect in the proposed framework. As already stated, we argue that visitors are inclined to seek some degree of variety when choosing between parks and that they tend to seek diversification in their activity choices within a theme park. Furthermore, we argue that the preferences of theme park visitors for different parks may also vary across seasons.

The three concepts of variety seeking behavior, diversification and season sensitive preferences are used to develop a modeling approach that allows one to measure efficiently the influence of theme park attributes on the various stages of the tourist decision making process.

The choice of approach is motivated in chapter 5, which discusses the strengths and weaknesses of different modeling approaches. Conjoint choice modeling is chosen as the most promising research approach. Current conjoint choice models however do not allow one to adequately model variety seeking, seasonality and diversification. The core of this thesis is thus concerned with a further elaboration of conjoint choice models. Results are presented in chapters 6 to 10.

Chapter 6 reviews existing models of variety seeking behavior, seasonality and diversification to identify useful concepts for the new model. The new conjoint choice analysis approach that supports the modeling of seasonality and variety seeking effects in theme park choices is developed in chapter 7.

In chapter 8, an empirical application of the proposed approach is described. More specifically, we test for the existence of both within and between park type variety seeking behavior in visitors’ choice of theme parks. Moreover, we investigate seasonal differences in consumer preferences for theme parks.

In chapter 9, a new conjoint choice modeling approach is introduced that allows one to test for diversification in activity choices of visitors of a theme park. An ordered logit model based on a conjoint choice experiment that supports the estimation of the duration and timing of visitor activity choices in a theme park is proposed. In addition, the sequence in activity choices and the composition of the choice set of activities are also included in this approach. Furthermore, a Poisson
regression model is tested to predict the number of activities theme park visitors are likely to choose during a day visit to a park.

In the chapter 10, the results of an empirical test of this approach are described.

Finally, chapter 11 summarizes the main findings of these studies and draws conclusions. The strengths and weaknesses of the proposed models are discussed. The chapter closes with some avenues for future research.
Temporal aspects of theme park choice behavior
2 THEME PARKS

2.1 INTRODUCTION

The aim of this thesis is to develop models and measurement methods that allow one to better understand and predict the choice behavior of theme park visitors to support the theme park planning process. However, first it is important to understand the concept of a theme park, because some characteristics of theme parks and trends in the tourism market may require a unique planning approach.

This chapter outlines the role and position of the theme park product as a key element in the tourism industry. A formal definition of the concept ‘theme park’ and a classification of parks are given. The history of theme park development is also reviewed. To understand the aims and goals of contemporary theme parks and their visitors with their motivations, it is helpful for theme park planners to know how these parks have developed over time and how this development influences their present role. In addition, the basic components of a theme park development plan are addressed. These components can be classified into three main areas, the theme park product, the theme park environment, and the total tourism environment, including the supply and demand sides of the theme park market.

Although theme parks are the main motivators for tourists to visit the destinations where they are located, tourists certainly need the support of other services to enable and optimize their theme park visit experience. The elements of the theme park environment that need to be coordinated when planning a theme park are the economic, socio-cultural and physical environment, transportation and infrastructure, accommodation, institutional elements and other tourists facilities
such as services. All these aspects and their consequences for theme park planning are briefly discussed.

Because the theme park market faces many dynamic developments, both on the supply and the demand side of the market, these trends are also outlined in this chapter. Especially, the consequences of these trends for the planning of theme parks are discussed. Specific attention is paid to the Dutch theme park market as we focus on this market in the empirical part of this thesis.

In section 2.8 we will summarize the main trends and impacts, and discuss the challenges they create for theme park planning. These conclusions highlight the implications of the unique characteristics of theme parks as a dedicated environment for planners that are faced with the task of optimizing this environment for tourists’ needs.

### 2.2 DEFINITIONS

The literature on theme parks is limited, and in fact, only few definitions of theme parks can be found. Generally, theme parks can be defined as a subset of visitor attractions. Therefore, we first lay out some definitions and characteristics for the more general term ‘visitor attractions’. Secondly, we review characteristics that have been used to describe theme parks and finally, give the definition of theme park that is used in this thesis.

Visitor attractions are described by Middleton (1988) as: ‘Designated permanent resources which are controlled and managed for the enjoyment, amusement, entertainment, and education of the visiting public’. In this context, the term ‘designated’ is used to indicate that the resource is committed to the types of uses and activities outlined in the definition. By using the word permanent Middleton excludes all temporary and other attractions not based on a fixed site or building. Still, within the remaining group of facilities there is a wide range of different types of attractions. He lists the ten main types of managed attractions for visitors. They are:

- ancient monuments;
- historic buildings;
- parks and gardens;
• theme parks;
• wildlife attractions;
• museums;
• art galleries;
• industrial archeology sites;
• themed retail sites;
• amusement and leisure parks.

An alternative definition of visitor attractions is provided by Swarbrooke (1995, p. 4): ‘Single units, individual sites or clearly defined small-scale geographical areas, that are accessible and motivate large numbers of people to travel some distance from their home, usually in their leisure time, to visit them for a short, limited period of time’. Although this definition clearly excludes uncontrollable and unmanageable phenomena it would include non-designated and temporary resources that Middleton excludes from his definition. However, the definition does imply that attractions are entities that are capable of being delimited and managed. Swarbrooke distinguishes four main types of attractions:

• features within the natural environment (beaches, caves, forests);
• man-made buildings, structures and sites that were designed for a purpose other than attracting visitors (churches, archeological sites);
• man-made buildings, structures and sites that were designed to attract visitors and were purposely built to accommodate their needs, such as theme parks (theme parks, museums, waterfront developments);
• special events (sporting events, markets).

Two important aspects distinguish these four types. Firstly, the first three types are generally permanent attractions, while the last category covers attractions that are temporary. Second, tourism is often seen as a threat to the first two types, and is generally perceived to be beneficial and an opportunity for the last two types. Managers of the first two types of attractions in general deal with problems caused by visitors, such as environmental damages and pollution, while managers of the other two types tend to aim to attract tourists, increase visitor numbers, and maximize economic input.

Arguably the most complete and at the same time concise description of a visitor attraction is given by Walsh-Heron and Stevens (1990). They include the above mentioned aspects, by using the following three characteristics:
Temporal aspects of theme park choice behavior

- an attraction sets out to attract visitors/day visitors from resident or tourist populations, and is managed accordingly;
- it provides a fun and pleasurable experience and an enjoyable way for customers to spend their leisure time;
- it provides an appropriate level of facilities and services to meet and cater to the demands, needs and interests of its visitors.

It can be concluded from the above three definitions that theme parks constitute a subset of all visitor attractions. Features that distinguish theme parks from other kinds of visitor attractions are: (i) a single pay-one-price admission charge; (ii) the fact that they are mostly artificially created; and (iii) the requirement of high capital investments.

In this thesis, we use Pearce’s (1988, p.60) definition: ‘Theme parks are extreme examples of capital intensive, highly developed, user-oriented, man-modified, recreational environments’. Theme parks attempt to create an atmosphere of another place and time, and usually emphasize one dominant theme around which architecture, landscape, rides, shows, food services, costumed personnel, retailing are orchestrated. In this definition, the concept of themes is crucial to the operation of the parks, with rides, entertainment, and food all used to create several different environments. Examples of types of themes used in contemporary theme parks include history-periods, fairy tails, animals, water, marine and futurism. These themes are used to create and sustain a feeling of life involvement in a setting completely removed from daily experience. Most theme parks are isolated, self-contained units. Furthermore, it needs to be noted that most theme parks are developed, targeted and managed as private sector companies, and are commercial enterprises. The world’s best known theme parks arguably are the Disney parks, such as Disneyland, Disneyworld and EuroDisney.

2.3 THE THEME PARK OVER THE YEARS

Forerunners of theme parks were the amusement parks, which were developed at the turn of this century and consisted of a mixture of entertainment, rides, games, and tests of skill provided at fairs, carnivals, circuses, and frequently they had an outdoor garden for drinking (Pearce, 1988). Coney Island, on the east coast in the
USA, was considered the most famous and largest amusement area during the first half of the 20th Century. It featured three amusement parks along with dozens of smaller attractions. Amusement parks were an important element of mass tourism in the pre-depression period. However, the decline of the traditional amusement park set in around the 1930’s because of the economic impact of the depression, the rise of movies, and the advent of WWII. Many parks were forced to close down permanently, while others survived, on a reduced scale, into the 1950s or even beyond.

Since the end of WWII the number and range of theme parks available to consumers has multiplied dramatically. The rise of car-ownership has increased mobility and allowed people to visit more isolated parks in their own countries, that were previously inaccessible. Rising affluence has increased the amount of free time. Also, longer weekends and increased paid holidays have helped to stimulate the expansion in theme park visits. Furthermore, the growth of tourism in the past fifty years and the recognition of the economic benefits of tourism have led to the growth of purpose-built attractions, such as theme parks, specifically designed to attract tourists, and to encourage them to spend their money.

Disney was the first to introduce a special and new style of parks around a number of themes or unifying ideas to sanitize the amusement park for the middle classes. An image was presented where attention was paid to cleanliness, visitor comfort and quality. This was all reinforced by the famous Disney television programs. Although many new theme parks were built in the late 1960’s, and early 1970’s, some old style amusement parks upgraded their image and came forth as successful modern theme parks, for example Hershey Park in Pennsylvania (Pearce, 1988). The modern day techniques for reproducing landscape, buildings, and artefacts can create a reality in theme parks that has been previously the preserve of film and theatre.

Recent decades saw a need for urban renewal (Wylson and Wylson, 1994). Through changes in transportation technology and social attitudes, downtown industrial and residential land has become redundant. For example, historic buildings are often inaccessible to the new scale of road, and historic buildings worthy of conservation are not always adaptable to new business practice. The current interest in urban space for leisure and the use of leisure as a generator for adaptation and renewal is significant. In marketing urban locations for new investment the quality of life is becoming identified with the quality of the leisure
environment. However, few cities have the close proximity of a theme park such as the zoo ‘Noorderdierenpark’ at Emmen in the Netherlands, or the Antwerp Zoo next to the railway station at Antwerp in Belgium.

During the 80’s and 90’s, theme parks began spreading around the world. While many developing nations are experiencing the entertainment of theme parks for the first time, the theme park growth slowed in the USA due to escalating costs and a lack of markets large enough to support a theme park. It is important to understand that the development of theme parks over time has been different in every country, reflecting differences in a number of factors including (Swarbrooke, 1995):

- the level of economic development and the distribution of wealth;
- the transport system;
- the natural environment and built heritage;
- the national culture;
- the degree to which tourism is a matter of incoming foreign visitors rather than domestic demand.

The historical overview demonstrates that there are in fact three different origins for the type of theme parks that are nowadays available to the public: (i) parks that are updated versions of the old amusement parks; (ii) commercial theme parks that are totally new leisure centers, specially designed by big businesses for the mass tourism market; and (iii) historic parks or outdoor museums that have origins in the interests of conservation, preservation and public education groups.

2.4 COMPONENTS OF THEME PARK PLANNING

Theme parks constitute a very powerful type of tourism destination, they have probably increased pleasure travel more than any other attraction. The scale of penetration of theme parks in the tourism sector is very impressive, and their revenue and multiplier effects are relatively high compared to other areas in the tourism sector such as accommodation and transportation. For example, an estimated 177 million theme park visits worldwide were reported in 1992, with revenues of nearly $3500 million world-wide (Tourism Research and Marketing, 1996). Furthermore, theme parks have a rather unusual role in context of out-of-
home recreation. Traditionally, recreational activities have been thought of as taking place in a natural environment. This is in sharp contrast with man-made theme park settings. Theme parks represent a highly specialized type of land use and tourism planning. The circulation, entertainment and feeding of great numbers of people demand highly skilled technicians and creative designers working together.

Figure 2.1  Theme park planning components
(based on Inskeep, 1988)

To optimize the benefits of theme parks for the community and prevent or at least minimize the problems that might be generated, theme parks must be planned in a
Temporal aspects of theme park choice behavior

controlled, integrated and sustainable manner, responsive to market demands. Typically, theme park planning is carried out at various levels, national, regional/urban and site planning. In chapter 3, the planning process at each of the levels is discussed in detail. In this chapter, the basic components of a theme park development plan that need to be considered in the planning processes are outlined. The better the various components of a theme park plan are understood, the better the park can be planned and the more successful theme park planning can be.

Figure 2.1 shows the components of a theme park plan (based on Inskeep, 1988). These elements are positioned in the framework of the total tourism environment and the tourist markets. To gain more insight into these elements, they are outlined in the following sections, as indicated in the figure. We start by addressing the theme park product, followed by a discussion of all elements that constitute the theme park environment. Finally, the total theme park environment, including the supply and demand sides of the theme park market are addressed.

2.5 THE THEME PARK PRODUCT

Theme park planners, when optimizing theme park product development, should realize how the park is viewed both from the point of view of the consumer and also from the viewpoint of the theme park managers. The design of the park needs to facilitate tourist consumption but also needs to support organizational objectives of the theme park manager (e.g., in areas such as logistics).

From the standpoint of a potential consumer, considering any form of tourist visit, the theme park product can be defined as a bundle or package of tangible and intangible components (Middleton, 1988). This package is perceived by the tourist as an experience available at a certain price. Specifically, the total product of a theme park consists of five main components:

- theme park rides, activities and exhibits;
- supporting facilities and services;
- accessibility of the theme park;
- image of the park;
- price to the consumer.

Of these components rides, activities and exhibits in the theme park
environment largely determine the tourist’s motivation and choice for a park (Moutinho, 1988). The supporting facilities and services allow visitors to enjoy and participate in the rides, activities and exhibits. Accessibility is determined by aspects like public transport, frequency and range of transport services, and roads. These all affect the costs, speed, and convenience with which a tourist may reach the park. The image of a theme park is not necessarily grounded in experience or facts, but may strongly influence the motivation to visit a particular park. Images and the expectations of trip experiences, are closely linked in prospective consumers’ minds. All theme parks have an image, often based on more historic rather than current events, and it is an essential objective of theme park marketing to influence future tourists’ images. In terms of pricing, most theme parks charge a pay-one-price admission, but consumers also face extra costs, for example to pay for their travel to the park. Therefore, some parks provide joint package fees for travel, entrance and accommodation to support accessibility of the park.

A theme park is a service product. A service is any act or performance that one party can offer to another party and is essentially intangible and does not result in ownership (Kotler, 1994). Service production may or may not be tied to a physical product. The service characteristics of theme parks greatly affect theme park planning (e.g. Kotler, 1994; Swarbrooke, 1995).

First, the theme park service is intangible, the visitor cannot see the result before it is purchased. A visitor does not know what the result of roller-coaster ride will be before he or she actually participates in the ride. Also, there is no tangible product to take home for the visitor. After the roller-coaster ride, there is only the experience and memories left in the visitor’s mind. Also, consumers cannot inspect the product before purchase. To reduce uncertainty, a consumer will look for signs or evidence of service quality. Sources of information on which consumers make a decision for purchase therefore assume a great importance for marketers. This explains the fact that good customer service, effective public relations, and quality literature are integral elements of theme park marketing.

Second, the theme park product is inseparable: service products are produced and consumed at the same time. Therefore, the service a visitor receives must be right the first time. Also, as a consequence of inseparability, tourism products offer only shared use rights. A visitor in a theme park has to share the whole park, attraction and facilities with the other visitors. If different users have conflicting expectations and attitudes, this can result in problems. For example, noisy teenagers
Temporal aspects of theme park choice behavior

and elderly people in a museum may not be compatible.

Third, theme parks offer only temporary use rights. Usually, visitors buy a ticket that allows them to spend one day in the park after which their use rights are over. Within the limited day visitors need to maximize the use of the rides, activities, exhibits and facilities available in the park.

Fourth, the theme park product is perishable and cannot be stored. This is not a problem when demand for the services is steady, because it is easy to staff the services in advance. However, when demand fluctuates, these fluctuations can cause problems for the park. For example, when most visitors arrive at the same time in the morning at the entrance of the park this may cause congestion, or when all visitors in a park follow the same routing there can be time specific peaks at the entrances of the rides, activities and exhibits. Capacity planning and routing, to deal with this fluctuating demand, is therefore a vital planning task. For example, differential pricing may shift some demand from peak hours to off-peak periods. Also, extra services can be offered during peak times, for example entertainment for visitors waiting in line for an attraction.

Finally, theme park services are highly variable. Theme park staff are involved in producing and delivering the service and are part of the product itself. Visitors are directly exposed to the strengths and weaknesses of the staff. Therefore, successful parks such as Disney World place a strong emphasis on staff recruitment, training, and performance. Also, theme park visitors themselves are directly involved in the production process. In the use of the product they will reflect their own attitudes, expectation and experiences, and by doing so, will customize the product to some degree. There are also external factors, like the weather, that may change the theme park product. For theme park planners this is essential to keep in mind.

In planning a theme park product, planners should realize also how theme park managers think about their product. The managers’ view can be described at three levels: the core product, the tangible product, and the augmented product (Kotler, 1994). In figure 2.2 the three levels of a theme park product are shown.

The core product is the most fundamental level and is what the consumer is really buying. It consists of the main benefits or benefits the consumer identifies as a personal need that will be met by the product. These are in general intangible and highly subjective attributes. For theme parks the main benefits sought by the visitor may be excitement, atmosphere, variety of on-site attraction, the company of others,
Theme parks

value for money and light-hearted fun.

Theme park managers need to turn the core product into a tangible product. This is the entity which the consumers can buy to satisfy their needs, and may include the attractions and rides, the safety and quality of the product, the brand name, etcetera.

The augmented product includes all the additional services and benefits the consumer receives, both tangible and intangible. For the theme park product these may be ancillary services such as catering and retailing, car parking facilities, services for visitors with special needs, and procedures for handling complaints.
2.6 AN ANALYSIS OF THE THEME PARK ENVIRONMENT

Although theme parks are main drivers of tourist visits, tourists certainly need support of other services to get to a destination. Theme park plans for example are incomplete if the non-attraction needs of visitors are ignored. In the following sub-sections the elements defining the theme park environment are discussed: the economic, socio-cultural and physical environments, transportation, other infrastructure, accommodation, institutional elements, and other tourists facilities and services. All these components of the theme park environment may be interrelated, and must be well understood in order to plan, develop and manage theme parks successfully.

2.6.1 ECONOMIC ENVIRONMENT

Theme park planning efforts are mostly directed towards improving the economy, because the economic impact of theme parks is generally positive including:

- increased direct and indirect employment, income and foreign exchange;
- improved transportation facilities and other infrastructure for tourism that residents also can utilize;
- generation of government revenues for improvement of community facilities and services;
- the multiplier effect within the local and regional economy.

Although improving the economy is an important goal, it will not be achieved unless planning for the economy is accompanied by three other goals, enhanced visitor satisfaction, protected resource assets, and integration with community social and economic life. For example, when theme parks use imported goods and services instead of taking advantage of locally available resources. Also, tourism can cause inflation of local prices of land, goods and services.

2.6.2 SOCIO-CULTURAL ENVIRONMENT

There could be a constructive interaction between theme park operations and their socio-cultural impact. They can bring both benefits and problems to the local society and its cultural patterns. A theme park in an area generates contact between residents and visitors. This can be problematic in areas where the traditional cultural
pattern of the residents differs extremely from that of the visitors of a park. Also, when there is a substantial socioeconomic difference between the visitors and the residents this may cause a problem. For example, problems may include overcrowding of facilities and transportation, overcommercialization, misunderstandings and conflicts between residents and visitors because of differences in languages, customs, and value systems, and violation of local dress and behavior codes. Theme parks especially have peak attendance figures, and therefore the concentration of visitors in space and time is a major problem. On the other hand, tourism in an area may improve the living standards of people and help pay for improvements to community facilities and services if the economic benefits of tourism are well distributed.

2.6.3 PHYSICAL ENVIRONMENT
Theme parks’ environmental impact is mostly negative and a cause for concern. As theme parks have been designed specifically to accommodate the modern visitor, the environmental impact of theme parks can include visual pollution like unattractive buildings and structures, and large unattractive car parks. The space occupation of parks is enormous and mostly involves destruction of parts of the natural environment. Other environmental problems are air and water pollution, noise, vehicular and pedestrian congestion, and land use incompatibility. Therefore, an essential element of theme park planning is determining the carrying capacities or use saturation levels of the area.

2.6.4 TRANSPORTATION
Passenger transportation is a vital component of the theme park system. Theme parks have a relationship with transport systems in a number of ways (Swarbrooke, 1995):

- transport networks make theme parks physically accessible to potential visitors and therefore are an important factor in determining the number of visitors a theme park is likely to attract;
- the existence of major theme parks and attractions leads to the development of new public transport services to meet the demand of visitors;
transport is also important within destinations to make travel between theme parks and attractions and between attractions and services as easy as possible;

• modes of transport can often be an attraction in themselves with passengers being encouraged to see using them as a type of special event. For example, the canal boats in the Netherlands;

• novel methods of on-site transport are used to move visitors around the theme park in ways that will add to the enjoyment of their visit.

Planners should consider that visitor demand is seldom directed toward a single transportation mode as created by business and government (Gunn, 1994). Access to specific theme parks, attractions and circulation within a destination frequently put several other modes into play. If any one travel link fails to provide the quality of service desired the entire trip may be spoiled. The planning of intermodal transportation centers is needed for domestic local, as well as outside, visitor markets.

2.6.5 INFRASTRUCTURE

In addition to transportation facilities, other infrastructure elements include water supply, electric power, waste disposal, and telecommunications. These components are usually planned by the public sector. Even though private and independent decision making are valued highly by most enterprises in all tourism sectors, each will gain by better understanding the trends and plans by others. The public sector can plan for better highways, water supply, waste disposal, etecetera, when private sector plans for attractions and services are known. Conversely, the private sector can plan and develop more effectively when public sector plans are known.

2.6.6 ACCOMMODATION AND OTHER TOURIST FACILITIES AND SERVICES

Accommodation, hotels and other tourist facilities, provide services so that tourists can stay overnight during their travels. Other facilities necessary for tourism development include tour and travel operations, restaurants, retail outlets, souvenir shops, financial facilities and services, tourist information offices, public safety facilities and services of police and fire protection. A theme park and its environment need to be planned in such a way that the entire array of physical
features and services are provided for an assumed capacity of visitors. It is important in planning the services businesses to realize that they gain from clustering (Gunn, 1994). Food services, lodging, and supplementary services must be grouped together and within reasonable time and distance reach for the visitor. For example, when the visitor begins to think of food service, it seems best to be located near other kinds of food services.

2.6.7 Institutional Elements

Finally, institutional elements need to be considered in planning the theme park environment. From national to local governing levels, statutory requirements may stimulate or hinder tourism development. For example, policies on infrastructure may favor one area over another. Also, the administrative laws and regulations can influence the amount and quality of tourism development in a particular area. Policies of the many departments and bureaus can greatly influence how human, physical and cultural resources are applied.

2.7 The Total Tourism Environment

A theme park and its total tourism environment need to be a place in which the entire array of physical features and services are provided for an assumed capacity of visitors. The tourism supply and demand market are the two sides that require close examination for theme park planning. Insight in market developments is necessary for taking a longer term perspective in theme park planning. Therefore, the latest trends on the supply and demand side of the theme park market are discussed. We will start with a short overview of the trends on the supply side of the theme park market worldwide, then continue with supply side trends in the Dutch theme park market, the main area of research in this thesis. Second, developments on the demand side of theme park markets worldwide are discussed, as well as developments and trends in demand in the Dutch market.
2.7.1 SUPPLY SIDE TRENDS WORLDWIDE

The theme park market worldwide has grown dramatically during the last decades. For example, in the USA (where most of the theme park trends originated), theme parks have more than 200 million paid attendees each year (Thach and Axinn, 1994). This strong consumer demand has resulted in the development of many parks. These parks are not only growing rapidly in size and importance, but also are investing substantial amounts in new entertainment and facilities, and extending their services into relatively unexplored areas such as catering and accommodation.

For example, four major theme parks opened in 1999. In the USA, Legoland California and Universal’s Islands of Adventure were opened. For Legoland California, more than 30 million Lego bricks were used in the construction of the 128-acre facility to create various displays and models throughout the park. In addition to those made with the actual blocks, other rides and attractions are constructed to look like they are built with Lego bricks. The target audience of the park is young families with children up to age 12, and nearly all of the 40 rides and attractions are somehow kidpowered. The park is expecting an attendance of 1.8 million visitors the first year.

The Universal’s Islands of Adventure, a 110-acre park, is located adjacent to Universal Studios Florida. The park has many unique rides and attractions as well as a large selection of themed traditional rides, such as roller coasters, children’s rides and a carousel.

The third park that was set for a late 1999 opening is the Great Adventure park in Brazil. Problems with environmental issues and zoning caused a seven month shutdown in construction. Finally, Terra Mitica, located in Benidorm, Spain is opened mid 1999. Its theme focuses on the Mediterranean civilizations through the years.

Asia is the theme park market for the new millenium (Zoltak, 1998b). For example in China, with a large resident population, improving demographics, with family size shrinking and income rising has brought a growth of the domestic tourism market. In the beginning, there was the shopping mall, because Asians love to eat and to shop. To entertain the children as well, some rides, activities and exhibits were added and this resulted in theme parks. Even more, several Asian cities, like Bangkok, Singapore and Kuala Lumpur, want to become ‘tourism hubs’, and theme parks are central to these plans. Recently, the Hong Kong government announced the development of a Disney theme park. Although the government has
actively publicized the benefits the project will bring to the Hong Kong economy, there is however still concern if a really huge American style park will work in Asia. But, if Japan is any guide, such a park seems to be highly attractive to consumers: Tokyo Disneyland, which opened in 1983, attracted 10 million visitors in its first year.

Although in the Asian countries a shift from shopping centers to theme parks can be seen, the opposite can be observed as well indicating a growing role of retailing in existing theme parks. The relationship between merchandising and theme park visits clearly has potential for further growth, and the advantages of stimulating this demand are becoming increasingly recognized by theme park operators. They are racing to squeeze more profits out of their rides, activities and exhibits by linking rides to merchandise and placing goods at spots where visitors are most likely to buy, and that is close to the key rides, activities and exhibits (Marketing News, 1997). The objective is to give people a part of the park to take home and share with others.

In Europe most theme parks were built in the last 25 years. First, theme parks were more a Northern Europe phenomenon, but recently, several regions and countries in Southern Europe have supported the growth of theme parks as an attractive option to increase economic input. For example, Port Aventura in Spain opened its gates for the public in 1994.

Due to all these new parks built, the theme park market is saturating (Rose, 1998). Consequently, the competition in the European theme park market is growing. Not only in terms of the growing number of new other parks, but also due to other uses of leisure time and discretionary expenditure such as home-based entertainment systems. Managers of large theme parks are concerned about the scale of the investments required to add new exciting rides, activities and exhibits to their product. Especially, because a golden rule is that a theme park every year has to expand their park with a new attraction, to attract the required level of visitors (Dietvorst, 1995). European theme parks invest in average twenty percent of their turnover on new or better rides, activities and exhibits. Sixty percent of these investments is generated from entrance fees and forty percent from catering and merchandising.
2.7.2 SUPPLY SIDE TRENDS IN THE NETHERLANDS

In the Netherlands, there are more theme parks per capita than in any other country in Western Europe. Table 2.1 shows that approximately 53 percent of the Dutch population (6 year and older) visited a theme park in 1995 (NBT, 1996).

Table 2.1 Percentage of population visiting a theme park by age and sex in The Netherlands in 1995

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-14 year</td>
<td>83%</td>
<td>61%</td>
<td>52%</td>
</tr>
<tr>
<td>15-24 year</td>
<td>65%</td>
<td>40%</td>
<td>54%</td>
</tr>
<tr>
<td>25-39 year</td>
<td>40%</td>
<td>21%</td>
<td>53%</td>
</tr>
<tr>
<td>40-64 year</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>65 year and over</td>
<td>52%</td>
<td>54%</td>
<td>53%</td>
</tr>
</tbody>
</table>

(Netherlands Board of Tourism, 1996)

Table 2.2 The top-twenty of most visited attractions in The Netherlands in 1995

<table>
<thead>
<tr>
<th>Attractions</th>
<th>Visitor numbers * 1000</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. De Efteling</td>
<td>2,650</td>
</tr>
<tr>
<td>2. Rondvaarten</td>
<td>2,100</td>
</tr>
<tr>
<td>3. Noorder Dierenpark (exl. Safaripark)</td>
<td>1,710</td>
</tr>
<tr>
<td>4. Burger’s Zoo</td>
<td>1,500</td>
</tr>
<tr>
<td>5. Dierenpark</td>
<td>1,210</td>
</tr>
<tr>
<td>6. Diergaarde Blijdorp</td>
<td>1,200</td>
</tr>
<tr>
<td>7. Artis, Aquarium, Planetarium</td>
<td>1,160</td>
</tr>
<tr>
<td>8. Rijksmuseum</td>
<td>1,050</td>
</tr>
<tr>
<td>9. Drielandenpunt</td>
<td>1,000</td>
</tr>
<tr>
<td>10. Ponypark Slagharen</td>
<td>1,000</td>
</tr>
<tr>
<td>11. Diamantslijperijen</td>
<td>1,000</td>
</tr>
<tr>
<td>12. Zeedierenpark Harderwijk</td>
<td>930</td>
</tr>
<tr>
<td>13. Openluchtmuseum de Zaanse Schans</td>
<td>900</td>
</tr>
<tr>
<td>14. Vincent van Gogh museum</td>
<td>840</td>
</tr>
<tr>
<td>15. Keukenhof</td>
<td>815</td>
</tr>
<tr>
<td>16. Madurodam</td>
<td>800</td>
</tr>
<tr>
<td>17. Recreatiecircuit de Tongelreep</td>
<td>750</td>
</tr>
<tr>
<td>18. Avonturenpark Hellendoorn</td>
<td>680</td>
</tr>
<tr>
<td>19. Ouwehands Dierenpark</td>
<td>640</td>
</tr>
<tr>
<td>20. Anne Frank huis</td>
<td>620</td>
</tr>
</tbody>
</table>

(Netherlands Board of Tourism, 1996)
Table 2.2 shows the top twenty of most visited attractions in the Netherlands in 1995. Together these parks attracted over 22 million visitors in 1995, of which the largest part comes from the Netherlands. This makes the Dutch the most enthusiastic theme park visitors in Europe, but very likely also the most discriminating ones. The Efteling, the largest and most famous theme park in the Netherlands, founded in 1951 in Kaatsheuvel, attracts yearly over 2.5 million visitors. The park specializes in bringing the world’s favorite fairy tales to 3-D life and won a prize as the best amusement park in the world in 1992. Teenagers will not be bored either, because the Efteling has several hair-rising rides. The Efteling is absolutely the market leader in the Netherlands and, for example, in their pricing strategy, all parks follow the Efteling.

In the Netherlands, with a sea climate, the attendance figures for the parks have a highly seasonal trend. Most of the parks operate on a limited nine month basis, from spring till autumn. Most visitors are attracted during the summer period and short holiday breaks, especially in the spring. Also, peaks in attendance can be seen for weekend days.

The representatives of the main parks in the Dutch theme park sector stated that the occupation of space that the parks require will increase enormously till 2015 (Ministerie van Economische Zaken, 1994). This is caused by:

- an increasing visitors’ desire for quality and space, partly caused by the changing visitor segments (e.g., more elderly people who need extra facilities);
- the need of parks for more and more space for sufficient exploitation;
- a changing theme park product, parks are investing substantially in new entertainment and facilities, and extending their services into relatively unexplored areas such as catering and accommodation, to lengthen visitors stay or to attract new segments.

For example the Efteling recently has included a golf course to its park. To extend tourists short day visits to an overnight or longer stay they invested in a hotel and bungalow park, and opened their park for the public during evening hours.

### 2.7.3 Demand Side Trends Worldwide

The nature of consumer tastes and preferences is changing. A number of trends have emerged that influence tourist lifestyles, and leisure and tourism choices (e.g.
Martin and Mason, 1993):

- focus on increasing personal needs;
- more active travel participation;
- more emphasis on educational experience of leisure;
- increasing displeasure at theme parks that show captive animals;
- general concern about the impact of modern industry, including tourism development, on the physical and social environment;
- greater awareness of risks to personal health and security and the contribution that individual diet and behavior patterns can make.

The concerns of the thoughtful consumer of the 1990’s ranges more widely than just considerations of health and the environment. Being thoughtful means using both money and time more carefully for activities that bring real and lasting benefits rather than superficial show. For theme parks, this implies that visitors are becoming more thoughtful and discriminating in their choice of parks in terms of both the destinations they choose to visit and the activities they want to undertake once they have arrived at the destination.

Because the travel markets for theme parks usually come from a radius of less than 300 miles, parks are dependent on repeat visits, and repeat visitors demand change. Some theme park managers believe they must add a new ride or attraction every year.

2.7.4 DEMAND SIDE TRENDS IN THE NETHERLANDS

In the Netherlands demographic developments are another key trend shaping consumer priorities and theme parks visits. Table 2.3 shows a comparison of the age distribution of the Dutch population in 1999 and the year 2005.

The figures show that in 2005, a higher proportion of the population will be in the older age group, especially in the group 50-64 year, and that the proportion of the age group 15-19 year is largely decreasing. For theme parks this is bad news, as most of them still rely on families and younger visitors. This tendency implies a need for the parks to develop rides, activities and exhibits that will encourage older visitors to visit theme parks.
To summarize, the potential visitor of the future will be (e.g., Martin and Mason, 1993; Swarbrooke, 1995):

- older than in the past, more likely to be in the middle age group with the distinctive priorities of that age group;
- more affluent than in the past, with considerable potential to spend on those types of leisure that fit his or her needs;
- more demanding in terms of quality, both of the natural and built environment at the places visited, and of the service and experience received;
- more thoughtful and discriminating about how the available resources of free time and disposable income are used;
- more active physically and mentally in free time, seeking destinations and pursuits that offer a change to participate and to learn, as well as to have fun and to be entertained.

In general, it can be concluded that tourists are demanding high quality and well planned destinations. Furthermore, it is important for theme park planners to bear in mind that the travel demand side of the market is very dynamic. Theme parks should be developed in such a way that they not only satisfy existing demand but also be sufficiently creative to stimulate new demand.


2.8 CHALLENGES FOR THE THEME PARK PLANNER

In the previous sections it was shown that theme parks operate in specific markets that face unique changes and trends in supply and demand. Also, the various components defining the theme park environment are quite unique. Together, these aspects determine to a high degree the way in which theme parks should be planned. Specifically, some characteristics of theme parks and their environment require a planning approach that is unlike some of the other approaches for planning public spaces. In this section we summarize the main characteristics and trends and discuss the ensuing challenges for theme park planning. Table 2.4 presents the main planning issues theme park planners face for each component of the theme park planning process.

The first challenge for theme parks managers is to integrate the elements in the park itself with all the elements defining the theme park environment in the theme park development plan. For example, theme parks cannot function without transportation possibilities to bring the visitor to the park, or food supply or accommodation to support the visitor’s stay.

This issue is related also to the second challenge mentioned in Table 2.4, public-private cooperation. Planning a theme park requires a significant public-private cooperation. More and more public governments turn to the private sector for the provision of services and the production of new products (Gunn, 1994). However, in order for such processes to run smoothly in theme parks, greater understanding of the roles of both sectors is needed. All private sector players on the supply side of the theme park environment such as, attractions, services, transportation, etcetera, depend greatly on investment, planning and management policies of government. Conversely, governments depend on the private sector for many tourism activities and responsibilities. Therefore, cooperation between the public and private sector is essential.

A third characteristic of theme parks is that their demand is highly seasonal (e.g., Middleton, 1988). For theme park planners seasonality effects mean that they need to plan the facilities in such a way that whatever season or number of visitors in the park, the visitor experiences in the park are optimal.
### Table 2.4 Challenges for the theme park planner

<table>
<thead>
<tr>
<th>Theme park plan components</th>
<th>Main planning issues</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Integration with other components</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>Theme park product</td>
<td>x</td>
</tr>
<tr>
<td>Economic environment</td>
<td>x</td>
</tr>
<tr>
<td>Physical environment</td>
<td>x</td>
</tr>
<tr>
<td>Socio-cultural environment</td>
<td>x</td>
</tr>
<tr>
<td>Transportation</td>
<td></td>
</tr>
<tr>
<td>Other infrastructure</td>
<td>x</td>
</tr>
<tr>
<td>Accommodation</td>
<td></td>
</tr>
<tr>
<td>Institutional elements</td>
<td>x</td>
</tr>
<tr>
<td>Other tourist facilities and services</td>
<td>x</td>
</tr>
<tr>
<td>Total tourism environment</td>
<td>x</td>
</tr>
<tr>
<td>Tourism market-supply side</td>
<td>x</td>
</tr>
<tr>
<td>Tourism market-demand side</td>
<td>x</td>
</tr>
</tbody>
</table>
Also, when demand for rides, activities and facilities fluctuates during the day this can cause problems for the park, such as congestion and time specific peaks at the rides, activities and facilities. For theme park managers, capacity planning and routing is therefore an important task to deal with these problems. For example, to optimize the visitor streams in the park and to minimize waiting times at the activities.

Another characteristic is the fact that theme parks face high fixed costs and low variable costs. This means that the costs per visitor in the low season, when there are only few visitors in the park, are much higher than in the high season, especially if the quality of the visitor experience has to be maintained. Furthermore, each year parks require high investments to add new exciting attractions to their product to attract the required level of visitors (Dietvort, 1995). Theme park planners may respond to these issues in several ways. From a supply point of view, they may try and offer a more complete set of services that opens up the theme parks for more extended seasons than was the case traditionally. This can be seen in parks like EuroDisney offering special holiday shows and themes in the winter period with special highlights around Christmas and New Year. At the demand side, theme park planners may rely on marketers to actively try and manipulate tourist demand, by price differentiation across seasons, special rates for early bookings and bundling of services and visits over time or with other tourist facilities in the region.

Similar to other tourist attractions, theme parks first and foremost provide enjoyment to their customers. This implies that theme park managers face especially strong demands from customers for new and exciting innovations in their services. It is not uncommon for tourists to expect one or more new rides in theme parks every year or otherwise to wait for several years before revisiting a theme park. Special strategies need to be devised to deal with tourist variety seeking.

Also typically a diverse number of services within a park is required to promote repeat visits and to cater for different members of visitors groups (e.g., seniors and children) and for different segments in the tourist population at large. This has important implications for theme park planning in terms of location and type of activities that should be introduced and supported. Detailed consumer information often is essential to meet these consumer expectations successfully.

Furthermore, theme parks are unique in that they require considerable space occupation, often in or near urban areas (Ministerie van Economische Zaken, 1994). In a time where most service providers and manufacturers are able to reduce their
demands for space through miniaturization and more information oriented production, theme parks require more space for a growing number of visitors, and increasing visitor expectations in terms of diversification, quality of supporting facilities and safety. These requirements place special demands on theme park planners in terms of: (i) meeting environmental standards imposed through (inter)national regulations and local communities, (ii) increasing demands in terms of landscaping and design, and (iii) financial responsibilities in terms of managing large areas of land which need to be bought, leased or rented depending on the organization’s financial management strategy.

Another challenge facing theme park planners is that planning a park requires special skills in terms of combining creative and commercial abilities. Theme park design is crucial in determining the success of a park. In terms of design, several different levels can be distinguished. First, rides, activities and exhibits have to be designed attractively and effectively both in terms of initial appeal and usage. Second, landscaping and urban design are required to integrate the different single facilities into a whole based on the selected theme for the park. Finally, activities and services need to be arranged that can support and increase consumer experiences of the physical elements in the park.

There also are some more general features of the theme park product that are shared with other services and that are a challenge to theme park planning. Specifically, theme parks as a service product are perishable, intangible, inseparable, variable and only offer temporary and shared use rights and special care must be taking in matching theme park demand and supply (e.g., Kotler, 1994; Swarbrooke, 1995). Meeting consumer demand must be done however without compromising environmental and socio-cultural objectives.

Because the theme product is consumed and produced at the same time, the service must be right the first time. Therefore, adequate theme park planning is highly critical for optimizing the delivery of the theme park product to the consumer. For example, optimizing visitor flows to and through the park is one of the most important areas in theme park planning.

Theme parks enable visitors to create their own experiences and memories. This experience starts with the planning of the visit and looking forward to the enjoyment that will result from the visit. Then traveling to the park occurs and the time actually spent in the park. This is followed by traveling back and the memories left from the visit, and maybe some souvenirs and photos. Theme park planners
should support the optimization of this whole process, although some elements involved are outside of the park.

The final challenges facing theme park planners are created by the theme park market. There is a growing competition in the theme park market, with an ever increasing number of parks and many parks expanding their activities. Even more so, the tourist demand market is facing demographic changes in the form of a greying population, economic changes that lead to tighter family time budgets because of an increasing number of double earner households, and the introduction of new technologies such as multimedia entertainment that compete directly with the traditional theme park market. Furthermore, parks have to cater for visitors who are getting more and more experienced and demanding. These visitors are becoming more thoughtful and discriminating in their choice of theme parks in terms of both the destinations they choose to visit and the activities they want to undertake once they have arrived at the destination.

The dynamic developments in the theme park market ask for facilities and services that are adjusted to the changing tastes and preferences of the tourism consumer, and are integrated into the total development plan of an area. This necessitates that theme park planning adopts marketing research approaches. Knowledge of potential market origins, and interests, habits, and other travel characteristics of the population is a necessary but not sufficient condition to plan the several components of the supply side. It is important for the parks to know how consumers think, and what makes them visit or not visit attractions, and when they want to visit a park. Also, for theme park planners, an estimate of peak visitor volume is essential to the planning of every feature of the theme park, parking, attractions, exhibits, toilet facilities, tour guidance, food services and souvenir sales.

2.9 CONCLUSION

In this chapter the basic components of a theme park development plan were addressed. The components can be classified in three main areas, the theme park product, the theme park environment and the theme park market.

It was discussed that the theme park market has grown dramatically during the last decades. However, the competition in the theme park market is growing
also, not only in terms of the growing number of parks, but also due to other uses of leisure time and discretionary expenditure. The occupation of space that the parks require increases due to the need for more spectacular attractions and the need for more space to exploit economic scale advantages, which leads to parks investing substantially in new entertainment and facilities, and extending their services into relatively unexplored areas such as catering and accommodation, to lengthen visitors stay or to attract new segments.

Simultaneously, the average visitor is older than in the past, more demanding in terms of quality, and more thoughtful and discriminating about how the available resources of free time and disposable income are used. This means that theme parks have to cater for visitors who are increasingly experienced and demanding in their choice of parks in terms of both the destinations they choose to visit and the activities they want to undertake once they have arrived at the destination. Given these trends of growing theme park supply, environmental constraints and increasingly discriminating consumer demand, it can be concluded that theme parks, to survive in this competitive market, must optimize their planning strategies.

In summary, theme park planners have to deal with the following main issues: integration of all theme park planning components, public-private partnerships, seasonality, fluctuations in demand during the day and over different days of the week, high fixed costs, consumers variety seeking behavior, large demands on space and effective theme park design and a growing competition in the market. It could be argued that there are three main dimensions underlying these issues. The first relates to the integration and cooperation of the planning components and sectors. The second one refers to theme park planners’ task to design and support shifts in consumer demand (such as seasonality, fluctuations in demand and consumer variety seeking behavior) and the third dimension relates to the fact that theme park planners face certain responsibilities in terms of dealing with the physical environment (such as large demands on space and effective theme park design).

It can be concluded that the challenges theme park planners face ask for planning methods that can integrate the different components in the planning processes within and across various levels of planning. Therefore, in the next chapter, planning processes and how they can be supported by methods and information are outlined in more detail.
Temporal aspects of theme park choice behavior
3  **THE CONTEXT: THEME PARK PLANNING APPROACHES**

3.1 **INTRODUCTION**

The previous chapter discussed the main components of the theme park development plan and the challenges facing theme park planners at the various planning levels. Components of theme park development plans can be classified into three main areas: the theme park product, the theme park environment and the theme park market. Furthermore, we showed that there are three main dimensions underlying key trends and issues facing theme park planners. The first relates to the integration and cooperation of the planning components and sectors, the second refers to theme park planner’s tasks to design and support shifts in consumer demand (such as seasonality, fluctuations in demand and consumer variety seeking behavior) and the third relates to the fact that theme park planners face certain responsibilities in terms of dealing with the physical environment (such as large demands on space and effective theme park design).

After gaining some understanding of theme parks, their components and some of the main planning issues, the question remains: How can theme park planning be optimally conducted and implemented? Are there processes and methods that nations, regions/cities and parks can use that will assist them in reaching their tourism and, more specifically, theme park development objectives? What information or research is needed to adequately support the various steps in the theme park planning processes and what decisions need to be made to optimize
This chapter addresses these questions. First, three levels of tourism planning are discussed: national, regional/urban and site planning. Secondly, a discussion of the steps that may be followed in the planning processes at each of the levels is provided. The theme park development components and main planning issues discussed in chapter 2 are integrated in these steps. The success of a theme park development plan depends on its integration in the three planning levels. It is concluded that specific planning methods and information are needed to deal with the complex components of the tourism supply side. Thirdly, in section 3.4 is discussed what methods and research can provide theme park planners with the information they need. Finally, this chapter is ended with a discussion.

3.2 TOURISM PLANNING LEVELS AND THE POSITION OF THEME PARK PLANNING

Tourism planning is typically carried out at three geographical levels, each level focusing on a different degree of specificity. These levels are the national level, the regional/urban level and site level. In this thesis, we focus on a specific area of research in tourism planning, the planning of theme parks, a highly specialized type of tourism facility. The success of a theme park development plan depends on its integration in the three theme park planning levels. These three levels and the relative position of the theme park development plan are outlined in the following sections.

3.2.1 NATIONAL PLANNING LEVEL

The main reason for planning at the national level is an optimal integration of tourism facilities across a nation. At this level, tourism policy is made. For most tourism projects, thus also for a theme park, tourism development starts by encouraging a region or an investor to make an economic feasibility study of one or more projects. To succeed, specifically for the larger theme parks, the national or regional tourism plan identifies from a government’s tourism policy point of view whether a theme park is appropriate for an area, and if so, what type and size is
suitable. For the theme park planner the outcome of planning at this national level can be regarded as a set of conditions within which the theme park planner must operate. Often they are visible in policy guidelines rather than in project construction.

Inskeep (1991) gives an overview of several aspects of planning at the national level:

• a physical structure plan including identification of major tourist attractions, designation of tourism development regions, international access points and the internal transportation network of facilities and services;
• other major infrastructure considerations;
• the general amount, types and quality level of accommodation and other tourist facilities and services required;
• the major tour routes in the country and their regional connections;
• tourism organizational structures, legislation and investment policies;
• overall tourism marketing and promotion programs;
• education and training programs;
• facility development and design standards;
• socio-cultural, environmental, and economic considerations and impact analysis;
• national level implementation techniques, including staging of development and short-term development strategy and project programming.

Planning at the national level is relevant for theme park planners as their planning operations are restricted conditional on the national policy framework. For example, the main road-infrastructure mostly is defined at the national level, which has important consequences for theme parks accessibility. Also, national public transport policy is very important as it can help relieve congestion problems around parks. Furthermore, legislation may restrict theme park planners, for example in terms of restrictions on the level of noise or on trading hours. Also, at the national level, changes can possibly be made in school and industrial legislation to allow greater diversity of vacation periods. This may reduce the effects of seasonality that continue to inhibit theme park development.
3.2.2 REGIONAL/URBAN PLANNING LEVEL

The creation of new theme parks (and convention centers, sport arenas, and festivals, etcetera) is primarily an urban function (Gunn, 1994). However, both cities and rural areas are essential to tourism. For example, new lodging, food services, transportation, information systems, and promotion depend on the decisions made in both urban and rural areas. In order to meet the desired tourism objectives, plans and decisions in the surrounding rural areas must be integrated with city tourism plans. Therefore, we refer to planning at this level as regional/urban planning.

The regional/urban planning level deals with one region within a nation, often a state or province. The outcome of the regional planning level may include identification of site project opportunities. Regional planning can provide policies, guide destination identification, foster integration of destinations, coordinate action and resolve issues for the region. Theme park planning must be integrated with the planning of the region in which the park is located so that land surrounding the park is developed and integrated with land use controls applied. Large theme parks can generate considerable development in their regions, which can result in land use and environmental problems if not regulated adequately. Regional/urban planning involves the following elements (Inskeep, 1991):

- regional and city tourism policy;
- regional access and the internal transportation network of facilities and services;
- location of tourism development areas including resort areas;
- type and location of tourist attractions;
- amount, type, and location of tourist accommodation and other tourist facilities and services;
- regional level environmental, socio-cultural, and economic considerations and impact analyses;
- regional level education and training programs;
- marketing strategies and promotion programs;
- organizational structures, legislation, regulations, and investment policies;
- implementation techniques including staging of development, project programming, and regional zoning regulations.

The regional/urban level of tourism planning is, of course, more specific than
the national level. Planning at the regional/urban level can be relevant for theme park planners in different ways. For example, at the regional level, a traveler information center can provide tourists with directions for finding and understanding the theme parks available in the region. Also, at the regional level, planning can be used to optimize the tourism product of a region, which can improve complementarity of facilities in the region and provide theme parks better conditions for operating their park.

3.2.3 SITE PLANNING LEVEL

The site planning level, also called design planning, provides very specific planning developments for individual tourism properties, usually controlled by a single individual, firm, or governmental agency. Site planning refers to the specific location of buildings and related development forms on the land and considers the functions of buildings, their physical interrelationship, and the characteristics of the natural environmental setting. Site planning also includes location of roads, parking areas, footpaths, and recreational facilities all of which are integrated with the building locations. This level of planning is the final implementation of physical development guided by national and regional/urban plans. It is at this stage that the ideas and recommendations result in an actual construction of supply side development.

Theme park site planning sets the components for the visitor experience. The way the tangible elements of the park are designed will shape the intangible visitor experience. Irrespective of how parks fulfill the major proportion of the travel experience, their plans are incomplete if the non-attraction needs of the visitors are ignored. Food service, accommodation and supplementary services must be within reasonable time and distance of visitors.

In addition to planning physical facilities, planning efficient visitor use of the park and avoiding serious environmental or social problems are also important. As discussed in chapter 2, the theme park product is perishable and cannot be stored, and this may be a problem when demand fluctuates. Congestion and over-usage of specific attractions are difficult to avoid and may cause severe problems for a theme park. Therefore, control of visitor use and flows is a basic consideration in much theme park planning. Establishing carrying capacities of attractions and applying techniques to organize visitor flows and to control over-usage is an important factor.
Inskeep (1991) proposes the following main objectives in visitor use planning:

- to allow visitors ample opportunity to enjoy, appreciate, and understand the attraction features;
- to make sure visitor use does not reach a level that results in excessive congestion, that depreciates visitor enjoyment of the park, and leads to irritation of the visitors;
- to restrict visitor use so that it does not result in environmental degradation of the feature, whether related to the natural or cultural environment;
- to allow residents from the area to visit and enjoy their own attractions.

In the theme park context, handling large number of visitors at major rides and exhibits often implies visitor queuing, visitors waiting in line to get entrance to the facilities. These queues of visitors waiting for rides, facilities and exhibits may engender a loss of personal control and overestimation of time spent in waiting along with boredom, irritation and discomfort for many visitors. There are techniques that can be applied to make queues more acceptable to tourists. Some suggestions include:

- provide live entertainment to amuse visitors waiting in a queue;
- using interesting and surprising queue shapes and forms;
- incorporating queues physically in the exhibit space;
- giving greater attention to physical comfort and service facilities for visitors waiting in queues.

Also, capacity planning and routing may be used to optimize visitor distribution over the park and therefore to reduce visitor queuing. Signs and information boards as well as leaflets may be used to guide visitors through the park and to provide them with information to help them decide how to best spend their time on site. Differential pricing for specific parts of the day is another technique that may shift some demand from peak hours to off-peak periods. Also, extra services can be offered during peak times to reduce overuse of other facilities.

It is common for theme parks to experience demand fluctuations caused by seasonality effects. This leads to underusage of the facilities in the park during certain periods of the year, and often to excessive demand at other times. Various techniques can be applied to reduce seasonality and more evenly distribute tourist use throughout the year. Specific low season activities can be developed to make it more attractive to visitors to travel to the park in the low season. The ability to
operate and attract visitors in bad weather is crucial if parks are to attract visitors in the low season when the weather tends to be at its worst. This means that a park needs to provide all-weather facilities to overcome the problems caused by bad weather.

3.3 THE BASIC PLANNING PROCESS

Assuming that national level approval for the development of a tourism project is received, the basic planning process consists of the seven steps presented in figure 3.1 (Inskeep, 1988):

![Site design planning steps diagram]

Inskeep (1988) proposed a framework of the process for preparing a tourism project.
development plan, in which he integrated the components of the tourism plan and the planning steps of figure 3.1. Using this framework of tourism planning process as a starting point, we adapted it specifically for the process of preparing a theme park development plan as presented in figure 3.2 (see also table 2.4 for the theme park planning components and main planning issues). Note that the three planning levels discussed are all involved in this process. However, national planning is of more influence in the left hand side of figure 3.2, while the steps on the right hand side specifically concern site planning. The theme park planning steps are addressed subsequently in the following sections.

3.3.1 STUDY PREPARATION
The first step in the theme park development planning process is that the government specifies its research agenda. Often, a tourism specialist is invited to advise and assess the specific types of planning needed and write the terms of reference for the study. To accomplish a theme park study, a multi-disciplinary team including, a land use planner, a theme park site planner, an architect, a marketing specialist, an infrastructure engineer, a tourism economist or financial feasibility analyst, are required. The key person of the team is the theme park development planner. Depending on the type of park other team members may be needed, such as specialists on museum design, on ecology, tourism facility standards, and zoologists. On international projects, local counterparts may usually work with the study team.

3.3.2 DETERMINATION OF OBJECTIVES
The study team determines the preliminary objectives for the theme park development plan. Although, one realizes that the objectives may need to be modified in a later stadium based on the results of the analysis and plan formulation. As tourism involves many different forms of development, establishing the objectives in consultation with the government is basic to the plan formulation. The tourism objectives should reflect the government’s general development policy and strategy.
Figure 3.2  Process for preparing a theme park development plan (adapted from Inskeep, 1988)
3.3.3 SURVEY
Figure 3.2 shows that there are several aspects in the preparation of the theme park development plan to be surveyed. Crucial in this stage are the inventory and subsequent evaluation of the various existing and potential tourist attractions. The attractions in an area should be listed by categories and systematically evaluated. The evaluation should identify the main attraction(s) for an area and the relationship between the attractions selected to the potential tourist markets. This information will also help the planners to determine logical tourism development regions.

Often, the suitability of three or four prospective sites for the project are compared. After narrowing down the choice to one site, cooperative discussions between planners, managers and owners may results in modifying the program.

3.3.4 ANALYSIS AND SYNTHESIS
Important in this stage of the development plan process is the analysis of tourist markets, the people who do and might travel. Because theme parks are driven by supply side development as well as market demand, both should be in balance. As plans are laid for theme park development, there should be clear understanding of travel market trends. For every tourism project understanding the potential traveler is essential. This understanding is required of planners, designers, owners, developers, and local citizen groups affected by tourism. Knowledge of potential market origins and the interests, habits and other travel characteristics of the visitors is needed in order to plan the several components of the supply side. The project developer together with the manager must provide the planner/designer with information of the results of market research. This analysis of the tourist markets is based on the survey of the characteristics of the present (if some tourism already exists) and potential tourists, the existing and potential major attractions of the area, distance and costs of travel from the market areas, the objectives of tourism development, and the relative attributes of competing destinations.

One needs to specify the number and types of tourists that an area can attract, if the recommended actions for development and promotion are taken. Based on the projection of tourists, the planner can project needs for accommodation, tourist facilities and services, transportation, manpower to work in park, probable economic impact, etcetera.
There must be a double-checking for the consideration of how well the proposed site and its development meet the needs of visitors. Throughout the study of market trends, designers, managers and owners should generate ideas for appropriate development. For example, the site analysis can reveal new opportunities to develop facilities for a segment of the market not considered possible in earlier stages. Another important part of synthesis is experimenting with functional relationships between the several elements of the project. Visualizing this can show how well different arrangements will suit visitor needs, fit the general site conditions, meet feasibility requirements, and provide for efficient management and maintenance.

3.3.5 POLICY AND PLAN FORMULATION
In this step of the process all the aspects studied need to be considered to formulate the theme park development policies and structure plan. Alternative policies need to be prepared and plans need to be outlined and evaluated in terms of fulfillment of the tourism objectives, optimization of economic benefits, minimization of environmental and socio-cultural impacts, and the integration into the overall development policy and plan.

3.3.6 RECOMMENDATIONS
After the most feasible plan has been selected, final plans for development can be prepared. To make the plan practical it should indicate many factors such as access, extent of land preparation, size, location, cost, availability of land, land use and other tourist facility regulations, and relationship to competition. With a clearer vision of what is to be developed and where, it is possible for the study team to come to conclusions on financial, physical, social and environmental feasibility.

3.3.7 IMPLEMENTATION AND MONITORING
If all the preceding steps have been taken and considered thoroughly by the government, planners, owners, designers, the study team can now engage in the creative thinking and conceptualizing to give form to the plan. In figure 3.2 the sequential steps necessary for implementation are presented.
No plan is infallible and continuous monitoring an assessment is needed by owners, planners and managers of how well the plan/design meets its objectives. The entire project was based on estimates of market interest and quality of management. Therefore, there may be a need for modified design after a couple of years of experience. The dynamic nature of the tourism market often requires constant adaptations of tourism development projects or improvements of earlier developed sites. Feedback from visitors and managers may provide useful information in this regard.

3.4 INFORMATION AND RESEARCH

There are three main dimensions underlying the most important trends and issues facing theme park planners:

- the integration and cooperation of the planning components and sectors,
- the task to design and support shifts in consumer demand,
- the responsibility in terms of dealing with the physical environment.

These elements are integrated in figure 3.2 which describes the theme park development process. Theme parks are places in which the entire array of physical features and services need to be provided for a maximum capacity of visitors. Therefore, demand and supply characteristics require close examination for theme park planning. Questions that should be addressed include the following. For whom are plans being made and what are their interests? What are the features most critical for the site and how can visitors gain an experience without undermining the resource? What information and design techniques are appropriate for solving these questions?

It can be concluded that theme park planning should be driven by both the supply side development as well as market demand. The two aspects should be in balance. However, balancing supply and demand is not an easy task as the theme park markets are dynamic and change over time. It requires that plans on the supply side be flexible enough to adapt to market changes. Therefore, understanding the potential visitor is essential for the tourism planning process. For example, an estimate of peak visitor volume is necessary to plan features of the attraction, parking, trails, exhibits, toilet facilities, tour guidance, food service and souvenir
stands. In other words, planning, selection and evaluation of theme parks should be made relative to the existing and potential tourist markets.

Therefore, as plans are laid for tourism development, research is a key issue in the process from defining and formulating the initial tourism policy objectives and investment goals to the final implementation and monitoring of the theme park. Specifically, market research provides the theme park planner with useful information on the theme park visitor. For example, market research may be used to forecast total theme park demand. Demand information is highly relevant for visitor use planning to optimize the theme park product in advance. For example, for planning the number of ticket booths open at the entrance of the park, or the transportation facilities in the park. Market research may also provide information on how to optimize visitor experiences in the park, which rides, facilities and exhibits they like to visit, at what time and for how long. This provides theme park planners with valuable insights, for example on how to balance visitor streams in a park and to combine attractions and supporting facilities such as food outlets.

3.5 Conclusion

This chapter has argued that an understanding of existing and potential visitors is essential in the theme park planning process, especially at the site planning level. It is important for parks to know consumers' preferences, what makes them visit or not visit particular parks, and when they want to visit a park. Also, for a theme park planner to be able to plan successfully, accurate forecasts of demand are required. Because the continuing differentiation in demand leads to more, and more varied target groups with different needs and wants, theme park planners wanting to increase demand and optimize visitor activity patterns need to put more emphasis on exploring and modeling demand for their parks.

Therefore the conclusion that we draw in this chapter is that there is a need for models and measurement methods that allow for a better understanding of theme park visitors’ choice behavior for the planning of theme parks. Marketing research techniques can effectively support evaluation of potential theme park rides, facilities and exhibits in terms of their expected impact on theme park demand and on visitor activity patterns in the parks. One of the essential parts of this research is
understanding the decisions that theme park visitors make. It is clear that better insight into visitor choice behavior can help design competitive planning strategies and explore new opportunities in the market. Therefore, there must be an increasing focus in theme park planning on marketing research and the decision process of consumers.

It goes without saying that a better understanding of consumer choice behavior and a related predictive model is at best a necessary, not a sufficient, condition for better informed planning decisions, as portrayed in the previous chapter. Such a tool can of course only support particular planning decisions and satisfy specific information needs. Other forms of information and knowledge should be generated to implement the planning process, described in the previous chapter.

Anyhow, if theme park planners wish to understand the decisions that theme park visitors make to increase the demand for facilities and optimize visitor behavior in the park, there first must be a clear framework to analyze theme park visitor choice processes. Currently, such a framework is not available. Therefore in the next chapter, we propose a framework for theme park planning research that will be illustrated and implemented in the later chapters.
4 THEME PARK CHOICE BEHAVIOR

4.1 INTRODUCTION

In chapter 3, we showed that insight into tourist theme park choice behavior is crucial to optimize theme park planning. Therefore, in this chapter, we examine the choice behavior of theme park visitors more closely. First, previous studies on theme park choice behavior are reviewed. However, previous research on theme park choice behavior is quite limited in scope and mostly descriptive in nature with an applied rather than theoretical focus. Therefore, we also review research on tourist choice processes in general, and relate this research to theme park visitor choice behavior.

Typically, the tourist decision process is conceptualized in previous research as a filtering process, in which tourists reduce a relatively large choice set of destination alternatives to the destination that is finally selected. Despite the fact that this approach provides an insightful framework to study tourist choice processes, it is also very complex and difficult to operationalize. Therefore, tools for measuring and predicting the consequences of theme park planning decisions on theme park visitor demand generally are most effective when only the last phases of the conceptual filtering process are modeled. This stage is often referred to as the choice process. This study builds on this tradition by proposing an extended conceptual model that addresses multiple facets of tourist preference and choice behavior.

We show that temporal aspects in tourists’ choices are relatively unexplored in previous studies. Most studies have focused on the tourist choice of a particular
destination or alternative at one specific point in time, and have not included aspects such as seasonality, or the fact that tourists’ preferences may vary on subsequent choice occasions. Furthermore, it is clear that theme park visitors not only choose one specific alternative to visit, but make a number of choices once they have arrived in the park, such as choices to participate in particular rides, routing choices and choices to buy or not buy certain souvenirs. As we have discussed in chapter 2, temporal aspects also play an important role in theme park choice behavior. Specifically, theme park visitors’ choices of when and how long to visit a particular theme park, and when to undertake particular activities within a day visit in a park are highly relevant if theme park planners wish to develop optimal planning strategies.

The dynamic nature of theme park visitor choice behavior over time can be classified in general terms as instances of variation in tourists’ choice behavior. We outline a general theoretical perspective for this type of tourist choice behavior.

Finally, we propose a modeling framework for theme park visitor choice behavior that extends traditional tourist choice models. Our framework includes three basic types of theme park choices: participation choice, destination choice, and activity choice. Timing is also an important aspect in the proposed framework. We argue, within the context of theme park choice behavior, that visitors are inclined to seek some degree of variation when choosing between parks and that they tend to seek diversification in their activity choices within a theme park, which implies that they choose a number of different activities during a day visit in a park. Furthermore, we argue that the preferences of theme park visitors for different parks may also vary across seasons. This chapter closes with a conclusion.

4.2 STUDIES OF THEME PARK CHOICE BEHAVIOR

In this section, we review previous studies related to theme park choice behavior. The number of studies that has been conducted in this field is rather limited, although in the recent years theme parks have become a more significant topic of analysis. Pearce and Rutledge (1994) divide the studies on theme parks in two main categories.

The first set of studies sets out criteria for the success for theme parks and is
largely based on the opinions of operators, consultants and marketers (e.g., Lavery and Stevens, 1990; Stevens, 1991; Gratton, 1992; Martin and Mason, 1993; Tourism Research and Marketing, 1996). Although this first set of studies does not specifically focus on theme park choice behavior, it does provide insight into more general issues in the area of theme park planning and management.

Lavery and Stevens (1990), for example, argue that future success of theme parks in Europe is determined by the success of more sophisticated methods of enlivening attractions, the rise of retail and leisure cooperative ventures, parks dedicated to particular topics of European origins, special events, big name artists and investment in people and service quality rather than capital. Furthermore, they state that for successful theme parks the analysis of changing demand patterns in the long run is of great value, because it can help to show distinct patterns in tourist demand, and helps theme park planners to anticipate to these changes.

Tourism Research and Marketing (1996) discusses international trends in the theme park sector. They show that theme parks are relatively new tourism inventions, and are not only growing in size and importance, but also investing substantially in new entertainment and facilities, and extending their services into catering and accommodation. There appears to be a new orientation towards the provision of what they call a leisure supermarket with an approach to a long if not year-round season, an appeal to the mass market and extension from the short day visit to an overnight or longer stay.

Martin and Mason (1993) consider the long term future for tourist attractions. They examine factors like renewed economic growth, new consumer lifestyles and priorities, demographic changes and new technologies. It is concluded that attractions have to cater for visitors who are more demanding and discriminating, as well as more active and more purposeful in their choice of destination. There will be a shift in emphasis from passive fun to active learning, and the quality and genuineness of visitor experience will be crucial to future success in the competitive market. They also direct attention to the necessity of meeting changing tourist demand in order to make theme parks successful in the next decade.

Finally, Stevens (1991) also expresses the call for more research and detailed analysis of tourist demand by stating that future research will be required to assist theme park planning, marketing segmentation and management efficiency including psychological analysis of such operational issues as queue management, managing the visitor experience together with motivation and participation surveys.
The second category of studies is in fact directed at these issues and often the studies in this category are more empirical and data-based than those in the first set (e.g., Wierenga and Bakker, 1981; Moutinho, 1988; McClung, 1991; Ah-Keng, 1994; Pearce and Rutledge, 1994; Thach and Axinn, 1994; Dietvorst, 1995). It is important to note that these studies have been conducted in different countries, including Scotland, the Netherlands, Australia and Singapore. Therefore, the findings of the studies need to be placed within the regional context of the research.

Moutinho (1988), for example, analyzes theme park visitors’ behavior in Scotland, in order to assist the development of strategic and tactical plans to provide a number of policy implications for suppliers of amusement parks. The study was designed to: (i) determine visitors’ choice criteria as related to an amusement park; (ii) the most important sources used by the tourist when choosing an amusement park; and (iii) the amusement park attributes that the visitor rates as most important. The results of this research show that a park that offers fun rides, little waiting in queues, a good climate or scenery, with easy access, and a clean family atmosphere, is more likely to be successful. Another major choice criterion was proximity.

McClung (1991) also studied which factors are influential in the selection of a theme park. He examined data from over 3,000 households in 10 eastern metropolitan areas in the USA. Respondents indicated four important influencing factors in their consideration of whether or not to attend a theme park: climate, preference for theme parks, children’s desire to attend and cost.

Another study on factors influencing tourists’ intention to visit a particular theme park was conducted by Ah-Keng (1994). This research aimed at predicting the success of a new theme park to be developed in Singapore which had not been seen or experienced by its potential visitors. The researcher presented both local residents and foreign visitors with a park under construction based on a Chinese historical theme for the purpose of assessing their receptivity. The results confirmed that the large majority of respondents demonstrated their intention to visit the new theme park. Of those who did not want to visit, the reasons put forward included lack of time, low level of interest in the theme park, and lack of interest in Chinese culture.

While the above three studies provide interesting results in determining the factors for successful theme park operations, it is difficult to see how their recommendations can be readily translated into planning actions. More specifically, these studies cannot be used to evaluate qualitatively potential theme park
Wierenga and Bakker (1981) used a more in-depth approach while analyzing theme park decision processes to support theme park marketing. First, they described a general visitor decision process with the following phases: (i) problem recognition, (ii) information search, (iii) evaluation of alternatives, (iv) choice, and (v) result. Then, they related these phases to theme park choice behavior. A survey was conducted in the Netherlands which included questions related to each phase of the decision process. The analysis of the data collected and results were given per phase of the decision process. Finally, an extensive discussion of managerial implications of the results of each phase was provided.

In addition to the more standard studies of how visitors rate attributes of amusement parks, Thach and Axinn (1994) addressed some new research questions. They sought to establish how the breadth (the number of parks visited in the past three years) and depth of experience (the total number of visits to amusement parks in the past three years) of tourists affect the rating and ranking of amusement park attributes. Additionally, Thach and Axinn attempted to define and distinguish between core theme park attributes and augmented theme park attributes. Respondents were asked to rate the importance of theme park attributes by using a five-point Likert scale. Subsequently, the attribute ratings were compared across the experience levels.

The results showed for example, that several core conditions must be met by a park. They include, cleanliness, variety of rides including roller coaster, agreeable scenery, and a not-too-crowed family atmosphere. ‘Hot button’ elements, being both highly important and highly discriminating, include various types of shows and activities with an educational orientation. Furthermore, their results showed that tourists who had visited more parks gave consistently higher ratings for comedy shows, music shows, animal shows, and general entertainment. Also it was shown that as depth of experiences increases, some of the service sectors (proximity, parking availability, and hours of operation) show decreasing importance. This analysis can provide theme park management with useful information. Tourists that make more visits to the same park or visit more different parks are assumed to have greater experience. Given the importance ascribed to both direct experience and word of mouth, potential visitors may be attracted less by knowledge of specific park features than by the satisfaction expressed by those having greater experience with amusement parks.
In another theme park study, Dietvorst (1995) examined the time-space behavior of theme park visitors. The study had a different perspective than the research discussed above, which analyzed static consumer data to test hypotheses about tourists’ preferences and motives. The time-space behavior of visitors is also important in determining the weaknesses and strengths of a theme park. It contributes to the understanding of mutual relationships between spatially dispersed attractions and movement patterns of visitors. Dietvorst analyzed time-space behavior in a specific theme park in the Netherlands. A sample of visitors in the park received a questionnaire including a so called time-budget that they had to fill out during the day. This included indicating which attractions and other merchandising points or restaurants were visited; in which sequence these activities were undertaken; how much time was spend on each attraction. The results showed visitor streams in the park for different time periods during the day.

Although the number of studies conducted on tourists’ theme park choice behavior is quite limited, the above research does provide insight into the aspects that are important for tourists when choosing a theme park. However, most of the studies are in general descriptive and have an applied rather than theoretical focus. The information obtained by this research does not effectively support evaluation of potential theme park rides, facilities and exhibits in terms of their expected impact on theme park demand, except in qualitative terms. It is not clear from the results of these studies how theme park choice behavior will change if new planning initiatives are taken. Therefore, to obtain more insight in tourist preference structures and choice processes, in the next section general work on tourist choice processes is reviewed as well.

4.3 TOURIST DECISION MAKING PROCESSES

Several models of tourist destination choice processes have been proposed. Some of the most recent models are those suggested by Woodside and Lysonski (1989), Um and Crompton (1990), Crompton (1992) and Mansfeld (1992). The central concept in their work are choice sets, and in most proposed models the decision process is conceptualized as a process of narrowing down from a relatively large choice set of destination alternatives to the destination that is finally selected. We will discuss
these models briefly.

Woodside and Lysonski (1989) presented a general model of tourist destination awareness and choice. Their model consists of four stages. The first stage is the destination awareness stage in which the destinations that a tourist considers are defined on the basis of whether he or she is in some way aware of them. Two exogenous groups of variables, tourist characteristics and marketing variables, influence tourist destination awareness. Tourist characteristics include: previous destination experience, lifecycle, income, age, lifestyles and value system. Marketing variables are product design, pricing, advertising and channel decisions. The second stage is the tourist destination preference stage. Tourists construct their preferences for alternatives from destination awareness and affective associations. Preferences are conceptualized as the rankings assigned to destinations by relative attitude strength. The third stage is the tourist’s intention to visit, that is, the tourist’s perceived likelihood of visiting a specific destination within a specific time period. This intention to visit is strongly associated with the tourist’s preferences. The fourth and final stage is the actual destination choice. This stage is affected by both intention to visit and situational variables.

Um and Crompton (1990) developed a two-stage approach to travel destination choice, in which they specifically focused on the role of attitudes and situational constraints in the pleasure travel destination choice process. The first stage in the process is evolution of an evoked set from the awareness set, and addresses the issue of whether or not to make a trip. In the second stage, a destination is selected from the evoked set. The results of their study suggested that attitude has a significant influence in determining whether or not a potential destination is selected as part of the evoked set and in selecting a final destination.

Crompton (1992) integrated the approaches by Woodside and Lysonski and Um and Crompton with a number of other choice set based descriptions of consumer choice processes that have been described in the consumer behavior decision process literature into a coherent conceptual structure and relates this structure to the context of tourism, and specifically to vacation destination choice. In his framework, three stages that constitute the core of the choice process used by potential tourists can be distinguished. In stage one, the initial (choice) set is developed. This set consists of all the locations that might be considered as potential vacation destinations before any decision process about a trip has been activated. The subjective beliefs about destination attributes that are responsible for locations
being included in this initial set are formulated from passive information catching or incidental learning. Once the decision has been made to go on a vacation, then the second stage begins. This stage involves undertaking an initial active search to acquire information that will enable the relative utility of destinations in the initial set to be evaluated and reduced to a small number of probable destinations. The third and final stage deals with a more thorough active search to determine which of those probable destinations will be selected as the final destination.

Mansfeld (1992) further extended this theoretical framework with a special focus on the beginning stage. The proposed process starts with a travel motivation stage. An analysis of the motivational stage can reveal the way in which tourists set goals for their destination choice and how these goals are then reflected in both their choice and travel behavior. Even more, travel motivation has been pointed out to be the stage that triggers the whole decision process and channels it accordingly. The second stage that is included is the information-gathering stage. Once motivated to make a trip, potential tourists need to gather sufficient information on the various aspects of their planned trip. The information gathering process proceeds in two phases. First, the individual collects enough information to ascertain that attractive destinations offered or chosen are within constraint limits, such as disposable time and money and family situation. Second, after alternative destinations have been mentally established, another type of information is gathered. This information is meant to enable the tourist to evaluate each alternative on a ‘place-utility’ rather than on a constraint basis.

Despite the fact that the above models of tourist destination choice provide insightful frameworks to study tourist choice processes, they are also very complex and difficult to operationalize. Therefore, they are not easily applied to measure and predict the consequences of theme park planning actions on theme park visitors demand. To arrive at demand forecasts the most useful results can be expected by specifically operationalizing those stages and elements of the decision process that can support evaluations of theme park planning actions. This stage is often referred to as the choice process.

Studies that focus on the early stages of the choice process, such as motivation, attitude and perception, provide relatively few tools to predict the consequences of changes in the theme park product and marketing on tourism demand, because the link between motivation, attitude and perception, with actual choice behavior is often weak.
Therefore, Witt and Witt (1992) asserted that only modeling studies that are focused on the last phases of the choice process, provide effective tools for predicting the outcome of tourist choice processes. Models that specifically focus on preference and choice behavior of tourists cannot only be used to describe and explain tourist choices, but also to predict the impact on demand of certain changes in aspects of the theme park product. For example, these models can be used to predict the effect of a lower entrance fee on tourist demand for a specific theme park, or a potential visitor’s preference for a new ride in a theme park. Therefore, we will now further focus on developing a conceptual model addressing tourists’ preference and choice behavior in relationship to theme parks. In the next chapter we will discuss the technical aspects involved in modeling this behavior.

4.4 PREFERENCE AND CHOICE

In this section we focus on reviewing a conceptual framework underlying theme park visitor preference and choice behavior. A sound conceptual framework to describe tourists’ choices is crucial in understanding and predicting the outcomes of theme park visitors’ choices and preferences. To support theme park planners in their decisions of planning strategies, information is needed on the impact of factors that influence theme park visitors’ preferences and choices for attractions in parks, and how visitors make choices among competing parks.

There is a growing number of studies in tourism and recreation that have focused on consumer preference and choice behavior (e.g., Louviere and Hensher, 1981; Lieber and Fesenmaier, 1984; Louviere and Timmermans, 1990; Dellaert, 1995; Stemerding, 1996). However, the applications of preference and choice modeling studies are still limited compared to other fields of research. For example, in transportation (Ben-Akiva and Lerman, 1985; Anderson, Borgers, Ettema and Timmermans, 1992) and retailing (Timmermans, 1982; Oppewal, 1995) choice modeling has been used extensively since the 1980s.

The conceptual model of individual choice behavior that underlies most of the currently used choice models is derived from various sources, such as Information Integration Theory (Anderson, 1970; 1974) and probabilistic choice theory (Luce, 1959). A conceptualization of this model for spatial choice behavior is
shown in figure 4.1 (cf. Timmermans, 1982; Louviere, 1988). We will discuss this model from the viewpoint of a theme park visitor facing the decision problem what park to select to visit.

The model illustrates that theme park choice behavior is the outcome of an individual decision making process. In this process a theme park visitor goes through various phases in selecting a park from a set of considered parks. Taking into account the park visitor’s constraints and preferences for different parks, there will be one park which optimizes the visitor’s experience.

The parks are perceived by the visitor as bundles of features, usually called attributes. The attributes can take on different values, for example, the entrance fee of a theme park, the availability of certain attractions, or the availability of bad weather facilities. Some of the attributes are of a quantitative nature, others are more qualitative. All the parks and their attributes define the physical environment.

It is assumed the decision problem, what park to choose, together with the visitor’s value system, motivation, information level, etcetera, defines a set of

---

**Figure 4.1 Conceptual model of theme park visitor choice behavior**

*(Timmermans, 1982)*
decision criteria, conditioning the visitor’s perception of the physical environment. This phase involves a subjective filtering based upon imperfect information and results in a cognitive environment. The visitor is usually only familiar with a subset of all theme parks and a small, not necessarily perfectly known, number of attributes defining the parks. The set of perceived parks defines an evoked set of destinations from which the visitor has to make a choice.

The visitors are assumed to discriminate between the limited number of parks available in their cognitive environment on the basis of a limited set of attributes. The perceived value of each attribute by a visitor is evaluated in terms of its attractiveness, and then combined by the visitor into an overall evaluation of the park alternatives. This integration process is subjective, and implies a weighted evaluation of the attributes. These weighted attribute evaluations are called part-worth utilities. The preference utility value of a park is a function of the part-worth utilities of its attributes. The preference structure consists of an ordering of the parks on the basis of their utility in satisfying the particular needs underlying the theme park visitor decision problem.

A decision rule is applied by the visitor to determine which park is chosen from the evoked set. The decision rule thus links the preferences for the parks to actual choice behavior. Usually, it is assumed that the park with the highest utility is selected.

This conceptual model of theme park visitor decision making is useful for linking park characteristics to the decisions that visitors make. By measuring the influence of the attributes on theme park visitors’ decisions, one is able to predict the effect of changing attributes on choice behavior. Moreover, this would allow one to predict choice behavior under new conditions (e.g., a new attraction available in the park) and for new theme parks. For theme park planners, this means that they can obtain information on the impact of planning actions on the choices visitors make in advance. The various ways to measure the influence of the attributes in the above decision making process will be discussed in the next chapter.

In this study, we specifically build on this conceptual model. However, we need to notice that in the choice modeling literature some temporal aspects relevant for theme park choice behavior are relatively unexplored. Most studies on tourist choice behavior have focused on individuals choosing a particular destination or alternative at a specific point in time (cf. Borgers, van der Heijden and Timmermans, 1989; Dietvorst, 1993; Crouch and Louviere, 2000). Such studies do
Temporal aspects of theme park choice behavior

not include aspects such as seasonality, or the fact that tourists may seek variety in their destination choices and may not choose the same destination on subsequent choice occasions. However, time is an important aspect in the choice behavior of theme park visitors. Specifically, visitors’ choice of when to visit a particular theme park, and when particular activities within a day visit in a park are undertaken, are relevant to theme park planners in developing optimal planning strategies.

Moreover, it can be concluded that most previous studies specifically focused on choices of single products or services. Examples are destination choice, vacation choice, and park choice. Only few authors investigated multiple decisions made by tourists or a more complex tourist decision making process (e.g., Woodside and MacDonald, 1994; Dellaert, 1995; Fesenmaier, 1995; Dellaert et al., 1998; Jeng and Fesenmaier, 1998; Tideswell and Faulkner, 1999; Taplin and McGinley, 2000). It can be argued that most tourist choices concerning activities and/or the purchase of services are strongly interrelated. For example, a top attraction in a theme park may be visited early on in visitors’ activity patterns to allow for repeat visits, or visits to certain less attractive attractions may be used to fill up time between more carefully planned visits to more attractive attractions (Dietvorst, 1995). This implies that tourists choose multiple activities over time and these choices may differ between occasions.

The dynamic nature of theme park visitor choice behavior over time, can be classified as instances of variation in choice behavior. Therefore, in the next section we explore the theory of variation in theme park visitor choice behavior in more detail.

4.5 THEORETICAL BACKGROUND ON VARIATION IN CHOICE BEHAVIOR

Despite the general recognition that variety in tourist choice behavior is a common phenomenon, both in the short (e.g., rides with exiting changes) to medium term (e.g., various rides in a day) (e.g., Fesenmaier, 1985; Borgers et al., 1989; Mommaas and van der Poel, 1989; Dietvorst, 1993; Stemerding, 1996; Oppermann, 1998; Urry, 1990), and in the long term (e.g., over the tourist life time) (e.g., Lawson, 1991; Opperman, 1995) the modeling of variation in choice behavior has
received little attention in the tourism literature (Crouch and Louviere, 2000). However, in the marketing literature and in psychology, variation in choice behavior has generated considerable more attention. Therefore, we draw on these literatures in discussing the theoretical and modeling background of variation in theme park visitor choice behavior. Our discussion will focus on variety in tourist choice behavior in the short to medium term, because this type of variety seeking affects theme park planning most directly.

First, we formalize our definition of various types of variation in behavior. Assume that on two successive choice occasions $t$ and $t+1$ we observe that a visitor chooses the same choice alternative. This is called repeat choice behavior (see also Pritchard and Howard, 1997; Oppermann, 1998). Alternatively, we may observe that an individual chooses two different choice alternatives at two successive choice occasions. This might be considered evidence of variation in choice behavior. Note that these successive choice occasions may occur within a day visit to a park, but also over a longer period of time, for example, over two seasons.

Although the operational definition of variation in choice behavior versus repeat choice behavior seems straightforward, it is actually a highly complex phenomenon. For example, the choice of different destinations might be the result of the fact that parents would like to give their children a well-balanced experience and thus take them to different destinations to expose them to different experiences. Similarly, in countries with cold winters, it will be difficult to find many people on the beach in the winter. Hence, the non-availability of a particular choice alternative, or perhaps in this example an experience, may induce theme park visitors to seek different choice alternatives on successive choice occasions. Also, the composition of the travel group might have an impact on the choice of activity and hence destination. One might even argue that going to the same destination at different times or during different hours of the day involves a different experience and hence could be viewed indicative of variation in choice behavior.

Figure 4.2 gives an overview of various types of variation in visitor choice behavior. Variation in behavior is contrasted with loyalty-seeking or repeat choice behavior. To explain variation in behavior, we differentiate between derived and intentional varied behavior. The distinction between intentional and derived varied behavior reflects the difference between intrinsically versus extrinsically motivations for variation in behavior (McAlister and Pesssemier, 1982; Kahn et al., 1986; Kahn and Raju, 1991). Derived varied behavior relates to extrinsically
motivated variation in behavior, whereas intentional varied behavior relates to intrinsically motivated variation in behavior. The difference between these two classes of motivation is whether the value derived from behavior is internal or external of the actual choice process. Variation in behavior is intrinsically motivated if the theme park visitor engages in this behavior for the value inherent in the process of switching between alternatives per se. The switching behavior is thus a goal in itself. Variation in behavior is extrinsically motivated when the goal of behavior is extrinsic to the choice process. In these cases, variation is not the goal in itself, but serves as a means in achieving some further goal.

Thus, a particular pattern of varied behavior is derived if there are reasons beyond the explicit desire to seek variety that explain the observed pattern. There might be a normative or situational reason such as a seasonality effect to explain that a visitor seeks different experiences in different seasons (see e.g., Calantone and Johar, 1984; Bonn et al., 1992; Uysal et al., 1994; Murphy and Pritchard, 1997; Siderlis and Moore, 1998). Another situational reason for derived varied behavior might be the non-availability of particular alternatives, due to for instance opening hours or opening seasons. A third factor for explaining derived variety seeking behavior is group affiliation, which is meant to indicate that the composition of the travel group might have an impact on the choice of leisure activity and hence destination. Also congestion may drive theme park visitors to seek variation in behavior.

Idiosyncratic reasons for derived varied behavior are caused by forces internal to the visitor, rather than imposed by factors and constraints beyond the visitors’ control. For example, dissatisfaction with the previous alternative may relate to switching behavior. Also, errors in a visitor’s perception of an alternative may cause derived variation in behavior. Habit plays an important role in visitors’ choice behavior with respect to low involvement decisions. This aspect may be less important in theme park variety seeking behavior because these decisions are in general not everyday, low involvement decisions.

Figure 4.2 illustrates that intentional varied behavior is conceptualized to reflect variation in behavior that is sought or avoided for its own sake. Intentional varied behavior is positively valued by visitors for its contribution to the underlying processes of relief of boredom with the choice task, relief of attribute satiation and satisfaction of curiosity (Lee and Crompton, 1992). Psychological theories of exploratory behavior are specifically concerned with a specific form of intrinsically
motivated variety seeking behavior, namely the response to novelty and change in the direct stimulus environment.

First, cognitive consistency theory provides a framework for understanding variety seeking behavior (cf. Timmermans, 1990). This theory assumes that theme park visitors hold beliefs about empirical objects and phenomena, which constitute the cognitive environment of the visitor. It is assumed that theme park visitors seek and maintain cognitive consistency. When inconsistency occurs, psychological tension is aroused, which puts the visitor in a motivational state to reduce such inconsistencies. In some situations these changes may relate to changes in attitudes or beliefs, which may lead to variety seeking. Thus, variety seeking behavior might be viewed in terms of theme park visitors actively searching for new information as a result of having experienced dissonance.

Second, complexity theories may be relevant to variety seeking behavior. Berlyne’s arousal theory (Berlyne, 1960) is perhaps the best known of these.
Berlyne’s theory of exploratory behavior focuses on the arousal potential of a stimulus, i.e., its ability to increase the visitor’s level of arousal. Every visitor has a unique, normal and adaptive optimal level of arousal he or she seeks to maintain, ranging from a high level that is characteristic of arousal seekers, to a low level that is characteristic of arousal avoiders. It is assumed that both novel stimuli and very familiar, monotonous stimuli are associated with a low degree of arousal, and therefore, arousal theory states that arousal is a U-shaped function of arousal potential.

Fiske and Maddi (1961) provided a more direct interpretation of variety seeking behavior. They assumed that variation is a basic desire of visitors. This variety seeking tendency differs per theme park visitor. Every visitor has an optimal stimulation level. When the arousal is below this optimum, a person gets bored. On the other hand, when the arousal is above this optimum, a visitor thinks the situation is too complex and is striving for simplification.

Consistent with the marketing literature, in figure 4.2, a distinction is made between structural and temporal variety seeking behavior. Structural variety is the variety that is present within a set of choice alternatives, whereas temporal variety is implied by the sequence of choices (Pessemier, 1985). Studies on temporal variety give a central role to time in their analysis of variety seeking behavior, and the implicit assumption is that theme park visitors achieve variety by making different choices at different occasions over time. At the moment of choice, certain alternatives become relatively more or less attractive than would be expected on basis of unconditional preferences for these alternatives. In contrast, studies on structural variety assume that tourists achieve variety by choosing a variety of items at any specific consumption occasion. Theme park visitors may be motivated to choose a bundle of different items at any particular moment in time, rather than a single item. Structural variety seeking represents a problem of portfolio choice. To some extent, this distinction between temporal and structural variety seeking behavior is subject to operational decisions. For example, if a leisure trip is taken as the relevant temporal unit of analysis, the various activity and destination choices during that trip can be viewed as manifestations of structural variety seeking behavior or diversification (e.g., Dellaert, 1995; Dellaert et. al., 1998; Fesenmaier, 1985; 1995). In principle, larger time windows can be conceptualized, which would equalize temporal and structural variety seeking behavior.

In the next section, we outline the main decisions relevant to theme park
visitor choice behavior and the types of variation in choice behavior that are most relevant in the context of theme park choices.

4.6 A MODELING FRAMEWORK OF THEME PARK VISITOR CHOICE BEHAVIOR

In this section, a model framework of theme park visitor choice behavior is presented (see figure 4.3). First, we discuss each of the aspects relevant to the framework in more detail and then present the model framework of theme park visitor choice behavior.

Three types of tourist choices are included in the theme park choice hierarchy, which are in analogue with existing marketing models that describe different types of consumer choices in other contexts (Gupta, 1988; Chiang, 1991; Chintagunta, 1993; Carson et al., 1994). However, theme park choices are somewhat different from consumers’ choices of more traditional products (e.g., cereals) (e.g., Crouch and Louviere, 2000). Therefore, we have adapted our framework accordingly. On the basis of our previous review of research on theme park visitor choice behavior (section 4.2) three type of choices are most relevant. They are: participation choice, destination choice and activity choices. Most studies to date have focused on destination choice only (e.g., Moutinho, 1988; Thach and Axinn, 1994), little work has been done to study theme park visit participation choice (McClung, 1991; Ah-Keng, 1994), and even fewer studies have researched visitors’ activity choices in parks (Dietvorst, 1995).

In our framework, the participation choice reveals whether or not a tourist wants to visit any theme park at all. If a consumer decides to visit a theme park the participation choice is followed by one or more destination choices. Then, when the consumer arrives at the selected theme park, several activities will be chosen during the visit in the park.

Timing is also an important dimension in the framework and serves to capture the temporal aspects influencing theme park visitor choice behavior. Specifically, we argue that in destination choices over time seasonality and variety seeking have significant influence. This means that visitors are especially inclined to seek some degree of variety when choosing between parks and that visitors’
preferences for different parks vary across seasons. Furthermore, we argue that visitors tend to seek diversification in their activity choices within theme parks, which means that they subsequently choose a number of different activities during a day visit to a park.

For theme park destination choice seasonality is an important issue. A key characteristic of most tourism markets is that demand fluctuates considerably between the seasons of the year (e.g., Middleton 1988; Bonn et al., 1992; Murphy and Pritchard, 1997; Kozak and Rimmington, 2000). In climates like Northern Europe and the Northern parts of the USA and Canada where weather differences between the seasons are large, seasonal shifts in preferences are a natural fact of life. Outdoor recreation is very unattractive in winter and strongly concentrated in the summer months. Thus, variations in seasonal contextual variables cause variation in behavior.

Insight in the seasonal differences in visitors’ preferences for theme parks is useful because it allows theme park planners and managers to anticipate over and under demand and to take precautionary measures. In particular, choice models that predict the demand across various seasons can provide useful information to theme park planners. Therefore, if it is assumed that preferences are stable throughout the year, the predictive ability and usefulness of the current choice models may be limited. Furthermore, preferences for different types of theme parks and competitive structures between theme parks may vary across seasons.

Variety seeking is another temporal aspect influencing theme park destination choices. Theme park variety seeking behavior implies that visitors do not have the same preferences for theme parks on subsequent choice occasions. The empirical evidence on variety seeking behavior in the context of theme park choice is particularly limited. Borgers, van der Heijden and Timmermans (1989) reported the results of empirical analyses which indicated that across five different choice occasions, almost 95 percent of the sample selected different parks.

The existence of variety seeking tourists implies that theme park planners and managers need to emphasize or add distinctiveness in the services and facilities they offer to visitors, to capture a greater proportion of the variety seeking segment. For example, planners could develop seasonal activities that take place in the park. Moreover, knowledge about specific types of variety seeking could help planners and managers identify competing parks that they have to focus on in their competitive promotion and advertising campaigns. Initiatives related to joint
strategies and alliances also can gain from the analysis of variety seeking behavior.

Furthermore, in activity choices within a theme park visitors tend to seek *diversification*, which means that they choose a number of different activities during a day visit in a park. Fesenmaier (1985) specifically addressed the issue of diversification in a study in which he investigated the extent to which households diversify their recreation patronage and the various aspects which may affect their decision of where to recreate. His objective was to evaluate the importance of the diversification assumption in conventional models of outdoor recreation. The most important conclusion of his study indicates that the structure of current models of

---

*Figure 4.3  A model framework of theme park choice behavior*
choice should be redesigned to reflect the possibility of households consciously choosing to diversify recreation activities.

On the basis of above discussed aspects we propose a model framework of theme park visitor choice behavior. The framework is presented in figure 4.3. To review, seasonality is addressed as a possible situational reason for derived varied behavior, whereas variety seeking and diversification are studied as intentional varied behavior. The difference between the latter two is that variety seeking is defined as temporal variety seeking behavior implied by the sequence of theme park destination choices over time, whereas diversification is defined as structural variation in behavior assuming that theme park visitors choose a bundle of different attractions, facilities, etcetera, at one specific theme park visit. Thus, diversification takes place within a well defined and specific time period (i.e. a day visit to a park), while variety seeking occurs over longer periods of time (i.e. between different visits to a park).

4.7 CONCLUSION

In this chapter, we have developed a conceptual framework for modeling the choice behavior of theme park visitors. This framework differentiates between participation choice, destination choice and activity choice. We have argued that several temporal aspects are critical to better understand and predict this type of choice behavior.

To conclude, we argue that (i) theme park visitors seek variety in their destination choices over time; (ii) visitors differ in their preferences for theme parks per season; and (iii) visitors tend to seek diversification in their activity choices throughout a day visit in a park. We address seasonality as a possible situational reason for derived varied behavior, whereas variety seeking and diversification are studied as intentional varied behavior. The difference between the latter two is that variety seeking is defined as temporal variety seeking behavior implied by the sequence of choices, whereas diversification is defined as structural variation in behavior assuming that consumers choose a bundle of different items at one specific consumption occasion.

In the next chapter, we discuss a research approach based on the proposed model framework that allows one to measure the various aspects of theme park
choice behavior effectively.
Temporal aspects of theme park choice behavior
5 MODELING AND MEASURING THEME PARK
CHOICE BEHAVIOR

5.1 INTRODUCTION

In chapter 4, we concluded that for evaluating the possible consequences of theme park planning decisions it is highly relevant to understand tourists’ choices of when to visit a particular theme park, and which activities to undertake at what moment in time when visiting a theme park. A modeling approach is needed that is based on the discussed conceptual model of theme park visitor choice behavior and the proposed model framework, and that allows one to measure effectively the influence of theme park attributes on the various stages of the theme park decision making process.

In the previous chapter, we observed that only few studies addressed visitors’ choice behavior in the context of theme parks. Moreover, it was concluded that most of these studies have been largely descriptive in nature, and therefore it is relatively difficult to use them to support theme park planning decision making. Little work has been done to develop models that systematically relate the characteristics of theme park products and services to the choices that tourists make.

Therefore, in this chapter we start by taking a more general perspective and review the theoretical foundations of modeling discrete choice behavior. Several models have been suggested in the past. Most of these are based on some economic or psychological theory about consumer choice. Various classes of discrete choice models, such as strict utility models and random utility models, are discussed.
Special attention in this respect is given to the multinomial logit model, the most widely applied discrete choice model. The universal logit model, an extension of the multinomial logit model, is discussed as well because it will be used as a stepping stone for the specific model to be developed.

To estimate the models various types of data and data collection methods can be used. Each of these data collection methods measures tourist preference and choice behavior in different ways. We review various methods used to measure tourist choice behavior. Generally speaking, there are two types of modeling approaches: (i) revealed choice/preference modeling and, (ii) stated or conjoint choice/preference modeling. Recently a combination of these two approaches has been advocated outside of tourism analysis. Revealed modeling is based on overt, real choice behavior, whereas the conjoint modeling approach requires respondents to choose between hypothetical products or services that are systematically constructed by the researcher on the basis of a statistical experimental design. Applications of both approaches in tourism research are given.

Strengths and weaknesses of the different approaches are discussed. The conclusion is that conjoint choice and preference modeling is the most promising research approach to model theme park visitor choice behavior to support theme park planning, and therefore we will further introduce the conjoint modeling approach. There are however some limitations to traditional conjoint approaches when modeling variety seeking, seasonality and diversification in theme park visitor choice behavior. These limitations are discussed in section 5.6. We conclude that an extended conjoint choice modeling approach is needed that allows one to study these temporal aspects in theme park visitor choice behavior.

5.2 THEORETICAL FOUNDATIONS OF CHOICE MODELING

In this section, the basic concepts of modeling discrete choice behavior are discussed (e.g. McFadden, 2000). Two types of theory can be used to incorporate the probabilistic nature of choice behavior into choice models: the strict utility theory and the random utility theory. The most widely applied choice model, the multinomial logit model is discussed, as well as the universal logit model, an extension of the multinomial logit model.
5.2.1 DISCRETE CHOICE THEORY

Current discrete choice modeling theory results from developments in micro-economy and psychology. Micro-economic consumer theory assumes that individuals derive a certain utility from consuming a bundle of products, depending on their preferences, the prices of the goods, and their available budget. It is assumed that individuals display rational behavior, and allocate their available budget to different products in such a way that their utility is maximized. Demand functions are derived which relate the amount of each product that is consumed with specific price and budget conditions. Individual choice behavior, however, typically involves discrete choices between mutually exclusive alternatives; hence classic micro-economic theory does not apply. Furthermore, demand functions can practically only be derived for product groups, or only for a most limited number of product types (e.g., Wierenga and Van Raaij, 1988).

An approach that can solve some of these problems within the utility theory framework was proposed by Lancaster (1966; 1971). The basis of Lancaster’s theory is that each product is described as a bundle of product characteristics or attributes. The various choice alternatives within a product group can be viewed as different combinations of attribute levels, and consumers are assumed to derive utility from these attributes. The advantage of Lancaster’s theory is that it allows one to describe individual choice among multiple products within the utility framework. However, Lancaster’s theory assumes that choice behavior is deterministic, and predicts choices rather than choice probabilities. This is often problematic as in applied contexts a number of unobserved factors may influence choice behavior, and it could be argued that individual choice behavior is probabilistic in nature. Strict utility theory and random utility theory can be used to incorporate the probabilistic character of choice behavior into choice models.

5.2.2 STRICT UTILITY MODELS

Strict utility theory, as proposed by Luce (1959), states that the probability of choosing a specific alternative is proportional to the utility of that alternative and inversely proportional to the total utility of all alternatives in the choice set:
\[
P(i|A) = \frac{U_i}{\sum_i U_{i'}} \quad \forall i, i' \in A
\]

where:
\(P(i|A)\) is the probability that alternative \(i\) is chosen from choice set \(A\);
\(U_i\) and \(U_{i'}\) are utilities associated with alternatives \(i\) and \(i'\).

The model assumes that consumers choose among alternatives using a relative comparison process that is independent of the composition of the choice set. This so called Independence from Irrelevant Alternatives (IIA) property implies that the utility of a particular choice alternative is independent of the existence and the attribute values of all other choice alternatives in the choice set. Under this assumption, it can be demonstrated that the odds of choosing a particular alternative over some other alternative are not affected by the composition of the choice set. Consider the odds of any two alternatives in the choice set, say \(P(i_1|A) / P(i_2|A)\). The denominators \(\sum U_i\) of both probabilities are equal, hence they cancel out.

\[
P(i_1|A) / P(i_2|A) = U_{i_1} / U_{i_2}
\]

which shows that the ratio of the odds of choosing 1 and 2 is independent of all other alternatives in the choice set. Furthermore, alternative utility functions can be specified, such as an exponential function of some underlying scale value, say \(U'\), \(U = exp(U')\). The log of this odds-ratio is then equal to a difference in scale values:

\[
\ln \left( \frac{U_{i_1}}{U_{i_2}} \right) = U'_{i_1} - U'_{i_2}
\]

Although strict utility is probabilistic and can handle and account for choice situations with multiple alternatives, it is still based on the assumption that utilities can be expressed and measured perfectly.

5.2.3 Random utility models

An alternative approach to account for the probabilistic nature of consumers’ choices is random utility theory (Thurstone, 1927). Random utility theory assumes that the utility \(U_i\) for an attribute profile or park \(i \in A\), (where \(A\) is the set of all parks
considered), consists of a systematic or deterministic component $V_i$ and a random error component $\varepsilon_i$. Thus, the utility for a certain alternative $i$ is expressed as follows:

$$U_i = V_i + \varepsilon_i \quad (5.4)$$

The systematic component in turn depends on the way in which subjects combine their part-worth utilities. Typically, a linear compensatory model is assumed, which means that low evaluations of a particular attribute may be compensated by high evaluations of one or more of the remaining attributes, as follows:

$$U_i = \sum_k \beta_k X_{ik} + \varepsilon_i \quad (5.5)$$

where the $X_{ik}$ are the (coded) attribute values (or levels) for all attributes $k$. The $\beta_k$ are the parameter values of the attributes, and indicate the relative influence of the various attributes on the utility of alternative $i$. The error component reflects inconsistencies exhibited by individuals and factors that cannot be measured by researchers. If one assumes that individuals demonstrate utility-maximizing behavior, within their budget constraints, then the probability that alternative $i$ is chosen over alternative $i'$ is expressed as:

$$P(i | A) = P(U_i > U_{i'}) \quad \forall \ i' \neq i$$

$$= P(V_i + \varepsilon_i > V_{i'} + \varepsilon_{i'}) \quad \forall \ i' \neq i$$

$$= P(V_i - V_{i'} > \varepsilon_i - \varepsilon_{i'}) \quad \forall \ i' \neq i \quad (5.6)$$

Equation 5.6 shows that the probability that a consumer chooses alternative $i$ from choice set $A$ is equal to the probability that the systematic component ($V_i$) and its associated error component for alternative $i$ ($\varepsilon_i$) is higher than the systematic component ($V_{i'}$) and error component ($\varepsilon_{i'}$) for all other alternatives in choice set $A$.

By making different assumptions about the distribution of the error component, a variety of probabilistic discrete choice models can be formulated. For example, Thurstone (1927) assumed a normal distribution for the random error component, which yields a probit model, while McFadden (1974) assumed a
Gumbel distribution (Gumbel, 1958), which results in the multinomial logit (MNL) model. The MNL-model is the most widely applied choice model to date, mainly due to the fact that the probability function that can be derived from the Gumbel distribution has a closed-form solution and can be estimated relatively easy.

5.2.4 THE MULTINOMIAL LOGIT MODEL

The multinomial logit model is the most widely applied model in discrete choice analysis to predict the probability that a choice alternative, such as a theme park, will be chosen. It is derived from the assumption that error distributions are independently and identically distributed (IID) according to a Gumbel distribution, which results in the multinomial logit model (MNL) of the following form:

$$P(i|A) = \frac{\exp(\mu V_i)}{\sum_{i'\in A} \exp(\mu V_{i'})}$$  \hspace{1cm} (5.7)

where,
- $P(i|A)$ is the probability that alternative $i$ is chosen from choice set $A$;
- $V_i$ is the structural utility of alternative $i$;
- $\mu$ is a scale parameter.

The $\mu$ is a scalar quantity known as the Gumbel scale factor (Gumbel, 1958). The Gumbel scale factor is inversely proportional to the variance in the error term of the MNL-model. When we deal with a single data set, this factor is arbitrarily set to one. The systematic component in the model can include both main and interaction effects, as follows:

$$V_i = \sum_k \beta_k X_{ik} + \sum_{k'} \gamma_{kk'} X_{ik} X_{ik'} \quad k = 1, \ldots, K - 1$$
$$k' = k + 1, \ldots, K$$  \hspace{1cm} (5.8)

where,
- $\beta_k$ is a parameter indicating the effect of the $k$th ($k=1,2,\ldots,K$) attribute of alternative $i$;
- $X_{ik}$ is the $k$th attribute of alternative $i$;
The most important limitation of the MNL-model is the Independence from Irrelevant Alternatives (IIA) property (see discussion Luce model, section 5.2.2). The IIA-property is implied by the assumption of independently and identically distributed error terms and independency of the choice probabilities from the characteristics of any other alternative in the choice set. This IIA property implies that the systematic component of the utility function \( V_i \) is a function of only the attributes of alternative \( i \), and is independent of the existence and the attributes of all other alternatives in the choice set. This assumption may not always be desirable, especially when it is expected that the choice probabilities of alternatives may be affected by the presence and or characteristics of other alternatives in the choice set. For example, a violation of IIA may be expected as a result of similarity between alternatives. In the context of the theme park market for example, the availability in the choice set of another zoo may influence a zoo-lovers decision for a specific zoo more than the availability of another amusement park in the choice set.

The universal logit model, or also called mother logit model, has been suggested to test for violations of the IIA property (McFadden, Tye and Train, 1977), but it can also be viewed as an extended choice model. It includes the attribute level of other choice alternatives in the specification of the utility function. If all of these effects are statistically non-significant, the IIA property holds. The effects of the attributes of other alternatives on the utility of alternative \( i \) are called attribute cross effects (Louviere, 1988). Dummy variables can be included to represent the presence or absence of competing alternatives. These effects are specified as availability effects (Anderson et al., 1992). The utility for a certain alternative \( i \) given a choice set \( A \) is then expressed as follows:

\[
U_i = \alpha_i D_i + \sum_k \beta_{ik} X_{ik} + \sum_{i' \in A, i' \neq i'} \delta_{i'k} D_{i'} + \sum_{i' \in A, i' \neq i'} \lambda_{i'k} X_{i'k} + \varepsilon_i \tag{5.9}
\]

where,
- \( D_i \) is a dummy indicating the presence of alternative \( i \);
- \( \alpha_i \) is a parameter denoting the effect of the presence of alternative \( i \);
- \( X_{ik} \) is the \( k \)th attribute of alternative \( i \);
- \( \beta_{ik} \) is a parameter indicating the effect of the \( k \)th \((k=1,2,\ldots,K)\) attribute of alternative \( i \);
\( \delta_{i} \) is a parameter denoting the effect of the presence or absence of alternative \( i' \) on alternative \( i \);

\( \lambda_{i}^{k} \) is a parameter indicating the effect of the \( k \)th attribute of alternative \( i' \) on alternative \( i \);

\( \epsilon_{i} \) is Gumbel distributed error term.

If the simple MNL-model and hence the IIA property holds, then the availability and attribute cross effects would not significantly differ from zero. Significant availability effects arise as a result of differences in the choice set composition. This means that the availability (presence or absence) of alternatives in a choice set influences the probability of choosing another alternative. The availability effects contain information on the competition between the alternatives. Negative availability effects will add to the utility of an alternative if the competitors are not available and will subtract if the competitors are available. Moreover they show to what extent alternatives are complements or substitutes to each other.

### 5.3 Measurement Approaches

To estimate the models discussed in previous section, various types of data and data collection methods can be used. Each of these data type collection methods measures tourist preference and choice behavior in a different way.

An overview of various methods used in the past to measure tourist choice behavior is provided in figure 5.1. The main difference between the stated and revealed modeling approaches is the type of data that is used, the specification of the choice models is identical. Revealed models are based on observations of tourist behavior in real market situations, whereas stated models are based on observations of responses made by tourists in controlled hypothetical situations. In this section, these two approaches are explained in more detail and examples of applications of each approach are given. This is followed, in the next section, by a comparison of the strengths and weaknesses of the approaches.
5.3.1 REVEALED CHOICE MODELING APPROACHES IN TOURISM

Revealed choice modeling approaches derive utility values and attribute weights from observed choices and the attribute values of the alternatives in a real market situation. Thus, revealed choices based on past behavior form the basis for modeling choice behavior. Data for revealed choice models are often derived from statistical sources, counts and participation figures, but also a posteriori responses and evaluations in questionnaires are used.

Crouch and Shaw (1993) conducted a meta-analysis of revealed choice models in tourism. The dependent variables used in the studies they reviewed were tourist expenditure, tourist receipts, tourist participation and length of stay. They concluded that the majority of studies used tourist participation as the measure of demand. A substantial proportion of studies also examined tourist receipts and/or expenditure. Only a small number of studies investigated length of stay as the dependent variable. Explanatory variables that were hypothesized to influence consumer choices in real tourism market included: income, price, exchange rate, transportation costs, socio-demographic trends, previous visits, tourist appeal, demographic factors and weather index.

Stynes and Peterson (1984) also reviewed studies on modeling recreation choices, but from a somewhat different perspective. They discussed studies that focused on tourist choices between different destinations, rather than on the choice whether or not to participate in specific tourist activities. Another example in this

---

**Figure 5.1 An overview of preference and choice measurement approaches**
area is Morey et al. (1991), who developed a choice model to describe recreation participation, site and activity choice in the context of marine recreational fishing.

Furthermore, Lim (1997) specifically reviewed 100 published studies of empirical international tourism demand models. She gave descriptive classifications according to the type of data, sample sizes, model specifications, the types of dependent and explanatory variables used, and the number of explanatory variables included. She concluded that most studies have used annual data. Tourist arrivals/departures and expenditures/receipts have been the most frequently used dependent variables. The most popular explanatory variables used have been income, relative tourism prices, and transportation costs.

5.3.2 Stated Preference and Choice Modeling Approaches in Tourism

The second main modeling approach is the stated preference and choice modeling approach. Among the stated preference approaches, the compositional approach or self-explicated approach can be distinguished from the decompositional approach.

In the compositional approach, respondents first evaluate the attractiveness of the levels of each attribute that makes up the travel alternative on some rating scale. Then, respondents are asked to indicate the relative importance of each attribute, for example by allocating 100 points across attributes (e.g., Green and Srinivasan, 1990). By multiplying the attractiveness and importance scores of each attribute, one can derive an alternative’s overall utility and predict choices, if one is willing to assume some choice rule that respondents use to select alternatives.

An example of the compositional approach in theme park research is McClung (1991) who identified factors that influence consumers’ selection of theme parks. The respondents were, among other things, asked to rate the importance of particular attractions in choosing a theme park, the importance of attributes such as distance, crowd, lodging, and to determine which general themes held the greatest appeal. The rating scale for importance was on a five-point scale ranging from ‘very important’ (5) to ‘very unimportant’ (1). The results indicated that the most important factors influencing park attendance are climate, preference for theme parks, children’s desire to attend and cost. Furthermore, it was found that learning was the highest rated attraction, followed by variety and quality of the restaurants. The highest ranking themes were educational exhibits, exotic animals, technology and botanical gardens.
Another study using the compositional approach is Ah-Keng (1994) who assessed the market receptivity of a new theme park in Singapore. A structured questionnaire was used in which respondents were asked to rate their interest in theme park activities on a five-point scale ranging from ‘not interested at all’ (1) to ‘most interested’ (5). The potential visitors appeared to favor Chinese cultural shows and Tang food.

Although the compositional approach has some practical advantages, Green and Srinivasan (1990) listed a number of possible problems: (i) respondents may not hold all else equal when they provide ratings for the levels of an attribute; (ii) social desirability effects may occur; (iii) respondents may answer on the basis of their own range of experience over existing products; (iv) the additive model is assumed as the literal truth; (v) any redundancy in attributes can lead to double counting; (vi) there is little chance to detect potential nonlinearity in the part-worth function; (vii) no respondent evaluation of choice or purchase likelihood can be obtained; and finally, (viii) respondents cannot express certain trade-offs among attributes.

In contrast, decompositional, or conjoint modeling approaches derive importance weights of attributes from responses to specified total choice alternatives. The approach requires respondents to make trade-offs among attributes, in a way very similar to the trade-offs that consumers face in real market situations.

The aim of the decompositional approaches is to understand and predict individuals’ preferences and choices based on their responses expressed under controlled experimental conditions. It is assumed that choice alternatives can be represented by a series of attributes which describe the choice alternative on different levels. These attribute levels are combined by the researcher on the basis of experimental designs to generate conjoint profiles. In these approaches the researcher has control over the attributes and their correlations. An example of a conjoint profile of a trip to a theme park is shown in figure 5.2. This profile shows a theme park trip to a zoo with an entrance fee of NLG 20,- and the travel time to this zoo is 60 minutes.

In conjoint preference modeling, respondents rate the profiles on a pre-defined scale or rank the set of profiles in order of preference. Choice tasks require respondents to choose between two or more profiles. It is assumed that consumers trade off the attribute levels to arrive at a choice according to some utility function. To estimate the shape of this utility function, each subject is presented with a series of choice sets containing different choice alternatives.
Like revealed choice modeling approaches, conjoint modeling provides quantitative measures of the relative importance of attributes influencing tourists’ preferences and choices. But in addition it provides the benefits that the researcher can include those attributes in the experimental design that are of interest for example to the theme park planner, and control these attributes and their correlations. Thus, the expected impact of new attributes on tourist choice behavior and the demand for products and services can be simulated.

Louviere and Timmermans (1990) provide a review of conjoint modeling approaches in the area of tourism research. They make a distinction between stated/conjoint preference and stated/conjoint choice modeling. An example of the conjoint preference technique is Bojanec and Calentone (1990) who applied conjoint preference to evaluate tourists’ preferences for a state parks’ services. They used a framework consisting of three models. A conjoint model was used to predict respondents’ preferences for service bundles based on their derived utilities for the bundle components. The overall bundle utilities are used as input for a logit choice model that estimates the probability that respondents would purchase a given service alternative. By manipulating one service component at a time, the model can be used to estimate the changes in the purchase probabilities associated with different combinations of service components. This would allow management to forecast the change in sales volume from a particular bundling strategy. Finally, the sales forecasts can be combined with the estimated costs of providing the various bundles and the prices at which the bundle may be offered to determine the profitability of the alternative bundling strategies.

Carmichael (1993) also used the conjoint preference technique to study tourists preferences for ski-destinations. Six attributes, described in terms of four levels, were chosen for inclusion in the study. Skiers were selected for personal interviews and asked to evaluate cards which showed full concept profiles for hypothetical ski resorts. The analysis provided information on the relative importance of attributes that skiers sought in ski destinations. The results could be
used to understand skiers needs and to market and position the ski product.

More recently, Dellaert et al. (1998) used a two-stage conjoint approach to study family members’ projection of each other’s preference and influence in holiday preferences. Two sources of error that may limit the accuracy of individual family members’ projections of joint family preferences are: (i) misperceptions of other members’ preferences; and (ii) misperceptions of other members’ influence in joint family evaluations. A two-stage conjoint approach was proposed to study these potential errors. Stage one compared family members’ projections of each other’s holiday preferences to members’ self-reported preferences. Stage two compared family members’ projections of each other’s influence to observed influence in joint family preferences. Results showed that family members’ projections of each other’s preferences in joint family preferences for holiday destinations can be inaccurate, but that their projections of influence measures may be relatively more accurate.

Examples of the conjoint choice technique are Louviere and Hensher (1983) who predicted the demand for a unique cultural event in Australia. Experimental observations of choice were derived for conjoint measurement type multi-attribute alternatives that described possible event configurations. The choice data were analyzed by means of discrete choice econometric models. A multinomial logit choice model was applied to forecast the choice of attendance at various types of international expositions. The results demonstrated that an optimum expo configuration can be determined, pricing policies can be examined, and so on.

Haider and Ewing (1990) used a conjoint choice experiment in a study of tourists’ choices of hypothetical Caribbean destinations. Choice alternatives were created in a design consisting of ten variables, each of which was defined in terms of three levels. The variables described characteristics such as accommodation, the distance of relevant tourist facilities from the accommodation and price. A second design was used to combine five alternatives at a time into choice sets and label each alternative as being situated on one of five islands. The results indicated that of all attributes considered, price and distance to the beach constituted the most important variables. In addition, the results from the experiments were used to estimate the demand for destination scenarios within the domain of attributes.

More recently, Stemerding (1996) tested the influence of circumstantial constraints on the choice of musea of urban tourists. The choice alternatives in this study were described as single day leisure trips. To represent potentially constraint-
inducing elements, conditions under which the consumer could participate in the trip were varied. Responses to these variables determined their constraining nature. The results indicated that museum visitors are not often directly constrained to participate in a day trip by the conditions that were specified in the study. However, the conditions did indeed influence the consumers’ evaluations of attributes in the further stages of the decision process.

Finally, Dellaert (1997) used choice experiments to model urban tourists’ choices of activity packages. Dutch urban tourists’ choices of activity patterns for a weekend in Paris were discussed. Alternatives were presented to the respondents in an experimental choice task, which described a weekend in Paris in four time periods: Saturday morning, Saturday afternoon, Saturday evening, and Sunday morning. A three level attribute described the possible activities for each time period. Results indicated that interactions between particular activities in different periods of the weekend were important. However, evening activities did not interact with daytime activities.

5.4 STRENGTHS AND WEAKNESSES OF MODELING APPROACHES

In this section, we compare the conjoint and revealed choice modeling approaches. Revealed choice modeling approaches are linked relatively closely with actual tourist choice behavior, because they are based on consumers’ choices in real markets. Therefore, a high external validity may be expected to revealed choice models, which would indicate a high predictive power. However, there are also a number of disadvantages to revealed choice models (cf. Oppewal, 1995). First, in real markets, the attributes of alternatives are often correlated. For example, price and quality, and facility size and variety in services are often correlated in tourism services. These correlations may lead to biased parameter estimates. Second, in collecting revealed preference or choice data, only one observation per respondent can be made. This implies that large samples are required and the cost of data collection is often high. Third, the exact specification of the choice set may be unknown to the researcher. For example, the researcher may not be able to observe all destinations that are considered by a respondent. Unknown alternatives may have been considered for choice, and this may cause biases in parameter estimates.
Fourth, estimates can only be obtained for existing alternatives and attributes levels. Information on people’s behavior is not available for completely new products or services. Therefore, revealed models cannot always predict potential impacts of new planning actions.

Conjoint modeling approaches, to a large extent, can potentially deal with these disadvantages. In this approach experimental designs are used to construct hypothetical products or services, and individuals’ preferences and choices are observed. The researcher has control over the hypothetical alternatives and attribute levels represented to respondents. This implies that the attributes that describe the alternatives can be varied independently of each other. The researcher can also construct and control the choice sets, and randomly assign these to the respondents. Therefore, the internal validity is often high. The conjoint preference and choice modeling approaches provide quantitative measures of the relative importance of attributes influencing people’s preferences and choices. Also, more than one observation per respondent can be made, as respondents can complete more than one preference or choice task. Furthermore, new elements may be included in the alternatives, which allows the estimation of parameter values for planning and marketing variables that are presently not yet available in the market. Consequently, the models provide assessments of the impact of planning or policy decisions on tourist behavior and market shares. This will provide tourism planners with forecasts of future demand for new products or services.

A potential problem of the conjoint choice and preference approaches is that the external validity may be lower as compared to the revealed choice approaches. The choices tourists make in hypothetical choice situations may differ from their actual choices. However, the internal validity of conjoint models is generally higher than that of revealed models because the choices are made under experimentally controlled conditions (Louviere and Timmermans, 1990).

Of course, conjoint preference/choice and revealed choice data have complementary strengths and weaknesses. Therefore, interest in combining both data sources have been growing (e.g. Swait and Louviere, 1993; Adamowics et al., 1994; Morikawa, 1994; Hensher et al., 1999; Louviere et al., 1999). The basis of choice data combination is that the scale of the estimated parameters and the random component in all choice models based on random utility theory are linked (see sections 5.2.3 and 5.2.4) (e.g. Ben-Akiva and Lerman, 1985). When we deal with a single data set the scale factor is arbitrarily set to one. Consequently, when
comparing parameters across two data sets, first the ratio of the scale factors need to be isolated before comparing the parameters. Swait and Louviere (1993) proposed an approach to compare the choice models estimated for two different data sources separately. Their procedure involves a test of the equality of both parameters and scale between the models estimated for two data sets. First, the hypothesis is tested of parameter equality given the optimal scale condition between two data sets, and next, conditional on not rejecting this hypothesis, the equality of scale is tested. If this latter hypothesis is not rejected, it is allowed to pool the data sets and estimate parameter vectors for the combined sets. Otherwise, the scale factors need to be rescaled before combining the data sources.

However, when to decide on the use of revealed choice or conjoint preference/choice data we conclude that conjoint preference and choice models are most useful in cases where choice alternatives are not currently available and when choice alternatives of interest are substantially different from those currently observed. Thus, conjoint preference and choice models can be applied especially when there is no data regarding the effects of new explanatory variables on existing markets, and/or when explanatory variables have limited variance in real world data. Also, when observational data are very expensive to collect conjoint models can be useful.

For theme parks, these advantages are especially relevant. For example, conjoint modeling may provide theme park planners in advance with information about the effect of adding new attractions to the park on theme park visitors. Adding new attractions to a park requires high investments and therefore, it is extremely relevant for theme park planners to know what the expected shift in theme park visitors demand will be.

In sum, the conjoint modeling approach offers potentially the most adequate approach to predict the impact of the possible consequences of theme park planning decisions on the demand of tourists choices between theme parks and their activity choices in a park. Therefore, in the next section conjoint modeling approaches are discussed in more detail.
5.5 **CONJOINT MODELING APPROACHES**

In this section, we further introduce conjoint choice and preference modeling for readers less familiar with the approach. Conjoint models are based on the premise that individuals' utility functions can be derived from observations of their preference ratings or choices in hypothetical situations. The central question addressed in conjoint modeling is how product and service characteristics can be related to the utility that consumers attach to these products or services. The construction of a conjoint preference or choice model involves the following steps:

- elicitation of influential attributes;
- specification of relevant attribute levels;
- choice of measurement task;
- selection of experimental design;
- constructing the questionnaire;
- analyzing the results.

Each of these steps is discussed in turn. We end this section with a comparison of the external validity of conjoint preference to conjoint choice models.

5.5.1 **ELICITATION OF INFLUENTIAL ATTRIBUTES**

First, the influential attributes relevant in the choice process need to be identified. A literature review is usually conducted to identify the relevant factors in the choice process. Previous studies may provide information about the important factors. Alternatively, several qualitative methods can be used to elicit relevant choice dimensions (for a review see Timmermans and Van der Heijden, 1987, and Stemerding, 1996). We only characterize these methods briefly.

The *repertory grid method* (cf. Kelly, 1955; Halsworth, 1988) explores individuals’ perceptions of choice alternatives by identifying the characteristics by which individuals distinguish between objects. Therefore, individuals are presented with triads of choices, and asked to indicate in which way two alternatives are similar, and thereby different from the third. This process is repeated until no new contrasting features are mentioned. Individuals are then asked to express the importance of the elicited features.
Alternatively, *importance scales* can be used to identify the influential attributes in the choice process. Individuals are asked to indicate on a rating, category, or constant sum scale how important specific attributes are.

A third option is the *factor listing* approach, which asks respondents questions such as: why do you choose or buy a particular product and not another product; which products do you buy; what is it about these products that make them attractive to you. Then, the number of times each attribute is mentioned is counted, and these frequencies are assumed to represent the importance of the attributes.

A more sophisticated but also more demanding approach is the *decision nets* method. It involves subjects to mention the most important attribute for their choice for a certain alternative, and to identify the critical levels at which they would no longer select this specific attribute. Then, the respondents are asked what they would do if an alternative would not possess this specific attribute: reject the alternative, or accept if what changes.

Once the important attributes influencing the choice process have been elicited, the number of attributes that will be included in the experiment needs to be defined. There are some aspects that need to be considered with regard to the number of attributes included in the experiment.

Including many attributes may make the task more complex for the respondents, and complicate the experimental design. On the other hand, including too few attributes may produce unreliable results because the task for the respondents may become unrealistic. It may become more difficult for the respondent to imagine what the alternatives represent, and different respondents may make different assumptions about the alternatives that cannot be observed by the researcher. This may increase response bias. Furthermore, one needs to consider whether the included attributes are of planning or managerial interest.

### 5.5.2 Specification of Relevant Attribute Levels

In addition to the number of attributes, one also needs to decide on the appropriate levels of each attribute. Generally, it is easier to construct experimental designs using two or four level attributes. Also, it is more difficult to construct a design for combinations of different number of levels, for example three and four levels. If one wants to estimate quadratic effects at least three levels are required. Furthermore, the range of the levels should be within the range of current experience and
believability. Finally, the attribute levels should cover the range of trade-off held by each individual and competitive trade-offs should be ensured.

5.5.3 **CHOICE OF MEASUREMENT TASK**

Conjoint preference and choice approaches differ in the way the responses are requested from the respondents. Characteristic of the conjoint *preference* approach is that respondents are asked to rate or rank hypothetical alternatives, while in the conjoint choice approach respondents are asked to make a choice between two or more profiles.

*Ranking* tasks require the respondents to order the profiles from most to least preferred. However, one needs to keep in mind that respondents can only handle a limited number of profiles. An alternative way is to ask the respondents first to place the profiles in groups and then to order them within each group.

There are some advantages to the ranking task. First, respondents may be more capable of ordering the profiles than reporting their degree of preference for each profile. Secondly, the respondents have to consider all alternatives carefully and have to make trade-offs between the profiles and their attributes continuously. However, there are also disadvantages to ranking attribute profiles. First, no information is collected with respect to the degree of preference respondents have for the profiles. Furthermore, the response data from different ranking depths are unequally reliable (Ben-Akiva, *et al.*, 1997).

Evaluating the alternatives on a category *rating* scale has become a more dominant response format (Cattin and Wittink, 1982). Rating tasks require respondents to indicate their strength of preference for each profile on some category rating scale, for example a 0 (extremely unattractive), to 10 (extremely attractive) numerical scale. The ratings provide information on both order and degree of preference. An advantage of using rating tasks is that an error theory is available which allows one to test for various model specifications, while ranking tasks lack such a theory.

The conjoint *choice* approach asks respondents to make actual choices between two or more hypothetical alternatives. The task for the respondent is to select a profile from a choice set that best reflects his or her preferences, or to allocate a fixed budget among the alternatives in each choice set. Usually, a base alternative is included in the choice sets, that respondents can choose when none of
the represented alternatives is attractive enough to be selected. An example of a
choice set is shown in figure 5.3. The task for the respondents with this choice set
could be ‘Please select the alternative you like best for your next trip to a theme
park’.

<table>
<thead>
<tr>
<th>Park type:</th>
<th>Alternative A</th>
<th>Alternative B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entrance fee:</td>
<td>Zoo NLG 20,- 60 minutes</td>
<td>Amusement park NLG 30,- 180 minutes</td>
</tr>
<tr>
<td>Travel time:</td>
<td>Would not go</td>
<td></td>
</tr>
<tr>
<td>Your choice</td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>

Figure 5.3 Example of a conjoint choice set

When comparing conjoint preference to conjoint choice models it can be argued that
conjoint choice tasks offer several potential advantages over preference tasks (e.g.,
Louviere and Woodworth, 1983; Carroll and Green 1995; Haaijer, 1999). First,
choice tasks are closer to real world behavior than rating or ranking tasks. In real
world behavior, tourists do not rate or rank alternatives but make choices among
different options. Secondly, choice tasks support direct predictions of demand and
market share, whereas preference tasks require one to formulate ad hoc assumptions
concerning tourists’ decision rules, if one wants to predict choices from preference
ratings or rankings. Thirdly, choice data allow one to accommodate current existing
alternatives and non-choice options as well as profiles.

A disadvantage of conjoint choice models is that choice data provide minimal
information since nothing is known about the non-chosen alternatives. When
differences in response scales are of interest, rating data give more information. As
a result of this limited information in choice data, it may be more difficult to
estimate models at an individual level. Choice models require a larger number of
observations to construct individual models than ratings data. However, often
adequate segmentation of the tourists can largely circumvent this disadvantage.

5.5.4 SELECTION OF EXPERIMENTAL DESIGN

Once a set of attributes and their associated levels is determined and the choice is
made about the measurement task, one needs to develop a design to generate
profiles that describe the alternatives. In case of a choice task it is also preferable to
select an experimental design to construct the choice sets. Crucial in experimental design is that all attributes must vary independently and thus a research design is required in which there are no correlations between all attributes. This enables the independent estimation of the attributes and ensures that any effect can be assigned to one attribute alone, without confounding with the effects of any other attribute. The aim of experimental design in the context of conjoint studies is to structure the data collection process in such a way that: (i) the identification possibilities for the utility function are maximized, (ii) the precision with which we estimate the parameters is maximized, and (iii) the realism of the task is maximized and the demands of the task are minimized.

To accomplish a design in which the correlations between all attribute levels are equal to zero, *full factorial designs* can be used. A full factorial design contains descriptions of all possible combinations of attribute levels. Therefore, it enables one to estimate all main effects and all interaction effects of each attribute. Interaction effects occur when the combined occurrence of attributes gives an extra positive or negative effect to an alternative’s utility. The size of a full factorial design, the total number of attribute profiles, is equal to the multiplication of all attribute levels. For example, seven attributes with three levels each produce $3^7$, or 2187 different alternatives. Obviously, the number of hypothetical alternatives becomes immensely high with an increasing number of attributes and levels. Hence, task size increases and an increasing response error may be expected. The respondents may ignore attributes or adopt response patterns.

Fortunately, only a small subset of all possible combinations is required which still enables the estimation of all attribute effects independently. This is accomplished by using *fractional factorial designs* (Montgomery, 1984). In a fractional factorial design, a subset of a full factorial design is used. In the example with seven attributes with three levels each, the smallest subset consists of 18 profiles, where all main effects can be estimated independently. The reduction of the number of profiles is obtained by assuming an additive utility function with main effects only. Interaction effects are assumed non-significant and hence are ignored. This assumption is often reasonable because main effects account for the largest amount of variance in the response data. However, the general strategy in choosing a fractional design is to protect against sources of variation that: (i) are not estimated; (ii) are confounded with what is estimated; and (iii) are likely to produce the most bias in parameters that are estimated (Louviere, 1988, p 40). It normally
Temporal aspects of theme park choice behavior

suffices to use a fractional design that permits independent estimation of all main effects and first order interactions.

In a choice experiment, in addition to designing choice alternatives, one also needs to design choice sets. Double design techniques have been developed in which first a design is applied to create the hypothetical alternatives, and then a second design is used to create the choice sets (Louviere and Woodworth, 1983). The choice for a particular experimental design strategy depends on the following aspects (e.g., Louviere and Timmermans, 1990; Oppewal, 1995): (i) the minimum and maximum possible size of the choice sets; (ii) whether the IIA assumption is assumed and accepted, or whether one wants to test this by estimating cross or availability effects; (iii) if IIA is tested, what particular types of cross and availability effects are relevant.

When IIA is assumed satisfied a priori, the utility of a specific alternative is independent from the choice set composition. Hence, there are some straightforward ways to design the choice experiments. First, a set of profiles needs to be designed that satisfies the statistical requirements for estimating the utility function. Second, a design needs to be constructed to place these profiles into choice sets. For this case, simple random allocation of profiles to choice sets may be used. Alternatively, one can construct all pairs or develop all combinations. Furthermore, one must decide on the size of the choice sets: paired or multiple comparisons.

The design strategy is also dependent on what type of utility function is assumed, a generic or alternative specific utility function. A generic utility function means that the parameters of the utility function are the same for all alternatives, while in an alternative specific utility function each alternative may have different attribute effects. If a generic utility function is assumed, the above mentioned strategies will suffice.

In the second case of an alternative specific utility function, the design problem is to put a number of profiles into choice sets in such a way that separate attribute effects can be estimated for each alternative. Therefore, first the profiles are designed to allow for estimation of whatever utility specification one desires for each choice alternative, and then randomly the profiles are assigned into choice sets.

If the IIA property cannot be assumed valid, one should construct a design in which the possible IIA violations can be estimated as availability or cross effects, or at least one should use a design in which the parameters that are of interest are independent from these violations. There are two design strategies: (i) one that
produces choice sets of varying size and allows the estimation of availability effects, and (ii) the other design strategy produces choice sets of fixed size and allows one to estimate cross effects.

Choice sets of varying size and composition, that allow estimation of availability effects, are constructed by using a $2^N$-design ($N$ being the number of choice alternatives) that permits estimation of first order interactions (e.g., Louviere and Woodworth, 1983; Anderson and Wiley, 1992). First $N$ alternatives are defined following design strategies mentioned above, and next each of these profiles is treated as a factor with two levels. The experimental design levels indicate for each alternative its presence or absence in the choice set.

Attribute cross effects can be estimated by using an orthogonal fraction of a $L^{N*K}$-design ($L$ is the number of attribute levels, $N$ is the number of choice alternatives, and $K$ is the number of attributes). In this design, each attribute of each alternative is thus treated as a separate factor, and an orthogonal main effects plan is used to vary the attributes of all alternatives simultaneously in an independent manner. The attributes of all alternatives are then orthogonal to one another within and between alternatives.

### 5.5.5 Constructing the Questionnaire

Conjoint choice and preference modeling is dependent on the integrity of the data collected from respondents, who may face some limits in their ability to process information. If the tasks are too long, too difficult, or if they lack sufficient reality, data quality will suffer and not contain the information sought. Therefore, it is important: (i) to make the instructions for the respondents simple and straightforward; (ii) to avoid differences in interpretation by administering task uniformly; (iii) to give the respondents examples of attribute combinations for practice; (iv) to give respondents information to set the domain of the experiment; and (v) to inform respondents about the objectives of the experiment.

Commonly, a verbal written presentation is used to present the attribute profiles and choice sets to the respondents. Recently, there has been some interest in using pictures, photographs, multimedia (Klabbers and Timmermans, 1999), and virtual reality (Dijkstra and Timmermans, 1998).
Temporal aspects of theme park choice behavior

5.5.6 ANALYZING THE RESULTS

Estimation procedures depend on the type of data, the specification of the utility function and the specification of the choice process. Commonly, if rating data have been collected ordinary least squares (OLS) regression is used to estimate the utility function. The dependent variable in the analysis is the profile rating and the independent variables are the coded attribute levels. Three common ways to code the attribute levels are dummy coding, effect coding and orthogonal coding. Regardless of the coding scheme used, the overall model fit is the same. The regression equation and its interpretation however differ. Coding schemes for the various coding methods for 2, 3 and 4 level attributes are presented in table 5.1.

Table 5.1 Coding schemes

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Dummy coding</th>
<th>Effect coding</th>
<th>Orthogonal coding</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 levels</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>1 (base)</td>
<td>0</td>
<td>-1</td>
<td>-1</td>
</tr>
<tr>
<td>3 levels</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>1 0</td>
<td>1 0</td>
<td>1 1</td>
</tr>
<tr>
<td>1</td>
<td>0 1</td>
<td>0 1</td>
<td>0 -2</td>
</tr>
<tr>
<td>2 (base)</td>
<td>0 0</td>
<td>-1 -1</td>
<td>-1 1</td>
</tr>
<tr>
<td>4 levels</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>1 0 0</td>
<td>1 0 0</td>
<td>3 1 1</td>
</tr>
<tr>
<td>1</td>
<td>0 1 0</td>
<td>0 1 0</td>
<td>1 -1 -3</td>
</tr>
<tr>
<td>2</td>
<td>0 0 1</td>
<td>0 0 1</td>
<td>-1 -1 3</td>
</tr>
<tr>
<td>3 (base)</td>
<td>0 0 0</td>
<td>-1 -1 -1</td>
<td>-3 1 -1</td>
</tr>
</tbody>
</table>

When dummy coding is used, all the attribute levels except one are coded as 1 on their corresponding vector and 0 on all others. One of the attribute levels is coded as 0 on all vectors. The estimated intercept is then equal to the mean of the attribute level assigned 0’s on all attribute vectors (base level). The estimated parameters are equal to the difference between the mean of the attribute level assigned 1’s in a given vector and the mean of the attribute level assigned 0’s on all attribute vectors. T-tests could be used to compare each attribute’s mean with the mean of the attribute level assigned 0’s on all attribute vectors.

When effect coding is used, attribute levels are coded as 1 on their
corresponding vector, except for one of the attribute levels which is coded as \(-1\) on all vectors. The sum of the effects is equal to zero for each attribute. The intercept is equal to the grand mean of the dependent variable, and the parameter estimates are equal to the deviation of the mean of the attribute level assigned 1’s in the corresponding vector from the grand mean.

Finally, in orthogonal coding, a different scheme is used which ensures that the attribute vectors are independent. The intercept can be interpreted as the grand mean of the dependent variable. The parameter estimates reflect the difference in mean attribute scores between the attributes of interest, when applied to the codes in the attribute vectors. T-tests indicate the significance of the contrast with which the corresponding coefficient is associated. Moreover, orthogonal coding provides, in case of an interval scale, information on linear, quadratic and cubic effects.

If ranking data have been collected, nonmetric scaling techniques such as MONANOVA (Kruskal, 1965), PREFMAP (Carroll, 1972) and LINMAP (Srinivasan and Shocker, 1973) may be used. It cannot be assumed that rank data are measured on an interval scale, and therefore ordinary least squares (OLS) regression is strictly speaking not applicable. The dependent variable in the analysis is the ranking of the profiles, and the independent variables are the coded attribute vectors.

To estimate the parameters in a choice model maximum likelihood estimation can be used. The dependent variable in the analysis are the discrete choices or the allocations, dependent on the task that is used. The independent variables are the coded attribute levels. Usually, the multinomial logit (NML) model is assumed to represent the choice data.

To test whether the estimated choice model significantly improves the null model, the log likelihood value at convergence \(LL(B)\) can be compared with the log likelihood of the null choice model \(LL(0)\) (i.e. the log likelihood that arises when each alternative is assumed equally likely to be chosen). This is tested using the likelihood ratio test statistic (Theil, 1971) \(G^2 = -2[LL(0) - LL(B)]\), which tests for the hypothesis that all parameters are equal to zero. This statistic is asymptotically chi-squared distributed with degrees of freedom equal to the number of free parameters in the model. The test can also be used to compare the log likelihood of models that can be regarded as an extension of each other. McFadden's rho square = \(1 - LL(B)/LL(0)\) is commonly used to indicate the goodness of fit of the choice model.
5.5.7 External Validity of Conjoint Models

If one wishes to apply the estimated preference model to predict choice behavior, the predicted utility values need to be transformed into choices (e.g., Louviere, 1988; Louviere and Timmermans, 1990). A common procedure is to: (i) define choice alternatives of interest in terms of the attribute levels varied in the experiment, (ii) predict the overall utility of each individual for each choice alternative using estimated utility functions, (iii) apply a choice rule, and (iv) estimate market shares, impact, etcetera.

Often, deterministic choice rules are used. For example, it has often been assumed that the choice alternative with the highest predicted utility will be chosen. Less commonly, probabilistic choice rules may be used. It is assumed that the predicted responses, the expected overall utilities, are estimates of the parameters of particular choice models. For example, the Luce choice axiom (Luce, 1959) or the multinomial logit model often can be assumed. However, whatever rule is applied, its validity cannot be tested statistically. In both approaches, the predicted choices for each alternative are summed, and the market share of each alternative is calculated by dividing its total predicted choices by the total number of individuals.

In the case of a conjoint choice experiment, the prediction of choice is straightforward and not ad hoc. The multinomial logit model (section 5.2.4) is used to predict the choice probabilities, that can be translated into market shares of each competing alternative.

A test of external validity for the conjoint choice model would require evidence that the choice process and estimated parameters in the choice experiment are the same as the process and estimates in the real market of interest. The question is whether people will make the same choices in reality as under experimental circumstances. There are several empirical tests of external validity (Carson, et al., 1994): (i) predicting the choice of a new product, and after introduction tracking down the changes in choices of that product over time; (ii) demonstrating spatial and temporal transferability of the parameters of experimental choice models; (iii) predicting the real choices made by separate but statistically equivalent samples of individuals; and (iv) demonstrating that the utilities from a model conditional on real market choices were the same as the utilities from a choice experiment. To date, the literature only reports few external validity tests. However, these studies suggest that conjoint models perform equally well or better than models derived form...
revealed preference data (e.g., Louviere et al., 1981; Horowitz and Louviere, 1993).

5.6 LIMITATIONS OF TRADITIONAL CONJOINT CHOICE APPROACHES

In section 5.4, we showed that the conjoint choice modeling approach offers many potential benefits to model theme park choice behavior to support theme park planning. The main reason is that theme park planners often have to deal with decisions on completely new and costly planning alternatives, which can be best evaluated using conjoint choice techniques. Like revealed choice modeling approaches, conjoint modeling provides quantitative measures of the relative importance of attributes influencing tourists’ utilities and choices for theme park products and services, but in addition it provides the potential benefits that the researcher can include those attributes in the experimental design that are of interest to the theme park planner, and control these attributes and their correlations. Thus, the expected impact of new theme park planning alternatives on tourist choice behavior and the demand for theme park products and services can be simulated. Moreover, conjoint choice modeling supports the evaluation of competing strategies in theme park planning by better understanding the consequences of each decision in terms of the expected shifts in demand and visitor patterns.

In chapter 4, we proposed a model framework with three basic types of theme park choices: participation choice, destination choice and activity choices. Furthermore, we argued that temporal aspects such as seasonality and variety seeking can be expected to influence visitors choices between theme parks over time, and that visitors can be expected to seek diversification in their activity choices while in a theme park. Therefore, a conjoint choice approach should be developed that is able to support the modeling of these type of theme park choices and the effects of diversification, variety seeking and seasonality on these choices.

Current conjoint choice approaches assume that individual preferences for choice alternatives remain invariant over time. In the context of theme park choice this means that the probability of visiting a particular theme park does not change over time. That is, it is assumed that if one can successfully represent choice behavior in a cross-sectional study, the estimated parameters can be used to predict the demand for a new park, or shifts in demand as a function of planning decisions.
related to park attributes. While the assumption of time-invariant preference functions may be reasonable in many applied choice contexts, we hypothesize, that especially in theme park destination choice, consumers are inclined to seek some degree of variety when making their choices.

Regardless of the specific reasons, if the variety seeking assumption is valid for at least a significant proportion of the consumers, the predictive ability of current conjoint choice models would be limited. Moreover, if consumers are involved in variety seeking behavior, estimation of richer models of consumer variety seeking behavior, and consideration of the implications of those models may yield interesting insights for theme park planners.

Therefore, if one wishes to consider variety seeking explicitly, the question becomes how it can be incorporated into the conjoint choice modeling approach. Variety seeking behavior in theme park choices involves a time-component because no two parks can be visited simultaneously. This implies that one has to observe choices for at least two consecutive choice occasions to investigate variety seeking behavior. Respondents need to be presented with at least two choice situations. Conventional conjoint choice models assume the systematic utilities for choice outcomes for each time period to be identical: there are no effects across choice occasions, and the outcome of choosing a particular alternative at time \( t \) is not influenced by the choice at time \( t-1 \). However, if variety seeking occurs, choices at time \( t \) depend on the choice made at time \( t-1 \). In the next chapter we develop such a conjoint choice model that can capture variety seeking behavior.

Also, a characteristic of most tourism markets is that demand fluctuates greatly between the seasons of the year, and it is likely that preferences for different type of parks may vary across seasons as well. Current conjoint choice models may be limited when consumers’ preferences for theme parks vary between different seasons. If one wants to incorporate seasonality effects in current conjoint choice models, one needs to observe choices for at least two time periods, in the case of seasonality at least for two different seasons of the year. The conjoint choice model needs to be adjusted in a similar way as when including variety seeking, as measurements for each separate choice moment are required.

In addition to the fact that in current conjoint choice modeling no allowance is made for changing preferences over time nor for certain durations of activities, another limitation is that most applications of conjoint choice models have studied single choice events. These assumptions may not be reasonable when visitor activity
choices and visitor preferences for activities within a theme park vary over different moments of the day. For example, a top attraction in a theme park may be visited early on in visitors' activity patterns to allow for repeat visits, or visits to less attractive attractions may be used to fill up time between more carefully planned visits to more attractive attractions. An understanding of the diversification in visitors' preferences for different activity patterns in a theme park, i.e. for visitors' preferences of when to do what in a park, is highly relevant. Therefore, the structure of current conjoint choice models should be redesigned to reflect the possibility that theme park visitors seek diversification in their activity choices. In chapter 9 we report on the development of a conjoint choice modeling approach that allows one to test for diversification in visitors’ activity choices in a theme park.

5.7 CONCLUSION

In this chapter, we have argued that the conjoint choice modeling approach offers a potentially valid approach to predict choice behavior of theme park visitors, and discussed the principles underlying this approach. Unfortunately, however, existing conjoint choice models do not incorporate any choice dynamics. The challenge for this thesis is therefore to extend current conjoint choice models to capture variety seeking, seasonality and diversification. The development and test of such an extension will be discussed in the following chapters.
Temporal aspects of theme park choice behavior
6 MODELING SEASONALITY AND VARIETY SEEKING IN THEME PARK CHOICE

6.1 INTRODUCTION

In the previous chapter, we pointed out that current conjoint choice approaches do not allow one to model some important temporal aspects of tourist choice behavior such as seasonality and variety seeking. Typically, current approaches assume that individuals’ preferences for choice alternatives remain invariant over subsequent purchase occasions. In the context of theme park choice behavior this implies that one cannot capture changes in preferences for visiting a given theme park over time. While the assumption of time-invariant preferences may be reasonable in many other applied choice contexts, the postulate underlying our research is that in theme park choices and other choices in the recreation and tourism area, consumers preferences are not stable and may change over time.

In a naive approach the dynamic nature of consumer choice behavior over time could be described by distinguishing between repeat choices of an alternative versus choices of an alternative not chosen previously (see figure 4.2). However, when looking more closely, variation in choice behavior can be distinguished in derived varied behavior, in which variation is not a goal in itself, and is not a consequence of changing preferences, and intentionally varied behavior, in which preferences change from one occasion to the other and switching is deliberate. We hypothesize that in theme park destination choice, consumers follow the latter pattern and are inclined to deliberately seek some degree of variety when choosing
between parks in subsequent trips. This implies that a consumer at a current choice occasion may choose a different theme park than the park that was chosen on the previous choice occasion primarily for reasons of variety seeking. We also hypothesize that consumers’ preferences for different parks may be situation dependent in the sense that they may vary across seasons. The manifestation of this phenomenon can be observed in the theme park market in the fluctuations in demand between the seasons of the year.

The models that have been developed specifically to measure and test for this type of variety seeking behavior can be divided into two main categories: inventory-based and non-inventory-based variety seeking models (Timmermans, 1990). Inventory-based models focus on the combinations of products that consumers choose from a particular product class within a certain time period. Non-inventory-based models in contrast predict switching probabilities from concepts of variety seeking and are mostly based on first-order Markov chains.

In this chapter, previous research on variety seeking models outside of the tourist area that is potentially relevant for theme park variety seeking choice behavior is discussed. Moreover, the BHT model (Borgers, Van der Heijden and Timmermans, 1989) is discussed. We conclude the chapter by summarizing the variety seeking models that were discussed and relate these models to the model framework and definitions of variety seeking and seasonality as outlined in chapter 4.

6.2 MODELS OF VARIETY SEEKING

There are several perspectives from which one can approach the fact that individuals may choose different alternatives at consecutive choice occasions. Variety seeking behavior can be considered the result of exogenous variables which define the choice set and the choice problem. McAlister and Pessemier (1982) give a more specific description of the cases of variations in behavior:

- changes in the composition of the choice set related to the nonavailability of particular choice alternatives;
- changes in the purpose underlying the choice behavior of interest;
- changes in attributes of the choice alternatives;
changes in constraints facing the individual;
• variations in contextual variables, e.g., weather conditions and transportation availability;
• changes in concurrent activities which influence the choice process;
• a basic desire in individuals for novelty;
• the fact that choices at successive choice occasions may reflect heterogeneous preferences of groups of individuals rather than consistent individual preferences.

The effect of such variables can be modeled by disaggregation or by treating the problem as a stepwise or multistage choice process. An example is Ansari et al. (1995), who proposed a two-level hierarchical model. Consumers are assumed first to decide whether or not to make a repeat purchase and then decide which alternative to purchase. Consumers are argued to go through a sequential decision making process in which the alternative choice decision is conditioned on the decision to either repeat or switch from the alternative last visited.

However, there are also models that explicitly try to explain variety seeking behavior. In the next section we review these models. This review is largely based on Timmermans (1990) and Van Trijp (1995). The models we discuss have in common that they take observed behavior as a starting point of their analysis with an emphasis on modeling observed variation in behavior in contrast to repeat purchase behavior. However, a distinction can be made between inventory-based variety seeking models and non-inventory-based variety seeking models.

### 6.2.1 INVENTORY-BASED VARIETY SEEKING MODELS

Inventory-based models emphasize that consumers buy combinations of products within a particular product class within some defined time period. The combinations that they buy reveal the level of variety that they seek. For example, tourists may choose to visit two particular amusement parks and one zoo within a year. Another example is that tourists allocate their budget among visits to a number of parks within a year. Thus, when they choose one expensive park at one time, they may decide to choose a less expensive park another time to optimize their budget spending.

McAlister (1979) developed one of the first inventory-based variety seeking models. The model assumes, following arousal theory, that consumers form
inventories of attributes and have ideal points for consuming particular attributes of choice alternatives. An ideal point represents the ideal amount of consuming a particular attribute, and these ideal points may thus differ between attributes. If one wishes to predict the choice of a collection of choice alternatives, it is thus necessary to know how much of an attribute is available in each of the choice alternatives.

McAlister developed a deterministic model, in which she specifically addressed attribute satiation as an underlying process for variety seeking. An important implication of satiation is that behavior is determined relative to existing inventories of attributes. McAlister’s model is based on two assumptions: (i) attributes are cumulative, and (ii) the marginal utility of each attribute is a decreasing function. The preference for an alternative depends on the extent to which its attribute levels contribute to bringing the attribute inventory levels closer to the ideal levels. More specifically, the squared difference between the summed attribute values and an individual’s ideal point is assumed to represent the marginal utility. A combination of alternatives will be chosen if

\[ U_g > U_h, \quad \forall \ h \neq g \quad (6.1) \]

where,

\[ U_k' = -\sum_{k=1}^{K} w_k (x_{g,k} - \hat{x}_k)^2 \quad (6.2) \]

and where,

- \( g, h \) are a collection of products;
- \( w_k \) is the importance weight of the \( k \)th attribute;
- \( x_{g,k} \) denotes the value of attribute \( k \) summed across all choice alternatives in the collection \( g \);
- \( \hat{x}_k \) denotes the ideal level of attribute \( k \);
- \( K \) is the total number of attributes across all products \( g \).

The negative of the sum is used because departures from ideal points are modeled.

Farquhar and Rao (1976) suggested a more sophisticated version. Their model for evaluating collections of items allows an item’s attributes to have two
types of influence on the preference for the collection. The first is a simple linear increase or decrease, depending on whether the attribute is desirable or undesirable. In addition, they assumed that the preference for a set of choice alternatives is influenced by the diversity within the set. If diversity within an attribute increases preference, the attribute is called ‘counterbalancing’. In contrast, when preferences decrease with increasing diversity, the attribute is called ‘equibalancing’. For both types of attributes, a linear relationship with preference for the collection of choice alternatives is assumed.

McAlister (1982) extended the attribute satiation model to the case of temporal variety seeking. This Dynamic Attribute Satiation (DAS) model differs from the structural satiation model in that a time related assumption is built in. This assumption is that consumption history may be converted into attribute specific inventories. She postulates that accumulated inventories of attributes resulting in behaviors, rather than accumulated experience with behaviors themselves, dictate the selection of different behaviors over time. However, the model deals with individual choice alternatives rather than with sets of choice alternatives. The model has the following form:

\[ U_i > U_j, \quad \forall j \neq i \]  
\[ (6.3) \]

where,

\[ U_i = -\sum_{k=1}^{K} w_k \left( I_{kt} + x_{ik} \right) - \hat{x}_k \]^2  
\[ (6.4) \]

and where,

- \( I_{kt} \) is the inventory of attribute \( k \) at time \( t \);
- \( x_{ik} \) denotes the amount of attribute \( k \) of alternative \( i \);

and all else is defined as before. By summing the attributes acquired in the past, a consumption history is converted into an inventory. The attribute values are weighted by a retention factor which increases with time so that the effect of some amount of attribute \( k \) consumed at time \( t-1 \) is greater than the consumption of the same amount of that attribute consumed at time \( t-2 \).

Although McAlister’s model is not very manageable in terms of estimation procedure, it specifically addresses attribute satiation as an underlying process of
variety seeking behavior.

McAlister and Pessemier (1982) extended the DAS model with a term which represents a stimulation contribution to preference to account for the effect of new experiences. Consequently, the model includes both the stimulation contribution to preference and the satiation contribution. This extra term may be expressed as

$$ w_{K+1} \left( D_{it} - \hat{x}_{K+1} \right)^2 $$

(6.5)

where,

- $w_{K+1}$ denotes the importance of the contribution of stimulation to the preference;
- $D_{it}$ is the total stimulation that will result from enacting behavior $i$ at time $t$;
- $\hat{x}_{K+1}$ is the ideal point for stimulation.

The total amount of stimulation consists of two components; (i) one representing the carryover stimulation from the prior period, and (ii) one that reflects the stimulation contribution of the intended behavior relative to the history of behaviors selected. Both components are discounted by a time-sensitive factor of stimulation retention.

Pessemier (1985) also proposed another model of variety seeking, in which he assumed that change in utility results from each attribute of a choice alternative plus from interpersonal and intrapersonal variety which the subject conveys. Interpersonal variety represents an individual’s need for group affiliation and personal identity. Intrapersonal variety concerns personal needs and is contrasted to social needs. An individual’s utility for a choice alternative is assumed to be a linear function of the squared distance between the individual’s ideal point and the inventory position of that choice alternative, in a space of $K+2$ dimensions. The model is represented as follows:

$$ U_{it} = a + b \left[ \sum_{k=1}^{K+2} w_k \left( I_{ikt} - \hat{x}_k \right)^2 \right] $$

(6.6)

where,

- $w_k$ denotes the importance or salience of the $k$th attribute;
- $I_{ikt}$ is the inventory of the $k$th attribute of choice alternative $i$ at time $t$;
- $\hat{x}_k$ is an individual’s ideal point for the $k$th attribute;
\(a, b\) are regression coefficients.

The space can be divided into \(K\) dimensions associated with the attributes, plus one dimension associated with intrapersonal variety, and one dimension associated with interpersonal variety. The individual inventory level that is maintained for a particular attribute is assumed to be a function of the time at which increments of the attributes were acquired, the size of the increments, and the consumption rate. The inventory level of intrapersonal varied experiences measures the variety produced by contiguous choices. The interpersonal inventory level consists of two elements: (i) one that indicates how similar the individual’s choices are to the choices of the individual’s peers, and (ii) one that indicates the degree of individuality implied by each choice.

Joint space analysis (a multidimensional scaling technique which simultaneously scales individuals and objects) is used to derive the individual’s ideal points and salience weights. Object ratings on attributes or paired similarity ratings are used to construct the object space.

Inventory-based models of variety seeking behavior are appealing in that they attempt to provide an explanation for observed variety seeking behavior among alternatives in terms of the attributes delivered by these alternatives. Consumers’ preferences for specific alternatives are related to attributes of the choice alternatives, and they may seek variety on one attribute and avoid variety on another. Furthermore, these modeling approaches are attractive because they incorporate the effect of the entire consumption history on the next choice to be made.

A distinction can be made in models that specifically focus on structural variety seeking behavior (Farquhar and Rao, 1976; McAlister, 1979), by dealing with the variety that is present within a set of choice alternatives and attributes, and models that combine structural variety seeking with temporal variety seeking behavior by including a time factor in their models (McAlister, 1982; McAlister and Pessemier, 1982; Pessemier, 1985). The studies including temporal variety seeking give a central role to time in their analysis of variety seeking behavior, and they assume that consumers achieve variety by making different choices at different occasions over time.

A disadvantage of these inventory-based models is that they are largely based on consumption or purchase histories and do not allow for a distinction between intentional and derived varied behavior (Kahn, Kalwani and Morrison, 1986). This
may threaten the validity of the estimated variety seeking parameters as the parameters indicating intentional variety seeking are confounded with derived varied behavior. For example, behavior may be labeled as variety seeking, which in fact may not be motivated by a desire to seek variety. Another disadvantage is that they are often analytically intractable and difficult to estimate.

Furthermore, most discussed models of variety seeking behavior are concerned with preferences rather than with choices. As discussed in chapter 5, preferences are generally assumed to be deterministic, and if one wants to relate preferences to choices, one is often required to formulate ad hoc assumptions concerning tourists’ decision rules to translate preferences into choice. Choice models, on the other hand, support direct predictions of demand and market share.

**6.2.2 Non-inventory-based models of variety seeking behavior**

Non-inventory-based models do not predict behavior from the attributes of the choice alternatives, but predict switching probabilities from concepts of variety seeking. Most of these models are based on first-order Markov chains.

Jeuland (1978) developed a partially deterministic model for variety seeking behavior that states that after the consumption of item $i$, the conditional preference for that alternative may be lower than its unconditional preference due to item satiation resulting from prior consumption. It is assumed that the utility of a given choice alternative is a function of the past experience of an individual with that alternative and the unique characteristics of the choice alternative. The utility of alternative $i$ at time $t$ is defined as follows:

$$ U_i^t = \frac{U_i}{(1 + \Phi E_i^t)} \tag{6.7} $$

where,

- $U_i^t$ denotes the utility for alternative $i$ at time $t$;
- $E_i^t$ represents the amount of experience with choice alternative $i$ at time $t$;
- $\Phi$ is a parameter indicating the impact of experience in utility at time $t$;
- $U_i$ accounts for the unique characteristics of choice alternative $i$.

Jeuland then assumed that a choice alternative will be chosen if its utility exceeds that of all other alternatives by at least some positive constant or threshold
Modeling seasonality and variety seeking in theme park choice

$\Delta$: 

$$U_u > U_{j\neq i} + \Delta, \quad \forall j \neq i$$ \hfill (6.8)

The experience function is defined in such a way that each time a particular alternative is chosen, the experience with that alternative increases; it decreases every time the alternative is not chosen.

Givon (1984) proposed a more general modeling approach in which variety seeking was explicitly considered. He proposed a first-order Markov model which was based on the assumption that variety seeking and variety avoiding represent feedback mechanisms from previous consumption that will distract choice behavior from being a zero-order process. The probability of choosing alternative $j$ given that alternative $i$ was chosen on the previous choice occasion is a function of the preference for choice alternative $j$ and the preference for switching. Givon suggested the following model:

$$P_{ij} = \frac{|VP| + VP}{2(n-1)} + (1 - |VP|)\theta_j \quad (6.9)$$

$$P_{ji} = \frac{|VP| - VP}{2} + (1 - |VP|)\theta_j \quad (6.10)$$

where,

$P_{ij}$ is the probability that alternative $j$ will be chosen if alternative $i$ was chosen on the previous choice occasion;

$VP$ is a measure of variety seeking, ranging from extreme desire for variety ($VP = 1$) to extreme resistance to variety ($VP = -1$);

$n$ is the number of choice alternatives;

$\theta_j$ denotes the basic preference for alternative $j$.

Maximum likelihood estimates for the parameters $VP$ and $\theta_j$ can be obtained at the level of individual purchase or consumption histories. Parameter estimates for $VP$ allow for the classification of individuals as to whether their choice behavior in a particular product category would be of the variety seeking, variety avoiding or zero-order type. More specifically, consumers with a value of zero for $VP$ are indifferent towards variety and they choose following a zero-order choice process.
and choose according to their long term preferences ($P_{ji} = \theta_j$ and $P_{ij} = \theta_i$). If a consumer likes variety, $0 < VP < 1$, the switching probability in 6.9 and 6.10 become $P_{ji} = (1-VP)\theta_j < \theta_j$ and $P_{ij} = VP/(n-1) + (1-VP)\theta_p$ which implies that $P_{ji} < P_{ij}$. If, however, the consumer does not like variety, $(-1 < VP < 0)$, the probabilities become $P_{ji} = |VP| + (1-|VP|)\theta_j$ and $P_{ij} = (1-|VP|)\theta_j$, so for these consumers $P_{ji} > P_{ij}$.

Givon’s (1985) extension of this model is estimated at the individual level for different partitions, so that the key attributes on which the individual seeks variety can be identified. In this case the conditional probability of choosing alternative $j$, given that alternative $i$ was chosen on the previous occasion, is a function of the preference for alternative $j$ and of the preference for all alternatives in the partition with alternative $i$.

Lattin and McAlister (1985) extended Givon’s model by not only including variety seeking intensity, but also brand preference and inter-brand similarity. They assumed that similarity between choice alternatives is a function of the features these alternatives share. The transition probability $P_{ji}$, defined as the probability of choosing alternative $j$ given that alternative $i$ was chosen on previous choice occasion is given by:

$$P_{ji} = \frac{\left(\pi_j - VS_{ij}\right)}{1 - V \sum_{j=1} S_{ij}}$$

(6.11)

where,
- $\pi_j$ is a parameter reflecting the sum of all features, unique and shared, provided by alternative $j$, (arbitrarily these values are scaled so that $\sum_j \pi_j = 1$);
- $S_{ij}$ is a parameter which reflects the features shared by $i$ and $j$;
- $V$ is a parameter of variety seeking intensity ($0 \leq V \leq 1$, if a consumer devalues recently consumed features completely, indicating a high desire for variety, $V = 1$).

The model is estimated by solving for a given $V$ a constrained optimization problem which minimizes the sum squared differences between observed switching probabilities and the predicted probabilities.

Feinberg, Kahn and McAlister (1992), extending Lattin and McAlister (1985), focused on transition probabilities by solving the model for steady-state...
probabilities. These steady-state probabilities, which are themselves functions of variety seeking intensity, brand preference, and brand positioning, are interpreted as expected market shares for a homogeneous population of individuals at a given point in time. By considering expected changes in market share associated with changes in the managerially influenceable variables, one develops insight about the market share impact of such changes in a variety seeking product class.

Kahn, Kalwani and Morrison (1986) used Jeuland’s (1979) and Givon’s (1984) models to form a taxonomic framework for defining and measuring certain types of variety seeking and reinforcement behaviors. This taxonomy comprises seven stochastic models, ranging from the zero-order to second-order mixed variety seeking and reinforcement models. They proposed a sign-discrimination test that depends on the comparison of selected empirical conditional choice probabilities. These conditional choice probabilities are empirically derived from individuals’ specific consumption histories. The signs of three such tests allow for discriminating among the seven competing variety seeking and reinforcement models. It is assumed that all individuals have identical variety seeking and inertial tendencies reflected in the variety seeking and reinforcement parameters. Therefore, the suggested test to discriminate between the different model formulations seems particularly appropriate to investigate differences in variety seeking and reinforcement behaviors across categories of alternatives and also across alternatives within those categories.

Kahn and Raju (1991) extended the Kahn, Kalwani and Morrison (1986) model specification in an attempt to separate the influences of price promotions in the market from the variety seeking and reinforcement parameters. By doing so, this is one of the few studies that attempted to explicitly distinguish between intentional varied behavior and derived varied behavior. Kahn and Raju (1991) examined the effect of changes in the frequency of price discounts on the choice behavior of variety seeking and reinforcement consumers. In modeling the effect of promotions on consumer choice, they assumed that the effect of promotions is linearly related to the probability of buying that brand in the absence of promotions. They empirically tested their model both on laboratory studies and market share implications in natural environments. In a similar way, Kahn and Louie (1991) investigated how in-store price promotions affect market share after the promotions have been retracted. In this study the variety seeking and reinforcement behaviors were experimentally induced rather than naturally occurring.
Bawa (1990) extended previous discussed models by addressing the issue that consumers might seek variety at one point in time and avoid variety at another. He argues that a consumer exhibits inertia and variety seeking behavior depending on his or her choice history. A model was developed for this ‘hybrid’ behavior of which pure variety seeking, pure reinforcement behavior and zero-order behavior are special cases.

The assumption was made that choice on any given occasion is affected by choices made after the most recent alternative switch. Thus, choice on occasion \( t \) is influenced by the choice made on \( t-1, t-2, \ldots, t-r \), where the most recent switch took place on occasion \( t-r \), with \( r \geq 1 \). Choices are assumed to be a function of the length of the ‘run’ for the alternative last purchased (a ‘run’ is a string of consecutive choices of the same alternative). The assumption implies that each time an alternative switch occurs, the choice process renews itself, leading to a re-evaluation of brand utilities.

The model is an individual level model based on observed runs in the purchase history. The model states that the perceived utility for alternative \( i \) on the \((r+1)\)th purchase occasion, given \( r_i \) sequential purchases of \( i \), is given by:

\[
U(i|r_i) = a_i + br_i + c(r_i)^2
\]  
(6.12)

while the perceived utility for alternative \( j \) \((j \neq i)\), given \( r_i \) sequential purchases of \( i \), is given by:

\[
U(j|r_i) = a_j \quad (j \neq i)
\]  
(6.13)

where,

- \( a_i, a_j \) are alternative-specific constants for alternatives \( i, j \);
- \( r_i \) is the number of consecutive choices of alternative \( i \) made after the last switch;
- \( a_i, a_j, b, c \) are parameters to be estimated from the data, with \( i,j=1,\ldots,K \) in a \( K \)-alternative market.

Note that \( r_i \) can be described as the length of the run of purchases of alternative \( i \). If the current run is of alternative \( i \), the utility of alternative \( i \) will be a function of the length of that run, as in equation 6.12. If the current run is some
Modeling seasonality and variety seeking in theme park choice

other alternative \( j \), the utility of alternative \( i \) will equal a constant \( a_i \). Parameter estimates can be obtained with conditional logit at the level of individual consumption histories. However, if a large number of parameters need to be estimated (\( K+2 \), in a \( K \) alternative market), this requires very lengthy purchase or consumption histories.

It can be concluded that Bawa’s model also provides little insight in what causes variety seeking, and the proposed model does not appear to have clear advantages in terms of prediction of market share. Moreover, the model’s predictive ability for market shares was not found to be higher than the simpler operationalizations of first-order and zero-order models.

Most recently, Chintagunta (1998) proposed a different modeling approach in which inertia and variety seeking were explicitly considered. This approach integrates the effects of inertia and variety seeking in brand-choice models and a semi-Markov model of purchase timing and brand switching. In this model alternative switching probabilities depend on interpurchase times.

It is assumed that an inertial household has the highest switching hazard for alternatives located perceptually close to each other in terms of attribute space, and a progressively lower hazard rate for alternatives located further away from each other. On the other hand, if a household is seeking variety, the most likely alternative chosen would be an alternative located furthest away in attribute space from the previously chosen alternative.

Results of an empirical analysis demonstrated that the model allowed one to distinguish between households that were inertial and those that were variety prone. The proposed model also provided insights in the optimal timing of promotions and implications for product positioning.

The above discussed models provide useful information for product positioning, by estimating the intensity of variety seeking behavior and uncovering complementary and substitutable relationships between products. However, their use for impact assessments within the context of theme park planning may be restricted. Specifically, if one wishes to predict the consequences of planning decisions, a model of tourist choice behavior should include manipulable, policy-relevant independent variables (Timmermans, 1985). Most non-inventory-based variety seeking models do not satisfy this condition, because they only quantify variety seeking behavior at the product level, implicitly assuming that the variety gained by switching among alternatives does not depend on the attributes of the
choice alternatives involved. At the very least, the relationship is not made explicit nor estimated. Timmermans argued that when using these models for prediction, one should either assume a stable process or assume different parameter values. Assuming a stable choice process is unrealistic because planning decisions will almost invariably influence the process. Assuming different parameter values implies that the model as estimated is no longer valid.

Furthermore, most non-inventory-based models of variety seeking behavior, like the inventory-based models, fall short in their adequacy to measure intentional varied behavior, or at least to make a distinction between intentional and derived varied behavior. As a consequence, the parameters obtained from these models reflect a tendency to choose the same alternative versus to switch away from a alternative, without distinguishing between switching for the sake of variety or for any other underlying motivation.

A model that is interesting in that it can deal with some of above discussed issues was developed by Borgers, Van der Heijden and Timmermans (1989). They developed a variety seeking model of choice behavior and tested it on outdoor recreational choice behavior. This would make the model particularly relevant for theme park planning. Therefore, in the next section the BHT (Borgers, Van der Heijden and Timmermans) model is discussed in more detail.

### 6.2.3 BHT-MODEL

The BHT variety seeking model of spatial choice behavior (Borgers, Van der Heijden and Timmermans, 1989) assumes that choice behavior at time $t$ is dependent upon alternatives that were chosen on $t-1$, $t-2$, …, 1. Although, the model only includes the most recent previous choice in the interest of parsimony, it can theoretically be extended to multiple layers. The model assumes that variety seeking choice behavior is alternative-specific because the utility derived from variety between different choice alternatives differs. Thus, the model is developed from two basic components: (i) an estimate of the effect of variety seeking on utility, which is assumed to be alternative-specific, and (ii) a function representing the effect of similarity/dissimilarity on variety seeking behavior.

The BHT model differs from most previously discussed models in that its parameters are estimated for each attribute separately to reflect the possibility that an individual may seek variety on one attribute and avoid variety on another.
Another difference between the BHT model and other models concerns the function that relates dissimilarity to preference. Most models incorporate a linear relationship to represent the fact that the probability of choosing a certain alternative increases with its dissimilarity from previously chosen alternative. However, individuals may exhibit varied behavior both within the class of potentially substitutable alternatives and between classes of potentially substitutable alternatives. In the first case, individuals seek variety within the same class of choice alternatives, while in the second case individuals may have become satiated by repeated choices from the same class and seek variety by choosing from a different class of potentially substitutable choice alternatives. This problem is addressed by defining a matching function, $Z$, on each attribute, the parameter of which reflects the strength of the relationship between similarity/dissimilarity and choice:

$$Z_{ijk} = \begin{cases} 
    1, & \text{if alternatives } i \text{ and } j \text{ match on variable } k \\
    0, & \text{if alternatives } i \text{ and } j \text{ do not match on } k \\
    1 - \frac{|X_{ik} - X_{jk}|}{\text{range}_k}, & \text{if } k \text{ is an interval variable}
\end{cases}$$ \quad (6.14)

and their model is given by:

$$P_{j|i} = \frac{\exp\left(-\theta_i D_{ij} + \sum_k \beta_k \left[1 - Z_{ijk}\right]\right)}{\sum_{j'} \exp\left(-\theta_i D_{ij'} + \sum_k \beta_k \left[1 - Z_{ij'k}\right]\right)}$$ \quad (6.15)

where,

- $P_{j|i}$ denotes the probability that alternative $j$ will be chosen given that alternative $i$ was chosen at the previous choice occasion;
- $\theta_i$ represents the effect of variety seeking for alternative $i$;
- $\beta_k$ is a parameter;
- $D_{ij} = 1$ if $i=j$, 0 otherwise.

A spatial component was introduced in this model by including distance and residential zones, as two of the variables.
The model was tested on data pertaining to outdoor recreational choice behavior. Three steps are required to test the model. First, one has to estimate some choice model to predict the distribution of choices on the first choice occasion. In this study, the Baxter-Ewing spatial interaction model was used to predict the distribution of recreational choices on the first choice occasion (Baxter and Ewing, 1981). However, any model could be used for this purpose. Secondly, the switching probabilities have to be predicted. Lastly, the predicted demand for the total time horizon needs to be calculated, and these predictions can then be compared with the observed demand.

The results of the empirical analyses indicated that across five different successive choice occasions, a large percentage of the sample selected different recreation areas. More specifically, a high degree of variety was associated with recreation areas of intensive use and with rather monotonous areas at a substantial distance from the respondents’ homes. Recreants of all recreation areas with facilities for swimming were relatively repetitive in their spatial choice behavior. Attributes such as ‘facilities for walking and/or biking’ and ‘privacy’ were most influential to variety seeking behavior.

Although the BHT model was successful in that it accounted for a large percentage (94%) of the variance in the aggregated demand for the choice alternatives, and that it outperformed a conventional, although rather sophisticated, gravity-type model of park choice (Baxter and Ewing, 1981), the model also has some disadvantages.

Firstly, the model focuses on transition probabilities. The utilities associated with the choice model are only indirectly incorporated into the model. They are reflected by the parameters of the model used to predict the choice pattern of the first choice occasion and the alternative-specific parameters which reflect the contribution of variety seeking to overall utility given that some alternative has been chosen on the previous choice occasion. As argued by Borgers, Van der Heijden and Timmermans (1989), a different research strategy would be to specify a utility function which includes the utility associated with a particular choice alternative or with particular attributes and also a measure of variety seeking.

Secondly, the approach is based on real-world choices only. This very fact that different motivational and situational reasons might explain observed variations in successive choices limits the possibility of using real-world choice data to test the assumption of variety seeking behavior. Different destination choices on successive
choice occasions might simply reflect situational factors rather than some motivational drive for variety.

6.3 Evaluation

The purpose of this description of models of variety seeking behavior was to select a particular approach that seems most promising to build the desired model, as explained in the previous chapter. In evaluating these models the following criteria are critical:

1. Is the model adequate in measuring variety seeking behavior? Specifically, is a distinction made between intentional and/or derived varied behavior?
2. Does the model focus on temporal and/or structural variety seeking behavior?
3. Does the model provide alternative and/or attribute level insight? Specifically, does the model allow one to include manipulable attributes relevant for planning decision making?
4. Finally is the model concerned with preferences or choices? Choice models support direct predictions of demand and market share, whereas preference models require one to formulate ad hoc assumptions concerning tourists’ decision rules.

A summary of the discussion of the previous sections is given in table 6.1, which reviews the various variety seeking models using these criteria.

An examination of this table suggests that the application of these models in the context of tourism planning, and more specifically in theme park planning, is somehow restricted. To support theme park planning, a modeling approach is needed that is able to predict the likely consequences of theme park planning and marketing decisions and their expected impact on theme park demand. Therefore, a model of tourist choice behavior should include manipulable independent attributes that are relevant for theme park planning decision making. The inventory-based models, all attribute-based models, have an advantage in this respect over the product level models in that they attempt to provide an explanation of observed variety seeking behavior based on the attributes of these alternatives. The structural
variety seeking models also have an advantage in this respect as they allow the identification of attributes on which variety is sought and those on which variety is avoided.

Table 6.1  Selective review and evaluation of variety seeking models

<table>
<thead>
<tr>
<th>Model Type</th>
<th>Study reference</th>
<th>Intentional</th>
<th>Derived</th>
<th>Temporal</th>
<th>Structural</th>
<th>Preference</th>
<th>Choice</th>
<th>Attribute</th>
<th>Alternative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inventory-based</td>
<td>Farquhar &amp; Rao, 1976</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Models</td>
<td>McAlister, 1979</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>McAlister, 1982</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>McAlister &amp; Pessemier, 1982</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Pessemier, 1985</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-inventory-based</td>
<td>Jeuland, 1978</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>models</td>
<td>Givon, 1984</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Givon, 1985</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lattin &amp; McAlister, 1985</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Kahn, Kalwani &amp; Morisson, 1986</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bawa, 1990</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Kahn &amp; Raju, 1991</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Feinberg, Kahn &amp; McAlister, 1992</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Chintagunta, 1998</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BHT model</td>
<td>Borgers, Van der Heijden &amp; Timmermans, 1989</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Most non-inventory-based models are alternative level models in that they provide information on variety seeking intensity related to the alternative as a whole. They do not provide an explanation why this behavior occurs.

Furthermore, the non-inventory-based models have an advantage over the inventory-based models, because they are concerned with choices rather than preferences. Preferences are generally assumed to be deterministic, and if one wants to relate preferences to choices, one is often required to formulate ad hoc assumptions concerning tourists’ decision rules to translate preferences into choice.
Choice models, on the other hand, support direct predictions of demand and market share.

All definitions of variety seeking behavior emphasize the distinction between intentional and derived varied behavior. However, the table shows that only one study (Kahn and Raju, 1991) tried to make this distinction. Other studies concentrate on the distinction between repeat choice of the alternative previously chosen versus the choice of any other alternative not chosen on the previous choice occasion. Models that do not allow to differentiate between intentional and derived varied behavior threaten the validity of the variety seeking parameters obtained (Kahn, Kalwani and Morrison, 1986). There are two approaches to deal with this measurement problem of the variety seeking parameters (Van Trijp, 1995).

The first approach is to increase the validity of the variety seeking parameters by explicitly incorporating extrinsic motivations and resulting variation in behavior into the model formulation. This was done by Kahn and Raju (1991), who incorporated variety seeking due to price promotions into their model specification, and thereby separated the variety seeking parameters from this effect.

A second approach to increase the internal validity of the variety seeking parameters is the use of experimental choice data, rather than real-world panel data (e.g., McAlister, 1982; Givon, 1985). The use of experimental choice data maximizes identification possibilities for the utility function and the precision with which parameters can be estimated. In experimental settings the choice task for the respondents is less affected by extrinsic motivations and constraints than in revealed panel data, which results in a better representation of variety seeking.

6.4 CONCLUSIONS

The aim of this chapter was to review existing variety seeking models as potential candidates for the models to be developed and tested in this thesis. The review suggests that only a few types of models are useful to model variety seeking and seasonality in theme park choice behavior to support theme park planning.

The main conclusion from our review was that current models of variety seeking behavior fail to discriminate between intentional and derived variety in tourist choice behavior. From the planner’s perspective, this distinction is crucial
because theme park design and marketing communications may differ considerably depending on whether tourists actively seek variety as an attractive element in their theme park visiting behavior or whether their choices vary simply on the basis of situational changes.

Therefore, to overcome some of the disadvantages of the previously discussed models, we decided to develop a variety seeking model using the conjoint choice modeling approach that specifically allows one to measure intentional temporal variety seeking behavior as well as seasonality as an important possible explained situational reason for derived varied behavior. Moreover, this model can support theme park planning actions by allowing one to evaluate the impact of such decisions before they are actually implemented. The model is outlined in the next chapter.
7 A CONJOINT CHOICE MODEL OF
SEASONALITY AND VARIETY SEEKING

7.1 INTRODUCTION

The discussion of planning context, choice theories and alternative models of variety seeking behavior, as outlined in the previous chapters, has led to the main conclusion that a conjoint choice modeling approach using experimental design data is potentially most powerful to develop a model of season-sensitive, variety seeking choice behavior that can be applied to predict the demand for theme parks.

The aim of this chapter is to develop such a conjoint choice analysis approach to support the modeling of seasonality and variety seeking in theme park visitors choice behavior. More specifically, we jointly develop a formal consumer choice model that includes the following two components: (i) consumers’ variety seeking behavior in theme park choices, and (ii) seasonal differences in consumers’ preferences for theme parks, and a conjoint experimental design that supports estimation of such model.

In this approach variety seeking is defined as temporal variety seeking behavior implied by a sequence of choices, and occurs if the probability of choosing a certain park \( i \) at time \( t \) depends on the choice of a park at time \( t-1 \). Thus, at the moment of choice, certain parks will become relatively more or less attractive than would be expected on the basis of unconditional preferences for these parks. Seasonality is defined as a possible situational reason for derived varied behavior. The manifestation of this phenomenon can be observed in the theme park market in
the fluctuations in demand between the seasons of the year, over and above the effect of variety seeking.

The chapter is organized as follows. First, definitions and assumptions are given. Next, the proposed choice model of seasonality and variety seeking choices between theme parks is outlined. Then, we define an experimental design approach that supports the proposed model specification. It satisfies the necessary conditions to estimate independently the seasonal and variety seeking effects. The chapter finishes with conclusions. An empirical test of the model is left to chapter 8.

7.2 DEFINITIONS AND ASSUMPTIONS

Variety seeking concerns changing behavior which is caused by the fact that an individual has some desire for change. Note that the reverse of variety seeking behavior is loyalty or repetitive choice behavior, in which individuals derive some utility from choosing the same choice alternative on successive choice occasions. For some readers, the concept of loyalty may have a long-lasting connotation. Most operational models of loyalty behavior, however, are first-order models. Thus, for loyalty seeking consumers the past choice outcome increases the probability of choosing the same alternative on the next choice occasion, whereas for variety seeking the outcome of past choices decreases the probability of selecting the same alternatives in the future. We hypothesize that in theme park choice behavior tourists are seeking variety in their choice behavior and that the variety seeking effects are between specific parks.

In principle, we capture variety seeking behavior by allowing choice behavior at choice occasion $t$ to be influenced by the choices made at occasions $t-1$, $t-2$, $t-3$, ..., 1. However, in the interest of the model development process, we treat variety seeking behavior as a first order feedback only from the consumption occasion previous to the most recent one (i.e. only the choice at $t-1$ affects the choice at $t$). If necessary, the principles we develop can be extended in a straightforward manner to incorporate longer feedback periods.

We hypothesize that seasonality is a major situational cause of derived variation in theme park choice behavior. In other words, we hypothesize that the probability that a consumer selects a theme park is dependent on the season in
which the park is chosen. Formally, we allow the utility of a theme park in season $s_1$ to differ from the utility of the same theme park in season $s_2$. We assumed these effects to be park specific.

To summarize, theme park visitor choice behavior is assumed to be influenced not only by the utility derived from the attributes of the park itself, but also by seasonal context and by previous theme park choices. More specifically, the seasonality and variety seeking choice model is developed from three basic components: (i) the utility derived from the attributes of an alternative, (ii) utility variation due to seasonality, and (iii) the utility derived from variety seeking behavior. Both seasonality and variety seeking are assumed to be park specific. Note that, although seasonality and variety seeking both are time related effects, only variety seeking choices are conditional on previous choices, while seasonality effects are independent of prior choices.

### 7.3 Model Specification

Traditionally, variety seeking and seasonality either have been ignored or assumed to be captured by the error term of the utility function. If one wishes to consider seasonality and variety seeking explicitly, the question becomes how they can be incorporated into the modeling approach. Both seasonality and variety seeking behavior involve time related theme park choices. This implies that one has to observe choices for at least two consecutive choice occasions to investigate seasonality and variety seeking behavior in theme park choice.

Conventional choice models, as outlined in chapter 5, assume the systematic utilities of choice outcomes for each time period to be identical: there are no effects across choice occasions. The outcome of choosing a particular alternative at time $t$ is not influenced or different from the choice at time $t-1$, nor is the preference in season $s_1$ different from the preference in season $s_2$. However, if variety seeking exists, choice probabilities at time $t$ will depend on the choice made at time $t-1$. Likewise, if seasonality exists, the choice probabilities in season $s_2$ will be different from the probabilities in season $s_1$.

In our model, we allow for the possibility that the utility of a choice alternative at time $t$ or season $s_2$ does not only depend on the attributes of the choice
alternative, but also on the alternative chosen at time \( t-1 \), as well as on seasonality effects. We assume that variety seeking and seasonality effects are independent.

Formally this can be expressed as follows. Assume a set of choice alternatives \( A \), where \( A \) is the set of all theme parks considered. Let \( S \) be a set of seasons taken into consideration. Furthermore, let \( T \) be a set of choice occasions. Let \( U_{ist(t) | i'(t-1)} \) be the utility for alternative \( i \in A \) in season \( s \in S \) at choice occasion \( t \in T \), given that alternative \( i' \in A \) was chosen at choice occasion \( t-1 \). Let \( U_{ist(t) | i'(t-1)} \) consists of three structural utility components; (i) \( V_{i-} \), the average utility derived from the attributes of alternative \( i \), across all seasons and choice occasions; (ii) \( V_{ia} \), the incremental (dis)utility of alternative \( i \) due to a particular season \( s \) across all choice occasions; and (iii) \( V_{it(t) | i'(t-1)} \), the incremental (dis)utility derived from variety seeking behavior from choosing alternative \( i \) after alternative \( i' \), across all seasons. Let \( e_{ist(t) | i'(t-1)} \) be the random error component. Then, the total utility can be expressed as:

\[
U_{ist(t) | i'(t-1)} = V_{ist(t)} + e_{ist(t) | i'(t-1)} = V_{i-} + V_{ia} + V_{it(t) | i'(t-1)} + e_{ist(t) | i'(t-1)}
\]

The value of the structural utility for alternative \( i \) in season \( s \) given that alternative \( i' \) was chosen on the previous choice occasion depends on the structure of the part-worth utilities in the model. If a linear compensatory model is assumed, this can be formalized as follows:

\[
V_{ist(t) | i'(t-1)} = \beta_{0.} + \beta_{i-} X_i + \sum_k \beta_{ki} X_{ki} \\
+ \theta_{is} X_s \\
+ \sum_{s \in A} \sum_{i \in A} Y_{i(t) | i'(t-1)} C_{i(t) | i'(t-1)}
\]

where,
\[\beta_{0.}\]
is the constant indicating the average utility of visiting a theme park (the difference in utility between the park alternatives and the base alternative of no park visit), estimated across all seasons and choice occasions;
A conjoint choice model of seasonality and variety seeking

$\beta_{i.}$ is an alternative-specific effect, across all seasons and choice occasions;

$X_i$ is a dummy variable for alternative $i$;

$\beta_{ki.}$ is a parameter indicating the effect of the $k$th ($k=1,2,...,K$) attribute of alternative $i$; across all seasons and occasions;

$X_{ki}$ is the $k$th attribute of alternative $i$;

$\theta_{is.}$ is a parameter denoting the effect of season $s$ on alternative $i$, across all choice occasions;

$X_s$ is a dummy indicating the season $s$;

$\gamma_{i,(t)|i',(t-1)}$ is a parameter indicating the variety seeking effect of having chosen alternative $i'$ at choice occasion $(t-1)$ on the utility of choosing alternative $i$ at occasion $t$, across all seasons;

$C_{i(t)|i'(t-1)}$ is a combination specific dummy indicating whether the alternatives chosen at choice occasion $t$ and occasion $(t-1)$ are identical or different.

We need to note that park $i'(t-1)$ may be the same alternative as $i(t)$ or different, allowing for identical or varied choices at $(t-1)$ and $t$.

The simple MNL model can be used to predict the probability that alternative $i$ will be chosen in season $s$ at occasion $t$ conditional on the fact that alternative $i'$ was chosen on the previous choice occasion. If it is assumed that the distributions of the error components $\varepsilon_{i(t)|i'(t-1)}$ are independently and identically distributed (IID) according to a Gumbel distribution, the probability is given by:

$$P(i_{s(t)}|i'(t-1)|A) = \frac{\exp\left(\beta_0 + \beta_{is}X_s + \sum_k \beta_{ki}X_{ki} + \theta_{is}X_sX_i + \gamma_{i,(t)|i',(t-1)}C_{i(t)|i'(t-1)}\right)}{\sum_{i'\in A} \exp\left(\beta_0 + \beta_{i's}X_{s'} + \sum_k \beta_{k'i'}X_{ki'} + \theta_{i's}X_{s'}X_{i'} + \sum_{i'\in A} \gamma_{i,(t)|i',(t-1)}C_{i(t)|i'(t-1)}\right)}$$

(7.3)

The parameters $\theta_{is.}$ denote the effect of seasonality. The more significant and larger these parameters, the larger the effect of seasonality and thus the larger the differences in preferences for the alternatives in different seasons. If consumers do not differ in their preferences for the parks by season these parameters will not be significantly different from 0.

The parameters $\gamma_{i,(t)|i',(t-1)}$ indicate the variety seeking effects and will reveal if
variety seeking effects between parks exist. These variety seeking parameters are estimated for all combinations of parks, and therefore reflect both variety seeking behavior and repetitive choice behavior. The larger the absolute value of these parameters, the larger the influence that a previously chosen alternative has on current choice.

To estimate the parameters in the choice model, maximum likelihood estimation can be used, as discussed in chapter 5. The likelihood ratio test can be used to test for the hypothesis that all parameters are equal to zero and for simplifications of the model in which seasonality and/or variety seeking effects are omitted. McFadden’s rho square can be used to indicate the goodness of fit of the choice model.

7.4 EXPERIMENTAL DESIGN APPROACH

To estimate the proposed variety seeking and seasonality model discussed in the previous section, we decided to use an experimental design that allows one to estimate independently the following effects: (i) park specific effects along with attribute effects of the parks (ii) seasonality effects for at least two different seasons \( s_1 \) and \( s_2 \), and (iii) variety seeking effects among parks chosen at at least two different choice occasions \( (t-1 \text{ and } t) \). As indicated before, in choice experiments, respondents’ choices are affected less by extrinsic motivations and constraints than for example in revealed choice data, which results in a better representation of variety seeking and seasonality.

To allow for a test for seasonality and variety seeking within the same experiment, we set choice occasion \( t-1 \) to be in season \( s_1 \) and choice occasion \( t \) in season \( s_2 \). Variety seeking components are assumed to be independent of seasonality in the current study. Given these assumptions, the experiments must be designed in such a way that seasonality effects between seasons \( s_1 \) and \( s_2 \) can be estimated separately from variety seeking effects between \( t-1 \) and \( t \). For the construction of the experimental design, this implies that the parks available in the two seasons should be varied independently within and between seasons. Moreover, modeling variety seeking requires one to estimate conditional effects between theme park choices over time. Considering two time periods, the experimental design needs to allow
one to estimate interaction effects between the parks available in the two time periods. As discussed in the previous section, we assume both seasonality and variety seeking effects to be park specific.

As discussed in chapter 5, the construction of such an experiment requires the design of choice alternatives, and the creation of choice sets. Two design strategies are available. These design strategies are: (i) to produce choice sets of varying size that allow the estimation of availability effects, and (ii) to produce choice sets of fixed size that allow one to estimate cross effects. In principle, these strategies also qualify to estimate the suggested model of seasonality and variety seeking.

The advantage of the second design strategy is that the attributes of all alternatives are orthogonal to one another within and between alternatives. However, a major disadvantage is that compared to the first design strategy the design sizes increase more rapidly when a time factor is included. Therefore, the first design approach focusing on choice sets of varying size and composition is preferred.

Choice sets of varying size and composition are constructed by using a $2^N$ design, where $N$ is the number of choice alternatives (e.g., Louviere and Woodworth, 1983; Anderson and Wiley, 1992). This experimental design indicates for each park the presence or absence in each of the choice sets. To allow for an independent estimation of the variety seeking and seasonality effects, the design should be extended for each time period. Thus a $2^{NT}$ design, where $N$ is the number of choice alternatives and $T$ is the number of time periods, can be used to test for seasonality and variety seeking effects. This design allows the independent estimation of the main effects of the parks within and between the two seasons and the independent estimation of interaction effects between the parks available in each time period. This design strategy results in a number of choice sets of varying size and composition, each consisting of one set of alternatives describing the availability/non-availability of each park in each time period.

To add attribute effects to the park specific constants, the attribute levels for each park are varied according to an orthogonal fraction of a $L^K$-design ($L$ is the number of attribute levels and $K$ is the number of attributes) in a number of attribute profiles. These attribute profiles are assigned to the parks in the choice sets as created by the $2^{NT}$-design. Thus, the attribute profiles are nested under the parks available in the choice sets. Therefore, the total number of profiles in the attribute
design needs to be equal to or less than the total number of times a park is available in the choice sets. For example, if each park is available 8 times in the choice sets for each park design a maximum of eight attribute profiles can be used. Because these attribute designs are nested under the orthogonal columns indicating the availability/non-availability of the parks in the choice sets, the final design, including the attributes, is orthogonal as well.

<table>
<thead>
<tr>
<th>Choice Set</th>
<th>Parks</th>
<th>Parks</th>
<th>Combination of parks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A₁</td>
<td>A₂</td>
<td>A₁A₂ A₁B₂ B₁A₂ B₁B₂</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1 1 1 1 1 1 1</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1 -1 1 -1 1 -1</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>-1</td>
<td>1 -1 1 1 -1 1</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>-1</td>
<td>1 -1 1 1 -1 1</td>
</tr>
<tr>
<td>5</td>
<td>-1</td>
<td>1</td>
<td>-1 1 1 1 -1 1</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>1</td>
<td>1 1 1 -1 1 -1</td>
</tr>
<tr>
<td>7</td>
<td>-1</td>
<td>1</td>
<td>-1 1 1 -1 1 -1</td>
</tr>
<tr>
<td>8</td>
<td>-1</td>
<td>-1</td>
<td>-1 -1 1 1 1</td>
</tr>
<tr>
<td>9</td>
<td>-1</td>
<td>1</td>
<td>-1 -1 1 1 -1</td>
</tr>
<tr>
<td>10</td>
<td>1</td>
<td>-1</td>
<td>1 -1 1 -1 1</td>
</tr>
<tr>
<td>11</td>
<td>-1</td>
<td>1</td>
<td>1 -1 1 1 -1</td>
</tr>
<tr>
<td>12</td>
<td>-1</td>
<td>1</td>
<td>1 -1 1 -1 1</td>
</tr>
<tr>
<td>13</td>
<td>-1</td>
<td>-1</td>
<td>-1 -1 1 -1 1</td>
</tr>
<tr>
<td>14</td>
<td>1</td>
<td>-1</td>
<td>1 -1 -1 -1 1</td>
</tr>
<tr>
<td>15</td>
<td>-1</td>
<td>1</td>
<td>-1 1 1 -1 1</td>
</tr>
<tr>
<td>16</td>
<td>-1</td>
<td>-1</td>
<td>1 1 1 1 -1 1</td>
</tr>
</tbody>
</table>

Consider the example of a $2^{NT}$ experimental design as depicted in table 7.1. In this example there are two parks that could be present (indicated by 1) or absent (indicated by −1) in each choice set in each of the two time periods. This $2^{2+2}$-design allows the independent estimation of the main effects of the parks within and between each time period. Therefore, possible shifts in preferences between the periods can be estimated for all parks, indicating variation in visitors preferences for the parks due to seasonality. Furthermore, the interaction effects between the parks
A conjoint choice model of seasonality and variety seeking

available at the time periods $t-1$ and $t$ can be estimated independently of the main effects of the parks available at both time periods. This allows testing for variety seeking behavior among the two alternatives between the two time periods. For the attributes, a separate design needs to be created and nested under the parks available in the choice sets as generated by the $2^{NT}$-design. Table 7.2 presents the choice sets created by a $2^{2*2}$-design, combined with the attributes for each park. Note that for each park (A₁, A₂, B₁ and B₂) eight attribute profiles are created by a separate orthogonal fraction of a $L^K$-design (depending on the number of attributes and their levels).

Table 7.2 Example of the choice sets

<table>
<thead>
<tr>
<th>Choice Set</th>
<th>Time Period 1</th>
<th>Time Period 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(t-1/s₁)</td>
<td>(t/s₂)</td>
</tr>
<tr>
<td></td>
<td>Parks and their attributes</td>
<td>Parks and their attributes</td>
</tr>
<tr>
<td>1</td>
<td>ParkA₁+Attributes A₁</td>
<td>ParkB₁+Attributes B₁</td>
</tr>
<tr>
<td>2</td>
<td>ParkA₁+Attributes A₁</td>
<td>ParkB₁+Attributes B₁</td>
</tr>
<tr>
<td>3</td>
<td>ParkA₁+Attributes A₁</td>
<td>ParkB₁+Attributes B₁</td>
</tr>
<tr>
<td>4</td>
<td>ParkA₁+Attributes A₁</td>
<td>ParkB₁+Attributes B₁</td>
</tr>
<tr>
<td>5</td>
<td>ParkA₁+Attributes A₁</td>
<td>ParkB₁+Attributes B₁</td>
</tr>
<tr>
<td>6</td>
<td>ParkA₁+Attributes A₁</td>
<td>ParkB₁+Attributes B₁</td>
</tr>
<tr>
<td>7</td>
<td>ParkA₁+Attributes A₁</td>
<td>ParkB₁+Attributes B₁</td>
</tr>
<tr>
<td>8</td>
<td>ParkA₁+Attributes A₁</td>
<td>ParkB₁+Attributes B₁</td>
</tr>
<tr>
<td>9</td>
<td>ParkB₁+Attributes B₁</td>
<td>ParkA₂+Attributes A₂</td>
</tr>
<tr>
<td>10</td>
<td>ParkB₁+Attributes B₁</td>
<td>ParkA₂+Attributes A₂</td>
</tr>
<tr>
<td>11</td>
<td>ParkB₁+Attributes B₁</td>
<td>ParkA₂+Attributes A₂</td>
</tr>
<tr>
<td>12</td>
<td>ParkB₁+Attributes B₁</td>
<td>ParkA₂+Attributes A₂</td>
</tr>
<tr>
<td>13</td>
<td>ParkA₂+Attributes A₂</td>
<td>ParkB₂+Attributes B₂</td>
</tr>
<tr>
<td>14</td>
<td>ParkA₂+Attributes A₂</td>
<td>ParkB₂+Attributes B₂</td>
</tr>
<tr>
<td>15</td>
<td>ParkA₂+Attributes A₂</td>
<td>ParkB₂+Attributes B₂</td>
</tr>
<tr>
<td>16</td>
<td>ParkB₂+Attributes B₂</td>
<td>ParkB₂+Attributes B₂</td>
</tr>
</tbody>
</table>

For estimation purposes, the experimental design needs to be reorganized into a design matrix which is statistically equivalent but facilitates easy interpretation of model parameters. The analysis of the conjoint choice data involves the estimation of a model including parameters that indicate: (i) the preferences for the parks and their attributes, (ii) parameters denoting the seasonal differences in preferences for
the parks, and (iii) parameters indicating variety seeking effects between the theme parks.

The estimation of the variety seeking parameters requires the aggregation of the observed choices for the given alternatives at choice occasion $t$, conditionally on the alternatives chosen at $t-1$. Dummy variables are used to represent the theme parks, with one park serving as the base. Dummy coding is also used to represent variety seeking effects between the parks chosen at $t$ and $t-1$. The constant is coded as 1 for all parks and 0 for the base alternative added to each choice set, and that is defined as ‘would not go’.

To estimate the seasonality effects, responses for one time period need to be combined with those for the other time period. This allows the overall estimation of consumers’ preferences for particular parks, independent of the season. To test for seasonality, the interaction of season and parks is included in the estimation design (using effect coding (1, -1) for the two seasons). Finally, attribute vectors are also effect-coded (see section 5.5.6), allowing for the estimated parameters to be interpreted in terms of the difference in utility between the corresponding level and the mean utility across all attributes.

7.5 CONCLUSION

In this chapter we discussed the development of a choice model and conjoint experimental design strategy to include and estimate variety seeking and seasonality effects. The proposed conjoint choice model of variety seeking and seasonality was developed from three basic components: (i) the utility derived from the attributes of an alternative, (ii) the utility derived from seasonality, and (iii) the utility derived from variety seeking behavior.

The proposed seasonality and variety seeking choice model differs from most existing variety seeking models discussed in chapter 6, in that it allows one to make a distinction between intentionally and derived varied behavior in the sense that we see seasonality as one factor causing derived behavior, whereas the interaction effects pick up intentionally variety seeking behavior. Now, it should be evident that we will not capture all possible causes of variation in behavior. Seasonality is selected as one of the most important determinants of derived varied behavior, while
the chosen experimental design approach implies that we control for any other possible cause. We are not arguing that such other causes do not exist, only that they cannot exert any systematic influence on the estimated parameters, given the nature of the constructed experimental design.

In the next chapter an empirical application of the proposed approach will be discussed.
Temporal aspects of theme park choice behavior
8 VARIETY SEEKING AND SEASONALITY IN
THEME PARK CHOICES OF TOURISTS

8.1 INTRODUCTION

This chapter discusses the results of a study to test the proposed conjoint choice model that incorporates variety seeking and seasonality effects. Two possible effects of variety seeking behavior are investigated: (i) is park type choice at choice occasion \( t \) influenced by the choice of type of park at occasion \( t-1 \); and (ii) do similar effects occur between choices within a particular type of park. Hence, we are testing for the existence of both within and between type of park effects.

To test for both these variety seeking effects we conducted two experiments: experiment 1 involved generic theme park types and some attributes describing these parks, and experiment 2 dealt with specific, existing theme parks in the Netherlands. The specific theme parks are so well known to tourists in the Netherlands that it is not possible and necessary to describe them in more attributes than only the entrance fee. Note that, although we focus specifically on variety seeking choice behavior between theme parks, the experiments also allowed testing for loyalty behavior, which in the present context was defined as a tourist choosing the same theme park on two successive occasions.

To test for seasonality we investigated the differences in consumer preferences for park types and specific parks in the spring and summer season, when the theme parks in the Netherlands attract most visitors. Seasonality effects are mostly due to weather conditions.
To allow for a test for seasonality and variety seeking within the same experiment, we set choice occasion \( t-1 \) to take place in the spring season and choice occasion \( t \) in the summer season (note that consumers are ‘allowed’ to choose only one park in each season). Therefore, only variety seeking components between the seasons are addressed in the current study. We need to note that the experiments are designed in such a way (see also chapter 7) that seasonality effects can be estimated independently of variety seeking effects between \( t-1 \) and \( t \).

In particular, we can test if the utility of a theme park alternative at time \( t \) does not only depend on the attributes of the park, but also on the park chosen at time \( t-1 \), as well as on seasonality effects. The pattern of estimates will reveal whether within and between park type variety seeking effects exist. The seasonality effects will show if consumers differ in their preferences for parks by season.

The chapter is organized as follows. First, experiment 1 on theme park type choice behavior is outlined, including a description of the procedures that we used to collect data, and the analysis and results. Next, the same steps for experiment 2 on specific theme park choice behavior are addressed. The chapter is completed with a discussion of planning implications and conclusions.

### 8.2 Experiment 1: Theme Park Type Choice

Experiment 1 addressed variety seeking and seasonality in the context of generic theme park types and some of the key attributes of tourists’ theme park choices. The main purpose of this experiment was to investigate the question whether or not tourists were intentional variety seekers in their theme park choices and if their preferences shifted over the seasons.

There are several steps in designing a conjoint choice experiment. First, the relevant attributes and appropriate levels of each attribute in the choice process need to be defined. Next, a design needs to be developed to generate profiles and place these profiles into choice sets. Finally, the choice task in which profiles and choice sets are presented to respondents need to be constructed. The next sections describe these successive steps from the perspective of the theme park types experiment.

The choice tasks of experiment 1 were presented in the Autumn of 1994 to respondents in the Netherlands as part of a larger questionnaire on theme park
choice behavior. This questionnaire was sent to a group of 4718 households with children living at home under the age of 18. This sample was selected from a commercial database that contained some 900,000 households, who fill out a questionnaire on a variety of topics every three years. Respondents were approached by mail and invited to participate in the present study. A free mail back envelope was provided. A total of 2359 respondents returned the questionnaire, representing a response rate of 50%, which is good for Dutch standards.

### 8.2.1 ATTRIBUTE ELICITATION

The choice experiment in this study was developed as follows. First, a literature search was conducted to identify the attributes of interest (e.g. Lieber and Fesenmaier, 1985; McClung, 1991; and section 4.2). The resulting attribute list was refined using interviews with theme park managers in the Netherlands.

<table>
<thead>
<tr>
<th>Attributes</th>
<th>Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of park</td>
<td>• Amusement park&lt;br&gt;• Zoo&lt;br&gt;• Cultural/educational park for children&lt;br&gt;• Cultural/educational park for adults</td>
</tr>
<tr>
<td>Travel time from home</td>
<td>• 1 hour&lt;br&gt;• 2 hours</td>
</tr>
<tr>
<td>Size of the park</td>
<td>• small&lt;br&gt;• large</td>
</tr>
<tr>
<td>Availability of bad weather facilities</td>
<td>• not available&lt;br&gt;• available</td>
</tr>
<tr>
<td>Full day trip</td>
<td>• no&lt;br&gt;• yes</td>
</tr>
<tr>
<td>Entrance fee</td>
<td>• Nlg 15,-&lt;br&gt;• Nlg 30,-</td>
</tr>
</tbody>
</table>

This procedure resulted in four different types of parks: (a) amusement parks, (b) zoos, (c) cultural/educational parks that are especially suitable for children, and (d) cultural/educational parks that are primarily targeted to adults. Five attributes to
describe each theme park were identified, and each of these was assigned two levels. The selected attributes and their levels were: travel time from home (1 and 2 hours), size of the park (small, large), availability of bad weather facilities (available, not available), full day trip (yes, no) and entrance fee (Nlg 15.-, Nlg 30.-). An overview of the attributes and their levels is provided in table 8.1.

Seasonality effects were examined in the experiment for the spring and summer season, because in those seasons the theme parks in the Netherlands attract most visitors.

8.2.2 EXPERIMENTAL DESIGN

As explained in chapter 7, testing the proposed variety seeking model requires the independent estimation of all interaction effects among the parks chosen at two successive choice occasions. Testing for seasonality effects requires the independent estimation of the parameters indicating differences in consumer preferences for various parks between the seasons. Thus, the experimental design should satisfy the conditions required to estimate the variety seeking and seasonality effects.

The following design strategy was used to create the profiles and choice sets that allow the estimation of the required effects. There were $2^{4\times2}=256$ possible choice set combinations, because the four types of theme parks could either be present or absent in the choice set ($2^4$ combinations), at the two choice occasions (spring and summer). From this total set, an orthogonal fraction, consisting of 64 choice sets was selected. The experimental design indicates for each park type the presence or absence in each of the choice sets. Thus, this resulted in 64 choice sets of varying size and composition, each consisting of one set of alternatives describing the availability/non-availability of each of the four park types for the spring and one set of alternatives for the summer period.

Because there were 5 two-level attributes for each park type, the attribute levels of the parks were varied according to a full factorial $2^5$ design in 32 profiles. In addition to the estimation of all main effects, this design allows the estimation of interaction effects between the attributes: entrance fee and travel time, full day trip, size of the park and availability of bad weather facilities; and between full day trip and travel time, park size, and availability of bad weather facilities. These profiles were assigned to the park’s positions in the choice sets.
Please select the park you would most likely visit on your first trip in the spring of 1995, and next select the park you would most likely visit on the first trip in the summer of 1995, given your choice of park in the spring of 1995.

**Figure 8.1 Example of a choice task for the theme park type experiment**
8.2.3 THE CHOICE TASK

Each respondent was presented 4 choice sets with combinations of spring and summer alternatives. Respondents were asked to imagine that they would make one trip in the spring and one in the summer. For each choice set, respondents were then asked to select the theme park they liked best as a place to visit in the spring, and to select the park they would visit in the summer. To familiarize respondents with the experimental task, they processed a few trial choice sets before they received the experimental choice sets. A constant base alternative, described as ‘no park visit’ was added to each choice set. An example of a choice set for the theme park type experiment is presented in figure 8.1.

8.2.4 SAMPLE DESCRIPTIVES

A description of the distribution of the respondents in the sample on a series of socio-demographics is given in table 8.2. The profile of the respondents showed an equal mix of women and men, of which fifty percent were in the age group of 20-39 years and forty three percent in the 40-59 years group. Most of the households consist of four or five persons, while only a small percentage are households with six or more persons. Almost seventy percent of the households had children under the age of twelve. Household disposable income was of a medium level for the largest group, but still some twenty percent belonged to the high level income group.

The respondents were also asked about their actual theme park visits in 1994 and their plans for 1995. Briefly summarized, in 1994, eighty percent of the respondents visited at least one theme park, and the same number of people planned a visit to a theme park in 1995. About twenty two percent of the respondents visited only one park in 1994, while twenty percent visited two parks, fourteen percent three parks, and twenty four percent of the respondents visited more than four parks. Respondents who had visited a park in 1994, on average visited 2.25 parks. In 1994, ninety six percent of the successive trips made by the respondents to theme parks involved different parks, and eighty four percent of these trips involved visits to different theme park types.
Table 8.2 Sample characteristics

<table>
<thead>
<tr>
<th>Variables</th>
<th>Levels</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Female</td>
<td>50.8</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>49.2</td>
</tr>
<tr>
<td>Age</td>
<td>&lt; 20 years</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td>20 &lt; 40 years</td>
<td>52.2</td>
</tr>
<tr>
<td></td>
<td>40 &lt; 60 years</td>
<td>43.0</td>
</tr>
<tr>
<td></td>
<td>≥ 60 years</td>
<td>3.8</td>
</tr>
<tr>
<td>Education level</td>
<td>Low</td>
<td>22.5</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>40.5</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>37.0</td>
</tr>
<tr>
<td>Income</td>
<td>Low</td>
<td>11.4</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>67.6</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>21.0</td>
</tr>
<tr>
<td>Age youngest child</td>
<td>&lt; 6 years</td>
<td>42.2</td>
</tr>
<tr>
<td></td>
<td>6 &lt; 12 years</td>
<td>25.4</td>
</tr>
<tr>
<td></td>
<td>12 &lt; 18 years</td>
<td>19.9</td>
</tr>
<tr>
<td></td>
<td>≥ 18 years</td>
<td>12.5</td>
</tr>
<tr>
<td>Number of persons in household</td>
<td>&lt; 4</td>
<td>33.0</td>
</tr>
<tr>
<td></td>
<td>4 &lt; 6</td>
<td>62.5</td>
</tr>
<tr>
<td></td>
<td>≥ 6</td>
<td>4.5</td>
</tr>
</tbody>
</table>

8.2.5 Analysis

As explained in chapter 7, the parameters of the following model were estimated:

\[
V_{is(t)|t'(t-1)} = \beta_{0.} + \beta_{i.}X_i + \sum_{k} \beta_{k.}X_{ki} + \theta_{is}X_iX_s + \sum_{i \in A} \sum_{i' \in A} \gamma_{i,(t)|t'(t-1)} C_{i(t)}|t'(t-1)
\]  (8.1)

where,

\( \beta_{0.} \) is the constant indicating the average utility of visiting a theme park (the difference in utility between the theme park alternatives and the
base alternative of no park visit), estimated across all seasons and choice occasions;

$\beta_i.$
is a theme park type specific effect, estimated across all seasons and occasions;

$X_i$
is a dummy variable for park type $i$;

$\beta_{ki}.$
is a parameter indicating the effect of the $k$th ($k=1,2,...,K$) attribute of theme park type $i$, estimated across all seasons and occasions;

$X_{ki}$
is the $k$th attribute of park $i$;

$\theta_{is}$.
is a parameter denoting the effect of season $s$ on park type $i$, estimated across all choice occasions;

$X_s$
is a coded variable indicating season $s$;

$\gamma_{i(t)|i'(t-1)}$
is a parameter indicating the variety seeking effect of having chosen park $i'$ at choice occasion $t-1$ on the utility of choosing park $i$ at choice occasion $t$, estimated across all seasons;

$C_{i(t)|i'(t-1)}$
is a combination specific dummy variable indicating the combination of theme park types chosen at choice occasion $t$ and occasion $t-1$.

Note that park $i'(t-1)$ may be the same as park $i(t)$, allowing for identical or varied choices at $t-1$ and $t$.

To estimate this model, the observed choices for the choice alternatives were aggregated across choice sets. More specifically, the estimation of the variety seeking parameters required that the observed choices for the given alternatives at choice occasion $t$ were aggregated, conditionally on the alternatives chosen at $t-1$.

Dummy variables were used to represent the park types, and one park served as the base. Dummy coding was also used to represent variety seeking effects between the parks chosen at $t$ and $t-1$. The constant was coded as 1 for all parks and 0 for the constant base alternative ‘would not go’. The interaction of season and parks were effect coded (spring +1, summer -1). Finally, attribute vectors were also effect-coded, implying that the estimated parameters can be interpreted in terms of the difference in utility between the corresponding level and the mean utility across all the attributes. The specific coding of these attributes is shown in table 8.3.

Maximum likelihood estimation was used to estimate the parameters of the choice model. The log likelihood value at convergence $LL(B)$ was compared with the log likelihood of the random choice model $LL(0)$ (i.e., the log likelihood that arises when the choice for each alternative is assumed to be equally likely) to test if the estimated choice model significantly improved the null model. This was tested
using the likelihood ratio test statistic \( G^2 = -2[LL(0)-LL(B)] \), which tests the hypothesis that all parameters are equal to zero. This statistic is asymptotically chi-squared distributed with degrees of freedom equal to the number of free parameters in the model. McFadden's rho square = \( 1-\frac{LL(B)}{LL(0)} \) was used to indicate the goodness of fit of the estimated choice model.

### Table 8.3 Coding of attributes theme park type experiment

<table>
<thead>
<tr>
<th>Attributes</th>
<th>Levels</th>
<th>Coding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of park</td>
<td>• Amusement park</td>
<td>1 0 0 0</td>
</tr>
<tr>
<td></td>
<td>• Zoo</td>
<td>0 1 0</td>
</tr>
<tr>
<td></td>
<td>• cultural/educational park for children</td>
<td>0 0 1</td>
</tr>
<tr>
<td></td>
<td>• cultural/educational park for adults</td>
<td>0 0 0</td>
</tr>
<tr>
<td>Travel time from home</td>
<td>• 1 hour</td>
<td>-1</td>
</tr>
<tr>
<td></td>
<td>• 2 hours</td>
<td>1</td>
</tr>
<tr>
<td>Size of the park</td>
<td>• small</td>
<td>-1</td>
</tr>
<tr>
<td></td>
<td>• large</td>
<td>1</td>
</tr>
<tr>
<td>Availability of bad weather facilities</td>
<td>• not available</td>
<td>-1</td>
</tr>
<tr>
<td></td>
<td>• available</td>
<td>1</td>
</tr>
<tr>
<td>Full day trip</td>
<td>• no</td>
<td>-1</td>
</tr>
<tr>
<td></td>
<td>• yes</td>
<td>1</td>
</tr>
<tr>
<td>Entrance fee</td>
<td>• Nlg 15,-</td>
<td>-1</td>
</tr>
<tr>
<td></td>
<td>• Nlg 30,-</td>
<td>1</td>
</tr>
</tbody>
</table>

### 8.2.6 RESULTS

The results of the analysis of the theme park type choice experiment are presented in this section. We present results of the seasonality and variety seeking model for parks types. These results include a discussion of the preferences for the theme park types and their attributes, and the seasonality and variety seeking effects between the parks.

#### Seasonality and variety seeking model for park types

Table 8.4 presents the parameter estimates for the following three aspects: (i) respondents’ preferences for the type of parks and their attributes; (ii) the effects of
seasonality in consumer preferences for park types; and (iii) variety seeking behavior between theme park types. Specifically, it includes parameters for the constant, the different park types, the attribute levels, the interactions between some of the attributes, the seasonal differences for the park types, the variety seeking and loyalty behavior effects between the theme park types, and the significance of all those parameters. Table 8.5 presents model statistics.

The overall fit of the model is good, with McFadden’s rho square value of 0.57. Most of the parameter values were significant at the 95% confidence level. Loglikelihood ratio tests showed that the model including parameters for the park types, the attributes and the interactions between the attributes, seasonal differences and variety seeking outperformed simpler models as indicated by table 8.5. This provides strong support for the existence of variety seeking and seasonality in consumer choice of theme park types. This is an important finding, placing doubt on the validity of more commonly used multinomial logit models of preference functions and choice behavior.

Table 8.4 Parameter estimates for the theme park types and their significance

<table>
<thead>
<tr>
<th>Attributes</th>
<th>Estimates</th>
<th>Standard error</th>
<th>t-statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-1.68</td>
<td>.07</td>
<td>-24.80</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Park type effects</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Amusement park</td>
<td>1.51</td>
<td>.07</td>
<td>20.24</td>
</tr>
<tr>
<td>Zoo</td>
<td>1.41</td>
<td>.08</td>
<td>18.40</td>
</tr>
<tr>
<td>Cultural/educational park for children</td>
<td>1.12</td>
<td>.08</td>
<td>14.37</td>
</tr>
<tr>
<td>Cultural/educational park for adults</td>
<td>0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Attribute effects: main effects</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Travel time</td>
<td>-.20</td>
<td>.02</td>
<td>-11.01</td>
</tr>
<tr>
<td>Size of the park</td>
<td>.24</td>
<td>.02</td>
<td>13.32</td>
</tr>
<tr>
<td>Availability of bad weather facilities</td>
<td>.24</td>
<td>.02</td>
<td>13.31</td>
</tr>
<tr>
<td>Full day trip</td>
<td>.36</td>
<td>.02</td>
<td>19.91</td>
</tr>
<tr>
<td>Entrance fee</td>
<td>-.46</td>
<td>.02</td>
<td>-25.06</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Attribute effects: interaction effects</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Travel time * Full day trip</td>
<td>.03</td>
<td>.02</td>
<td>1.65</td>
</tr>
</tbody>
</table>
Variety seeking and seasonality in theme park choices of tourists

<table>
<thead>
<tr>
<th>Attributes</th>
<th>Estimates</th>
<th>Standard error</th>
<th>t-statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Travel time * Entrance fee</td>
<td>.09</td>
<td>.02</td>
<td>4.84</td>
</tr>
<tr>
<td>Size of the park * Full day trip</td>
<td>-.01</td>
<td>.02</td>
<td>-.75</td>
</tr>
<tr>
<td>Size of the park * Entrance fee</td>
<td>.00</td>
<td>.02</td>
<td>.43</td>
</tr>
<tr>
<td>Availability of bad weather facilities * Full day trip</td>
<td>-.00</td>
<td>.02</td>
<td>-.04</td>
</tr>
<tr>
<td>Availability of bad weather facilities * Entrance fee</td>
<td>.03</td>
<td>.02</td>
<td>1.43</td>
</tr>
<tr>
<td>Full day trip * Entrance fee</td>
<td>.03</td>
<td>.02</td>
<td>1.58</td>
</tr>
</tbody>
</table>

Seasonality effects

| Amusement park                                                            | .00       | .04            | .22         |
| Zoo                                                                       | .26       | .05            | 5.86        |
| Cultural/educational park for children                                    | .18       | .05            | 3.95        |
| Cultural/educational park for adults                                      | .36       | .07            | 5.34        |

Loyalty behavior effects

| Amusement park * Amusement park                                          | 1.15      | .15            | 7.54        |
| Zoo * Zoo                                                                 | .26       | .14            | 1.88        |
| Cultural/edu for children * Cultural/edu for children                     | .90       | .17            | 5.17        |
| Cultural/edu for adults * Cultural/edu. for adults                       | 1.78      | .23            | 7.77        |

Variety seeking effects

| Zoo * Amusement park                                                     | .83       | .13            | 6.66        |
| Cultural/educational for children * Amusement park                       | .60       | .14            | 4.18        |
| Cultural/educational for adults * Amusement park                         | .02       | .20            | .12         |
| Amusement park * Zoo                                                     | .92       | .13            | 6.83        |
| Cultural/educational for children * Zoo                                  | .67       | .14            | 4.64        |
| Cultural/educational for adults * Zoo                                    | .43       | .22            | 1.97        |
| Amusement park * Cultural/educational for children                       | .69       | .14            | 4.74        |
| Zoo * Cultural/educational for children                                  | .92       | .13            | 7.03        |
| Cultural/edu for adults * Cultural/edu for children                      | .02       | .23            | .08         |
| Amusement park * Cultural/educational for adults                         | .37       | .23            | 1.58        |
| Zoo * Cultural/educational for adults                                    | .71       | .20            | 3.60        |
| Cultural/edu for children * Cultural/edu for adults                      | .50       | .23            | 2.11        |
Table 8.5  Model comparisons theme park type experiment

<table>
<thead>
<tr>
<th>Model</th>
<th>Log-likelihood</th>
<th># parameters</th>
<th>McFadden’s Rho square</th>
</tr>
</thead>
<tbody>
<tr>
<td>Null model $LL(0)$</td>
<td>-2784.77</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model with park types only</td>
<td>-2141.72*</td>
<td>4</td>
<td>.23</td>
</tr>
<tr>
<td>Model with park types + attributes</td>
<td>-1341.47*</td>
<td>9</td>
<td>.52</td>
</tr>
<tr>
<td>Model with park types + attributes + interactions</td>
<td>-1321.26*</td>
<td>16</td>
<td>.52</td>
</tr>
<tr>
<td>Model with park types + attributes + interactions+ seasonality</td>
<td>-1289.65*</td>
<td>20</td>
<td>.53</td>
</tr>
<tr>
<td>Model with park types + attributes + interactions+ seasonality + variety seeking</td>
<td>-1176.48*</td>
<td>36</td>
<td>.57</td>
</tr>
</tbody>
</table>

* loglikelihood significantly better than previous model at a 95 % confidence level in loglikelihood ratio test

Preferences for theme park types and their attributes
The constant of the estimated choice model indicates the average difference in utility between the theme park alternatives and the base alternative of ‘no park visit’. Because many respondents selected the base alternative, the parameter value of this constant is negative, indicating that the probability of visiting any one of the park types is lower than the probability of staying at home. We calculated the probability that a visitor would choose the ‘no park visit’ option and we found that on average across all park types 30 percent of the respondents preferred to stay at home. This percentage is higher than could be expected on basis of the revealed theme park choices, in which 20 percent of the respondents choose not to visit a theme park. This may be due to the fact that respondents when making a choice from generic parks find it difficult to think of all possible options they have for visiting a theme park within the type. Therefore, they may underestimate the utility of generic park types relative to a set of specifically named theme parks.

The park type specific parameters show that in general, consumers prefer amusement parks, followed by zoos and cultural/educational parks for children. Least preferred are cultural/educational parks targeted at adults. This is not surprising because the respondents all came from households with children.

The parameter estimates for the attributes show that utility decreases with increasing travel time and entrance fee, and increases with the size of park, the availability of bad weather facilities, and the ability to spend a full day in the park. Furthermore, a low entrance fee and the possibility to spend a whole day in the park
are considered most important, as indicated by the higher parameter values. There is a significant positive interaction between travel time and entrance fee, indicating that parks are particularly attractive if they are both nearby and not expensive, or far away and expensive.

**Seasonality**
The seasonality parameters indicate that consumers differ in their preferences for theme park types by season. More specifically, figure 8.2 shows the choice probabilities for the park types in spring versus summer, assuming that the respondents could choose from all four park types in both spring and summer, and all else being equal. The following MNL model was used to calculate these probabilities.

\[
P(is|A) = \frac{\exp(\beta_i \cdot X_i + \theta_{is} \cdot X_s)}{\sum_{i \in A} \exp(\beta_i \cdot X_i + \theta_{is} \cdot X_s)}
\]

(8.2)

where,
- \(\beta_i\) is a park type specific effect, estimated across seasons and choice occasions;
- \(\theta_{is}\) is a parameter denoting the effect of season \(s\) on park type \(i\), estimated across choice occasions;
- \(X_i\) is a dummy indicating park type \(i\);
- \(X_s\) is a coded variable indicating the season \(s\).

Note that figure 8.2 focuses on the relative probabilities of choosing the different parks per season, not the average. The choice probabilities indicate that, in the spring, respondents who visit a park prefer zoos, followed by amusement parks and cultural/educational parks for children. Least preferred are cultural/educational parks targeted to adults. In summer, the respondents prefer the amusement parks rather than zoos. This difference in seasonal preferences might be explained by the fact that in the spring zoos have many new-born animals, making a visit to the zoo more attractive. In summer, day trips to a theme park are often made as part of a vacation. Consumers therefore may have more time to travel and to spend in the park. Consequently they tend to visit the larger amusement parks. Moreover, most amusement parks have open air attractions, making a visit to this type of park in summer more attractive, especially because the chances for good weather are better.
Variety seeking
The results in table 8.4 suggest that there are theme park type loyal consumers as well as theme park type variety seekers. It can be seen that some respondents prefer a combination of amusement parks across choice occasions $t$ and $t-1$. Furthermore, the results show that there is a very high loyalty effect for adult targeted cultural/educational parks (although the park type specific parameter value for this type of park is low compared to those of the other parks). This finding suggests that a homogeneous segment of respondents prefer this kind of park. The variety seeking effects are relatively large for the combinations of a zoo and an amusement park, regardless of order of visiting, and for a zoo at occasion $t-1$ and a cultural educational park for children at $t$.

We calculated the probability that a certain park type will be chosen at current choice occasion ($t$) conditional on the fact that a particular park type was chosen previously ($t-1$). In calculating these probabilities we allowed respondents to choose from all four park types at both choice occasions and assumed all else being equal. The following model was used to predict the probability that park $i$ was chosen at choice occasion $t$ conditional on the fact that park $i'$ was chosen at
Variety seeking and seasonality in theme park choices of tourists

occasion $t-1$:

$$
P(i(t)|i'(t-1)|A) = \frac{\exp\left(\beta_{i'}X_{i'} + \gamma_{i(t)}C_{i'(t-1)}\right)}{\sum_{i'\in A} \exp\left(\beta_{i'}X_{i'} + \sum_{i'\in A} \gamma_{i(t)}C_{i'(t-1)}\right)} 
$$

(8.3)

where all variables and parameters are as defined in equation 8.1.

Figure 8.3 Choice probabilities for the park types chosen at choice occasion $t$ conditional on the park types chosen at occasion $t-1$

Figure 8.3 displays the choice probabilities for the park types chosen at occasion $t$ conditional on the park types chosen at previous choice occasion. In general, the
choice probabilities show that respondents prefer the combination of twice an amusement park, the respondents seem to be amusement park loyal. Also favored is a combination of a zoo chosen at \( t-1 \) with the choice of an amusement park at time \( t \). This combination is also preferred in reverse order. Furthermore, a high probability can be seen for the combination of a zoo chosen at occasion \( t-1 \) and a cultural educational park for children preferred at \( t \). It can be concluded that the respondents who prefer cultural educational parks for children are quite type-loyal. There is also a very high loyalty effect for adult targeted cultural/educational parks, although the overall parameter value for this type of park is low compared to that of other parks. It suggest a small but homogeneous segment of respondents who prefer this kind of park. In contrast, the combination of visiting a zoo twice is not favored by the respondents.

It can be concluded that the respondents choose both combinations of the same park type, as well as combinations of different park types. The combination of choosing the same type of park twice is an indication of type loyalty, although these respondents still may show within park type variety seeking behavior. Therefore, in the experiment with specific theme parks, we tested for this second type of variety seeking behavior.

### 8.3 EXPERIMENT 2: CHOICE OF SPECIFIC THEME PARKS

In this section the steps involved in the design of the experiment with the specific parks are described. The following sections are organized in the same way as for the experiment 1. The data for this experiment were collected as part of the same questionnaire used for the previous experiment.

#### 8.3.1 SELECTION OF PARKS

The choice experiment for the specific theme parks was designed as follows. First, the twelve best known theme parks in The Netherlands were selected. These twelve specific parks were classified according to the four types defined in the theme park type experiment. This resulted in the following list: four amusement parks (Hellendoorn, Duinrell, Walibi Flevo and Efteling), four zoos (Burgers’ Zoo,
Noorder Dierenpark, Artis and Dolfinarium), three cultural/educational parks for children (Omniversum, Archeon and Openluchtmuseum) and one cultural/educational park for adults (Kröller Müller) (table 8.6). However, we need to emphasize that, especially the larger parks, often accommodate several types of attractions and this classification is slightly arbitrary. The parks were varied in terms of entrance fee (Nlg 15,-, and Nlg 30,-). Seasonality effects were again examined for the spring and summer season.

<table>
<thead>
<tr>
<th>Attributes</th>
<th>Levels</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific Park</td>
<td>• Hellendoorn</td>
<td>• Amusement park</td>
</tr>
<tr>
<td></td>
<td>• Duinrell</td>
<td>• Amusement park</td>
</tr>
<tr>
<td></td>
<td>• Walibi Flevo</td>
<td>• Amusement park</td>
</tr>
<tr>
<td></td>
<td>• Efteling</td>
<td>• Amusement park</td>
</tr>
<tr>
<td></td>
<td>• Burgers’Zoo</td>
<td>• Zoo</td>
</tr>
<tr>
<td></td>
<td>• Dolfinarium</td>
<td>• Zoo</td>
</tr>
<tr>
<td></td>
<td>• Noorder Dierenpark</td>
<td>• Zoo</td>
</tr>
<tr>
<td></td>
<td>• Artis</td>
<td>• Zoo</td>
</tr>
<tr>
<td></td>
<td>• Archeon</td>
<td>• Cultural/educational park for children</td>
</tr>
<tr>
<td></td>
<td>• Omniversum</td>
<td>• Cultural/educational park for children</td>
</tr>
<tr>
<td></td>
<td>• Openluchtmuseum</td>
<td>• Cultural/educational park for children</td>
</tr>
<tr>
<td></td>
<td>• Kröller Müller</td>
<td>• Cultural/educational park for adults</td>
</tr>
<tr>
<td>Entrance fee</td>
<td>• Nlg 15,-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Nlg 30,-</td>
<td></td>
</tr>
</tbody>
</table>

### 8.3.2 Experimental design

The design involved selecting a fraction of a $2^{12/2}$ full factorial design, as there were twelve parks that could be present or absent in each of the two time periods. An orthogonal fraction of this total set, consisting of 256 choice sets of varying size and composition, was selected. Each choice set consisted of parks open in the spring and parks open in the summer. The two levels of the attribute ‘entrance fee’ are systematically nested under the parks available in the choice sets.
Please select the park you would most likely visit on your first trip in the spring of 1995, and next select the park you would most likely visit on the first trip in the summer of 1995, given your choice of park in the spring.

### SITUATION 1

**Parks available in the SPRING**

<table>
<thead>
<tr>
<th>Park</th>
<th>Entrance fee</th>
<th>Helendoorn</th>
<th>Duinrell</th>
<th>Burgers'Zoo</th>
<th>Noorder Dierenpark</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>O</td>
<td>Nlg 15.-</td>
<td>Nlg 30.-</td>
<td>Nlg 15.-</td>
<td>Nlg 15.-</td>
</tr>
<tr>
<td>Park</td>
<td>Entrance fee</td>
<td>Artis</td>
<td>Archeon</td>
<td>Omniversum</td>
<td>Kröller Müller</td>
</tr>
<tr>
<td></td>
<td>O</td>
<td>Nlg 15.-</td>
<td>Nlg 30.-</td>
<td>Nlg 15.-</td>
<td>Nlg 15.-</td>
</tr>
</tbody>
</table>

**Your Choice**: O would not go

**Your Choice**: O would not go

### Parks available in the SUMMER

<table>
<thead>
<tr>
<th>Park</th>
<th>Entrance fee</th>
<th>Efteling</th>
<th>Walibi Flevo</th>
<th>Dolfinarium</th>
<th>Duinrell</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>O</td>
<td>Nlg 15.-</td>
<td>Nlg 30.-</td>
<td>Nlg 15.-</td>
<td>Nlg 15.-</td>
</tr>
<tr>
<td>Park</td>
<td>Entrance fee</td>
<td>Omniversum</td>
<td>Openluchtmuseum</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>O</td>
<td>Nlg 15.-</td>
<td>Nlg 30.-</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Your Choice**: O would not go

*Figure 8.4  Example of a choice task for experiment 2*
8.3.3 THE CHOICE TASK
Respondents were presented 8 randomly selected choice sets. Like in the theme park type experiment, respondents were asked to select the theme park they liked best for their first trip in the spring of 1995, and to select the park that they would most likely visit, if any, on the first trip in the summer of 1995. Respondents processed a few trial choice sets before they received the experimental choice sets to familiarize themselves with the experimental task. A constant base alternative, described as ‘no park visit’ was added to each choice set. An example of a choice set is presented in figure 8.4.

8.3.4 ANALYSIS
To estimate the model for this experiment (see equation 8.1), the observed choices for the choice alternatives were aggregated across choice sets. Estimating the variety seeking parameters required that the observed choices for the given theme parks at choice occasion \( t \) were aggregated, conditionally on the theme parks chosen at \( t-1 \).

<table>
<thead>
<tr>
<th>Table 8.7 Coding of attributes specific theme park experiment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attributes</td>
</tr>
<tr>
<td>---------------------</td>
</tr>
<tr>
<td>Specific Park</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Entrance fee</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
Dummy variables were used to represent the parks, and one park served as the base (Openluchtmuseum). Dummy coding was also used to represent variety seeking effects between the parks chosen at \( t \) and \( t-1 \). The constant was coded as 1 for all parks and 0 for the constant base alternative ‘would not go’. The interaction of season and parks were effect coded (spring +1, summer -1). Finally, effect coding was also used to code the attribute entrance fee (table 8.7).

Maximum likelihood estimation was used to estimate the parameters of the choice model. For a technical explanation of the statistical tests and measures that were used we refer to chapter 5.

### 8.3.5 RESULTS

This section presents the results of the analysis of experiment 2 on visitors choices of specific theme parks. As in experiment 1, the following elements are discussed: the seasonality and variety seeking model, the preferences for specific parks, and the seasonality and variety seeking effects in theme park choice behavior.

**Seasonality and variety seeking model for specific parks**

In the experiment with specific theme parks we specifically focus on the following aspects: (i) respondents’ preferences for the specific theme parks; (ii) the effects of seasonality on consumers’ preferences for these parks; and (iii) variety seeking behavior within specific theme parks.

First, the model was estimated for all parameters, then it was re-estimated eliminating the non-significant variety seeking parameters. For expositional clarity, we present the results of the analysis in three tables: table 8.8 includes parameters and the significance for the constant, the different parks, the entrance fee and seasonality effects. Table 8.9 presents the significant variety seeking/loyalty behavior effects between the specific parks. Finally, table 8.10 shows the model statistics.
Table 8.8 Parameter estimates for the specific parks and their significance

<table>
<thead>
<tr>
<th>Attributes</th>
<th>Estimates</th>
<th>Standard error</th>
<th>t-statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-1.25</td>
<td>.05</td>
<td>-23.84</td>
</tr>
<tr>
<td>Park specific effects</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hellendoorn</td>
<td>-.29</td>
<td>.08</td>
<td>-3.77</td>
</tr>
<tr>
<td>Duinrell</td>
<td>.31</td>
<td>.07</td>
<td>4.61</td>
</tr>
<tr>
<td>Walibi Flevo</td>
<td>.13</td>
<td>.09</td>
<td>1.66</td>
</tr>
<tr>
<td>Efteling</td>
<td>1.37</td>
<td>.06</td>
<td>23.14</td>
</tr>
<tr>
<td>Burgers’ Zoo</td>
<td>.48</td>
<td>.07</td>
<td>7.27</td>
</tr>
<tr>
<td>Dolfinarium</td>
<td>.32</td>
<td>.07</td>
<td>4.53</td>
</tr>
<tr>
<td>Noorder Dierenpark</td>
<td>.63</td>
<td>.06</td>
<td>9.94</td>
</tr>
<tr>
<td>Artis</td>
<td>.29</td>
<td>.07</td>
<td>4.35</td>
</tr>
<tr>
<td>Archeon</td>
<td>.11</td>
<td>.07</td>
<td>1.65</td>
</tr>
<tr>
<td>Omniversum</td>
<td>-.39</td>
<td>.08</td>
<td>-5.24</td>
</tr>
<tr>
<td>Kröller Müller</td>
<td>-.48</td>
<td>.07</td>
<td>-6.51</td>
</tr>
<tr>
<td>Openluchtmuseum</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attribute effects: main effect</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Entrance fee</td>
<td>-.65</td>
<td>.01</td>
<td>56.74</td>
</tr>
<tr>
<td>Seasonality effects</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hellendoorn</td>
<td>.17</td>
<td>.06</td>
<td>2.63</td>
</tr>
<tr>
<td>Duinrell</td>
<td>.08</td>
<td>.05</td>
<td>1.61</td>
</tr>
<tr>
<td>Walibi Flevo</td>
<td>.28</td>
<td>.06</td>
<td>4.35</td>
</tr>
<tr>
<td>Efteling</td>
<td>.14</td>
<td>.04</td>
<td>3.62</td>
</tr>
<tr>
<td>Burgers’ Zoo</td>
<td>.32</td>
<td>.05</td>
<td>6.71</td>
</tr>
<tr>
<td>Dolfinarium</td>
<td>.41</td>
<td>.05</td>
<td>7.53</td>
</tr>
<tr>
<td>Noorder Dierenpark</td>
<td>.25</td>
<td>.04</td>
<td>5.61</td>
</tr>
<tr>
<td>Artis</td>
<td>.29</td>
<td>.05</td>
<td>6.02</td>
</tr>
<tr>
<td>Archeon</td>
<td>.10</td>
<td>.05</td>
<td>2.08</td>
</tr>
<tr>
<td>Omniversum</td>
<td>.58</td>
<td>.06</td>
<td>9.66</td>
</tr>
<tr>
<td>Openluchtmuseum</td>
<td>.04</td>
<td>.05</td>
<td>.76</td>
</tr>
<tr>
<td>Kröller Müller</td>
<td>.07</td>
<td>.06</td>
<td>1.20</td>
</tr>
</tbody>
</table>
Table 8.9  Parameter estimates for the variety seeking and loyalty behavior effects between specific parks  
(only significant values are presented)

<table>
<thead>
<tr>
<th>Choice occasion $t$-1</th>
<th>Hel</th>
<th>Dui</th>
<th>Wal</th>
<th>Eft</th>
<th>Bur</th>
<th>Dol</th>
<th>Noo</th>
<th>Art</th>
<th>Arc</th>
<th>Omn</th>
<th>Ope</th>
<th>Krö</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hellendoorn</strong></td>
<td>1.16</td>
<td>1.67</td>
<td>1.75</td>
<td>1.02</td>
<td>1.00</td>
<td>1.58</td>
<td>1.50</td>
<td>1.24</td>
<td></td>
<td></td>
<td></td>
<td>.92</td>
</tr>
<tr>
<td><strong>Duinrell</strong></td>
<td>1.09</td>
<td>.99</td>
<td>.82</td>
<td>1.46</td>
<td>.81</td>
<td>.86</td>
<td>1.06</td>
<td>1.19</td>
<td>.62</td>
<td>.80</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Walibi Flevo</strong></td>
<td>1.39</td>
<td>1.77</td>
<td>1.87</td>
<td>1.58</td>
<td>1.42</td>
<td>1.64</td>
<td>1.65</td>
<td>1.93</td>
<td>1.09</td>
<td>.96</td>
<td>1.10</td>
<td>.90</td>
</tr>
<tr>
<td><strong>Efteling</strong></td>
<td>.94</td>
<td>1.25</td>
<td>1.20</td>
<td>1.00</td>
<td>1.24</td>
<td>1.22</td>
<td>1.21</td>
<td>1.47</td>
<td></td>
<td></td>
<td></td>
<td>.54</td>
</tr>
<tr>
<td><strong>Burgers’Zoo</strong></td>
<td></td>
<td>.54</td>
<td>.97</td>
<td></td>
<td>.58</td>
<td>.60</td>
<td>1.24</td>
<td></td>
<td>.80</td>
<td>.71</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Dolfinarium</strong></td>
<td>1.33</td>
<td>1.11</td>
<td>1.11</td>
<td>1.47</td>
<td>1.31</td>
<td>.85</td>
<td>1.16</td>
<td>1.36</td>
<td>.64</td>
<td>.82</td>
<td>.83</td>
<td></td>
</tr>
<tr>
<td><strong>Noorder Dierenpark</strong></td>
<td>.65</td>
<td>1.08</td>
<td></td>
<td></td>
<td>.90</td>
<td>.65</td>
<td>.74</td>
<td>1.26</td>
<td></td>
<td>.97</td>
<td>1.05</td>
<td></td>
</tr>
<tr>
<td><strong>Artis</strong></td>
<td>.91</td>
<td></td>
<td></td>
<td></td>
<td>1.04</td>
<td>.84</td>
<td>1.30</td>
<td></td>
<td>.52</td>
<td></td>
<td></td>
<td>.81</td>
</tr>
<tr>
<td><strong>Archeon</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.89</td>
<td>1.09</td>
<td>1.13</td>
<td></td>
<td>.89</td>
<td>1.58</td>
<td>.96</td>
<td></td>
</tr>
<tr>
<td><strong>Omniversum</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.29</td>
<td></td>
<td></td>
<td>.96</td>
</tr>
<tr>
<td><strong>Openluchtmuseum</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.90</td>
<td>.84</td>
<td>1.03</td>
</tr>
<tr>
<td><strong>Kröller Müller</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.17</td>
<td></td>
<td>1.25</td>
</tr>
</tbody>
</table>


Table 8.10  Model comparisons

<table>
<thead>
<tr>
<th>Model</th>
<th>Log-likelihood</th>
<th># parameters</th>
<th>McFadden’s Rho square</th>
</tr>
</thead>
<tbody>
<tr>
<td>Null model LL(0)</td>
<td>-14415.85</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model with parks</td>
<td>-12598.50*</td>
<td>12</td>
<td>.13</td>
</tr>
<tr>
<td>Model with parks + entrance fee</td>
<td>-10673.92*</td>
<td>13</td>
<td>.26</td>
</tr>
<tr>
<td>Model with parks + entrance fee + seasonality</td>
<td>-10494.75*</td>
<td>25</td>
<td>.27</td>
</tr>
<tr>
<td>Model with parks + entrance fee + seasonality + variety seeking</td>
<td>-10075.82*</td>
<td>117</td>
<td>.29</td>
</tr>
</tbody>
</table>

* loglikelihood significantly better than previous model at a 95% confidence level in loglikelihood ratio test

The latter table show that McFadden’s rho square value for the full model is 0.29, and most parameters were significant at the 95% confidence level. Loglikelihood ratio tests showed that the model including all parameters outperformed simpler models, providing empirical evidence of the significance of variety seeking and seasonality effects in the choice of theme parks.

Preferences for specific theme parks
The constant listed in table 8.8 indicates the average utility of visiting a theme park (i.e., the average difference in utility between the theme park alternatives and the base alternative of no park visit). The parameter value of the constant is negative, which suggests that the average probability of visiting a specific park is lower than the probability of staying at home. We calculated that 17% of the respondents would prefer not to go to a park. This percentage does not differ much from the revealed theme park choices made by the respondents, where 20% preferred to stay at home.

Not surprisingly, the ‘Efteling’, the largest and best known theme park in the Netherlands, in general was, compared to the other parks, favored most by the respondents. The Efteling is followed by the Noorder Dierenpark, a highly appreciated zoo. Then two more zoos (Burgers’Zoo and Dolfinarium) and the second amusement park (Duinrell) follow. At the lower end of the preference scale, the cultural/educational parks for children, Archeon, Omniversum and Openluchtmuseum can be found. Absolutely least preferred is Kröller Müller, a cultural/educational park mostly targeted at adults. This was expected because all respondents belong to households with children living at home.
A comparison of the results of this experiment with those of the previous experiment, indicates that the estimated preference functions are largely consistent. The preference order of the specific zoos and cultural/educational parks the same as the of the theme park types. However, the preferences for the amusement parks differ considerably. The Efteling is by far the most preferred amusement park, Duinrell and Walibi Flevo can be found somewhere in the middle on the preference scale, while Hellendoorn is one of the least appreciated amusement parks. Thus, although, on average, amusement parks are preferred by consumers, there is a large variation between amusement parks. The attribute entrance fee has a strong, negative parameter, indicating that it is a important factor in the choice of theme parks.

**Seasonality**

The seasonality parameters are also presented in table 8.8. Figure 8.5 presents choice probabilities for the specific parks in spring versus summer based on these estimates (see equation 8.2). The simulations are based on a scenario in which respondents could choose from all twelve parks in both spring and summer, all else being equal.

The results suggest that there are significant seasonal differences. All zoos are more preferred in spring than in summer, especially the Dolfinarium and Burgers’Zoo. The same type of pattern can be seen in the experiment with park types. Most amusement parks are favored in summer, particularly, Duinrell and Efteling. A difference with the results of the experiment regarding theme park types is that three of the cultural/educational parks used in the experiment are chosen more in summer than in spring, whereas the experiment concerning theme park types suggested the opposite. This is possibly due to the fact that the Openluchtmuseum and Archeon are both open-air parks, while Kröller Müller is located in a large forest. Consumers may prefer to visit these parks when the chances of having good weather are higher. In the experiment with theme park types we did not make this explicit distinction between open-air and non-open air parks.
Figure 8.5 Choice probabilities for the specific parks in spring versus summer

### Variety seeking

Table 8.9 presents the parameters for the variety and loyalty seeking effects between the specific parks. A strong variety seeking tendency can be seen between zoos at choice occasion $t-1$ and amusement parks chosen at occasion $t$. For example, this is illustrated by high parameter values between Noorder Dierenpark and Walibi Flevo, and Artis and both Walibi Flevo and the Efteling. Also, a strong loyalty type interaction could be seen between two amusement parks. Besides a strong preference for twice Walibi Flevo or Hellendoorn, consumers also favor for example a combination of Walibi Flevo and Hellendoorn, or Duinrell and Walibi Flevo. The estimated parameters again suggest the existence of theme park type loyal consumers and theme park variety seeking seekers.

However, whereas in the experiment concerning theme park types the focus was on between type variety seeking behavior, this experiment specifically focused on within type variety seeking behavior. Therefore, we calculated the probability that an specific park that belongs to a certain park type will be chosen at choice occasion $t$ conditional on the fact that a specific park, belonging to the same park type was chosen at occasion $t-1$ (see formula 8.3).
Figure 8.6 represents these choice probabilities for the amusement parks chosen at occasion $t$ conditional on the amusement parks chosen at occasion $t-1$. Figures 8.7 and 8.8 show respectively the choice probabilities for the zoos and cultural educational parks.

Figure 8.6 shows strong variety seeking effects for combinations of Hellendoorn chosen at occasion $t$ and Duinrell and Walbi Flevo chosen at $t-1$. Also, strong variety seeking effects can be seen for the combination of Duinrell chosen at occasion $t$ and Efteling chosen at $t-1$. Consumers do not prefer the combination of the Efteling chosen at previous occasion and Hellendoorn chosen at $t$, and the
combination of Walibi Flevo chosen at t-1 and Duinrell at choice occasion t.

Furthermore, the results show that consumer are not particular loyal in their preferences for parks when it concerns Hellendoorn, Duinrell and Efteling. On the other hand, Walibi Flevo lovers prefer to visit this park twice.

Figure 8.7 presents similar results for within the zoo type of parks loyalty and variety seeking effects. Considerable variety seeking and loyalty effects can be seen. Specifically, large choice probabilities are calculated for the combinations of Burgers’ Zoo chosen at t and Artis chosen at t-1, and for Noorder Dierenpark chosen at t and Artis at t-1. In contrast, small probabilities are found for the combination of
Bugers’ Zoo at choice occasion \( t \) and Dolfinarium at choice occasion \( t-1 \), and for the combination of Artis chosen at \( t \) and Burgers’ Zoo at \( t-1 \). On average, consumers prefer combinations with other parks chosen at \( t-1 \) over combinations with the same park, except for Artis, their visitors are quite park loyal.

Figure 8.8 suggest that the combination of visiting Omniversum at \( t-1 \) and Archeon at choice occasion \( t \) is strongly preferred by the respondents. In contrast, the choice of Kröller Müller at \( t-1 \) and again Archeon chosen at occasion \( t \) is not favored by the respondents. For three of the parks, Omniversum, Openluchtmuseum and
Kröller Müller, consumers are particular park loyal. They prefer combinations of visiting twice these parks over combinations with another park chosen at previous choice occasion. For the other cultural/educational park, Archeon, consumers tend to seek more variety, the combination of visiting twice this park ranks not so high in the order preference.

8.4 IMPLICATIONS FOR THEME PARK PLANNING

The results of the conjoint choice experiments may have relevant implications for theme park planning. First, the information about tourists’ preferences for specific parks per season may provide theme park planners with information about the number of visitors to be expected in their park during the various seasons. The theme park type experiment showed for example that in the spring, respondents prefer to visit zoos, followed by amusement parks, while in the summer, respondents favor visiting amusement parks rather than zoos. The specific theme park experiment produced similar results: all zoos were visited more often in the spring than in the summer, especially the Dolfinarium and Burgers’ Zoo, while most amusement type of parks were visited in the summer than in the spring, particularly, Duinrell and Efteling.

This information can help theme park planners in their task to plan facilities in such a way that whatever season or number of visitors in the park, the visitor experiences in the park are optimal. The better the visitor numbers can be predicted the better for example the visitor streams in the park can be organized and the waiting times at the activities be minimized.

Furthermore, the parks may try and offer a more complete set of services to attract theme park visitors in the season that their park is less visited. For example, the zoo Dolfinarium may include more theme park type activities in their park during the summer to attract more visitors and to gain a better position in the theme park market in that season.

Theme park planners may also rely on marketers to actively try and manipulate tourist demand, for example by offering lower entrance fees in the less favored season. This could be an important strategy, especially because our results showed that the visitors are quite price-sensitive. The entrance fee was considered
by the visitors as one of the most important theme park attributes.

Besides information on consumers’ preferences for the park in each season, the experiments also provided information on theme park visitor variety seeking and loyalty behavior.

The existence of variety seeking consumers implies that, to capture a greater proportion of this segment, theme park planners need to emphasize or add distinctiveness in the visits they offer to the consumers. For example, they could emphasize the 'new experiences' that consumers may have in subsequent trips, for example, by stressing seasonal activities that take place in their park. Moreover, the specific effects could help them to identify the competing parks they have to focus on in their competitive promotion and advertising campaigns.

Theme park planners could also take initiatives related to joint strategies and alliances. For example, a theme park and a zoo could offer visitors special rates for a combined entrance pass for their parks, both to be visited within some specified time period (e.g., a year).

Moreover, the results of the experiments indicated that visitors’ preferences for a park decrease with increasing travel time, but increase with the size of park and the ability to spend a full day in the park. Therefore, theme park planners, especially when their park is not particular large, should combine their park together with other parks or with other tourist facilities in the region, and promote it to the visitors as one tourism destination.

8.5 CONCLUSION

This chapter described the results of an empirical test of a conjoint choice model including variety seeking and seasonality effects. More specifically, we tested for the existence of both within and between park type variety seeking effects in visitors’ theme park choices, and we investigated seasonal differences in consumer preferences for theme parks.

The results suggest that consumers differ in their preferences for theme parks by season. Most remarkable is that zoos are more preferred in spring than in summer, while for amusement parks the opposite is observed. In general, the estimated parameters for variety seeking indicate that there are theme park type
loyal consumers as well as theme park type variety seekers. For example, respondents favor a combination of amusement parks, but also a combination of a zoo and an amusement park. In contrast, visiting a zoo twice in a year is not favored by the respondents.

The results of the specific theme parks experiment suggest that the within park type variety seekers seem to be larger in number than the park loyal segment. Specifically, this applies to amusement parks and zoos. Three out of the four cultural/educational parks consumers are park loyal.

The findings of this study provide strong empirical support for the existence of variety seeking and seasonality in consumer choice of theme parks. This is an important finding, placing doubt on the validity of the multinomial logit models of choice behavior, commonly used in tourism research.
Temporal aspects of theme park choice behavior
9 MODELING DIVERSIFICATION IN THEME PARK ACTIVITY CHOICE

9.1 INTRODUCTION

In the previous chapter, we formulated and empirically tested a conjoint choice model which incorporated variety seeking and seasonality effects. We focused on testing whether these effects were significant in consumer choice processes. The positive evidence found in this regard suggests that conventional choice models which are typically time-invariant can be improved. Although we did not pursue such an analysis, the model developed in the previous chapters can in principle be applied to predict the absolute number of weekly visitors of particular theme parks, along the line currently available conjoint choice models are used.

Once, the number of visitors for a particular theme park is predicted, the question becomes what kind of activities they will pursue in the park. This may again reflect the notion of variety, but to differentiate this from variety seeking in the sense of the choice of different theme parks involved by successive choice occasions, we call it diversification.

In the context of this thesis, diversification is defined as intentional structural variation in behavior assuming that consumers achieve variety by choosing a set of different options during one specific consumption occasion, which in our case is a visit to a theme park. Thus, according to our definition, diversification takes place within a well-defined and specific time period (i.e. visit to a park), while variety seeking occurs over a longer period of time (i.e. between different theme park
A better understanding of diversification is important to manage the demand for the various facilities in a theme park across a day. Choices that tourists make to undertake activities and/or to purchase services in a theme park are mutually dependent. For example, a top attraction in a theme park may be visited early on to allow for repeat visits during the day, whereas visits to certain less attractive attractions may be used to fill up time between more carefully planned visits to more attractive facilities. An understanding of visitors' preferences for different activity patterns in a theme park is highly relevant because it can support theme park planners: (i) to develop a better theoretical understanding of theme park visitors’ complex choice behavior, and (ii) to provide guidance on how the demand for activities fluctuates during the day, and how it can be accommodated and directed.

Describing and predicting diversification in theme park activity choices involves the modeling of a complex phenomenon. Since diversification involves intentional structural variation in behavior, it cannot be measured by focusing on just one aspect of theme park activity choice behavior. From this definition of diversification it follows firstly that the total number of activities chosen during a day visit in a park and the time spent on a activity, called activity duration, should be studied to measure diversification in theme park activity choices. Secondly, we argue that timing of the activity choices, the sequence of activities chosen, and the composition of the set of activities chosen, are other important aspects in the study of diversification.

In particular, information on these aspects of diversification provide several valuable insights for tourism planners. It can provide information on: (i) how to balance visitor streams in a park; (ii) the expected effect of adding new attractions to theme parks on visitors' activity patterns in a park; (iii) the strong and weak elements of the theme park; (iv) the expected impact of strategies to limit queuing, and (v) potential solutions for logistic problems. Thus, on the basis of this information theme park planners can further optimize visitors' experiences in the park.

Again, we selected the conjoint choice modeling as an appropriate and efficient way to describe and predict tourist diversification behavior. The conjoint choice modeling approach allows one to systematically relate the characteristics of tourism products and services to the activities that tourists undertake. However,
again to the best of our knowledge, existing conjoint choice studies have not dealt with count and duration data, implied by these aspects.

Therefore, in this chapter we introduce another elaboration of the conjoint choice modeling approach that allows one to study the various aspects defining diversification in visitors' activity choices in a theme park. An ordered logit model is used to model duration data observed in a conjoint allocation task. The use of ordered logit to describe duration data was originally introduced by Han and Hausman (1990) and allows one to predict the probability that a certain event will occur, or that a certain event duration will end in a given period of time, conditional on the fact that the event has not occurred or did not end before that time period. We apply the model in the context of theme park activity choices to: (i) predict the time tourists which to spend on each of the activities available in the park, and (ii) describe tourists’ choices for various activities in the theme park in defined time periods throughout the day. The suggested approach allows for the estimation of a model that explains the duration and timing of visitor activity choices in a theme park as a function of activity and visitor characteristics as well as the other activities available in the park.

The sequence in theme park activity choices follows from the timing of activity choices. For each time period throughout the day the probability that an activity is chosen can be calculated. These probabilities show which activity most likely is visited first, which activity next, etcetera. On the basis of this information the sequence in activity choices can be determined.

The composition of the set of activities chosen by the visitors in the park follows from availability effects estimated on activity duration data. These effects show which activities are complements and which activities are substitutes, and therefore indicate how theme park visitors compose sets of activities that they are likely to choose throughout a day visit in a park.

The final aspect of diversification in theme park activity choices is the number of activities chosen by visitors in a theme park. Do visitors wish to spend their time at only a few activities or do they prefer to spend less time at a larger number of activities? In contrast to measuring timing, duration, sequence and composition of theme park activity choices, the number of activities chosen within a day visit to a park as a function of activity and visitor characteristics can be modeled by a Poisson model for count data.

This chapter is organized as follows. First, in the following section, the
concept of diversification is discussed in more detail. This is followed by a brief discussion of the Poisson model in section 9.3 that can be used to predict the number of activities chosen by a visitor in a park. Next, the modeling of duration, timing, sequence and composition of theme park activity choices is discussed in sections 9.4 and 9.5. The main emphasis is on modeling timing and duration, because the sequence in activities chosen and the composition of the set of chosen activities are derived from the timing and duration models, and therefore they do not require separate formal model development. We give a theoretical and methodological background on timing and duration models. Then, the ordered logit model is discussed in more detail. This chapter closes with a review of the various aspects defining diversification and the approaches used to model these aspects. An empirical test of the model is presented in chapter 10.

9.2 MEASURING DIVERSIFICATION

Diversification is defined in this thesis as intentional structural variation in behavior assuming that consumers achieve variety by choosing a number of items within a well defined and specific time period. We argue that in the context of theme park choice behavior it is likely for visitors to seek diversification. This means that visitors choose a number of different activities during their visit to a park. Theme park visitors will try to optimize their experiences in a park by selecting a specific sub set of all activities available in the park. This selection of activities could for example be influenced by the composition of the travel group. A group with both younger and older children may visit different activities to fulfill the needs of both.

Although the operational definition of diversification seems straightforward, it is actually a highly complex problem. There is, to our knowledge, no measurement instrument available to indicate whether a theme park visitor seeks diversification in his or her activity choices. Therefore, in this thesis we introduce five variables that all indicate some aspects of diversification. These aspects are:

- Number of activities chosen;
- Activity duration;
- Composition of the set of activities chosen;
- Timing of activity choices;
• Sequence of activity choices.

We focus on the number of activities chosen by visitors in a theme park because it is directly related to diversification. Do visitors in a park choose a large number of activities during their visit or do they prefer to spend their time at only a single attraction? One could argue that the more activities a visitor chooses, the more they diversify their activity choice behavior.

A second aspect of diversification is activity duration. Activity duration provides information on how much time is spent on each of the activities by a visitor in the park. It shows, for example, which activities are main attractions and what activities are additional elements in the park in terms of the amount of time spending. It also shows whether visitors would like to spend much time on only a few activities or if they prefer to spend less time on more attractions, and it shows whether consumers prefer to spend their time on a particular type of activity.

Activity duration brings us to the third aspect of diversification, namely the composition of the set of activities chosen. The composition of the set of activity choices follows from the availability effects that could be estimated from activity duration data. These availability effects show which activities are complements and which activities are substitutes in terms of visitor time spending. Activities that are complements are more likely to be chosen together in a visitor’s choice set, while substitutes are more likely to replace one another in the set of activities chosen. For example, two souvenir shops may be substitutes, in the sense that visitors may choose to visit one or the other shop, but that they are not likely to visit both shops during their day visit in a park.

Another aspect is the timing of activity choices. Predicting at what time during the day a visitor chooses a particular attraction indicates a visitor’s activity pattern as it is most likely to occur. It indicates how visitors diversify their activities throughout the day. Do they first visit the main attractions in the park? When do they go to the shops to buy souvenirs, in the beginning of the day or do they specifically visit the shops before they return home?

Finally, the sequence in theme park activity choices is an aspect of diversification. If one knows the timing of activities, one also knows which activity is most likely visited first, which one next, etcetera. Timing information indirectly indicates the sequence in activity choices, thus the activity patterns as they are most likely to occur in the park. Therefore, the sequence of theme park activity choices shows how the visitors diversify in these activity choices.
Figure 9.1 Modeling diversification

Based on a Conjoint choice experiment

9.3 MODELING THE NUMBER OF ACTIVITIES

To model the number of activities that a visitor is likely to choose during a day visit in a park a Poisson regression model for count data will be used (e.g., Maddala, 1983; Myers, 1990; Kleinbaum et al., 1988). The number of counts, in this study the number of activities a visitor chooses in a park, is assumed to be a function of one or more explanatory variables. Variables that could explain the number of activities chosen in the park, that therefore should be included in the model, are for example the total number and type of activities available in the park, and the time spent in the park.

The difference between Poisson regression and standard multiple regression is that the former involves the Poisson distribution and the latter the normal distribution. Formally, the Poisson regression model can be expressed as follows.
For the dependent discrete random variable \( Y \) (i.e., the number of activities a theme park visitor chooses) and observed frequencies, \( y_i \), where \( i = 1, \ldots, N \) and \( y_i \geq 0 \), and explanatory variables \( X_i \), the probability is given by:

\[
P(Y = y_i) = \exp^{\lambda_i - \lambda_i y_i / y_i!}, \quad y_i = 0,1,\ldots
\]  

where,

\[
\ln \lambda_i = \beta X_i
\]  

In this model, the random variable \( y_i \) has mean \( \lambda_i \), and since the Poisson distribution applies, the variance of \( y_i \) is also \( \lambda_i \). The mean is modeled as a function of a set of explanatory variables (i.e. the total number and type of activities available in the park, and the time spent in the park). In general, one could say that the more positive and larger the value of \( \beta X_i \), the more activities are chosen, and the more negative and larger this value, the less activities are chosen.

### 9.4 Modeling Timing, Duration, Sequence and Composition of Activities

Modeling timing, duration and sequence in theme park visitors’ activities and the composition of the set of chosen activities by the visitor involves a time element. In tourists’ visits to theme parks, the duration decision of activity participation and the timing of activities in the park are two major timing decisions (other timing decisions include arrival and departure time, timing of visit, etcetera). The sequence in visitor activity choices and the composition of theme park activity choices can be derived from the timing and duration of the activities.

The objective of this section is to discuss timing and duration models and explain their applicability to our problem. The sequence and composition of theme park activity choices may be derived from the timing and duration models, and therefore they do not require separate formal model development. These timing and duration models generally are more known as hazard based duration models which predict the probability of duration until the start or finish of an event (e.g., Hensher and Mannering, 1994).
9.4.1 TIMING AND DURATION MODELS

A duration model in its statistical form is referred to as a hazard function. The hazard function gives the instantaneous probability that an event occurs in the interval \((t, t+\Delta t)\), provided that the event has not occurred or ended before the beginning of the interval. This conditional probability of duration starting or ending is an important concept as the probability that an event starts or ends is clearly dependent on the length of time the duration has lasted. For example, when investigating visitor activity choices in a theme park, the probability that a visitor will visit the main attraction is dependent on the time the visitor has spent already in the park conditional on the fact that a visitor still has not chosen this attraction. In this thesis we focus on the hazard function from two perspectives: (i) the probability that an activity is chosen by the visitor in a theme park in a specific time interval during a day visit; and (ii) the probability that an activity duration ends in specific time interval.

A good overview of the mathematical approach of hazard based models is given by Hensher and Mannering (1994). The hazard function is described in terms of the cumulative distribution function, \(F(t)\), and its corresponding density function, \(f(t)\). For graphical illustrations of these functions and the other functions that are discussed see figure 9.2. The cumulative distribution function is described as follows:

\[
F(t) = P(T < t)
\]  

where,

- \(P\) denotes the probability;
- \(T\) is a random time variable;
- \(t\) is some specified time.

In the case of timing of visitor activity choices in a theme park, we define the cumulative distribution function to indicate the probability of a visitor choosing a specific activity in a theme park before some transpired time, \(t\). In the case of activity duration, the cumulative distribution function indicates the probability that a visitor will end his or her visit to a specific attraction before some transpired time, \(t\). Figure 9.2 show an example of a cumulative distribution function, \(F(t)\), which indicates that with increasing time \(t\), the probability that an attraction is chosen by a visitor increases.

The first derivative of the cumulative distribution function, with respect to
time, is the density function:

\[ f(t) = \frac{dF(t)}{dt} \]  

(9.4)

The density function gives the unconditional distribution of durations \( T \). Figure 9.2 shows an example of a density function. The hazard function, expressed in terms of the cumulative distribution function and density function, gives the rate at which events are occurring at some time \( t \), given that the event has not occurred up to time \( t \):

\[ h(t) = f(t) / (1 - F(t)) \]  

(9.5)

The hazard function, \( h(t) \) gives the conditional probability that an event will start or end between time \( t \) and \( t + \Delta t \), given that the event has not appeared up to or ended before time \( t \). For example, for theme park activity choices this means that the hazard gives the probability rate that a visitor chooses a specific activity or attraction in a theme park, given that the visitor has not chosen that activity or attraction earlier on during the day.

Another important function is the survivor function. The survivor function gives the probability that a duration will be greater than or equal to some specified time \( t \).

\[ S(t) = P(T \geq t) \]  

(9.6)

where,

\( P \) denotes the probability;

\( T \) is a random time variable;

\( t \) is some specified time.

In the case of visitor activity choices in a theme park, the survivor function indicates the probability that a visitor has not yet ended the time spend at a specific activity or attraction in a theme park, or that a specific activity is not yet chosen by a visitor at some specified time \( t \). The survivor function is related to the cumulative distribution function by:

\[ S(t) = 1 - F(t) \]  

(9.7)
Consequently, the survivor function is related to the hazard function by:

\[ S(t) = \frac{f(t)}{h(t)} \]  

(9.8)

An example of this function is graphically presented in figure 9.2.

Having introduced the basic functions, we can now examine the hazard function more carefully, as the slope of this function has important implications for the duration process. The shape of the hazard function may take many different forms that represent the nature of different underlying duration processes. For example, the hazard function (figure 9.3, \( h_1(t) \)) can be monotonically increasing over time \( t \), indicating that the probability that an activity starts within the next time interval \( t + \Delta t \) increases continuously. This implies that the longer the period in which a consumer does not choose a specific activity the higher the probability that it will be chosen.

Figure 9.2 Illustration of hazard \( h(t) \), density \( f(t) \), cumulative distribution \( F(t) \) and survivor \( S(t) \) functions
Alternatively, the hazard may be monotonically decreasing (figure 9.3, h2(t)). This could occur for instance when considering theme park visitor arrival timing over a day. Most visitors will probably come to the park early during the day, so they can spend the whole day in the park, and therefore visitor arrivals are less likely to occur as the day passes. This phenomenon can be explained by the fact that the later a visitor arrives in the park, the less time he/she can spend in the park, and therefore the less attractive a visit becomes.

The hazard may also be constant over time (figure 9.3, h3(t)). This indicates that there is no-duration dependence. In this case the probability that an event starts in a specific time interval is not dependent on the time that has passed before the time interval. This could be the case, for example, for the probability that an arbitrary visitor would be involved in a minor accident.

![Hazard function distributions](image)

*Figure 9.3  Hazard function distributions*

Finally, a hazard function can first increase until a specific point and then decrease (figure 9.3, h4(t)). An example of this type of hazard function may occur when
considering the probability that a visitor will visit a food outlet in a theme park
during a day visit. It is likely that the probability that a visitor uses a food outlet in
the park increases during the morning, with a peak at lunchtime and then decreases
during the rest of the day.

It may be clear that different duration processes may result in different
hazard functions. In this respect a number of different distributions can be chosen
for the hazard functions.

(i) Exponential distribution (figure 9.3, h3 (\(\lambda=1\)))

\[ h(t) = \lambda ; \quad t > 0 \]  \hspace{1cm} (9.9)

(ii) Weibull distribution (figure 9.3, h2 (\(\lambda = 1.4, \beta = 0.5\)), h1 (\(\lambda = 0.86, \beta = 1.5\))

\[ h(t) = \lambda \beta (\lambda t)^{\beta - 1}; \quad \lambda, \beta > 0 \]  \hspace{1cm} (9.10)

(iii) Log-logistic distribution (figure 9.3, h4, (\(\lambda = 1.9, \beta = 2.7\))

\[ h(t) = \frac{\lambda \beta (\lambda t)^{\beta - 1}}{1 + (\lambda t)^{\beta}} \]  \hspace{1cm} (9.11)

These various distributions can be used to describe different duration processes. For
example, the Weibull distribution (h2, \(\lambda = 1.4, \beta = 0.5\)) could plausibly be used to
predict visitor arrivals during the day, because most visitors are likely to arrive in the
morning, while fewer visitors will arrive in the park later during the day.

The exponential distribution function results in a constant hazard function.
This would imply that the probability of starting a specific activity would always be
the same, irrespective of the length of time that has gone by. This distribution does
not seem to be useful to describe visitor activity choices in a theme park.

9.4.2 TYPES OF HAZARD MODELS

Several hazard models exist, each with its own underlying properties. First, there
are non-parametric models, that do not involve any assumptions about the
underlying distribution of the duration data. Secondly, there are semi-parametric
models, which make minimal assumptions about the underlying distribution.
Finally, there are the parametric models, which were discussed above, and which
make explicit distributional assumptions for the duration data.
The non-parametric approach to modeling hazards is convenient when little or no knowledge of the functional form of the hazard is available and when there are only duration times available and no other explanatory variables. When examining theme park visitors activity choices it is likely that explanatory variables such as for instance household type, party size, weather conditions, and household income influence the timing of visitors choices for various attractions in a park. Moreover, from the viewpoint of theme park planners it is important that the modeling approach should include manipulable attributes to predict the likely consequences of policy measures. Therefore, the non-parametric hazard models may be less useful to model theme park visitors activity choices.

An alternative approach are the semi-parametric hazard models. These models do not make a distributional assumption for the hazard, but do assume a functional form specifying how the explanatory variables interact in the model. Two important semi-parametric hazard models are; (i) Cox’s proportional hazard model (1972), and (ii) Han and Hausman’s ordered logit model (1990).

Cox’s proportional hazard model is based on the assumption that the explanatory variables act as multipliers on some underlying hazard function. The hazard rate can be decomposed into one term that is dependent on time and one term that is dependent on the variables. In proportional hazard models the variables shift the base level of the hazard. For these models the hazard rate with variables, \( h(t \mid X) \), is given by the following equation:

\[
\begin{align*}
  h(t \mid X) &= h_0(t) \exp(\beta X) \\
  \text{where,} \\
  h_0(t) & \text{ is the baseline hazard function at time} \ t \text{ assuming all elements of the variable vector} \ X \text{ zero;} \\
  \beta & \text{ is a vector of estimable parameters;} \\
  X & \text{ is vector of the coded variables.}
\end{align*}
\]

Besides the proportional hazard models there are also accelerated lifetime models, that include variables in the hazard model in such a way that the slope of the baseline hazard changes. This model assumes that the variables rescale time directly:
where all variables are as defined above.

The other semi-parametric hazard model is the ordered logit model as proposed by Han and Hausman (1990). These authors developed a flexible parametric proportional hazard model, in which the baseline hazard is non-parametric, while the effect of the explanatory variables takes a particular functional form. Their model differs especially from previously discussed models in that it can handle discrete duration data. This is an advantage because duration data is often of a discrete form, for example by hour, week, or month. Furthermore, the ordered logit model can handle ties in duration data. Ties may occur for example when many visitors choose to start or end an activity at the same time. This issue is discussed in more detail in the next section.

Parametric models of duration embody specific assumptions about the distribution of the duration times. In the parametric approach, a distributional assumption is being made for the hazard along with an assumption on the functional form of how the variables interact in the model. Fully parametric models can be estimated in proportional hazards or accelerated lifetime forms.

Finally, we consider the competing risks model, an extension of simple hazard based duration models. Traditionally, in all three model structures, as discussed in this section, duration is assumed to end or start as a result of a single event. In a competing risks model one of a number of events may start or end a duration. For example, in the case of theme park activity choices, there may be multiple activities that a visitor can choose at a specific point in time, or equivalently, the tourist may end a visit to a specific attraction because he/she wants to choose a new attraction to visit from a whole set of other attractions.

Until recently, most researchers assumed that a competing risks model with \( n \) possible outcomes had a likelihood function that could be separated into \( n \) distinct pieces (Hensher and Mannering, 1994). In that case, estimation could proceed by estimating separate hazard models for each of the \( n \) possible outcomes. This approach implies that independence among the competing risks was assumed.

However, alternative competing risks models which allow for interdependence among the risks have very restricted assumptions of the form of the hazards (Han and Hausman, 1990). Also, previous attempts to generalize the semi-parametric proportional hazard models to the competing risks situation have allowed
only for a very restricted form of interdependence among the risks (Han and Hausman, 1990).

In conclusion we can say that the non-parametric hazard modeling approach are less convenient for modeling theme park activity choices because no explanatory variables can be included. For theme park activity choices it seems likely that for example party composition, weather conditions and waiting time influence visitors activity choices in a park.

Also, the parametric models of duration seem less useful for modeling theme park visitor activity choices, because they assume a very restricted form of the hazard. Beforehand, it is difficult to assume a specific form for the hazard for each of the activities, and probably the form of the hazard will be different for the various activities. This reasoning also applies to the situation if competing risks models are convenient for modeling consumers activity choices. The competing risks models that allow for interdependence among the risks have very restricted assumptions of the form of the hazards, and therefore their use for activity pattern choice may be limited.

Then, the semi-parametric hazard models are left. These models seem most appropriate for modeling the choices theme park visitors make. These models do not assume a restricted form for the hazard function and allow one to include explanatory variables. However, there are two types of semi-parametric hazard models, the proportional hazard model and the ordered logit model. The difference between these two is that the ordered logit model can handle discrete duration data, which is an advantage because duration data is often of a discrete form.

Before concluding which of the semi-parametric hazard models is best for describing and predicting timing and duration of theme park activity choices there are some modeling issues that need to be discussed in more detail. In the next section these issues are outlined.

### 9.4.3 Important Modeling Issues

Some issues require special consideration when developing a hazard based model: (i) heterogeneity; (ii) censoring; (iii) time varying variables; (iv) state dependence; and (v) data ties. In the following paragraphs we will first discuss these issues in general terms and then discuss them with impact to the duration and timing of visitor activities in a theme park. This discussion is based on Hensher and
Mannering (1994).

First, the issue of unobserved heterogeneity is addressed. In proportional hazard based modeling, it is implicitly assumed that the hazard function is homogeneous over the population studied. All the variation in the duration is assumed to be captured by a variable vector $X$ (equation 9.12). However, a problem arises when some unobserved variables, that are not included, influence the durations. This is called unobserved heterogeneity and can result in a specification error that can lead to incorrect interpretations of the shape of the hazard function and the parameter estimates. Fortunately, a number of corrections have been developed to account for heterogeneity. Mostly, a heterogeneity term is included, that is specifically designed to capture unobserved effects across the population, and work with the conditional duration density function.

The second modeling issue concerned in hazard based modeling is censoring. There are two types of censoring, right and left censoring. Right censoring indicates the problem that some event has not started at the time that the data collection ends. It is not possible to determine whether an event may start just after the ending of the observation or for example may never start. Right censoring can be handled in both proportional and accelerated life time hazard models by a relatively minor modification.

Left censoring relates to the problem that an event has already started before the data collection started. One does not know how much time has passed since the event started. Left censored data presents a modeling problem. The problem becomes to determine the distribution of duration start times, from which the contribution of left censored observations to the model’s likelihood function can be determined.

The third problem is concerned with time-varying variables. These are variables which change during the duration process, for example, an individual’s marital status might change when one collects data over a longer period. Empirically, time-varying variables can be included in the hazard models by allowing the variables vector to be a function of time and accordingly rewrite the hazard function. The problem with including these time varying variables is that the parameters becomes difficult to interpret.

The fourth modeling issue is state dependence. State dependence is the effect that past duration experiences have on current durations. Three types of state dependence may occur in duration modeling; duration dependence, occurrence
Dependence and lagged duration dependence.

Duration dependence focuses on the conditional probability of a duration. As discussed before, this type of state dependence is captured in the shape of the hazard function, and therefore is no problem in hazard modeling. For example a monotone increasing hazard indicates that the more time has passed the more likely it becomes that an event will start.

Occurrence dependence denotes the effect of the number of previous durations on the current duration. For example, the fact that a visitor has already chosen an activity several times will affect the probability that the activity will be chosen again. This type of dependence is accounted for by including the number of previous duration occurrences in the variable vector \( X \).

Lagged duration dependence indicates the effect that the lengths of previous durations have on current durations. Again, this type of behavior may be accounted for by including lagged durations in the variable vector.

The fifth aspect important in hazard based modeling are data ties. Data ties occur when a number of observations end or start their durations at the same time. This may occur especially when data collection is not precise enough to determine the exact ending or starting times. The functions for proportional hazards and accelerated lifetime models become increasingly complex in the presence of data ties. To handle, among others, data ties, discrete time approaches have been developed. For example, the ordered logit model is a generalized discrete time approach that accounts for possible data ties.

Finally, the impact of these modeling issues depends on the choice of semi-parametric hazard based duration models, discussed in the previous section, for predicting the timing of visitor activity choices in a theme park. The two semi-parametric based hazard models discussed were the proportional hazard model and the ordered logit model.

Firstly, censoring is not a problem when modeling activity choices in a theme park, because the observation period, the time the visitors may spend in the park, is restricted to the opening times. Therefore, data can be easily collected through the opening hours of the park.

Time varying variables are no problem because the short time period, a day visit in the park, in which the observations are made. The effect of duration dependence is included in the model and indicated by the shape of the hazard function. Occurrence dependence and lagged duration dependence, when of relevance, can be included in the
model by a variable indicating respectively the number of times an activity is already chosen by a visitor and the time the visitor already has spent on an activity.

Heterogeneity could be a problem when there are segments of visitors that significantly differ in the timing of their activity choices or in the time spend at an attraction in the park. However, the ordered logit model can include heterogeneity relatively easily as compared to the proportional hazard model.

Furthermore, as mentioned previously, the ordered logit model is unhindered by a large number of data ties. In traditional hazard models the presence of data ties can be problematic because the likelihood function for the model becomes increasingly complex (Hensher and Mannering, 1994).

It can be concluded that the ordered logit model has some advantages over other hazard-based models, which makes it more useful into modeling theme park activity choices. Therefore, this model is discussed in more detail in next section.

9.5 AN ORDERED LOGIT MODEL APPROACH TO MODELING THEME PARK ACTIVITY CHOICES

The ordered logit model, as proposed by Han and Hausman (1990), is a flexible duration model, based on an ordered logit or ordered probit model and may be used to describe the probability that an activity duration will end in a specific time interval conditional on the fact that the duration has not ended in previous time intervals. In the case of activity timing, the ordered logit model may be used to predict the probability that an activity is chosen in a given period of time, conditional on the fact that the activity was not chosen in previous time periods. This conditional probability is an important concept because the probability that an event happens in a certain time period is clearly dependent on the length of previous time periods in which the event did not happen (Hensher and Mannering, 1994).

The ordered logit model is a semi-parametric hazard model in which the baseline hazard is non-parametric, while the function of variables takes a particular functional form, which is typically linear. In the case of theme park activity choices the explanatory variables may consist of characteristics of the activities and characteristics of the consumer. The underlying hazard model is based on either an ordered probit or ordered logit model where an unknown parameter is estimated for
each time interval over which the model is specified.

In the next section the structure of the ordered logit is outlined. We discuss how each of the aspects defining diversification (timing, duration, sequence and composition of theme park activity choices) can be predicted by using the ordered logit model in the final section.

9.5.1 Structure of the Ordered Logit Model

The ordered logit model is a variant of the ordered probit model as developed by McElevy and Zavoina (1975). The model traditionally has been applied in applications such as surveys, in which the respondent expresses a preference in terms of ordinal ranking. Han and Hausman (1990) proved that the ordered logit model also can be used to describe duration data. The focus of the model is on the probability that an event occurs or ends after different periods of time. This probability is conditioned on the fact that the event has not yet occurred or ended. It allows one to formulate a function describing shifts in conditional probability over time.

The data to estimate this model are assumed to be generated as observations of failure or starting times over discrete periods \( t = 0, 1, 2, 3, \ldots, J \) for individuals \( i = 1, 2, 3, \ldots, n \). This is indicated as follows:

\[
\begin{array}{cccccccccc}
T_0 & T_1 & T_2 & T_3 & \ldots & T_J \\
0 & 1 & 2 & 3 & \ldots & J \\
\end{array}
\] (9.14)

The lower row shows the values taken on by the dependent variable in the model. The dependent variable is zero if the activity is started by the individual in the first time period, 1 if the activity is started in the second time period and so on. The same applies for activity duration. The model is based on the following specification:

\[
y = \beta X_i + \epsilon_i
\] (9.15)

\[
y_i = 0 \text{ if } y \leq \mu_0,
1 \text{ if } \mu_0 < y \leq \mu_1,
2 \text{ if } \mu_1 < y \leq \mu_2,
\ldots
J \text{ if } y > \mu_{J-1}
\]
where \( y_i \) is the observed time period for activity \( i \).

The preference function for an activity consists of a systematic component \( \beta X_i \) and a random error component \( \varepsilon_i \). In the systematic component, \( X_i \) expresses the variables of the activity and individual, and \( \beta \) indicates the parameter values of these variables. It is assumed that the explanatory variables of each individual \( X_i \) do not change with time. The error component \( \varepsilon_i \) reflects a number of different aspects that cannot be observed by the researcher such as measurement errors, environmental circumstances, and omitted explanatory variables. The ordered logit model results from the assumption that the distribution of the error component has a standard logistic distribution instead of a standard normal as in the ordered probit model. The \( \mu \)'s are unknown parameters, estimated for each time period. An advantage of this approach is that the parameters of the variables are invariant to the length of the observed time periods. When sample size increases, the length of the time periods can be decreased.

Han and Hausman (1990) start the specification of their model with the proportional hazards specification of Prentice (1976) where the hazard function is shown by:

\[
\lambda_i(t) = \lim_{\Delta \to 0} \frac{\Pr[t < t_i < t + \Delta t_i > t]}{\Delta} = \lambda_0(t) \exp(-\beta X_i) \tag{9.16}
\]

They specify this in the log form of the integrated hazard as:

\[
\ln \int_0^t \lambda_0 \, dt = \beta X_i + \varepsilon_i \tag{9.17}
\]

where \( \varepsilon_i \) takes an extreme value form:

\[
F(\varepsilon_i) = \exp(-\exp(\varepsilon_i)) \tag{9.18}
\]

Let

\[
\ln \int_0^t \lambda_0 \, dt = u_i, \quad t=1, \ldots, T \tag{9.19}
\]
The probability of failure in period $t$ by individual $i$ is

$$\Pr[T_{i,t-1} < t_i < T_i] = \int_{u_{i,t-1}}^{u_{i,t}} f(\epsilon) d\epsilon \tag{9.20}$$

The logs of the integrated baseline hazards, $u_t$, are treated as constants in each period and estimated simultaneously with the parameters $\beta$. Let the indicator variable $y_{it}$ be $t-1$ if $t_i$ falls in period $t$, then the probability defined above with the extreme value distribution for $\epsilon$, exactly defines the ordered logit model. Estimates are obtained by using maximum likelihood. The probabilities which enter the log-likelihood function are:

$$\Pr[y_i = j] = Pr[y \text{ is in the } j\text{th range}]$$

$$= F(\mu_{j-1} - \beta X_i) - F(\mu_{j} - \beta X_i) \tag{9.21}$$

The loglikelihood function takes the following form

$$\ln L = \sum \ln L_i = \sum \ln \Pr[Y_i = y_i] \tag{9.22}$$

where $Y_i$ is the theoretical random variable and $y_i$ is the observed value of $Y_i$. At the end of the estimation, estimates of the hazard rates can be computed.

$$h(t) = \Pr(t_j < t < t_{j+1})/\Pr(t \geq t_j) \tag{9.23}$$

This is computed by using the predicted cell probabilities for the ordered logit model at the means of the explanatory variables. These probabilities are divided by the interval width if values are provided that allows these to be calculated. The model may be estimated either with individual or grouped discrete time data. If individual data are used, the dependent variable $y_i$ is coded $0, 1, 2, \ldots, J$. If data are grouped, a full set of proportions, $P_0, P_1, \ldots, P_j$, which sum to 1.0 at every observation must be provided. In the case of theme park activity choices the estimated models may include parameters such as activities and visitor characteristics. Note that the model must include a constant term as the first variable. Since the equation does include a constant term, one of the $\mu$’s is not identified. At the end of the estimation the
hazard rates are computed for each of the discrete time periods for which data are observed.

To test whether the estimated model $LL(B)$ significantly improves the restricted model $LL(0)$ with the constant only, the log likelihood value of the unrestricted model $LL(B)$ is compared with the log likelihood of the restricted model $LL(0)$. A likelihood ratio test statistic $G^2 = -2[LL(0)-LL(B)]$ is calculated to test the hypothesis that all parameters are equal to zero. This statistic is asymptotically chi-squared distributed with degrees of freedom equal to the number of free parameters in the model. McFadden’s rho square is used to indicate the goodness of fit of the model.

### 9.5.2 Modeling timing, duration, sequence and composition of the set of chosen activities

When modeling timing in theme park activity choice behavior by using an ordered logit model approach as proposed in the previous section, hazard rates are estimated for each time period for which the model is specified. The hazard rates give the probability that an activity is chosen in a specific time period, conditioned on the fact that the activity was not chosen in foregoing time periods.

On the basis of the estimated probabilities for the timing of visitors’ activity choices in the park one can calculate the average sequence in activity choices. For each of the time periods throughout the day the probability that an activity is chosen is calculated. These probabilities show which activity most likely is visited first, which one next, etcetera. On the basis of this information the sequence in activity choices can be determined.

For activity duration the hazard rates indicate the probability that a visitor will end spending time at a specific attraction in a specific time period, conditional on the fact that the visitor was still spending his or her time at this attraction. From these hazard rates, the probabilities that an activity duration will end in a specific time period can be calculated.

The composition of the set of activities chosen by the visitors can be predicted by estimating an ordered logit model on the duration times, that includes availability effects (see chapter 5). Significant availability effects arise as a result of differences in composition of the choice set, in this case a theme park. This means that the availability (presence or absence) of particular activities in the park
influences the probability of spending time at another activity. The availability effects contain information on the competition between the activities, moreover they show to what extent activities are complements or substitutes to each other.

Formally, availability effects can be tested by including the presence or characteristics of other activities as explanatory variables of the choice probability for a given activity (McFadden, Tye, and Train, 1977). Using equation 9.15, the model for activity $i$ is specified as follows:

$$y = \beta x_i + \sum_{i' \in A \setminus i'} \lambda_{i'i} D_i + \epsilon_i$$

$$y_i = 0 \text{ if } y \leq \mu_0,$$
$$1 \text{ if } \mu_0 < y \leq \mu_1,$$
$$2 \text{ if } \mu_1 < y \leq \mu_2,$$
$$\ldots$$
$$J \text{ if } y > \mu_{j-1}$$

where, $D_i$ is a dummy denoting the presence of activity $i'$ and $\lambda_{i'i}$ is a parameter indicating the effect of the presence of activity $i'$ on the activity $i$, and all other variables and parameters are as defined in 9.5.1.

The modeling approach as defined allows the estimation of models of timing and duration of theme park activity choice behavior. However, we have argued already that controlled experiments can help to gain better insight into theme park choice behavior. Therefore, the ordered logit model will be based on a conjoint choice experiment to describe and predict diversification in theme park visitors’ activity choices.

### 9.6 CONCLUSION

The aim of this chapter was to develop a model of diversification behavior. Diversification in theme park activity choices is defined as intentional structural variation in activity choice behavior, assuming that theme park visitors achieve variety by choosing a number of different activities during a day visit in a park. We argued that diversification in theme park activity choices is a multidimensional
phenomenon. It cannot only be described by the total number of activities chosen by a visitor during a visit to a park and the time spent on the activities, but also by the timing of the activity choices, the sequence of chosen activities, and the composition of the set of activities chosen.

In this chapter we introduced a conjoint choice modeling approach that supports the estimation of the various aspects defining diversification in visitor activity choices in a theme park. Specifically, an ordered logit model based on a conjoint choice experiment was proposed that supports the estimation of the duration and timing of visitor activity choices in a theme park. Indirectly, the sequence in activity choices and the composition of the set of activities chosen by the visitors is included in this approach.
10 DIVERSIFICATION IN VISITOR ACTIVITY CHOICE IN A THEME PARK

10.1 INTRODUCTION

This chapter discusses the results of an empirical test of the approach, suggested in previous chapter, to model the various aspects of diversification in theme park activity choice behavior. We have argued that in the context of theme park activity choice behavior visitors likely seek diversification. This implies that visitors choose a number of different activities when visiting a park. Diversification in theme park activity choice is not only described by the total number of different activities chosen by visitors during a visit in the park and the time spent on each of the activities, but we will also study the timing of the activity choices, the sequence of activities chosen and the composition of the set of chosen activities.

Duration and timing of visitors’ activity choices are modeled using an ordered logit model. This approach also allows one, indirectly, to model the sequence and composition of activity choices. The number of different activities chosen during a day visit in a park as a function of activity, visitor and context characteristics are modeled by using a Poisson regression model.

All models are estimated using experimental design data based on visitors’ choices for various hypothetical scenarios of activities availability in an existing theme park in the Netherlands. The suggested approach supports the estimation of the proposed models in which each of the aspects defining diversification is described as a function of activity, visitor and context characteristics. Our findings
show the activity patterns of the visitors in this theme park as they are most likely to occur, and indicate to what extent theme park visitors seek diversification in their activity choices.

The chapter is organized as follows. First, the conjoint choice experiment used in this study is outlined. This is followed by a description of the procedures that we used to collect the data to estimate the models. Next, the analysis and results of the various estimated models are reported, and managerial implications are discussed. The chapter closes with a conclusion.

### 10.2 The Conjoint Choice Experiment

In conjoint choice experiments respondents are presented with hypothetical choice situations. In these choice situations, choice alternatives are represented by a series of attributes which describe the choice alternative on different dimensions. The attribute levels are combined by the researcher to result in so called profiles describing a particular choice alternative. As described in chapter 5, there are several steps involved in designing conjoint choice experiments. The next sections describe all the steps that were involved in designing the current study.

The conjoint choice experiment was conducted as part of a larger questionnaire that was administrated among visitors in a theme park in the Netherlands in the Summer of 1994. The theme park that was studied is especially targeted to children. A convenience sample of 2094 adults was selected. Respondents were invited to participate in the survey, and if willing to do so, asked to fill out the survey as soon as possible after their visit to the park. Respondents were asked to complete the questionnaire as a representative of their travel party which included children. A pre-stamped return envelope was provided. A total of 357 respondents returned the questionnaire, representing a response rate of 17%.

#### 10.2.1 Attribute Elicitation

The attribute list in this study was defined on the basis of a discussion with the management of the theme park in which the data was collected. The main attributes of the theme park were described in terms of theme park activities. First, nineteen
activities were defined, three of which are currently not available in the park. The management of the park was considering adding one or more of these three activities to the park, and was interested in the effect of the availability of these activities on visitors’ activity choice. For reasons of confidentiality the descriptions of the park and the activities in the park are only given in generic terms.

The nineteen activities included in the experiment were classified in four generic categories. The first category are theaters and contains five activities, these are indicated by the characters A, B, C, D and E. The second category consists of live entertainment by fantasy characters. Five activities belong to this category, also represented by the characters A, B, C, D and E. The third category is made up of attractions, also with five activities, again represented by A, B, C, D and E. The fourth category consists of food outlets and other retail outlets, containing four activities, indicated by the characters A, B, C and D. One of the new activities belongs to the theaters, and the other two belong to the food and retail outlets category.

After specifying the activities, attributes for each of the activities were determined. The attributes describing the activities are activity duration, waiting time, and location in the park. These attributes were only included for activities when relevant. For example, for most retail outlets, activity duration and waiting time were not considered relevant, while for theaters the effect of activity duration and waiting time was considered very important. Activity duration was included as a four level attribute for thirteen of the activities. The levels of the attributes were made specific for each activity on the basis of discussions with the management of the park and their experience with waiting and duration times. Overall, the levels for activity duration ranged from five to sixty minutes. Waiting time, a four level attribute, was relevant for nine of the activities. The levels for waiting time ranged from five to forty minutes. Location, a two level attribute, was only relevant for one of the new activities. The managers had two locations in mind for this new activity. For the other two new activities the location was already selected and was included in the description of the activities in the survey. For the existing activities, location was defined to be the present location in the park. The activities, attributes and their levels are presented in table 10.1.
<table>
<thead>
<tr>
<th>Location</th>
<th>Activity duration in minutes</th>
<th>Activity time in minutes</th>
<th>Waiting</th>
<th>Activity</th>
<th>Location</th>
<th>Activity duration in minutes</th>
<th>Activity time in minutes</th>
<th>Waiting</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>Theater A</td>
<td>B</td>
<td>20</td>
<td>30</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>20</td>
<td>10</td>
<td>Theater B</td>
<td></td>
<td>20</td>
<td>30</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>20</td>
<td>10</td>
<td>Theater C</td>
<td></td>
<td>20</td>
<td>30</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>60</td>
<td>40</td>
<td>5</td>
<td>Theater D</td>
<td></td>
<td>20</td>
<td>30</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>20</td>
<td>5</td>
<td>Theater E*</td>
<td></td>
<td>20</td>
<td>30</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>15</td>
<td>10</td>
<td>Life entertainment by fantasy character A</td>
<td></td>
<td>20</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>15</td>
<td>10</td>
<td>Life entertainment by fantasy character B</td>
<td></td>
<td>20</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>20</td>
<td>5</td>
<td>Life entertainment by fantasy character C</td>
<td></td>
<td>20</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>20</td>
<td>5</td>
<td>Life entertainment by fantasy character D</td>
<td></td>
<td>20</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>20</td>
<td>5</td>
<td>Life entertainment by fantasy character E</td>
<td></td>
<td>20</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>20</td>
<td>5</td>
<td>Attraction A</td>
<td></td>
<td>20</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>20</td>
<td>5</td>
<td>Attraction B</td>
<td></td>
<td>20</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>20</td>
<td>5</td>
<td>Attraction C</td>
<td></td>
<td>20</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>20</td>
<td>5</td>
<td>Attraction D</td>
<td></td>
<td>20</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>5</td>
<td>10</td>
<td>Attraction E</td>
<td></td>
<td>20</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>10</td>
<td>10</td>
<td>Food and retail outlet A</td>
<td></td>
<td>15</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>10</td>
<td>10</td>
<td>Food and retail outlet B</td>
<td></td>
<td>15</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>10</td>
<td>10</td>
<td>Food and retail outlet C*</td>
<td></td>
<td>15</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>10</td>
<td>10</td>
<td>Food and retail outlet D*</td>
<td></td>
<td>15</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>
10.2.2 EXPERIMENTAL DESIGN

The experimental situations or ‘profiles’ in this study are hypothetical theme parks constructed by varying the absence and presence of various existing and new activities within the theme park as well as their attributes. This approach allowed us to estimate the effect of theme park activities independently of the absence or presence of competing activities.

The following design strategy was used to create the choice sets and choice alternatives. The nineteen activities that could be present or absent in each of the choice sets were taken as a starting point. An orthogonal fraction of a $2^N$ availability design (where $N$ is 19; the number of alternatives) was taken with its foldover. This design allows the estimation of alternative specific effects for all activities as well as the availability effects between these activities (Anderson and Wiley, 1992). Specifically, we constructed an orthogonal fraction of a $2^{19}$ design and its foldover in 64 choice sets. The experimental design prescribed for each activity its presence or absence in each of the choice sets. Each activity was available in 32 of the 64 choice sets.

The attributes of the activities (activity duration, waiting time and location), were varied according to a $L^K$ design, (where $L$ is the number of attribute levels and $K$ is the number of attributes). For the relevant attributes for each activity, a full factorial $4^2$-design consisting of 32 profiles was constructed, with two four level attributes (i.e. activity duration and waiting time) and one two level attribute (i.e. location). These profiles were assigned to the activities’ positions in the choice sets.

10.2.3 HYPOTHETICAL CHOICE TASK

The respondents’ task for each hypothetical choice situation was structured as follows. Respondents were asked to imagine that they could redo their last visit in the park. They were asked to imagine that the park would be somewhat different from their last visit. Some activities would still be available and some new activities would be added, but some existing activities would not be available. Each choice set represented a new hypothetical park.
<table>
<thead>
<tr>
<th>Activities</th>
<th>Time</th>
<th>9.00</th>
<th>9.30</th>
<th>10.00</th>
<th>10.30</th>
<th>11.00</th>
<th>11.30</th>
<th>12.00</th>
<th>12.30</th>
<th>13.00</th>
<th>13.30</th>
<th>14.00</th>
<th>14.30</th>
<th>15.00</th>
<th>15.30</th>
<th>16.00</th>
<th>16.30</th>
<th>17.00</th>
<th>17.30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arrival</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Theater A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waiting time</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activity duration</td>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Food and retail outlet A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Life entertainment by fantasy character A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activity duration</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Life entertainment by fantasy character B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activity duration</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Food and retail outlet B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activity duration</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Life entertainment by fantasy character C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waiting time</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activity duration</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Theater B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waiting time</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activity duration</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attraction C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waiting time</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attraction D</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waiting time</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Theater C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waiting time</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activity duration</td>
<td>30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Theater E</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waiting time</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activity duration</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Food and retail outlet D</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activity duration</td>
<td>30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Departure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Figure 10.1  Example of a hypothetical choice situation*
The available activities were presented in the first column of a table, and a time axis from 9.00 A.M. until 6.00 P.M. was presented in the first row. For an example of a hypothetical choice situation, see figure 10.1. Note that although currently the activities are described in generic terms, in the survey they were all described as the real existing activities known to the respondents. Respondents could assume that all attractions run continuously.

The respondents were asked to indicate at what time during the day they would visit the various activities, if any, and how much time they would spend on each of the activities. The arrival and departure times could be different from their last visit. The respondents could indicate the time spent by drawing a line for each of the activities they wanted to visit, from the point in time they started walking to the activity, to the point in time they would leave the activity. Next, they were asked to indicate the walking and waiting time for each activity, by converting the single line into a double line. They were told that the locations of the activities were the same as in the present park. Respondents were provided a map of the park to help them in finding the location of activities. Respondents were asked to assume that their travel party and the weather were the same as during their last visit.

To familiarize the respondents with the experimental task, they first reported their revealed behavior in the park in a table of the same format and processed a trial choice set before they received the experimental choice sets. Each respondent completed three experimental choice sets.

**10.3 Sample Descriptives**

The initial analysis of the sample, presented in table 10.2, showed that a large proportion of respondents were females. Most respondents were from a medium, high education and income group. This finding is possibly due to the fact that the park has a strong focus on educational elements in the park, and the park has no ‘hard thrill’ rides. The activities in the park are very child-friendly and the children are getting actively involved in the theaters, live entertainment and attractions. Alternatively, higher educated people might be more likely to respond to this questionnaire.
The percentages for group size indicate that there were in fact two types of visitor groups. One group consists of the households who visited the park with three, four or five persons, consisting of one or two adults and children. The other type of visitors consisted of school groups with, of course, a larger group size. The percentages of the number of children in specific age groups showed clearly that most children visiting the park were in the age group from 0 to 10 years old. Hardly any children from 11 to 18 years old visited the park. Therefore, it can be concluded that the main market segments for this park are households with young children, and school groups from primary schools. Furthermore, the results show that 34.8 percent of the visitors already had visited the park once or several times before. This is a relatively high repeat rate compared to other tourist attractions in the Netherlands.
(NRIT, 1998). We also asked respondents in the survey if they were likely to repeat their visit to the park. 71.7 percent said they would, 22.9 percent was undecided, while 5.4 did not plan to come back to the park. This is a positive result for the park as visitors seem to have liked their visit to the park.

10.4 ANALYSIS

The analysis of the conjoint choice data involved the estimation of models for each of the aspects defining diversification:

- number of activities chosen;
- activity duration;
- timing of activities;
- sequence;
- composition of the set of activities chosen.

Ordered logit models were used to predict duration, timing, sequence and composition of activity choices and a Poisson regression model was used to predict the number of activities chosen by the visitors. The estimated models include parameters for the activities, the attributes activity duration, waiting time and location, and the following visitor and context characteristics: income level, education level, the weather during the visit in the park, the total number of visitors in the travel party, and the number of persons in the respondents group that belonged to specific age groups. Only the number of persons in the age groups 0 to 5 and 6 to 11 were included in the models because for other age groups the total numbers were too small (see table 10.2 sample characteristics).

The data for estimation were prepared as follows. In all estimation data sets, dummy variables (1, 0) represented the activities. When an activity was chosen more than once by the same visitor, which did not happen often, the activity was included as a separate, independent choice in the data set. Attribute vectors, and visitor and context characteristics were effect-coded (1, -1). An overview of the specific coding of the variables is provided in table 10.3.

When estimating the ordered logit models for the timing of activities, the starting times for the activities as given by the respondents were recoded for half hour periods. In the ordered logit models for activity duration the time spent on each
of the activities was recoded for five minute periods.

Table 10.3 Coding of the attributes and their levels

<table>
<thead>
<tr>
<th>Levels</th>
<th>Attraction duration</th>
<th>Waiting time</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Linear</td>
<td>Quadratic</td>
</tr>
<tr>
<td>1 = lowest</td>
<td>-3</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>-1</td>
<td>-1</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>-1</td>
</tr>
<tr>
<td>4 = highest</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Levels</th>
<th>Weather 1</th>
<th>Weather 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 = bad</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2 = average</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>3 = good</td>
<td>-1</td>
<td>-1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Levels</th>
<th>Income 1</th>
<th>Income 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 = low</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2 = medium</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>3 = high</td>
<td>-1</td>
<td>-1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Levels</th>
<th>Education 1</th>
<th>Education 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 = low</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2 = medium</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>3 = high</td>
<td>-1</td>
<td>-1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Levels</th>
<th>Sex</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>1</td>
</tr>
<tr>
<td>Male</td>
<td>-1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Levels</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location A</td>
<td>1</td>
</tr>
<tr>
<td>Location B</td>
<td>-1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Group size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of children in age 0 to 5 in group</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of children in age 6 to 10 in group</td>
</tr>
</tbody>
</table>

In the following sections, we will discuss the principles underlying the ordered logit model and the Poisson regression model as applied in this study. This is followed by a discussion of the results of the estimation of the various models.
10.4.1 THE ORDERED LOGIT MODEL

An ordered logit model was estimated for each of the activities to predict the time period during the day that each of the activities was most likely to be started by the visitors in the park. Parameters were estimated for the attributes of the activities, and visitor and context characteristics. Indirectly, the results of these models indicate the sequence of activities visited by the respondents in the park.

Ordered logit models were also estimated for each of the activities to predict the duration times of the activities. In these models, the attributes of the activities, and the visitor and context characteristics were used as explanatory variables. For the sake of clarity, separate ordered logit models that included availability effects were estimated on the duration times for each of the activities. These models were estimated to describe what activities would be complements or substitutes. The results should lead to descriptions of the composition of the set of activities chosen by the visitors.

As explained in chapter 9, formally the estimated ordered logit models can be described as follows. The data to estimate the timing models are observations of the starting times of activities over discrete half hour time periods throughout the day, \( t = 0, 1, 2, 3, \ldots, J \) for individuals \( i = 1, 2, 3, \ldots, n \). For the duration models the data are observations of the duration times of the activities over discrete five minute time periods. The dependent variable \( y_i \) is zero if the activity is started by the individual or the duration ends in the first time period, 1 if the activity is started or ended in the second time period, 2 for the third period, and so on. Assume a choice set \( A \), containing \( a \) activities. The model for activity \( i \) is specified as follows:

\[
y = C_i + \sum_k \beta_{ik} X_{ik} + \sum_s \delta_{is} X_{is} + \sum_{i \in A, i \neq i} \lambda_{ij} D_{ij} + \epsilon_i
\]

(10.2)

where,

- \( y_i \) is the observed time period for activity \( i \), (starting time or ending of duration);
- \( C_i \) is a constant for activity \( i \);
Temporal aspects of theme park choice behavior

\begin{align*}
X_{ik} & \quad \text{expresses the kth attribute of activity } i; \\
\beta_{ik} & \quad \text{is a parameter denoting the effect of the kth attribute of activity } i; \\
X_s & \quad \text{denotes the (coded) sth visitor or context characteristic;} \\
\delta_s & \quad \text{is a parameter indicating the effect of the sth visitor or context characteristic;} \\
D_{i'} & \quad \text{is a dummy denoting the presence of activity } i'; \\
\lambda_{i'i} & \quad \text{is a parameter indicating the effect of the presence of activity } i' \text{ on the activity } i; \\
\epsilon_i & \quad \text{is an error component;} \\
\mu_j & \quad \text{is a parameter estimated for each time period } j-1.
\end{align*}

Note, that depending on the type of model estimated (timing, duration, composition) some elements may be excluded in the estimation.

Estimates are obtained by using maximum likelihood. At the end of the estimation of each ordered logit model, hazard rates can be computed for each time period over which the model is specified. Hazard rates were calculated for each of the activities for each time period. The hazard rates for the ordered logit models for activity timing give the probability that an activity will be chosen in a specific time period, conditional on the fact that the activity was not chosen in previous time periods. When modeling theme park activity duration, the hazard rates indicate the probability that a visitor will end a specific activity in a specific time period, conditional on the fact that the visitor was still spending time on this activity in previous time periods. From these hazard rates, the probabilities that an activity will be chosen or an activity duration will end in a specific time period can be calculated.

To test whether the estimated model significantly improved the model with the constant only, the log likelihood value of the unrestricted model $LL(B)$ was compared with the log likelihood of the restricted model $LL(0)$ (model with the constant only). A likelihood ratio test statistic $G^2 = -2[LL(0)-LL(B)]$, was calculated to test the hypothesis that all parameters are equal to zero. This statistic is asymptotically chi-squared distributed with degrees of freedom equal to the number of free parameters in the model.

### 10.4.2 Poisson Regression Model

A Poisson regression model was estimated to predict the number of activities a visitor is likely to choose during a day visit in a park. Variables that could explain
the number of activities chosen are the activities and their attributes, the average
total time spend by the visitor in the hypothetical theme parks (from arrival till
departure), the number of activities available in the park (on the basis of the
experimental design), and some visitor and context characteristics.

Formally, the Poisson regression model estimated can be expressed as
follows. For a discrete random variable $Y$, and observed frequencies, $y_i$, where $i = 1,
\ldots, N$ and $y_i \geq 0$, and explanatory variables $X$, the probability that $Y$ will occur is:

$$
\Pr(Y = y_i) = \exp^{-\lambda} \frac{\lambda^{y_i}}{y_i!}, \quad y = 0, 1, \ldots,$$

(10.3)

$$
\ln \lambda = C_0 + \sum_i \beta_i X_i + \sum_k \beta_{ik} X_{ik} + \sum_s \delta_s X_s
$$

where,

- $C_0$ is a constant;
- $\beta_i$ is a parameter for activity $i$;
- $X_i$ is a dummy denoting the presence of activity $i$;
- $\beta_{ik}$ is a parameter indicating the effect of the $k$th attribute of activity $i$;
- $X_{ik}$ expresses the $k$th attribute of activity $i$;
- $X_s$ denotes the (coded) $s$th visitor and context characteristics;
- $\delta_s$ is a parameter indicating the effect of the $s$th visitor or context characteristic.

In this model, the discrete random variable $y_i$ has mean $\lambda_i$, and this mean is modeled
as a function of the set of explanatory variables.

The estimation of the Poisson model starts with an approximation of the
count variable on the explanatory variables by using an ordinary least squares
regression. The remaining output consists of the results of a maximum likelihood
estimation, including the iterations, log likelihood function, restricted log likelihood
function, and a goodness of fit statistic. To test if the estimated model significantly
improved the model with the constant only, the log likelihood value of the
unrestricted model is compared with the log likelihood of the restricted model.
Additionally, one can estimate the probability of obtaining, say, $y$ chosen activities.

10.5 RESULTS

In this section the results of the model estimations are presented. The results are
discussed for each aspect of diversification (the number of activities chosen, activity
duration, activity timing, sequence of activities chosen, and the composition of the
set of activities chosen) separately.

In each section, a general discussion of the results of the models estimated is
provided along with results on specific questions (see section 9.2) on the relation
between that particular aspect and diversification in theme park activity choices.
The planning implications of the results are addressed in the following section.

10.5.1 NUMBER OF ACTIVITIES CHOSEN

The results of the Poisson regression model that was estimated from the number of
activities chosen by the visitors in the park are presented in this section. The
independent variables included in the model are the type of activities, the attributes
of the activities, visitor and context characteristics, the total time spent in the park
and the number of activities available in the park. Specifically, we investigated the
following questions:

N1. Does the number of activities a visitor chooses depend on the total
time spent by the visitor in the park, and the number of activities
available in the park?

N2. How many activities will on average be chosen by the visitors in the
park?

N3. How do the type of activities, the attributes of the activities (waiting
time, duration and location), and visitor and context characteristics
affect the number of activities chosen by the visitors?

Table 10.4 presents the parameter estimates for the Poisson regression model.
For the sake of clarity, only the model with significant parameters is presented.
Note, that the coding of the variables is presented in table 10.3. Table 10.5 presents
performance statistics for all estimated models.

Effects of total time spent in the park and activities available

The model comparisons show that most models outperform the null model with
constant only. However, the models with as the only explanatory variable the total
time spent in the park or the number of activities available in the park do not
outperform the null model. Thus, the total time spent by the visitors in the park and
the number of activities available in the park do not explain the number of activities
chosen. Probably visitors who spend more time in the park are more relaxed and
spend more time at each of the activities. Also, there might be an optimal number of
activities for a visit to a park. However, it might be that the more activities available
in the park, the more likely it is that the visitors come back to the park for a repeat
visit. Investigation of this hypothesis is however beyond the scope of this thesis.

The other variables that are presented in table 10.4, the type of activities, the
attributes of the activities and visitor and context characteristics have a significant
effect on the number of activities chosen by the visitors during a visit to the park.
Table 10.6 shows the effects of these variables on the probability that a specific
number of activities is chosen.

Table 10.4 Significant parameter estimates for the Poisson regression

<table>
<thead>
<tr>
<th>Attributes</th>
<th>Estimates</th>
<th>Standard error</th>
<th>t-statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>2.31</td>
<td>.008</td>
<td>303.18</td>
</tr>
<tr>
<td>Theater A</td>
<td>-.08</td>
<td>.02</td>
<td>-3.58</td>
</tr>
<tr>
<td>Theater B</td>
<td>.06</td>
<td>.02</td>
<td>2.41</td>
</tr>
<tr>
<td>Theater D</td>
<td>.07</td>
<td>.02</td>
<td>3.45</td>
</tr>
<tr>
<td>Theater E</td>
<td>.06</td>
<td>.02</td>
<td>2.87</td>
</tr>
<tr>
<td>Life entertainment A</td>
<td>-.07</td>
<td>.02</td>
<td>-2.88</td>
</tr>
<tr>
<td>Life entertainment B</td>
<td>-.05</td>
<td>.02</td>
<td>-2.23</td>
</tr>
<tr>
<td>Life entertainment B</td>
<td>-.02</td>
<td>.01</td>
<td>-1.79</td>
</tr>
<tr>
<td>Life entertainment C</td>
<td>-.03</td>
<td>.01</td>
<td>-2.52</td>
</tr>
<tr>
<td>Life entertainment D</td>
<td>.05</td>
<td>.02</td>
<td>2.28</td>
</tr>
<tr>
<td>Attraction A</td>
<td>-.06</td>
<td>.02</td>
<td>-2.41</td>
</tr>
<tr>
<td>Food &amp; retail outlet A</td>
<td>-.10</td>
<td>.03</td>
<td>-3.02</td>
</tr>
<tr>
<td>Food &amp; retail outlet C</td>
<td>.10</td>
<td>.03</td>
<td>3.39</td>
</tr>
<tr>
<td>Food &amp; retail outlet D</td>
<td>.08</td>
<td>.02</td>
<td>3.14</td>
</tr>
<tr>
<td>Income 1</td>
<td>.02</td>
<td>.009</td>
<td>1.87</td>
</tr>
<tr>
<td>Income 2</td>
<td>-.02</td>
<td>.009</td>
<td>-1.87</td>
</tr>
</tbody>
</table>
### Table 10.5 Model comparisons

<table>
<thead>
<tr>
<th>Model</th>
<th>Log-likelihood</th>
<th># parameters</th>
<th>Significance level (against null model)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Null model LL(0) (with constant only)</td>
<td>-6641.07</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model with activities</td>
<td>-6595.89</td>
<td>19</td>
<td>.00</td>
</tr>
<tr>
<td>Model with activities and attributes</td>
<td>-6562.30</td>
<td>86</td>
<td>.00</td>
</tr>
<tr>
<td>Model with total time spent in the park</td>
<td>-6640.49</td>
<td>1</td>
<td>.28</td>
</tr>
<tr>
<td>Model with number of activities available in park</td>
<td>-6639.70</td>
<td>1</td>
<td>.10</td>
</tr>
<tr>
<td>Model with visitor and context characteristics</td>
<td>-6631.38</td>
<td>9</td>
<td>.02</td>
</tr>
<tr>
<td>Model with all variables</td>
<td>-6553.11</td>
<td>97</td>
<td>.00</td>
</tr>
<tr>
<td>Model with significant variables only</td>
<td>-6582.25</td>
<td>18</td>
<td>.00</td>
</tr>
</tbody>
</table>

### Number of activities chosen

Table 10.6 presents the probabilities for the number of activities for the model with the constant. It shows that the modus for the number of activities chosen is 10; 13 percent of the visitors is likely to choose 10 activities during a visit to the theme park. On average, 57 percent of the consumers choose between eight and twelve activities while visiting the park.

### Effects of type of activities, attributes, and visitor and context characteristics

Models 2a and 2b presented in table 10.6 show the effect of including activities with positive parameters (theater A, food and retail outlet A, life entertainment A and B and attraction A) in the model versus including activities with negative parameters (life entertainment D, theaters D and E, and food and retail outlets C and D) in the model to predict the number of activities chosen by the visitors in the park. The results show that the number of activities likely to be chosen by visitors increases when the activities with positive parameters are available in the park and decreases for activities with negative parameters. It is not a particular type of activities that makes the number of activities chosen increase or decrease. A remarkable finding is that the activities with negative parameters are located more in the beginning of the route the visitors might follow in the park, while the activities with positive parameters are located more at the end of the route the visitors tend to follow. This could indicate that visitors tend to choose more activities (that is to say, they start to hurry to get the most out of their visit), as they proceed through the park and there are still attractions remaining.
Table 10.6 Probabilities for the number of activities chosen for various models

<table>
<thead>
<tr>
<th>Number of Activities</th>
<th>Model 1</th>
<th>Model 2a</th>
<th>Model 2b</th>
<th>Model 3a</th>
<th>Model 3b</th>
<th>Model 4a</th>
<th>Model 4b</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>.00</td>
<td>.00</td>
<td>.02</td>
<td>.00</td>
<td>.01</td>
<td>.00</td>
<td>.00</td>
</tr>
<tr>
<td>3</td>
<td>.01</td>
<td>.00</td>
<td>.05</td>
<td>.00</td>
<td>.02</td>
<td>.01</td>
<td>.01</td>
</tr>
<tr>
<td>4</td>
<td>.02</td>
<td>.00</td>
<td>.09</td>
<td>.01</td>
<td>.03</td>
<td>.02</td>
<td>.02</td>
</tr>
<tr>
<td>5</td>
<td>.04</td>
<td>.00</td>
<td>.13</td>
<td>.02</td>
<td>.06</td>
<td>.03</td>
<td>.04</td>
</tr>
<tr>
<td>6</td>
<td>.06</td>
<td>.01</td>
<td>.15</td>
<td>.04</td>
<td>.09</td>
<td>.06</td>
<td>.07</td>
</tr>
<tr>
<td>7</td>
<td>.09</td>
<td>.01</td>
<td>.15</td>
<td>.06</td>
<td>.12</td>
<td>.08</td>
<td>.09</td>
</tr>
<tr>
<td>8</td>
<td>.11</td>
<td>.03</td>
<td>.13</td>
<td>.08</td>
<td>.13</td>
<td>.11</td>
<td>.11</td>
</tr>
<tr>
<td>9</td>
<td>.12</td>
<td>.04</td>
<td>.10</td>
<td>.10</td>
<td>.13</td>
<td>.12</td>
<td>.13</td>
</tr>
<tr>
<td>10</td>
<td>.13</td>
<td>.06</td>
<td>.07</td>
<td>.12</td>
<td>.12</td>
<td>.12</td>
<td>.13</td>
</tr>
<tr>
<td>11</td>
<td>.11</td>
<td>.08</td>
<td>.05</td>
<td>.12</td>
<td>.10</td>
<td>.12</td>
<td>.11</td>
</tr>
<tr>
<td>12</td>
<td>.10</td>
<td>.09</td>
<td>.03</td>
<td>.11</td>
<td>.07</td>
<td>.10</td>
<td>.09</td>
</tr>
<tr>
<td>13</td>
<td>.07</td>
<td>.10</td>
<td>.01</td>
<td>.10</td>
<td>.05</td>
<td>.08</td>
<td>.07</td>
</tr>
<tr>
<td>14</td>
<td>.05</td>
<td>.11</td>
<td>.01</td>
<td>.08</td>
<td>.03</td>
<td>.06</td>
<td>.05</td>
</tr>
<tr>
<td>15</td>
<td>.04</td>
<td>.10</td>
<td>.00</td>
<td>.06</td>
<td>.02</td>
<td>.04</td>
<td>.03</td>
</tr>
<tr>
<td>16</td>
<td>.02</td>
<td>.09</td>
<td>.00</td>
<td>.04</td>
<td>.01</td>
<td>.03</td>
<td>.02</td>
</tr>
<tr>
<td>17</td>
<td>.01</td>
<td>.08</td>
<td>.00</td>
<td>.03</td>
<td>.01</td>
<td>.02</td>
<td>.01</td>
</tr>
<tr>
<td>18</td>
<td>.01</td>
<td>.06</td>
<td>.00</td>
<td>.02</td>
<td>.00</td>
<td>.01</td>
<td>.01</td>
</tr>
<tr>
<td>19</td>
<td>.00</td>
<td>.05</td>
<td>.00</td>
<td>.01</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
</tr>
<tr>
<td>20</td>
<td>.00</td>
<td>.03</td>
<td>.00</td>
<td>.01</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
</tr>
</tbody>
</table>

Model 1 model with constant only  
Model 2a model with constant and activities with positive parameters  
Model 2b model with constant and activities with negative parameters  
Model 3a model with constant and the lowest level of activity duration for life entertainment B and theater B  
Model 3b model with constant and the highest level of activity duration for life entertainment B and theater B  
Model 4a model with constant and the lowest level of income  
Model 4b model with constant and the medium level of income

Models 3a and 3b present the difference between the linear effect of the lowest level for activity duration (5 minutes) for the activities life entertainment B and theater B and the highest level of activity duration (20 minutes). The results show an effect that could be expected, the longer the duration of that particular activity the lesser activities visited in total by the visitors.
Finally, models 4a and 4b, indicate the effect between the lowest and medium income level on the number of activities likely to be chosen by the visitors. These results suggest that the lower the income level the more activities visited by the visitors.

10.5.2 ACTIVITY DURATION

The second type of model describes the amount of time spent by the visitors on each of the activities. The questions specifically addressed in this section are:

D1. What activities are main attractions and what activities are supporting elements in the park in terms of time spending?
D2. How do waiting time, activity duration and location affect the time visitors want to spend on a particular activity?
D3. Do visitor and context characteristics affect the time visitors want to spend at particular activities?
D4 What are the preferences of the visitors for the duration of the various activities?

The parameter estimates of the ordered logit models for activity duration are presented in table 10.7 and the performances of the models are shown in table 10.8. Table 10.8 displays that most estimated models which include the attributes of the activities and the visitor and context characteristics outperform the null model with the constant only. Exceptions are the models for attractions A and C and for the food and retail outlets A and C. Table 10.7 presents the parameter estimates for the constant, the attributes activity duration, waiting time and location, and some visitor and context characteristics.

Main attractions and supporting elements in visitor time spending

All constants but one (food and retail outlet A), significantly differ from zero. These constants indicate the average duration. The main attractions in terms of visitors time spending are the theaters and life entertainment by fantasy characters. The attractions and food and retail outlets are the more supportive elements in the park. However, the constants of the food and retail outlets differ considerably. These results are not surprising because the theme park in which the data was collected is especially known for its theaters and life entertainment by fantasy character. Because the results can only be presented in generic terms, it is not possible to
discuss differences between specific activities in more detail.

**Effects of activity duration, waiting time, and location**

The parameter estimates for the linear effect of activity duration are all significant at the 0.05 level. They show, that the more time an activity takes, the more time visitors spent on that activity, which seems logical. Only few quadratic and cubic duration effects are significant. This suggests that for the relevant attributes utility increases at an increasing rate with a longer duration, at least within the range varied in the experiment.

Two-third of the parameter estimates indicating the linear effect of waiting time per activity significantly differ from zero, and they are all positive. This means that the longer the visitors have to wait for an activity the more time spent in total on that activity. This is what one would expect.

The last activity attribute is location, only included for one of the new activities. This negative parameter indicates that when food and retail outlet C is located on site B, the visitors would spend significantly more time on this activity than when located at site A. Especially, because visitors tend to spend their money at the food and retail outlets, site B is to be preferred from a management point of view, because the more time spent at the outlet probably the more money spend at this site.

**Effects of visitor and context characteristics**

Table 10.7 demonstrates that only few visitor and context characteristics affect the time spent on a certain activity. Only educational level has a significant effect on activity duration for three of the activities, theater C, life entertainment C and food and retail outlet D. The parameters indicate that visitors with a low income level spend significantly less time on these particular activities than visitors with a medium or high income level.
Table 10.7 Parameter estimates for the ordered logit models for activity duration
(only significant values represented, * = significant at 0.05 level, " = significant at 0.1 level, X not included)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>5.09*</td>
<td>6.15*</td>
<td>5.27*</td>
<td>5.40*</td>
<td>5.36*</td>
<td>4.50*</td>
<td>3.87*</td>
<td>5.14*</td>
<td>5.21*</td>
<td>3.87*</td>
<td>2.38*</td>
<td>4.22*</td>
<td>3.42*</td>
<td>2.48*</td>
<td>4.56*</td>
<td>4.36*</td>
<td>1.36*</td>
<td>2.78*</td>
<td></td>
</tr>
<tr>
<td>Ad lin</td>
<td>.29*</td>
<td>.42*</td>
<td>.40*</td>
<td>1.24*</td>
<td>.47*</td>
<td>.50*</td>
<td>.68*</td>
<td>.39*</td>
<td>.65*</td>
<td>.54*</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>.42*</td>
<td>X</td>
<td>.64*</td>
<td>X</td>
<td>.89*</td>
</tr>
<tr>
<td>Ad qua</td>
<td>.37</td>
<td>.27</td>
<td>.27</td>
<td>.27</td>
<td>.27</td>
<td>.27</td>
<td>.27</td>
<td>.27</td>
<td>.27</td>
<td>.27</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Wt qua</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Wt cub</td>
<td>.19*</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Location</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Inc 1</td>
<td>-.71*</td>
<td>.71</td>
<td>.71</td>
<td>.71</td>
<td>.71</td>
<td>.71</td>
<td>.71</td>
<td>.71</td>
<td>.71</td>
<td>.71</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Inc 2</td>
<td>-1.16*</td>
<td>-.67</td>
<td>-.67</td>
<td>-.67</td>
<td>-.67</td>
<td>-.67</td>
<td>-.67</td>
<td>-.67</td>
<td>-.67</td>
<td>-.67</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Edu 1</td>
<td>.50*</td>
<td>.63</td>
<td>.63</td>
<td>.63</td>
<td>.63</td>
<td>.63</td>
<td>.63</td>
<td>.63</td>
<td>.63</td>
<td>.63</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Edu 2</td>
<td>-1.16*</td>
<td>-.67</td>
<td>-.67</td>
<td>-.67</td>
<td>-.67</td>
<td>-.67</td>
<td>-.67</td>
<td>-.67</td>
<td>-.67</td>
<td>-.67</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Wea 1</td>
<td>.50*</td>
<td>.50</td>
<td>.50</td>
<td>.50</td>
<td>.50</td>
<td>.50</td>
<td>.50</td>
<td>.50</td>
<td>.50</td>
<td>.50</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Wea 2</td>
<td>.50*</td>
<td>.50</td>
<td>.50</td>
<td>.50</td>
<td>.50</td>
<td>.50</td>
<td>.50</td>
<td>.50</td>
<td>.50</td>
<td>.50</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

(T = theater, L = life entertainment by fantasy character, A = attraction, F = food and retail outlet)
(Ad = activity duration, Wt = waiting time, lin = linear, qua = quadratic, cub = cubic)
(Inc = income, Edu = education, Wea = weather, Tot per = number of persons in group)
Table 10.8  Performances of the ordered logit duration models

<table>
<thead>
<tr>
<th></th>
<th>T-A</th>
<th>T-B</th>
<th>T-C</th>
<th>T-D</th>
<th>T-E</th>
<th>L-A</th>
<th>L-B</th>
<th>L-C</th>
<th>L-D</th>
<th>L-E</th>
</tr>
</thead>
<tbody>
<tr>
<td>$LL(\theta)$ (constant only)</td>
<td>-410.67</td>
<td>-338.47</td>
<td>-468.77</td>
<td>-507.47</td>
<td>-448.24</td>
<td>-311.95</td>
<td>-349.27</td>
<td>-313.80</td>
<td>-305.85</td>
<td>-336.70</td>
</tr>
<tr>
<td>$LL(\beta)$</td>
<td>-381.81</td>
<td>-301.32</td>
<td>-442.76</td>
<td>-393.83</td>
<td>-410.86</td>
<td>-282.82</td>
<td>-294.68</td>
<td>-289.56</td>
<td>-268.51</td>
<td>-302.70</td>
</tr>
<tr>
<td>Degrees of freedom</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>12</td>
<td>15</td>
<td>12</td>
<td>12</td>
<td>15</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Significance level</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>A-A</th>
<th>A-B</th>
<th>A-C</th>
<th>A-D</th>
<th>A-E</th>
<th>F-A</th>
<th>F-B</th>
<th>F-C</th>
<th>F-D</th>
</tr>
</thead>
<tbody>
<tr>
<td>$LL(\theta)$ (constant only)</td>
<td>-334.76</td>
<td>-657.49</td>
<td>-251.17</td>
<td>-159.84</td>
<td>-296.97</td>
<td>-171.54</td>
<td>-349.07</td>
<td>-244.16</td>
<td>-335.94</td>
</tr>
<tr>
<td>$LL(\beta)$</td>
<td>-327.49</td>
<td>-646.51</td>
<td>-246.53</td>
<td>-146.84</td>
<td>-276.89</td>
<td>-166.53</td>
<td>-308.99</td>
<td>-238.31</td>
<td>-280.96</td>
</tr>
<tr>
<td>Degrees of freedom</td>
<td>9</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>15</td>
<td>9</td>
<td>12</td>
<td>10</td>
<td>12</td>
</tr>
<tr>
<td>Significance level</td>
<td>.10</td>
<td>.04</td>
<td>.68</td>
<td>.01</td>
<td>.00</td>
<td>.35</td>
<td>.00</td>
<td>.31</td>
<td>.00</td>
</tr>
</tbody>
</table>

(T = theater, L = life entertainment by fantasy character, A = attraction, F = food and retail outlet)
Preferences for the duration of the activities
After having estimated the ordered logit models, hazard rates were computed for each time period over which the model is specified. The hazard rates indicate the probability that a visitor will end spending time on a specific activity in a specified time period conditional on the fact that the visitor was still spending time on this activity in foregoing time periods. Figures 10.2 to 10.5 show the estimated conditional probabilities for the duration of the activities. For ease of comparison, probabilities are presented per type of activities in one figure.

The functions are more or less increasing throughout the day, while also some clear spikes can be seen. The functions are increasing because the probability that an activity duration will end in a specific time period is conditioned on the fact that the activity was not ended in foregoing time periods. Especially, when duration time increases and the activity duration has not yet been ended, the probability that it will end in one of next periods will be high.

From the hazard rates, the probabilities for the duration can also be calculated without the conditional effects. These probabilities are presented in figures 10.6 to 10.9. Again, each figure includes the probabilities for all activities belonging to one type. The figures with the unconditional probabilities are more suitable to portray visitor duration preferences than the hazard rates. The figures clearly show the preferences of the visitors for the duration of the various activities.

The probability functions for the life entertainment by fantasy characters (figure 10.7), all have a similar form. The probabilities strongly increase until 15, 20 minutes and then decrease until 35, 40 minutes, where the probabilities are less than 0.05. However, the probability functions for life entertainment by fantasy characters C, D and E also have a peak at 30 minutes. Note that in the hypothetical experiment the levels for activity duration varied between 5 and 25 minutes.

For the attractions, the probability functions show a different pattern. Although again four out of the five attractions have their peak at 20 minutes, the tails of functions decrease less fast and are more spread out. Especially, for attraction B the probability function is slowly increasing with a small peak at 65 minutes and then slowly decreasing.

The probability functions for the theaters are in between those for the life entertainment by fantasy characters and the attractions. The functions strongly increase with peaks between 20 (theater B) and 45 (theater D) minutes.
Diversification in visitor activity choice in a theme park

Figure 10.2  Estimated hazard rates for the duration of the theaters

Figure 10.3  Estimated hazard rates for the duration of the life entertainment by fantasy characters
Temporal aspects of theme park choice behavior

Figure 10.4  Estimated hazard rates for the duration of the attractions

Figure 10.5  Estimated hazard rates for the duration of the food and retail outlets
Figure 10.6  Estimated probabilities for the duration of the theaters

Figure 10.7  Estimated probabilities for the duration of the life entertainment by fantasy characters
Temporal aspects of theme park choice behavior

Figure 10.8 Estimated probabilities for the duration of the attractions

Figure 10.9 Estimated probabilities for the duration of the food and retail outlets
Figure 10.9, showing the probability functions for the food and retail outlets presents very diverse functions. The function for food and retail outlet A shows two peaks at 15 and 30 minutes and thereafter a strong decrease. Food and retail outlet B has one peak at 30 minutes, indicating that the visitors prefer to spend 30 minutes at this outlet. Food and retail outlet C starts with two peaks at 5 and 15 minutes and then the function slowly decreases. Finally, for food and retail outlet D, visitors seem to prefer the 35 and 50 activity duration levels.

10.5.3 TIMING OF ACTIVITY CHOICES

The third aspect defining diversification in visitor activity choices is the timing of the activity choices. Ordered logit models were estimated for all nineteen activities. The dependent variable in the model was the time visitors started at a specific activity recoded for half hour periods throughout the day. The explanatory variables included in the models estimated per activity were the attributes, activity duration, waiting time and location and some visitor and context characteristics. The questions specifically addressed in this section are:

T1. Is this timing choice dependent on the type of activities, the attributes of the activities (waiting time, activity duration and location) and visitor and context characteristics?

T2. At what time during the day do visitors choose particular activities?

Questions that indirectly follow from the timing of activity choices, but that are more related to the sequence in these choices will be discussed in the next section.

Table 10.9 presents the parameter estimates and significance for the ordered logit models for activity timing for all nineteen activities, and table 10.10 presents the performances of the models.

Table 10.10 indicates that only four of the models with variables (life entertainment by fantasy characters A and D, attractions D and E and food and retail outlets B and C) significantly outperformed the restricted model with the constant only. This already indicates that only few activity attribute, visitor and context characteristics influence the timing of the activity choices.
Effects of type of activities, attributes, and visitor and context characteristics

Table 10.9 presents the parameter values for the constant, activity duration, waiting time, and some visitor and context characteristics. The constants all significantly differ from zero. The values of the constants show the average order in which the activities are chosen across the day. The constants do not show a particular, constant pattern, there is not one particular type of activity that is always chosen sooner. The hazard rates, that are discussed later on, will provide more insight in how the activity timing choices are distributed over the time periods of the day.

The parameter estimates for the linear effect of activity duration are only significant for three of the activities. These three parameters were all positive, implying that the longer the activity duration, the more likely the respondents choose the activities later during the day. For the linear effects of the attribute ‘waiting time’ the parameters were significant for five activities and all were positive. This indicates that the longer the visitors has to wait, the later they chose this particular activity.

As for the visitor and context characteristics, only a small set of parameters is significantly different from zero. For example, significant weather effects can be seen for theaters B and D, although with opposite parameter signs. This is not surprising because theater D is an open air theater and therefore is more likely to be chosen when the weather is good, while theater B is an indoor theater and chosen when the weather is average or bad.

A significant effect is also obtained for the number of persons in the group for theater D. The more persons in the group, the earlier during the day this theater was chosen. Furthermore, the parameters for income for fantasy character B have a significant value. This implies that the lower income group chooses to visit this fantasy character later during the day. In contrast, the medium income group chooses this fantasy character earlier, while the high income group stays somewhere in the middle. An opposite effect was obtained for the life entertainment by fantasy character E.
Table 10.9  Parameter estimates for the ordered logit models for activity timing
(only significant values represented, * = significant at 0.05 level, “ = significant at 0.1 level, X not included)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>2.31*</td>
<td>5.40*</td>
<td>4.41*</td>
<td>3.29*</td>
<td>5.94*</td>
<td>4.14*</td>
<td>3.59*</td>
<td>5.41*</td>
<td>4.57*</td>
<td>3.91*</td>
<td>3.69*</td>
<td>4.58*</td>
<td>4.09*</td>
<td>6.59*</td>
<td>5.00*</td>
<td>3.83*</td>
<td>3.63*</td>
<td>4.37*</td>
<td>5.63*</td>
</tr>
<tr>
<td>Ad lin</td>
<td>.18*</td>
<td>.12*</td>
<td>.13*</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Ad qua</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Ad cub</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Wt lin</td>
<td>-.15*</td>
<td>X</td>
<td>.11*</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Wt qua</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Wt cub</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Location</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Inc 1</td>
<td>.54*</td>
<td>-.59*</td>
<td>.54*</td>
<td>.59*</td>
<td>.54*</td>
<td>.59*</td>
<td>.54*</td>
<td>.59*</td>
<td>.54*</td>
<td>.59*</td>
<td>.54*</td>
<td>.59*</td>
<td>.54*</td>
<td>.59*</td>
<td>.54*</td>
<td>.59*</td>
<td>.54*</td>
<td>.59*</td>
<td>.54*</td>
</tr>
<tr>
<td>Inc 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Edu 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Edu 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wea 1</td>
<td>-.44*</td>
<td>.43*</td>
<td>-.44*</td>
<td>.43*</td>
<td>-.44*</td>
<td>.43*</td>
<td>-.44*</td>
<td>.43*</td>
<td>-.44*</td>
<td>.43*</td>
<td>-.44*</td>
<td>.43*</td>
<td>-.44*</td>
<td>.43*</td>
<td>-.44*</td>
<td>.43*</td>
<td>-.44*</td>
<td>.43*</td>
<td>-.44*</td>
</tr>
<tr>
<td>Wea 2</td>
<td>.45*</td>
<td>-.43*</td>
<td>.45*</td>
<td>-.43*</td>
<td>.45*</td>
<td>-.43*</td>
<td>.45*</td>
<td>-.43*</td>
<td>.45*</td>
<td>-.43*</td>
<td>.45*</td>
<td>-.43*</td>
<td>.45*</td>
<td>-.43*</td>
<td>.45*</td>
<td>-.43*</td>
<td>.45*</td>
<td>-.43*</td>
<td>.45*</td>
</tr>
<tr>
<td>Age 0-5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age 6-10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(T = theater, L = life entertainment by fantasy character, A = attraction, F = food and retail outlet)
(Ad = activity duration, W = waiting time, lin = linear, qua = quadratic, cub = cubic)
(Inc = income, Edu = education, Wea = weather, Tot per = number of persons in group)
Table 10.10 Performances of the ordered logit timing models

<table>
<thead>
<tr>
<th></th>
<th>T-A</th>
<th>T-B</th>
<th>T-C</th>
<th>T-D</th>
<th>T-E</th>
<th>L-A</th>
<th>L-B</th>
<th>L-C</th>
<th>L-D</th>
<th>L-E</th>
</tr>
</thead>
<tbody>
<tr>
<td>$LL(0)$ (constant only)</td>
<td>-287.89</td>
<td>-398.28</td>
<td>-436.11</td>
<td>-512.05</td>
<td>-529.09</td>
<td>-341.19</td>
<td>-399.85</td>
<td>-375.29</td>
<td>-391.24</td>
<td>-414.84</td>
</tr>
<tr>
<td>$LL(\beta)$</td>
<td>-279.51</td>
<td>-388.37</td>
<td>-429.26</td>
<td>-505.34</td>
<td>-520.34</td>
<td>-331.43</td>
<td>-390.93</td>
<td>-365.64</td>
<td>-380.12</td>
<td>-408.32</td>
</tr>
<tr>
<td>Degrees of freedom</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>12</td>
<td>15</td>
<td>12</td>
<td>12</td>
<td>15</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Significance level</td>
<td>.33</td>
<td>.18</td>
<td>.55</td>
<td>.34</td>
<td>.29</td>
<td>.08</td>
<td>.12</td>
<td>.20</td>
<td>.03</td>
<td>.37</td>
</tr>
<tr>
<td></td>
<td>A-A</td>
<td>A-B</td>
<td>A-C</td>
<td>A-D</td>
<td>A-E</td>
<td>F-A</td>
<td>F-B</td>
<td>F-C</td>
<td>F-D</td>
<td></td>
</tr>
<tr>
<td>$LL(0)$ (constant only)</td>
<td>-355.18</td>
<td>-535.11</td>
<td>-248.93</td>
<td>-196.16</td>
<td>-342.80</td>
<td>-218.62</td>
<td>-306.18</td>
<td>-249.80</td>
<td>-351.97</td>
<td></td>
</tr>
<tr>
<td>Degrees of freedom</td>
<td>9</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>5</td>
<td>9</td>
<td>12</td>
<td>10</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Significance level</td>
<td>.43</td>
<td>.73</td>
<td>.11</td>
<td>.04</td>
<td>.05</td>
<td>.14</td>
<td>.09</td>
<td>.05</td>
<td>.23</td>
<td></td>
</tr>
</tbody>
</table>

(T = theater, L = life entertainment by fantasy character, A = attraction, F = food and retail outlet)
Preferences for the timing of the activities

Figures 10.10 to 10.13 show the estimated hazard rates, that is, the conditional probabilities for the activities. Each figure presents the functions for the activities belonging to a particular type. The functions are more or less increasing throughout the day, although some important spikes can be seen. The functions are increasing because the probability that an activity is chosen in a specific time period is conditioned by the fact that the activity was not chosen in foregoing time periods. Especially at the end of the day, if an activity has not been chosen yet, the probability that it will be chosen in one of the last periods is very high.

Moreover, figures 10.14 to 10.17 present the estimated probabilities for the activities without the conditional effects. These figures clearly show the timing of visitors’ choices for the various activities throughout the day.

In the theater category, figure 10.14 shows that theater A has a large peak in the morning, showing that it is likely chosen in the morning, before the other activities. It is a theater located at the entrance of the park and visitors tend to start their visit by choosing this theater. Theater B is also chosen most often in the morning, but there is also a small peak from 2.00 P.M. to 2.30 P.M. Theaters C and D follow the same pattern, the probability that they are chosen increases during the morning, decreases at lunch time and then again slightly increases after lunch. Theater E is more likely to be chosen by the visitors later during the day.

Focusing on the fantasy characters, it can be noted that the life entertainment by fantasy characters A, B and C are especially chosen by the visitors during the morning, while characters D and E have their peaks after lunch time.

One of the attractions, A, is especially chosen during the morning, with a peak from 10.00 A.M. to 11.00 A.M. The probabilities for the other attractions to be chosen are equally and evenly distributed across the day.

Among the food and retail outlets two existing activities were included in the experiment and two new activities. It is remarkable that the existing food and retail outlets are mostly chosen during the morning, with a peak for outlet B at lunchtime, while the visitors prefer to visit the new outlets specifically later during the day. Therefore, it seems a good idea to include these new outlets in the park because the new outlets do not compete directly with the existing ones.
Temporal aspects of theme park choice behavior

Figure 10.10 Estimated hazard rates for the timing of the theaters

Figure 10.11 Estimated hazard rates for the timing of the life entertainment by fantasy characters
Figure 10.12 Estimated hazard rates for the timing of the attractions

Figure 10.13 Estimated hazard rates for the timing of the food and retail outlets
Temporal aspects of theme park choice behavior

Figure 10.14 Estimated probabilities for the timing of the theaters

Figure 10.15 Estimated probabilities for the timing of the life entertainment by fantasy characters
Diversification in visitor activity choice in a theme park

Figure 10.16 Estimated probabilities for the timing of the attractions

Figure 10.17 Estimated probabilities for the timing of the food and retail outlets
10.5.4 Sequence of chosen activities

Timing information, as discussed in previous section, indirectly indicates the sequence of activity choices. The question addressed in this section is:

S1. Which activity is most likely visited first, which one second, etcetera?

On the basis of the estimated probabilities for the timing of visitors’ activity choices in the park, it was calculated which activities are most likely chosen per half hour period during the day. It was assumed that all activities were available throughout the day and that they were independent. Furthermore, we assumed that the number of visitors in the park are equal during the day. The probabilities for all nineteen activities were rescaled to sum to 1 per half hour period. Figure 10.18 presents the estimated probabilities for the activities most likely to be chosen for each half hour period. For easy reference, for each half hour only the activities with the largest probabilities are presented, the other activities with small probabilities are combined in the ‘other’ group.

Sequence of activities chosen

Figure 10.18 shows that the visitors of the park most likely start their visit with theater A, but also a small number chooses life entertainment by fantasy characters A and B, or attraction A. This pattern stays the same until approximately 10.30 A.M.. Then, theater A is visited less often, and theater B becomes more significant. After 11.30 A.M., fantasy characters A and B are not likely to be chosen, but theater C, fantasy character D and food and retail outlet B are more preferred to visit. From 12.00 A.M., theaters C, D and E are becoming more popular to be visited. Important for theme park management is that theater E, one of the new activities has a high probability to be chosen during the rest of the day. Also, attraction B is very likely to be chosen from 12.00 A.M until 3.00 P.M.. Furthermore, it can be seen that from 12.00 A.M. until 3.00 P.M. the set of activities chosen by the visitors is quite diverse. Finally, it seems that the food and retail outlets C and D are highly likely to be chosen by the visitors at the end of the day; again, a very important signal for theme park management, because these activities are also new and included in the hypothetical theme parks. Furthermore, the results suggest that visitors tend to follow the route in the park as indicated by the order of activity locations. This is the route that is advised by the theme park management.
Figure 10.18 Estimated probabilities for the activities per half hour period during the day

(T = theater, L = life entertainment by fantasy character, A = attraction, F = food and retail outlet)

Figure 10.19 Relative number of visitors during the day
visitors in the park

Figure 10.20 Estimated probabilities for the activities per half hour period during the day, corrected for the relative number of visitors in the park.

(T = theater, L = life entertainment by fantasy character, A = attraction, F = food and retail outlet)
The above discussion is based on the assumption that visitor numbers are equal throughout the day. This is not quite realistic. Therefore, figure 10.19 presents the relative number of visitors in the park. These numbers are based on the time that visitors spend in the hypothetical theme parks. Secondly, the probability that an activity is chosen per half hour is calculated, considering the number of visitors in the park. Again, independence between activities was assumed, moreover, it was assumed that all activities were available during the day. Again, only the activities with the largest probabilities are shown, the other activities with small probabilities are combined in the ‘other’ group.

The relative number of visitors presented in figure 10.19 indicate that the park has most visitors in the morning, with a peak from 10.00 A.M. till 12.00 A.M.. In the afternoon, the number of visitors decreases evenly. Figure 10.20 indicates how the visitors are likely to be distributed over the various activities in the park. This gives theme park management information on the number of visitors they can expect at specific time periods during the day at particular activities. This information is especially important for the new activities that are to be planned in the park. Before these new activities are implemented in the park it suggests how many visitors could be expected at these activities during a day.

10.5.5 COMPOSITION OF THE SET OF ACTIVITIES CHOSEN

The last aspect defining diversification in theme park activity choice behavior is the composition of the set of chosen activities. This aspect follows from the availability effects that are estimated on basis of the activity duration data. Significant availability effects arise as a result of differences in the composition of the hypothetical theme parks as presented to the respondents. This means that the availability (presence or absence) of particular activities in the hypothetical theme park influences the probability of spending time at another activity. The availability effects contain information on the competition between activities. Moreover they show to what extent activities are complements or substitutes of each other in terms of visitor time spending.

Ordered logit models were estimated for each of the nineteen activities. The dependent variable in the model was the time spent on each of the activities recoded for five minute time periods. The explanatory variables in the model were the availability effects. The question specifically addressed in this section is:
C1. What activities are complements and what activities are substitutes in terms of visitor time spending among the activities?

Table 10.11 displays the performances for all estimated ordered logit models. It shows that most models outperform the null model with only the constant (with the exception of life entertainment by fantasy character E, attractions A, B, C, and D and food and retail outlet C). Table 10.12 presents the parameter estimates which are significant at the 0.05 level. In this table, the diagonal shows the constant for the activities. The other values in each row represent the availability effects of the activities in the first column on the activities presented in the first row. Positive parameters indicate that the activities are complements and negative parameters indicate that activities are substitutes (see 9.5.2).

Complements and substitutes
Overall, the availability effects show that some activities are complements. However, more activities seem to be substitutes in terms of visitor time spending. Large substitution effects can be seen between theater C and life entertainment B, theater B and food and retail outlet D, attraction C and theater D and between food and retail outlet C and life entertainment by fantasy character D. Some, but not so large, complement effects can be seen between life entertainment A and theater D, attractions C and E and respectively theaters B and A, attraction B and life entertainment B and between life entertainment E and attraction A. Only few of these effects are symmetric, which means that the availability effect of one activity on the other is as large as the effect the other way around. For example, an asymmetric effect can be seen between life entertainment by fantasy character B and theater C, there is a large substitution effect from the theater on the fantasy character, while this effect is much stronger the other way around.

Within the same type of activity there are no complement effects, only some substitution effects can be seen. Most of these substitution effects are between the activities of the theater type. This could be explained by the fact that the visitors prefer to spend most of their time in the theaters and therefore, the competition in visitor time spending between the theaters is large.
Table 10.11  Model performances

<table>
<thead>
<tr>
<th></th>
<th>T-A</th>
<th>T-B</th>
<th>T-C</th>
<th>T-D</th>
<th>T-E</th>
<th>L-A</th>
<th>L-B</th>
<th>L-C</th>
<th>L-D</th>
<th>L-E</th>
</tr>
</thead>
<tbody>
<tr>
<td>LL(θ) (constant only)</td>
<td>-410.67</td>
<td>-338.47</td>
<td>-468.77</td>
<td>-507.47</td>
<td>-448.24</td>
<td>-311.95</td>
<td>-349.27</td>
<td>-313.80</td>
<td>-305.85</td>
<td>-336.70</td>
</tr>
<tr>
<td>LL(β)</td>
<td>-378.51</td>
<td>-316.61</td>
<td>-444.58</td>
<td>-405.93</td>
<td>-411.32</td>
<td>-276.38</td>
<td>-288.51</td>
<td>-292.56</td>
<td>-265.63</td>
<td>-333.28</td>
</tr>
<tr>
<td>Degrees of freedom</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>Significance level</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>A-A</th>
<th>A-B</th>
<th>A-C</th>
<th>A-D</th>
<th>A-E</th>
<th>F-A</th>
<th>F-B</th>
<th>F-C</th>
<th>F-D</th>
</tr>
</thead>
<tbody>
<tr>
<td>LL(θ) (constant only)</td>
<td>-334.76</td>
<td>-657.49</td>
<td>-251.17</td>
<td>-159.84</td>
<td>-296.97</td>
<td>-171.54</td>
<td>-349.07</td>
<td>-244.16</td>
<td>-335.94</td>
</tr>
<tr>
<td>LL(β)</td>
<td>-327.40</td>
<td>-644.54</td>
<td>-246.56</td>
<td>-142.87</td>
<td>-286.65</td>
<td>-156.53</td>
<td>-312.63</td>
<td>-234.18</td>
<td>-290.99</td>
</tr>
<tr>
<td>Degrees of freedom</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>Significance level</td>
<td>.68</td>
<td>.10</td>
<td>.95</td>
<td>.01</td>
<td>.30</td>
<td>.04</td>
<td>.00</td>
<td>.33</td>
<td>.00</td>
</tr>
</tbody>
</table>

(T = theater, L = life entertainment by fantasy character, A = attraction, F = food and retail outlet)
Table 10.12  Availability effects
(only significant values at 0.05 level represented)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>T-A</td>
<td>4.44</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T-B</td>
<td>-.54</td>
<td>5.72</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.66</td>
</tr>
<tr>
<td>T-C</td>
<td></td>
<td></td>
<td>5.67</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T-D</td>
<td></td>
<td>5.23</td>
<td></td>
<td></td>
<td></td>
<td>-.14</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T-E</td>
<td>-.37</td>
<td>-.38</td>
<td>5.37</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L-A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.55</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L-B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-.76</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L-C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.06</td>
<td></td>
<td>4.01</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L-D</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.01</td>
<td>4.83</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L-E</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.34</td>
<td></td>
<td></td>
<td>3.09</td>
</tr>
<tr>
<td>A-A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2.07</td>
</tr>
<tr>
<td>A-C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-D</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-E</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F-A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F-B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4.73</td>
</tr>
<tr>
<td>F-C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F-D</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(T = theater, L = life entertainment by fantasy character, A = attraction, F = food and retail outlet)
Between the type of activities, most significant availability effects, both in terms of complements and substitutes, can be seen between life entertainment by fantasy characters and theaters; attractions and theaters; and between attractions and life entertainment by fantasy characters. This also could be explained by the fact that visitors tend to spend most of their time at the theaters and life entertainment by fantasy characters, and therefore have clear preferences for certain combinations of these activities to visit.

10.6 PLANNING IMPLICATIONS

An important task for theme park planners and managers is to successfully plan the supply and demand side in a park. This is difficult as a theme park has specific characteristics. For example, as discussed in previous chapters, the theme park product cannot be stored, and it is produced and consumed at the same time. Also, the demand for rides, activities and facilities fluctuates during the day. Congestion and over-usage of specific attractions are difficult to avoid and may cause severe problems for a theme park. Therefore, capacity planning and routing is an important task to deal with these problems.

Knowledge of diversification in theme park activity choices, for example, what activities visitors prefer in the park and when they want to visit specific activities, is important for capacity planning. The proposed model and experimental approach in this study on theme park activity choice behavior can provide guidance on visitor activity patterns in the park.

The Poisson regression model could be used to model the number of activities chosen by the visitors in the theme park as a function of activity, visitor and context characteristics. For example, an interesting result is that the number of activities available in the park does not explain the number of activities chosen by the visitor. It seems there is an optimal number of activities that could be visited in a one day visit to a park.

Furthermore, it was concluded that when visitors realize that there are more activities available at the end of the route they also want to visit these activities and therefore on average tend to choose more activities to visit. We also found that the sequence of activities is rather related to the design and routing in the park. This
suggests that signs and information boards may be useful to help visitors orientate themselves once they have arrived in the park and to provide them with information at the start of their route to help them decide how to best spend their time on site. This provides an instrument for optimal capacity planning.

The ordered logit models for activity duration provide information on the importance of the elements in the park in terms of visitor time spending. In the park studied, visitors preferred to spend most of their time on the theaters and life entertainment by fantasy characters. These are the main attractions in the park and managers could emphasize this aspect in their advertising. The attractions and food and retail outlets seemed to be more supportive elements in the park.

The models for activity timing and sequence in activity choice behavior provide theme park planners with information on how the demand for various activities is changing during the day and how the visitors are distributed over the activities in the park during the day. This information is relevant for visitor use planning to optimize the theme park product in advance. For example, the planning of the staff that should be available in the park and the number of ticket booths open at the entrance of park can ease this type of information. Management could decide whether extra services should be offered during peak times to reduce overuse of specific facilities. Also differential pricing for specific parts of the day might be useful to shift some demand from peak hours to off-peak periods.

A major advantage of this modeling approach is that it allows one to predict how new activities are likely to perform in the park, and how they are likely to affect the other existing activities.

Overall, it can be concluded that the proposed approach to model diversification in theme park activity choice behavior can provide information on how visitors behave in the park, which rides, facilities and exhibits they want to visit, at what time and for how long. This may provide theme park planners and managers with valuable information to support visitor use planning. The results can be used to balance visitor streams in a park and to develop solutions for logistic problems.
10.7 CONCLUSION

This chapter reported the results of a study that focused on modeling the various aspects defining diversification in visitors’ activity choices in a theme park. Diversification in theme park activity choices was described by the number of activities chosen by visitors during a day visit in a park, the time spend on the activities, the timing of the activity choices, the sequence of activities chosen, and the composition of the set of chosen activities.

Ordered logit models were estimated to describe activity timing and activity duration. The modeling approach also provided information on the sequence in activities chosen by the visitors in the park and the composition of the set of activity choices. A Poisson regression model was estimated to predict the number of activities a visitor is likely to choose during a day visit in the park. All models were estimated from experimental design data based on visitors’ choices and time spending in various hypothetical scenarios of activity availability in an existing theme park in the Netherlands.

The results indicate that the total time spent by visitors in the park and the number of activities available in the park do not seem to explain the number of activities chosen. Moreover, it seems that there is an optimal number of activities that could be visited within a one day visit to a park. It would be interesting to compare this result to number of activities visitors choose in other parks.

Furthermore, visitors liked to spend most of their time on the theaters and life entertainment by fantasy characters. Attractions and food and retail outlets were more supportive elements in the park. Not surprisingly, the longer the waiting time or activity duration the more time spent on the activities. Location was included in the model for one of the new food and retail outlet activities, and it was observed that at one of the two possible locations visitors spent significantly more time at this activity. The results also suggest that visitors tend to follow the route in the park as advised by theme park management.

Overall, these results demonstrate the value of the suggested modeling approach to analyze and predict several aspects of diversification in theme park choice behavior.
11 CONCLUSIONS AND DISCUSSION

The goals and objectives of this thesis were (i) to propose a framework for modeling theme park visitor choice behavior, (ii) to develop choice models to measure and predict the various aspects of the proposed framework, (iii) to develop a conjoint choice experimental design technique that allows one to estimate the proposed choice models, (iv) to test the newly developed models using empirical data, and (v) to explore the implications for theme park planning.

Two major studies were carried out with these goals in mind. The aim of the first study was to examine the existence and nature of seasonality and variety seeking behavior in consumer choice of theme parks. The aim of the second study was to explore diversification in theme park activity choice behavior. In the remainder of this concluding chapter, the concepts of variety seeking, seasonality and diversification are recapitulated, the most important findings of the two studies are discussed, strengths and weaknesses of the proposed models and experiments are analyzed, and avenues for future research are given.

An essential element of the theme park planning process is to develop an adequate understanding of the behavior of existing and potential visitors, in particular the choices and trade-offs that these visitors make. Therefore, an important objective of this thesis was to propose a modeling framework of theme park visitor choice behavior that could address three important types of theme park choices: participation choice, destination choice and activity choice. Temporal aspects such as seasonality and variety seeking may influence these visitor choices. Furthermore, visitors may seek diversification in their activity choices while in a theme park.

In this thesis, we provided a classification of different motivational and
situational reasons that may explain observed variation in successive choices. More specifically, seasonality was conceptualized as a possible situational reason for derived varied behavior, whereas variety seeking and diversification were studied as intentional varied behavior. The difference between the latter two is that variety seeking is driven by temporal variety seeking behavior implied by the sequence of theme park destination choices over time, whereas diversification is driven by structural variation in behavior assuming that theme park visitors choose a bundle of different attractions and facilities during one specific theme park visit.

Empirical tests of the existence of seasonality, variety seeking and diversification using real-world choice data are limited because the effects of different reasons for variation in behavior are often confounded in real world data. Therefore, we used the conjoint choice approach to analyze theme park visitor choice behavior.

In the conjoint choice approach, statistical experimental design techniques are used. This approach provides the benefit that the researcher can include those attributes in the experimental design that are of interest. These attributes are varied independently of each other. Therefore, conjoint choice analysis allows one to control the cause-and-effects relationships of interest. Moreover, the experiments can include manipulable independent attributes that are relevant for theme park planning decision making. Specifically, conjoint choice analysis allows the researcher to include new choice options, currently not existing in the real world, in the choice tasks. For example, it allows the prediction of the likely consequences of planning and marketing variables that are yet not represented in the market. This allows theme park planners to predict future demand for new products or services.

Thus, the potential advantage of high external validity that may be expected when revealed variation in choice data is modeled may not exceed the advantage of the high internal validity of conjoint choice models that allows the disentangling of the various reasons for variation in choice behavior.

However, we also concluded that current conjoint choice models were restricted for our purposes because they did not allow one to adequately model the characteristics of theme park visitor behavior as addressed in the theme park choice modeling framework. Therefore, this thesis introduced a new conjoint choice modeling approach. More specifically, the traditional conjoint choice models and experiments were extended in this thesis to test that (i) theme park visitors seek variety in their destination choices over time; (ii) visitors differ in their preferences
Conclusions and discussion

for theme parks by season; and (iii) visitors tend to seek diversification in their activity choices during a visit to a park.

In the first study, a choice model and a conjoint experimental design were developed to test for seasonality and variety seeking effects in consumer choice of theme parks. We proposed a choice model that allows for changing preferences over time. More specifically, three basic components were included in the model: (i) the utility derived from the attributes of an alternative, (ii) the utility derived from seasonality, and (iii) the utility derived from variety seeking behavior. The study involved two different choice experiments: experiment 1 tested for seasonality effects and variety seeking behavior within type of parks, and experiment 2 tested for seasonality effects and variety seeking effects between theme park types. Note that, although we focussed specifically on variety seeking effects in theme park choice behavior, the experiments also allowed testing for loyalty as indicated by a tourist choosing the same theme park on two successive occasions.

In this study, we defined variety seeking behavior as temporal varied behavior implied by the sequence of choices. Variety seeking occurs if the probability of choosing a certain park at a particular choice occasion depends on the choice of a park at previous choice occasion. This operational definition of variety seeking behavior is very strict. It could, for example, be argued that tourists exhibit a particular pattern of park visits over a year, a zoo in spring and an amusement park in summer. This behavioral pattern may be considered a manifestation of variety seeking behavior but it could also reflect simple seasonality. Tourists may also seek variety in their visits to alternative tourism destinations regardless of the nature of seasonality. We realize that other interpretations of the concept of variety seeking behavior can be given. One could even argue that a visit to the same theme park is different each time. This thesis, however, is based on the more strict operational definition. As a first attempt to model seasonality and variety seeking in tourist choice behavior simultaneously, our study shows that variety seeking and seasonality are important aspects in theme park choice and therefore certainly need more attention in tourism research.

Of course, this conclusion is tight to our choice of methodology. A commonly raised objection against stated choice models is that respondent choice may be an artifact of experimental design decisions and may not reflect actual behavior. Decision making under hypothetical circumstances may be quite different from decision making in real markets. It means that the conjoint experiment needs to
be designed carefully. In the experimental design, the researcher selects and highlights the relevant variables. This raises the question whether the alternatives under study are valid and well described by the various attributes. Respondents' attention may be drawn to attributes that they otherwise might not consider. To overcome this potential problem, a literature research was conducted and the relevant attributes influencing visitor choice behavior were discussed with sector experts. Moreover, several versions of the instrument were pilot-tested. Although this does not necessarily guarantee a valid instrument, obvious problems are avoided.

To test for seasonality, we investigated the differences in consumer preferences for park types and specific parks in the spring and summer season, the most important seasons for theme park visits in the Netherlands. To allow for a test for seasonality and variety seeking within the same experiment, we set choice occasion one to take place in the spring season and choice occasion two in the summer season. Therefore, a limitation of the current study is that we could only address variety seeking behavior between seasons. Moreover, there is the risk of confounding variety-seeking behavior and seasonality. However, the experiments were designed such that the seasonality effects could be estimated independently of the variety seeking effects.

The present experimental design approach assumed a first order process in variety seeking behavior, a choice process in which only the previously selected park impacts present choice. A $2^{NT}$ design, where $N$ is the number of parks and $T$ is the number of time periods, was used. In this study, only two time periods were included in the experiment. The suggested design strategy can, however, be extended to higher order variety seeking choice processes in a straightforward mathematical way. Nevertheless, the experimental design and consumer choice tasks may become complex quite quickly because the design should allow the independent estimation of the main effects of the parks within and between the time periods and the independent estimation of interaction effects between the parks available in the time periods. Hence it seems fair to say that the developed modeling approach is difficult to apply to a detailed accounting of variety seeking behavior.

We should emphasize that the choice sets and the presence or absence of particular parks are defined by the experimental design. Therefore, respondents themselves could not determine which parks are available and which one are not in their choice set. Although respondents were asked about their actual choice set and
the nature of the destinations actually chosen, it was not within the limits of this thesis to extend the estimated conjoint choice model to real market data. A link between the experimental design data and actual behavior would have been instrumental on assessing the external validity of the model. It would provide some information about the correspondence between the predicted demand and the observed choice in the real world. In future research, it be would be interesting to see how these actual, real world choices are related to the choices made in the experimental task. From a methodological point of view, such an analysis does not provide any specific challenge. As explained in the literature review, a test (Swait and Louviere, 1993) could be used to test for the equality of the utility estimated for both kinds of data. Alternatively, both revealed and stated preference data could be used simultaneously to estimate the model. Finally, the outcomes of the conjoint choice experiment can be used to simulate actual choice behavior.

Another potential threat to the validity of the results is the construction of the choice task. In the choice task, respondents were restricted in the sense that they had to choose for both time periods simultaneously. It could be argued that in real life they may decide on their second choice, only after their first visit, in which case the leisure experience itself could influence whether variety seeking behavior occurs. For example, if a tourist went to a theme park and thoroughly enjoyed it, he or she would be more inclined to return the next time despite the fact that he or she may seek variety. On the other hand, one could also argue that households plan their theme park visits in advance for any given year, for example based on their vacation allowance. Future research could address this potential threat by comparing these alternative measurement procedures. For example, one could develop interactive experiments, vary the degree of positive feedback to theme park experiences and test whether this variation leads to different choice probabilities.

To test the proposed model a mail back survey, including the experiments, was sent to a random sample of households in the Netherlands. Results can therefore only be interpreted for the Dutch theme park market. Moreover, only households with children living at home were selected to participate in the survey. Results therefore do not necessary apply to other segments. If the goal of the study would have been to predict actual season-sensitive demand for theme parks, this sampling bias would create substantial problems. However, as emphasized earlier, the goal of this study was to test a new model and hence this bias is of no particular concern. If the modeling approach should be used to predict total demand, one
simply needs to create a random sample or, alternatively, estimate the model for different segments and apply commonly used weighing schemes.

The analysis of the conjoint choice data involved the estimation of models including parameters that indicate the preferences for the parks and their attributes, seasonal differences in preferences for the parks, and variety seeking effects between theme parks. The overall fit of the estimated models was good and most of the parameter values were significant at the 95% confidence level. The models including parameters for seasonal differences and variety seeking outperformed simpler models. This provides strong support for the existence of variety seeking and seasonality in consumer choice of theme parks. This is an important finding, placing doubt on the validity of more commonly used multinomial logit models of choice behavior to predict theme park choice behavior. To further qualify this conclusion, we have shown that the estimated seasonality and variety seeking effects are statistically significant. Hence, the conjoint choice models, including these effects, outperform the conjoint choice models, not including these effects and hence assuming time-invariant behavior. These results do not necessarily imply that the models, developed in this thesis, also better predict actual demand. This implication would only be true if choice behavior under hypothetical circumstances is systematically and positively related to actual choice behavior in the real world. Again, because we did not test this commonly assumed relationship, we cannot, strictly speaking, conclude that the model including seasonality and variety seeking also better predicts actual behavior. Likewise, we cannot conclude that the suggested model outperforms alternative model specifications, such as gravity models.

The results of the models do suggest, however, that consumers differ in their preferences for theme parks by season. Similar patterns can be seen in both experiments. Most remarkable is that zoos are preferred more in the spring than in summer, while the opposite is true for amusement parks. Furthermore, the results indicate that variety seeking significantly influences people’s choice of theme parks. Variety seeking effects depend on the type of park. For example, visitors of cultural/educational parks targeted at adults tend to be loyal, whereas variety seeking is highest for those visiting zoos.

When interpreting these results, it should also be realized that we estimated aggregate models. The results suggest that at the individual level both loyal and variety seeking segments can be found. We should emphasize that in the current
Conclusions and discussion

study we did not explicitly identify such market segments. It would be interesting in future research to identify such segments. Loyal versus variety seeking segments can be derived from the input data directly. Segments can also be further examined by examining the relationship between segment membership and socio-demographic characteristics.

Notwithstanding the fact that the main focus of this thesis is a methodological one, the results also have planning and management implications. The findings of seasonality effects can help theme park planners/managers in their task to plan facilities such that visitor experiences are optimized over seasons. Furthermore, the models also provide information on theme park visitor variety seeking and loyalty behavior. This information can be used to capture a greater proportion of the variety seeking segment. Theme park planners need to emphasize or add distinctiveness in the visits they offer to the visitors. Although this is a well-known strategy to increase attendance, one needs the specific information offered by the model to design the planning and management strategy such as to create a maximum impact, assuming that the model is valid or at least is better than untested assumptions.

Finally, related to the first study, it should be evident that our aim was not to pursue a full-blown forecast of the time-varying number of visitors to any given park. Our focus was on some of the key issues in building a new type of choice model. Having said that, no new methodology is required to actually make such forecasts. Well-known methodology, developed for conventional conjoint choice models, can be applied for this purpose. If the total population, or the population for particular segments is known, the predicted participation probabilities can be used to predict total latent demand. The estimated parameters of the choice model can then be used to allocate this latent demand across the alternative parks. The estimated seasonality and variety seeking parameters then serve to vary the demand across season. If more detailed predictions are required within seasons, adjustments based on observed data can be used as a baseline. Alternatively, a similar methodology, using a more detailed accounting of higher order variety seeking effects can be developed and applied. If the model is to be applied to new parks, one should either repeat the data collection process and re-estimate the model, or make additional assumptions about the similarity of the new park and those included in the experiment and simulate behavior. While all these steps potentially are labor-intensive, they do not represent any problems, not encountered when applying
The aim of the second study was to explore diversification in theme park activity choice behavior. Diversification in theme park activity choices is a complex type of behavior and could not be operationalized in terms of just one aspect. Therefore, it was defined in this study in terms of five aspects: the number of activities chosen by visitors during a visit to a park, the relative time spent on each of the activities, the timing of activity choices, the sequence of activities chosen, and the composition of the set of activity choices.

Duration and timing of visitors’ activity choices in a theme park were modeled using an ordered logit model based on duration data observed in a conjoint allocation task. To the best of our knowledge, this is the first conjoint study using such data. The model was applied to predict the time visitors spend on each of the activities available in a theme park, and to describe visitors’ choices for various activities in the theme park in specific time periods throughout the day. The modeling approach also provided information on the sequence of the chosen activities and the composition of the set of activity choices. A Poisson regression model for count data was estimated to predict the number of activities a visitor is likely to choose during a visit in the park.

The ordered logit model, as used in this study, is a type of hazard model that focuses on the probability that an event will start or end in a given time interval, conditioned on the fact that the event has not occurred or ended before the beginning of that time interval. The advantages of the ordered logit model over other hazard based duration models can be summarized as follows. First, the model can handle discrete data, that is time periods. Secondly, the estimated parameters are invariant to the length of the time intervals and therefore the intervals do not have to be of the same length. Furthermore, the model is not hindered by the large numbers of data ties that occur when a number of visitors choose to start with their activities at the same time. Finally, there is no restricted form for the assumed hazard function as is the case for example in competing risks models. This is convenient because the form of the hazard may be different for each of the activities.

The experimental situations in this study were hypothetical theme parks constructed by varying the absence and presence of various existing and new activities within the theme park as well as their attributes, waiting time, activity duration and location. This experimental design approach supported the estimation of the proposed models in which each of the aspects defining diversification is
described as a function of activity, visitor and context characteristics.

The *data collection* involved that for each hypothetical theme park the respondents were asked to indicate how much time would be spent on each of the activities. Note that the task for the respondents should be interpreted as a time allocation task: at one moment in time a respondent indicates his or her time spending on each of the activities in the park.

As also argued for the first study, in real life, the experience of the first activity choice may influence the next choice of a particular activity. For example, if visitors chose an activity that they like, they may choose to do it again. Alternatively, their visit to the park may more or less follow a pre-planned schedule.

To increase the realism of the experimental task, we asked respondents to imagine that the context of their last visit, indicated by travel party, weather, etcetera, also applied to the hypothetical theme park visit. Strictly speaking therefore the time allocation data, induced by new attractions and facilities in the park, should be viewed as representing rescheduling behavior. The question to what extent these data do reflect time-space behavior depends on the distribution of contextual variables and the congruence of the experiment task with actual decision making. If the contextual variables do not reflect any bias and if congruence is not an issue, there is no reason in principle not to view the collected data as representing scheduling as opposed to rescheduling behavior.

We also asked the respondents to indicate their revealed activity choice behavior in the park similar to how they indicated their choices in the hypothetical choice situations. The objective of this exercise was to allow the respondents to become familiar with the proposed conjoint choice approach. However, it would be interesting to test in future research the external validity of the choice models estimated from the stated activity patterns. Such an analysis was beyond the scope of this thesis.

The conjoint choice experiment was conducted as part of a larger questionnaire that was administrated among a *sample* of 2074 visitors in a theme park in the Netherlands. Respondents were asked to fill out the survey as soon as possible after their visit to the park and to complete the questionnaire as a representative of their travel party which included children. The response rate was 17% (357 respondents returned the questionnaire). This is not a particular high response rate, although for a written questionnaire it is also not particularly low. It should be mentioned that the choice task was quite complex. A solution might be to
Temporal aspects of theme park choice behavior

do a face to face survey. However, it is difficult to get tourists to participate in a survey when they are enjoying themselves, visiting a theme park.

The main results of the estimated ordered logit models showed that the main attractions in the park in terms of visitors time spending were the theaters and life entertainment by fantasy characters, while the attractions and food and retail outlets were more supportive elements in the park. Furthermore, the results showed the shape of the distribution of the visitors during a day over the various activities in the park. Only few activity attributes, visitor and context characteristics influenced the timing and sequence of the activity choices. The availability effects included in the ordered logit models showed that within the same type of activity there are no complementary effects, only some substitution effects. Most of the competition in visitor time spending was between the theater type activities, on which visitors spend most of their time. The results from the estimated Poisson regression model indicated that the total time spent by the visitors in the park and the number of activities available in the park do not explain the number of activities chosen.

One of the limitations of the modeling approach is that respondent heterogeneity may influence activity choice behavior. Certain segments may have preferences that deviate systematically from the average. A simple way of incorporating heterogeneity is to estimate the suggested models for different visitor segments. A more general, but also considerably more difficult approach would be to incorporate heterogeneity in the estimated parameters.

Notwithstanding the fact that the results of this study only relate to the park in which the data was collected, the results do likely provide some general information about the activity behavior of theme park visitors. For example, the finding that designed routes are related to activity sequences can probably be generalized to other parks. In any case, the proposed approach could be applied to other theme parks, provided that some new data is collected and the models are re-estimated.

The findings provide in principle some guidance for theme park planning and management. Knowledge of diversification in theme park activity choice behavior can provide information on how visitors behave in the park, which rides, facilities and exhibits they wish to visit, at what time and for how long. One of the main advantages of our approach, due to the fact that a conjoint choice experiment was used, is that it allows us to model the impact of new, not yet existing, attractions and facilities on the various aspects defining diversification in visitor activity
choices. By definition, historical data are not available for not yet existing attractions and facilities. Hence, any assessment of the impact of such new attractions and facilities necessarily has to rely on analogue reasoning. Overall, knowledge of visitor activity patterns will give theme park planners and managers information to make better informed decisions related to the optimal mix of attractions and facilities, to limiting queues, to avoiding logistics problems, etcetera.

Thus, although the various models perform well, this thesis represents only a first attempt to model seasonality, variety seeking and diversification behavior using a conjoint choice approach. The approach also has its potential limitations, that warrant further testing or elaboration. In particular, the model of variety seeking and seasonality behavior assumes a first order process in variety seeking behavior in that it assumes that only the previously selected alternative impacts present choice. An interesting avenue of future research would be to examine the interdependency of consumer choices over time by developing models that are based upon a more liberal choice format, where respondents can select any possible combination of parks across a year. These models are largely unexplored both in choice modeling in general, and in tourism research in particular.

A possible approach might be to use the modeling approach applied in the second study for modeling diversification to model variety seeking behavior and seasonality in consumer choice of theme parks. The advantage of the modeling approach presented in the second study over the approach presented in the first study is that a more liberal choice process is allowed. Rather than allowing respondents only to make two choices, they are allowed to make several choices and even indicate at what time period they would like to make their choice for a particular alternative. For example, respondents could be presented with 24 time periods of a month, and then be asked to allocate their theme park choices for the next 2 years over a particular choice set containing theme parks constructed on basis of an experimental design. Ordered logit models could then be estimated which predict in which month parks are most likely to be chosen. This approach could handle some of the problems, discussed in this chapter. The results could, for example, provide information about the seasons in which parks are most likely to be chosen, and could also indicate patterns of theme park visits over a longer period of time.

Furthermore, it would be interesting to develop a competing risks model, with the same advantages as the ordered logit model. In a competing risks model,
different events may start or end durations. Specifically, in the case of theme park activity choice behavior, a competing risks model would be convenient because there may be multiple activities that a visitor can choose at a specific point in time, or equivalently, the tourist may end a visit to a specific attraction because he/she wants to choose a new attraction to visit from a whole set of other attractions. However, the competing risks models that have been developed so far, have too restricted assumptions about the hazard function. Specifically, in the case of theme park activity choices it is difficult to justify assumptions of one specific form for the hazard for each of the activities because the form of the hazard may be different for each of the activities. Thus, some original work is required.

We showed that the use of experimental designs is very useful to disentangle the various aspects that could cause variation in choice behavior. However, a disadvantage of these designs is that they do not allow one to incorporate the experience of the first choice respondents make to include into the next choice they make, etcetera. Interactive design techniques should be developed and explored that allow for more controlled inclusion of contexts effects during the choice process in the choice models. Particularly, computer supported data collection methods would be useful, because the choice task for the respondents could then be adapted immediately after the answers given by the respondents. In a paper and pencil survey this is not possible.

Of course, the proposed model and experimental design approach could be applied into other types of tourist choice behavior. For example, the modeling approach used in the second study could be used to model the various day-trips a tourist chooses within a specified time period, the various activity choices made by a tourist during a city-trip, and the various choices made for a holiday.

In any case, if the results obtained in the studies reported in this dissertation can be generalized, the results strongly suggest that currently used models of time-invariant tourist choice behavior should be replaced by models as suggested in this thesis to support theme park planning, design and decision making processes.
REFERENCES


Lavery, P. and T. Stevens (1990), Attendance Trends and Future Developments at Europe’s Leisure Attractions, EIU Travel and Tourism Analyst, 2, 52-75.


Temporal aspects of theme park choice behavior


## AUTHOR INDEX

### A
- Adamowics, W., 89
- Ah-Keng, K., 1, 56, 69, 85
- Anderson, D.A., 61, 97, 131, 197
- Anderson, N.H., 81
- Ansari, A., 107
- Axinn, C.N., 26, 56, 57, 70
- CBS, 31
- Chiang, J., 69
- Chintagunta, P.K., 69, 117, 122
- Cox, D.R., 181
- Crompton, J., 58, 59, 66
- Crouch, G.I., 4, 63, 65, 69, 83

### B
- Bakker, C., 56, 57
- Bawa, K., 116, 122
- Baxter, M.J., 120
- Ben-Akiva, M., 61, 89, 93
- Berlyne, D.E., 67
- Bojanec, D.C., 86
- Bonn, M.A., 66, 70
- Borgers, A.W.J., 61, 63, 64, 70, 106, 118, 120, 122
- Dietvorst, A.J.G., 27, 34, 56, 58, 63, 64, 69
- Dijkstra, J., 97

### D
- Dellaert, B.G.C., 61, 64, 68, 87, 88
- Ettema, D., 61
- Ewing, G.O., 87, 120
- Fesenko, D.W., 68
- Ewing, G.O., 87, 120

### F
- Farquhar, P.H., 108, 111, 122
- Faulkner, B., 64
- Feinberg, F.M., 114, 122
- Fesenko, D.R., 61, 64, 68, 71, 139
- Fiske, D.W., 68
Temporal aspects of theme park choice behavior

G
Givon, M., 4, 113, 114, 115, 122, 123
Gratton, C., 55
Green, P., 84, 85, 94
Gumbel, E.J., 80
Gunn, C.A., 24, 25, 32, 42
Gupta, S., 69

H
Haaijer, M.E., 94
Haider, W., 87
Halsworth, A.G., 91
Han, A., 6, 171, 181, 182, 183, 186, 187, 188
Hausman, J., 6, 171, 181, 182, 183, 186, 187, 188
Hensher, D., 61, 87, 89, 175, 176, 182, 183, 186
Horowitz, J.L., 101
Howard, D.R., 65

I
Inskeep, E., 17, 18, 41, 42, 44, 45, 47

J
Jeng, J.M., 64
Jeuland, A.P., 112, 115, 122
Johar, J.S., 66

K
Kahn, B.E., 4, 6, 65, 111, 114, 115, 122, 123
Kalwani, M., 4, 6, 111, 115, 122, 123
Kelly, G.A., 91
Klabbers, M.D., 97
Kleinbaum, D.G., 174
Kotler, P., 19, 20, 21, 35
Kozak, M., 70
Kruskal, J.B., 99

L
Lancaster, K.J., 77
Lattin, J.M., 114, 122
Lavery, P., 55
Lawson, R., 64
Lee, T.H., 66
Lerman, S.R., 61, 89
Lieber, S.R., 61, 139
Lim, C., 84
Louie, T.A., 115
Louviere, J.J., 4, 61, 62, 63, 65, 69, 81, 86, 87, 89, 90, 94, 95, 96, 97, 100, 101, 131, 243
Luce, R.D., 61, 77, 100
Lyonskii, S., 58, 59

M
MacDonald, R., 64
Maddala, G.S., 174
Maddi, S.R., 68
Mannering, F.L., 175, 176, 1182, 184, 186
Mansfeld, Y., 58, 60
Martin, W.H., 30, 31, 55
Mason, S., 30, 31, 55
McAlister, L., 4, 65, 106, 107, 109, 110, 111, 114, 122, 123
McClung, G.W., 56, 69, 84, 139
McElevy, R.D., 187
McFadden, D., 76, 79, 191
<table>
<thead>
<tr>
<th>Author</th>
<th>Page References</th>
</tr>
</thead>
<tbody>
<tr>
<td>McGinley, C.</td>
<td>64</td>
</tr>
<tr>
<td>Middleton, V.T.C.</td>
<td>12, 18, 32, 70</td>
</tr>
<tr>
<td>Min.E.Z.</td>
<td>29, 34</td>
</tr>
<tr>
<td>Mommaas, H.</td>
<td>64</td>
</tr>
<tr>
<td>Montgomery, D.C.</td>
<td>95</td>
</tr>
<tr>
<td>Moore, R.E.</td>
<td>66</td>
</tr>
<tr>
<td>Morey, E.R.</td>
<td>84</td>
</tr>
<tr>
<td>Morikawa, T.</td>
<td>89</td>
</tr>
<tr>
<td>Morrison, D.</td>
<td>4, 6, 111, 115, 122, 123</td>
</tr>
<tr>
<td>Moutinho, L.</td>
<td>19, 56, 69</td>
</tr>
<tr>
<td>Murphy, P.E.</td>
<td>66, 70</td>
</tr>
<tr>
<td>Myers, R.H.</td>
<td>174</td>
</tr>
<tr>
<td>N</td>
<td></td>
</tr>
<tr>
<td>NBT</td>
<td>2, 28</td>
</tr>
<tr>
<td>NRIT</td>
<td>201</td>
</tr>
<tr>
<td>O</td>
<td></td>
</tr>
<tr>
<td>Opperman, M.</td>
<td>64, 65</td>
</tr>
<tr>
<td>Oppewal, H.</td>
<td>61, 88, 96</td>
</tr>
<tr>
<td>P</td>
<td></td>
</tr>
<tr>
<td>Pearce, P.L.</td>
<td>14, 15, 54, 56</td>
</tr>
<tr>
<td>Pessemier, E.A.</td>
<td>4, 65, 68, 106, 110, 111, 122</td>
</tr>
<tr>
<td>Peterson, G.L.</td>
<td>83</td>
</tr>
<tr>
<td>Prentice, R.L.</td>
<td>188</td>
</tr>
<tr>
<td>Pritchard, M.P.</td>
<td>65, 66, 70</td>
</tr>
<tr>
<td>R</td>
<td></td>
</tr>
<tr>
<td>Raju, J.S.</td>
<td>4, 65, 115, 122, 123</td>
</tr>
<tr>
<td>Rao, V.A.</td>
<td>108, 111, 122</td>
</tr>
<tr>
<td>Rimmington, M.</td>
<td>70</td>
</tr>
<tr>
<td>Rose, F.</td>
<td>27</td>
</tr>
<tr>
<td>Rutledge, J.</td>
<td>54, 56</td>
</tr>
<tr>
<td>S</td>
<td></td>
</tr>
<tr>
<td>Shaw, R.N.</td>
<td>83</td>
</tr>
<tr>
<td>Shocker, A.D.</td>
<td>99</td>
</tr>
<tr>
<td>Siderlis, C.</td>
<td>66</td>
</tr>
<tr>
<td>Srinivasan, V.</td>
<td>84, 85, 99</td>
</tr>
<tr>
<td>Steimerding, M.P.</td>
<td>61, 64, 87, 91</td>
</tr>
<tr>
<td>Stevens, T.R.</td>
<td>13, 55</td>
</tr>
<tr>
<td>Stynes, D.J.</td>
<td>83</td>
</tr>
<tr>
<td>Swait, J.</td>
<td>89, 90, 243</td>
</tr>
<tr>
<td>Swarbrooke, J.</td>
<td>13, 16, 19, 21, 23, 31, 35</td>
</tr>
<tr>
<td>T</td>
<td></td>
</tr>
<tr>
<td>Taplin, J.H.E.</td>
<td>64</td>
</tr>
<tr>
<td>Thach, S.V.</td>
<td>26, 56, 57, 69</td>
</tr>
<tr>
<td>Theil, H.</td>
<td>99</td>
</tr>
<tr>
<td>Thurstone, L.L.</td>
<td>78, 79</td>
</tr>
<tr>
<td>Tideswell, C.</td>
<td>64</td>
</tr>
<tr>
<td>Timmermans, H.J.P.</td>
<td>4, 61, 62, 63, 67, 70, 86, 89, 91, 96, 97, 100, 106, 107, 117, 118, 120, 122</td>
</tr>
<tr>
<td>Train, K.</td>
<td>81, 191</td>
</tr>
<tr>
<td>Tye, W.B.</td>
<td>81, 191</td>
</tr>
<tr>
<td>U</td>
<td></td>
</tr>
<tr>
<td>Um, S.</td>
<td>58, 59</td>
</tr>
<tr>
<td>Urry, J.</td>
<td>64</td>
</tr>
<tr>
<td>Uysal, M.</td>
<td>66</td>
</tr>
<tr>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Van der Heijden, R.E.C.M.</td>
<td>63, 70, 91, 106, 118, 120, 122</td>
</tr>
<tr>
<td>Van der Poel, H.</td>
<td>64</td>
</tr>
<tr>
<td>Van Raa, W.F.</td>
<td>77</td>
</tr>
<tr>
<td>Van Trijp, J.C.M.</td>
<td>107, 123</td>
</tr>
</tbody>
</table>
Temporal aspects of theme park choice behavior

W
Walsh-Heron, J., 13
Wierenga, B., 56, 57, 77
Wiley, J.B., 97, 131, 198
Witt, C.A., 61
Witt, S.F., 61
Wittink, D., 93
Woodside, A.G., 58, 59, 64
Woodworth, G., 94, 96, 97, 131
WTO, 1
Wylson, A., 15
Wylson, P., 15

Z
Zavoina, W., 1877
Zoltak, J., 1, 26
SUBJECT INDEX

A
Accelerated lifetime model, 181, 185
Activity,
  choice, 5, 69, 239
  duration, 6, 171, 173, 190, 210-219, 246
  timing, 6, 171, 173, 190, 219, 227, 246
Aggregate models, 244
Amusement park, 14, 15
Arousal theory, 67, 107
Attribute, 62, 77, 85, 91, 92, 131, 139, 194, 195, 240, 242
  cross effects, 81, 97, 131
  levels, 77, 92, 131, 195
Attribute satiation model, 109
Availability effects, 7, 81, 82, 97, 131, 190, 191, 232, 248

B
Base alternative, 93
BHT variety seeking model, 118-120

C
Censoring, 184, 185

Choice,
  experiment, 96, 130, 152, 241
  model, 5, 121
  set, 131, 133, 197, 198, 242
  task, 141, 155, 243
Coding,
  dummy, 98,
  effect, 98, 99,
  orthogonal, 99
Cognitive,
  consistency theory, 67
  environment, 63
Competing risks model, 182, 246, 249-250
Complexity theory, 67
Composition of the set of activities, 6, 171, 173, 190, 232-236, 246
Compositional approach, 84
Conjoint,
  allocation task, 6
  choice approach, 93, 240
  choice experiment, 4, 138, 165, 194
  choice modeling, 4, 5, 87, 101
  choice set, 94
  preference modeling, 85, 86, 93
Cumulative distribution function, 176, 178

D
Data ties, 185, 186
Decision rule, 63
Decompositional approach, 85
Density function, 177, 178
Derived varied behavior, 4, 65, 123
Design strategy, 96, 131, 242
Destination,
   awareness, 59
   choice, 3, 5, 69, 239
Discrete choice,
   behavior, 76
   theory, 76-77
Diversification, 4, 5, 68, 70, 71, 171, 174, 236, 240, 246
Double design technique, 96
Duration data, 6, 171
Dynamic attribute satiation (DAS)
   model, 109

E
Estimation procedures, 98
Experimental,
   choice data, 4, 123
   design, 94-97, 130-134, 139, 140, 197, 240, 242, 250
External validity, 89, 240

F
Fractional factorial design, 95
Full factorial design, 95

G
Goodness of fit, 99, 145, 190, 205
Gumbel,
   distribution, 80, 129
   scale factor, 80

H
Hazard,
   function, 176-180, 188, 246
   models, 180-183
   rate, 181, 189, 190
Heterogeneity, 184, 186, 248
Hierarchical model, 107

I
Ideal point, 108
Independence from Irrelevant Alternatives (IIA), 78, 81
Independently and Identically Distributed (IID), 80, 129
Information Integration Theory, 61
Intentional varied behavior, 4, 66, 123, 240
Interaction effects, 95, 132, 242
Interactive design, 250
Internal validity, 89, 100, 123, 240
Interpersonal variety, 110
Intrapersonal variety, 110
Inventory-based models, 107-112, 121

J
Joint space analysis, 111
Subject index

L
Likelihood ratio test statistic, 99, 145, 190
Linear compensatory model, 79, 128
Loyalty behavior, 65, 126

M
Main effects, 95, 132, 242
Market research, 51
Markov,
  chain, 112
  model, 113, 117
Maximum likelihood estimation, 99, 144, 189, 205
Micro-economic consumer theory, 77
Mother logit model, 81
Multinomial logit (MNL) model, 80, 129

N
Non-inventory-based models, 112-118, 122
Non-parametric hazard models, 181, 183
Number of activities chosen, 6, 171, 173, 205, 206-210, 246

O
Ordered logit model, 6, 171, 181, 185, 186-190, 203, 204, 232, 237, 246, 248

P
Parametric hazard models, 182, 183
Participation choice, 3, 69, 239
Planning,
  decision, 5
  process, 45
  research, 3
Poisson regression model, 7, 171, 174-175, 204, 205, 206, 236, 246
Preference,
  function, 188
  model, 100, 121
  structure, 63
Probabilistic choice theory, 61
Probit model, 79
Profile, 85, 86, 95, 131
Proportional hazard models, 181, 185

Q
Questionnaire, 97

R
Random,
  error component, 79, 128, 188
  utility theory, 78, 79
Ranking
  data, 99
  task, 93
Rating,
  data, 98
  scale, 93
Repeat choice behavior, 3, 65
Revealed,
  choice data, 4, 130
  choice modeling, 83, 88
  models, 82
  preference, 243
Rho square, 99, 145, 190
Temporal aspects of theme park choice behavior

S
Sample, 139, 142, 194, 199, 243, 247
Season, 5
Seasonality, 4, 32, 69, 126, 130, 134, 149, 160, 240, 241
Seasonality and variety seeking model, 126-130, 145, 146, 156, 159
Self-explicated approach, 84
Semi-parametric hazard models, 181, 183, 185, 186
Sequence of activities, 171, 173, 190, 228-232, 246
State dependence, 184
duration dependence, 185
occurrence dependence, 185
lagged duration dependence, 185
Stated preference, 243
and choice modeling, 84, 90-103
Strict utility theory, 77, 78
Structural utility, 128
Structural variety seeking, 68, 111, 240
Survivor function, 177, 178
Systematic component, 79, 188

T
Temporal variety seeking, 68, 111, 240
Theme park, 1, 11-38
definition, 14
demand, 26-31, 121
design, 35
development plan, 47
history, 14-16
Universal’s Island of Adventure, 26
Time varying variables, 184, 185
Time-space behavior, 58, 247
Timing and duration models, 175
Tourism, 1
Tourism planning levels, 40
  national level, 40, 41
  regional/urban level, 40, 42
  site level, 40, 43
Tourist,
  choice behavior, 3, 250
  decision making process, 64
  preference and choice behavior, 61-64
Travel,
  destination choice, 59
  motivation, 60

U
Universal logit model, 81
Utility function,
  alternative specific, 96
  generic, 96
Utility theory framework, 77

V
Variation in behavior, 65, 106
Variety seeking, 4, 68, 69, 70, 126, 130, 134, 150, 161, 240, 241
Visitor,
  attraction, 12, 13
  use planning, 44
Temporal aspects of theme park choice behavior
SAMENVATTING (DUTCH SUMMARY)

Themaparken genereren een grote toeristische vraag en spelen een belangrijke rol als trekkers voor toeristische gebieden. De markt voor themaparken, met name in Europa, maakte afgelopen decennia een zeer sterke groei door. Tegelijkertijd nam echter de concurrentie toe. De markt vertoont daarom momenteel verzadigingsverschijnselen. Dit wordt niet alleen veroorzaakt door het groeiende aantal parken, maar behalve het aanbod van de gezamenlijke themaparken is er ook een zeer gevarieerd scala aan andere voorzieningen dat dingt om de gunst van de toerist. De druk op themaparken neemt daarnaast toe omdat de competitie voor ruimte in stedelijke gebieden voor wonen, bedrijven, recreëren, etcetera sterk is gegroeid. Ook themaparken hebben een steeds grotere ruimte behoefte, bijvoorbeeld voor uitbreiding met spectaculaire attracties of uitbreiding in de vorm van accommodatie of retailing.

In hoofdstuk 2 worden allereerst trends en ontwikkelingen aan de vraagzijde besproken. Belangrijke demografische veranderingen zijn vergrijzing en ontgroening. Veranderingen in toeristengedrag worden verder veroorzaakt door trends zoals het feit dat mensen onder een steeds grotere tijdsdruk leven, toeristen mondiger en kritischer worden en vragen om hogere kwaliteit. Door deze ontwikkelingen wordt de toerist steeds selectiever in de parken die bezocht worden en de activiteiten die ondernomen worden wanneer ze eenmaal in een park zijn.

Voor themaparken is de uitdaging om te werken aan professionele planningstrategieën, die kunnen helpen om hun marktaandeel te versterken. In hoofdstuk 3 wordt dit planningsproces voor themaparken uitgewerkt. Op basis van de analyse van dit proces wordt geconcludeerd dat voor themapark planning kennis over de diverse aspecten van het keuzegedrag van toeristen van groot belang is.
Uiteraard is het niet de enige vorm van essentiële informatie, maar wel een belangrijke. Voorspellen wat de wensen van huidige en toekomstige toeristen zijn, wanneer ze een park willen bezoeken, en wat ze willen doen wanneer ze eenmaal in een park zijn, zijn daarvoor belangrijke onderdelen. Maar ook bijvoorbeeld een analyse van de vraag wat de effecten van planningsingrepen zijn, die vaak met kostbare investeringen gepaard gaan, op het keuzegedrag van de toerist. Marktonderzoek kan ondersteuning bieden aan dergelijke planning. In dit proefschrift wordt een methode ontwikkeld en getoetst om het keuzegedrag van toeristen ten aanzien van themaparken te modelleren ter ondersteuning van plannings beslissingen.

In hoofdstuk 4 wordt een conceptueel schema over themapark keuzegedrag gepresenteerd dat bestaat uit drie belangrijke themapark keuzes en een tijdsdimensie. De keuzes zijn, themapark participatiekeuze, themapark bestemmingskeuze en de activiteitenkeuze tijdens een bezoek aan een themapark. De participatiekeuze geeft aan of een toerist al dan niet een themapark wil bezoeken. Als de toerist besluit een park te bezoeken volgt de bestemmingskeuze: de keuze naar welk park toe te gaan. Als de toerist op de bestemming is gearriveerd volgen een aantal activiteitenkeuzes. De tijdsdimensie geeft de temporele aspecten weer die deze typen themapark keuzes beïnvloeden, variatie zoeken, seizoenseffecten en diversificatie.

De keuzes die toeristen over de tijd heen maken kunnen worden onderverdeeld in herhalingsgedrag en variatie zoekend gedrag. Bij herhalingsgedrag worden dezelfde alternatieven gekozen bij twee opeenvolgende keuzes terwijl bij variatie zoekend gedrag verschillende alternatieven worden gekozen. Wanneer verschillende keuzes worden gemaakt kan dit veroorzaakt worden door doelbewust variatie zoekend gedrag of afgeleid variatie zoekend gedrag. In het eerste geval wordt er bewust, met als doel variatie, verschillende alternatieven gekozen. In het tweede geval wordt de keuze van verschillende alternatieven bepaald door andere aspecten en daaruit afgeleid ontstaat er een keuze van verschillende alternatieven.

Seizoenseffecten kunnen worden beschouwd als een situationele reden voor afgeleid variatie zoekend gedrag, terwijl variatie zoeken en diversificatie bewust variatie zoekend gedrag zijn. Overeenkomstig de marketing literatuur wordt het verschil tussen variatie zoeken en diversificatie uitgelegd als het verschil tussen temporeel en structureel variatie zoekend gedrag. Bij temporeel variatie zoekend gedrag gaat het om de keuze van verschillende alternatieven over de tijd heen,
terwijl het bij structureel variatie zoekend gedrag om de keuze van een aantal verschillende alternatieven binnen een bepaalde tijdsseenheid gaat. Bijvoorbeeld in het geval van activiteitenkeuze in een themapark, kiest de toerist een set van activiteiten of attracties tijdens één bezoek aan een park. Het verschil tussen temporeel en structureel variatie zoekend gedrag is natuurlijk in zekere mate afhankelijk van operationele beslissingen, met name het tijdskader dat gesteld worden.

In hoofdstuk 5 worden de belangrijkste modellen die gebukt worden om toeristenkeuzes te meten geëvalueerd. De voorgestelde conjuncte keuze benadering biedt een alternatief voor de zogenaamde ‘revealed’ keuzemodellen, die gebaseerd zijn op keuzegedrag van toeristen binnen een bestaande marktsituatie. Deze revealed keuzemodellen hebben echter een aantal nadelen, zoals: de keuzes kunnen beïnvloed zijn door aspecten die niet van belang zijn voor een planner, er is geen informatie beschikbaar over het keuzegedrag van toeristen met betrekking tot nog niet bestaande nieuwe producten, en de verklarende variabelen kunnen onderling sterk gecorreleerd zijn.

In een conjunct keuze experiment krijgen de respondenten een aantal hypothetische keuze alternatieven voorgelegd. Deze keuze alternatieven worden beschreven aan de hand van een aantal kenmerken die elk verschillende waarden kunnen aannemen. De alternatieven en kenmerken worden door de onderzoeker samengesteld op basis van statistische experimentele designs. Individuele preferentie of nutsfuncties kunnen afgeleid worden van de keuze die toeristen maken in hypothetische omstandigheden. De modellen voorspellen de kans dat een alternatief, bijvoorbeeld een themapark, gekozen wordt als functie van kenmerken van dat alternatief en de kenmerken van de overige alternatieven in de keuze set. Met deze aanpak kan correlatie tussen de kenmerken van de alternatieven vermeden worden. Verder leidt de aanpak tot een kwantitatieve meting van het relatieve belang van de kenmerken die de preferenties en keuzes bepalen. Ook kan bijvoorbeeld voorspeld worden wat het marktaandeel zal zijn van een nieuw nog niet bestaand alternatief.

Echter, in de meeste modellen die preferenties van toeristen meten en de marktaandelen voor themaparken voorspellen, zo ook in de conjuncte keuzemodellen, wordt verondersteld dat het nut dat toeristen aan een bepaald alternatief ontlenen stabiel is over tijd. Preferenties en keuzes kunnen in deze modellen niet veranderen. Deze aanname van een tijd-invariante preferentie functie
is in veel studies aanvaardbaar, maar voor keuzes van themaparken is het meer plausibel om te veronderstellen dat toeristen een bepaalde mate van variatie wensen aan te brengen in de door hen bezochte parken. Daarnaast houden de modellen geen rekening met het feit dat de tijd die toeristen wensen te besteden aan de diverse activiteiten kan verschillen. Deze aannames zijn moeilijk te verdedigen wanneer activiteitenkeuzes van bezoekers van themaparken worden gemodelleerd. Daarom kan worden geconcludeerd dat de voorspellende kwaliteit van de huidige modellen beperkt is als seizoenseffecten, variatiezoekend gedrag en diversificatie een sterk effect hebben op de keuzes van themapark bezoekers.

Het hoofddoel van dit proefschrift is dan ook het ontwikkelen en toetsen van keuzemodellen die de diverse aspecten uit het conceptuele schema van themapark keuzegedrag kunnen beschrijven, en conjuncte keuze experimenten uit te werken die het mogelijke maken om deze modellen te schatten, beide ter ondersteuning van themapark planning. Specifiek worden keuzemodellen en conjuncte keuze experimenten ontwikkeld die het mogelijk maken om te testen: (i) in hoeverre themapark bezoekers variatie zoeken in hun bestemmingskeuze van themaparken over de tijd heen, (ii) of themapark bezoekers verschillende preferenties hebben voor themaparken afhankelijk van het seizoen waarin de keuze wordt gemaakt, en (iii) hoe themapark bezoekers diversificatie wensen aan te brengen in de activiteiten die ze ondernemen gedurende een bezoek aan een park.

Om deze vragen te onderzoeken is een tweetal studies in het kader van dit promotie onderzoek uitgevoerd. De eerste studie richt zich specifiek op de keuzes die toeristen maken tussen parken, en een tweede studie besteedt aandacht aan de activiteitenkeuzes van bezoekers in een themapark.

Voordat de twee studies worden uitgewerkt, wordt eerst in hoofdstuk 6 een overzicht gegeven van bestaande modellen die specifiek ontwikkeld zijn om variatie zoekend gedrag te meten. De meeste studies die zijn uitgevoerd om variatie zoekend gedrag te testen benadrukken het belang van het meten van onderscheid tussen doelbewust en afgeleid variatie zoekend gedrag. Modellen die zijn geschat op werkelijk vertoond keuzegedrag, bijvoorbeeld op panel data, laten moeilijk toe om dit onderscheid te maken. De validiteit van de geschatte parameters die de mate van variatie zoekend gedrag uitdrukken wordt bedreigd omdat de redenen die de variatie in keuze veroorzaken niet ontrafeld kunnen worden. Een manier om dit te ondervangen is het gebruik van experimentele keuze data in plaats van data over werkelijk vertoond keuzegedrag. Het gebruik van experimentele data heeft als
voordeel dat de parameters met meer precisie kunnen worden geschat en dat de nutsfunctie beter geïdentificeerd kan worden. De experimentele keuzetaak wordt minder beïnvloed door diverse motivationele en situationele effecten dan in werkelijk vertoond keuzegebrag, wat resulteert in een beter representatie van de variatie in het keuzegebrag.

Gebaseerd op dit overzicht worden de twee studies beschreven in de hoofdstukken 7 tot en met 10. In hoofdstuk 7 wordt een model en conjunct keuze experiment voorgesteld om variatie zoeken en seizoenseffecten te meten in de bestemmingskeuze van toeristen bij het bezoek van themaparken. De participatiekeuze wordt ook in het model meegenomen. In hoofdstuk 8 volgt een empirische test van het model. In de tweede studie, in hoofdstuk 9, worden modellen en een conjunct keuze experiment uitgewerkt met als doel om activiteitenkeuzes van bezoekers in een themapark te beschrijven. In hoofdstuk 10 volgt de beschrijving van een empirische test van de voorgestelde aanpak.

Het doel van het eerste onderzoek, uitgewerkt in hoofdstuk 7, is om seizoenseffecten en variatie zoekend gedrag van themaparken bezoekers te meten en te voorspellen met behulp van een conjunct keuzemodel. We staan toe dat het nut dat aan de keuze van een bepaald park wordt ontleend op een bepaald tijdstip, afhankelijk is van (i) de kenmerken van dat park, (ii) het park dat op het vorige tijdstip is gekozen, en (iii) het seizoen waarin het park wordt gekozen.

Om variatiezoekend gedrag te meten moet een tijdsaspekt worden meegenomen in het model. Dit houdt in dat ten minste voor twee opeenvolgende tijdstippen de door de toerist gemaakte keuzes geobserveerd moeten worden. Als er sprake is van variatiezoekend gedrag zal de kans dat een bepaald alternatief op tijdstip t gekozen wordt afhankelijk zijn van de keuze die gemaakt is op tijdstip t-1. Dus op het moment van keuze zullen sommige parken relatief meer/minder aantrekkelijk worden dan verwacht zou worden op basis van de onconditionele preferenties voor de parken. Om seizoenseffecten te meten moet ook minimaal voor twee tijdstippen (seizoenen) keuzes van toeristen gemeten worden. Als seizoensen effect hebben op de keuze van toeristen zullen de preferenties voor de parken verschillen per seizoen.

Een test van het voorgestelde model is beschreven in hoofdstuk 8. Er zijn 2 conjuncte keuze experimenten opgezet: experiment 8.1 waarin generieke themaparken en een aantal van hun kenmerken worden gevarieerd om seizoenseffecten en variatiezoekend gedrag tussen verschillende type themaparken
Temporal aspects of theme park choice behavior

te bepalen en experiment 8.2 waarin bestaande themaparken uit Nederlands zijn meegenomen waarvan alleen de prijs is gevarieerd om zo de seizoenseffecten en variatiezoekend gedrag binnen een bepaald type parken te kunnen bepalen. Om variatiezoekend gedrag te meten zijn er voor twee tijdstippen, voorjaar en zomer, keuze sets aan de respondenten voorgelegd. De vraag aan de respondenten was om zich voor te stellen dat ze het eerste uitstapje voor het voorjaar van het volgende jaar gingen plannen en vervolgens het eerste uitstapje voor de zomer van dat jaar. Hierbij dienen we op te merken dat de experimentele designs zodanig worden geconstrueerd dat de seizoenseffecten en het effect van variatie zoekend gedrag onafhankelijk van elkaar zijn te meten. Ook dient opgemerkt te worden dat naast variatie zoekend gedrag ook herhalingskeuzes kunnen worden gemeten.

De resultaten van het onderzoek tonen aan dat de preferenties van toeristen voor bepaalde parken verschillen per seizoen. Het lijkt dat toeristen dierentuinen liever in de lente bezoeken dan in de zomer, terwijl voor amusementsparken het tegenovergestelde geldt.

Daarnaast laten de resultaten zien dat een redelijk groot gedeelte van de toeristen variatie zoekend gedrag vertoont. De keuzes blijken afhankelijk te zijn van het type park. Bijvoorbeeld de neiging tot variatiezoekend gedrag tussen type parken is vooral groot tussen amusementsparken in het voorjaar en dierentuinen in de zomer, en tussen dierentuinen in het voorjaar en musea voor kinderen in de zomer. Variatiezoekend gedrag binnen typen komt ook voor, bijvoorbeeld tussen de Efteling in het voorjaar en Duinrell in de zomer (beide amusementsparken), tussen het Omniversum in het voorjaar en Archeon in de zomer (beide musea), en tussen Artis in het voorjaar en Burgers’Zoo in de zomer (beide dierentuinen). Aan de andere kant is er een hoge kans op herhalingskeuzes voor bijvoorbeeld twee keer een museum.

De resultaten van deze studie hebben implicaties voor planners van themaparken. Bijvoorbeeld de voorkeuren van de toeristen voor de parken in de verschillende seizoenen geeft een indicatie hoeveel bezoekers te verwachten. Dit kan planners helpen om de faciliteiten zodanig te plannen dat de bezoekers zo optimaal mogelijk verdeeld zijn over het park. Daarnaast laten resultaten zien dat het bijvoorbeeld ook goed is om sterk seizoen gerichte activiteiten te ontwikkelen en deze te benadrukken in promotie campagnes. Met informatie over variatie zoekend gedrag kunnen planners bijvoorbeeld om een groter gedeelte van het variatiezoekende publiek aan te trekken de afwisseling in het aanbod van het park
benadrukken, of de bezoekers erop wijzen dat ze bij ieder bezoek weer nieuwe ervaringen op kunnen doen in het park.

Het doel van de tweede studie, beschreven in hoofdstuk 9 is om diversificatie in de activiteitenkeuzes van toeristen bij het bezoek van themaparken te modelleren. Diversificatie is geoperationaliseerd aan de hand van de volgende aspecten: (i) het aantal activiteiten dat door de bezoekers van een themapark wordt gekozen gedurende het bezoek aan een park, (ii) de tijd die aan ieder van de activiteiten in het park wordt besteed, (iii) het tijdstip gedurende de dag waarop de activiteiten worden gekozen, (iv) de volgorde in de activiteitenkeuzes, en (v) de compositie van de set van gekozen activiteiten.

Om de tijd die aan de activiteiten in het park wordt besteed en het tijdstip waarop een activiteit wordt gekozen te voorspellen worden ordered logit modellen gebruikt. Een ordered logit model is een type hazard model dat kan worden gebruikt om te voorspellen wat de kans is dat een bepaalde activiteit begint, of dat een bepaalde tijdsduur eindigt in een bepaald tijdsinterval, geconditioneerd op het feit dat de activiteit nog niet was begonnen, of een bepaalde tijdsduur nog niet was beëindigd voor dat tijdsinterval. In deze studie is het model gebruikt om te voorspellen in welk tijdseenheid gedurende de dag een bepaalde activiteit wordt gekozen door de bezoekers in een park en om te voorspellen hoeveel tijd wordt gespendeerd door de bezoekers aan de activiteiten in een park.

De compositie van de set van gekozen activiteiten kan worden afgeleid van de zogenaamde aanwezigheidseffecten, die kunnen worden geschat op de tijd besteed aan bepaalde activiteiten. Deze aanwezigheidseffecten geven het effect weer van de aan-/afwezigheid van een bepaalde activiteit in het park op de kans dat een andere activiteit wordt gekozen. De effecten geven informatie over de competitie tussen activiteiten; zijn bepaalde activiteiten elkaars complement of juist substituut in termen van tijdsbesteding. Zo kan informatie worden verkregen over de compositie van de set van gekozen activiteiten. De volgorde in gekozen activiteiten volgt indirect uit de modellen die geschat zijn om de tijdstippen te bepalen waarop de activiteiten worden gekozen. Een Poisson regressie model is gebruikt om het aantal activiteiten te voorspellen dat een bezoeker van het park zal kiezen.

Alle modellen worden geschat op experimentele data die is verkregen uit de tijdsbesteding van bezoekers van een bekend themapark in Nederland in hypothetische keuze situaties die zijn samengesteld uit een aantal bestaande activiteiten in het park en een aantal nieuwe activiteiten. In de keuzesituaties zijn de
activiteiten beschreven aan de hand van de wachtijd, activiteitsduur en voor de nieuwe activiteiten ook nog de locatie in het park. Deze aanpak ondersteunt de schatting van de voorgestelde modellen om de verschillende aspecten van diversificatie te beschrijven als een functie van activiteiten, bezoekers en omgevingskenmerken.

In hoofdstuk 10 wordt een empirische test van de voorgestelde methode uitgewerkt. De resultaten laten zien wat de voorkeuren van bezoekers zijn voor de voorzieningen in het park, op welk tijdstip ze gekozen worden, en hoeveel tijd bezoekers aan bepaalde voorzieningen willen besteden. Bijvoorbeeld, de resultaten van de ordered logit modellen laten zien dat de bezoekers de meeste tijd wensen te besteden aan de theaterachtige activiteiten. Ook laten ze zien op welk tijdstip welke attractie het meest populair is om bezocht te worden. Voor de themapark planner kan dit informatie opleveren onder andere over hoe de bezoekers zich gedragen in het park, welke route ze kiezen, en waar ze hun tijd aan wensen te besteden.

Ook wordt aangetoond dat het aantal activiteiten aanwezig in het park geen invloed heeft op het aantal activiteiten dat wordt gekozen door de bezoekers. Ook de totale tijd besteed in het park heeft geen invloed op het aantal activiteiten dat wordt gekozen. Bezoekers die meer tijd in het park besteden doen wat rustiger aan en besteden meer tijd bij de attracties.

Verder geven de resultaten inzicht in welke activiteiten complementair zijn en welke activiteiten substituerend werken in termen van vertoond tijd-ruimte gedrag. Een van de grote voordelen van deze aanpak is dat vooraf voorspeld kan worden wat voor invloed nieuwe, nog niet in het park aanwezige, voorzieningen zullen hebben op de activiteitenpatronen van de bezoekers van een park. Bijvoorbeeld een nieuwe winkel die in het experiment was toegevoegd werd met name in de middag gekozen, terwijl de bestaande winkel met name in de ochtend werd bezocht. Hieruit kan worden geconcludeerd dat deze winkels niet veel concurrentie van elkaar zullen ondervinden.

In hoofdstuk 11, tenslotte, wordt een samenvatting van de belangrijkste conclusies gegeven en mogelijkheden voor toekomstig onderzoek besproken. De belangrijkste conclusies uit dit proefschrift zijn dat (i) de tijdsaspecten variatie zoeken, seizoenseffecten en diversificatie een belangrijke invloed hebben op het keuzegedrag van toeristen ten aanzien van themaparken, (ii) de ontwikkelde modellen waarin deze tijdsaspecten zijn opgenomen themapark keuzegedrag beter voorspellen dan modellen waarin deze aspecten niet zijn opgenomen, (iii) de
ontwikkelde experimentele design strategieën goed bruikbaar zijn om data te verzamelen om het effect van de genoemde tijdsaspeecten te schatten; en (iv) de resultaten van dit type studies bruikbaar zijn om themapark planning te ondersteunen.

De voorgestelde modellen hebben echter ook enkele beperkingen. In het conjuncte keuzemodel waarin variatie zoekend gedrag en seizoenseffecten zijn meegenomen wordt alleen eerste orde effecten meegenomen. Dit betekent dat alleen de invloed van de direct voorafgaande keuze op de huidige keuze meegenomen kan worden, en niet de hele voorafgaande keuze geschiedenis. Het is interessant om in toekomstig onderzoek modellen te ontwikkelen waarbij de respondenten meer vrijheid hebben in het aantal keuzes dat ze willen maken.

Een belangrijke restrictie van de eerste studie is verder dat de respondenten werd gevraagd om de keuzes voor de beiden parken in één keer te maken, terwijl in werkelijkheid mogelijk de tweede keuze pas gemaakt wordt nadat het eerste bezoek is afgelegd, waardoor de ervaring van het eerste parkbezoek de keuze voor een tweede park kan beïnvloeden. Anderzijds is het echter wellicht ook redelijk om te veronderstellen dat toeristen, bijvoorbeeld gebaseerd op hun vakantiebudget, in één keer bepalen wat zij aan dagtochten zullen ondernemen in een gegeven jaar.

Daarom geldt voor beide studies, waarin respondenten werd gevraagd om in één keer hun tijd te verdelen over de attracties in de hypothetische themaparken. Ook is hier kan verondersteld worden dat de ervaring bij de eerste activiteit de keuze bij de tweede activiteit mogelijk beïnvloedt, enzovoort, hetgeen de resultaten zou kunnen beïnvloeden.

Voor toekomstig onderzoek is het dan ook interessant om te kijken of er meer interactieve experimentele design strategieën gebruikt kunnen worden ontworpen, waarbij eerdere keuzes en context effecten gedurende het keuze proces opgenomen kunnen worden in het keuzemodel en de keuzetaak kan worden aangepast.

Verder geldt voor beide studies dat de modellen op geaggregeerd niveau geschat zijn. Het zou interessant zijn om in toekomstig onderzoek te kijken of er specifieke segmenten van themapark bezoekers zijn. In methodologische zin zijn hiertoe geen nieuwe ontwikkelingen nodig. Bekende methoden kunnen worden gebruikt.

Als laatste kan nog worden opgemerkt dat gezien de significantie van de waargenomen effecten en de goede bruikbaarheid van de methode het interessant zou zijn om de voorgestelde modellen en experimentele design strategieën ook in
andere gebieden binnen toerisme toe te passen. Zo zouden bijvoorbeeld dagtochten van toeristen kunnen worden onderzocht of de keuzes voor activiteiten van toeristen in een bepaalde stad worden beschreven.

Op basis van de resultaten van de studies in dit proefschrift kan worden geconcludeerd dat de bestaande modellen met een tijd-invariante preferentie functie te beperkt zijn om de themaparkkeuzes van toeristen goed te beschrijven. De bestaande modellen zouden daarom moeten worden vervangen door modellen zoals ontwikkeld in dit proefschrift. De voorgestelde modellen vormen hiermee tevens een beter uitgangspunt voor de ondersteuning van de beslissingen betreffende de planning en het ontwerp van themaparken.
CURRICULUM VITAE

Astrid Kemperman (1966, Valkenswaard) is an assistant professor of Urban Planning at the Eindhoven University of Technology. Between 1993 and 1997 she was a PhD-student at the same university, while being employed by the Dutch Organization for Scientific Research (NWO).

Astrid holds a MSc degree in Consumer and Household Studies from Wageningen Agricultural University (1992), with specializations in recreation and tourism and research methods. She also holds a Bachelors degree in Facility Management from Diedenoort College in Wageningen (1990). Her secondary education (VWO-B) was at the Hertog Jan College in Valkenswaard (1986).

Astrid’s research interests are in the areas of tourism planning, marketing and management, dynamics of tourist behavior, and tourist choice modeling. She teaches urban planning and research methodology, and supervises urban planning and design projects.
Temporal aspects of theme park choice behavior
BOUWSTENEN is een publikatiereseks van de Faculteit Bouwkunde, Technische Universiteit Eindhoven. Zij presenteert resultaten van onderzoek en andere activiteiten op het vakgebied der Bouwkunde, uitgevoerd in het kader van deze Faculteit.

BOUWSTENEN zijn verkrijgbaar bij:

Publikatiewinkel 'Legenda'
Hoofdgebouw 4.92
Faculteit Bouwkunde
Technische Universiteit Eindhoven
Postbus 513
5600 MB Eindhoven

of telefonisch te bestellen:
040 - 2472293
040 - 2472529

Kernredaktie
Prof. dr dipl. ing. H. Fassbinder
Prof. dr R. Oxman
Prof. ir H.H. Snijder
Prof. dr H.J.P. Timmermans
Prof. ir J.A. Wisse

International Advisory Board

Prof. ir N.J. Habraken
Massachusetts Institute of Technology
Cambridge U.S.A.

Prof. H. Harms
Technische Universität Hamburg
Hamburg, Duitsland

Prof. dr G. Helmberg
Universität Innsbruck
Innsbruck, Oostenrijk

Prof. dr H. Hens
Katholieke Universiteit Leuven
Leuven, Belgie

Dr M. Smets
Katholieke Universiteit Leuven
Leuven, Belgie

Prof. dr F.H. Wittmann
ETH - Zürich
Zürich, Zwitserland
Reeds verschenen in de serie
BOUWSTENEN

nr.1 Elan, a computermodel for building energy design, theory and validation
M.H. de Wit
H.H. Driessen
R.M.M. van der Velden

nr.2 Kwaliteit, keuzevrijheid en kosten
Evaluatie van experiment Klarendal, Arnhem
drs J. Smeets
C. le Nobel, arch. HBO
M. Broos, J. Frenken, A. v.d. Sanden

nr.3 Croowijk
van 'bijzonder' naar 'gewoon'
drs V. Smit
ir K. Noort

nr.4 Staal in de woningbouw
ir E.J.F. Delsing

nr.5 Mathematical theory of stressed skin action in profiled sheeting with various edge conditions
ir A.W.A.M.J. v.d. Bogaard

nr.6 Hoe berekenbaar en betrouwbaar is de coefficient k in \( \bar{x} \) - ko en \( \bar{x} \) - ks?
ir K.B. Lub
drs A.J. Bosch

nr.7 Het typologisch gereedschap
Een verkennende studie omtrent typologie en omtrent de aanpak typologisch onderzoek
J.H. Luiten arch. HBO

nr.8 Informatievoorziening en beheerprocessen
ir A. Nauta / drs J. Smeets (red.)
Prof. H. Fassbinder (projectleider)
ir A. Proveniers,
drs J.v.d. Moosdijk

nr.9 Struktuurering en verwerking van tijdgegevens voor de uitvoering van bouwwerken
ir W.F. Schaefer
ir P.A. Erkels

nr.10 Stedebouw en de vorming van een speciale wetenschap
K. Doevendans

nr.11 Informatica en ondersteuning van ruimtelijke besluitvorming
ir G.G. van der Meulen

nr.12 Staal in de woningbouw, korrosiebescherming van de begane grondvloer
ir E.J.F. Delsing

nr.13 Een thermisch model voor de berekening van staalplaatbetonvloeren onder brandomstandigheden
ir A.F. Hamerlinck

nr.14 De wijkgedachte in Nederland
Gemeenschapsstreven in een stedebouwkundige context
ir K. Doevendans
ir R. Stolzenburg

nr.15 Diaphragm effect of trapezoidally profiled steel sheets.
Experimental research into the influence of force application
ir A.W.A.M.W. v.d. Bogaard

nr.16 Versterken met spuit-ferrocement.
Het mechanische gedrag van met spuit-ferrocement versterkte gewapende betonbalken
ir K.B. Lub
ir M.C.G. van Wanroy
nr.17
De tractaten van
Jean Nicolas Louis Durand
ir G. van Zeyl

nr.18
Wonen onder een plat dak.
Drie opstellen over enkele vooronder-
stellingen van de stedebouw
dr ir K. Doevendans

nr.19
Supporting decision making processes
A graphical and interactive analysis of
multivariate data
drs W. Adams

nr.20
Self-help building productivity
A method for improving house
building by low-income groups
applied to Kenya 1990-2000
ir P. A. Erkelens

nr.21
De verdeling van woningen:
een kwestie van onderhandelen
drs V. Smit

nr.22
Flexibiliteit en kosten in het ontwerp
proces Een besluitvormingondersteunend model
ir M. Prins

nr.23
Spontane nederzettingen begeleid
Voorwaarden en criteria in Sri Lanka
ir P.H. Thung

nr.24
Fundamentals of the design of
bamboo structures
O. Arce-Villalobos

nr.25
Concepten van de bouwkunde
Prof. dr ir M.F.Th. Bax (red.)
dr ir H.M.G.J. Trum (red.)

nr.26
Meaning of the site
Xiaodong Li

nr.27
Het woonmilieu op begrip gebracht
Jaap Ketelaar

nr.28
Urban environment in developing countries
editors: dr ir Peter A. Erkelens
dr George G. van der Meulen

nr.29
Strategische plannen voor de stad
Onderzoek en planning in drie steden
Prof. dr H. Fassbinder (red.)
ir H. Rikhof (red.)

nr.30
Stedebouwkunde en stadsbestuur
ir Piet Beekman

nr.31
De architectuur van Djenné
Een onderzoek naar de historische stad
P.C.M. Maas

nr.32
Conjoint experiments and retail planning
Harmen Oppewal

nr.33
Strukturformen Indonesischer Bautechnik Entwicklung methodischer Grundlagen für eine 'konstruktive pattern language' in Indonesien
Heinz Frick

nr.34
Styles of architectural designing
Empirical research on working styles and personality dispositions
Anton P.M. van Bakel

nr.35
Conjoint choice models for urban tourism planning and marketing
Benedict Dellaert

nr.36
Stedelijke Planvorming als co-produktie
Prof. dr H. Fassbinder (red.)
nr 37
Design Research in the Netherlands
editors: Prof. dr R.M.Oxman,
Prof. dr ir. M.F.Th. Bax,
Ir H.H. Achten

nr 38
Communication in the Building
Industry
Bauke de Vries

nr 39
Optimaal dimensioneren van gelaste
plaatliggers

nr 40
Huisvesting en overwinning van
armoede
dr.ir. P.H. Thung en dr.ir. P. Beekman
(red.)

nr 41
Urban Habitat: The environment
of tomorrow
George G. van der Meulen,
Peter A. Erkelens

nr 42
A typology of joints
John C.M. Olie

nr 43
Modeling constraints-based choices
for leisure mobility planning
Marcus P. Stemerding

nr 44
Activity-based travel demand
modeling
D. Ettema

nr 45
Wind-induced pressure fluctuations on
building facades
Chris Geurts

nr 46
Generic Representations
Henri Achten

nr 47
Johann Santini Aichel
Dirk De Meyer

nr 48
Concrete behaviour in multiaxial
compression
Erik van Geel

nr 49
Modelling site selection
Frank Witlox

nr 50
Ecolemma model
Ferdinand Beetstra

nr 51
Conjoint approaches to developing
activity-based models
Donggen Wang

nr 52
On the effectiveness of ventilation
Ad Roos

nr 53
Conjoint modeling approaches for
residential group preferences
Eric Molin

nr 54
Modelling architectural design
information by features
Jos van Leeuwen

nr 55
A spatial decision support system for
the planning of retail and service
facilities
Theo Arentze

nr 56
Integrated lighting system assistant
Ellie de Groot

nr 57
Ontwerpend leren, leren ontwerpen
dr.ir. J.T. Boekholt
**Stellingen**

bij het proefschrift

Temporal aspects of theme park choice behavior  
Modeling variety seeking, seasonality and diversification  
to support theme park planning

1. Modellen die gebaseerd zijn op tijd-invariante preferentie functies gaan ten onrechte voorbij aan essentiële elementen in het keuzegedrag van themapark bezoekers.

2. Seizoenseffecten en variatie zoeken beïnvloeden zowel de keuze van toeristen binnen als tussen verschillende typen themaparken.

3. Het aantal activiteiten aanwezig in een themapark en ook de totale door de bezoeker in het park bestede tijd hebben nauwelijks invloed op het aantal activiteiten dat door de bezoeker wordt gekozen.

4. Conjuncte keuze experimenten kunnen een belangrijke rol spelen bij het vóóraf evalueren van de consequenties van themapark planningsbeslissingen.

5. Vanuit een planningsoogpunt is het gebruik van modellen die het keuzegedrag van toeristen voorspellen te prefereren boven het gebruik van modellen die zich richten op eerdere fasen in het gedrag van toeristen zoals de attituden of motivaties.

6. Ondanks aanzienlijke vooruitgang in de afgelopen jaren, kan de toeristische sector nog veel leren van andere economische sectoren met betrekking tot het systematisch gebruik van op formele statistische technieken gebaseerde consumenten gedragsmodellen.

7. Het aangeven van wandelroutes door toeristische voorzieningen is een goed management instrument om de verdeling van bezoekers over de voorziening te optimaliseren.

8. In de uitgebreide literatuur over variatie zoekend gedrag door consumenten is het verschijnsel dat consumenten op zoek gaan naar verrassingen ten onrechte onderbelicht.

9. Toeristische functies verdienen meer aandacht in de stedelijke en regionale planningsprocessen dan tot nu toe gebruikelijk is.

10. Er kan pas sprake zijn van volledige emancipatie van de vrouw wanneer niet alleen de vrouw, maar ook haar partner er op wordt aangesproken hoe hij werk en zorg gaat combineren wanneer er een kind op komst is.

11. Om met de geest de materie in beweging te kunnen brengen zouden TUE medewerkers er goed aan doen om naast gedegen denkwerk ook hun eigen menselijke materie regelmatig door conditietraining in beweging te brengen.