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generoasa permisiune de a-l folosi
în scopuri didactice

Exploring Consumer Point-Of-Purchase Dynamics

Combining Virtual Reality and Choice Modeling
in Consumer Purchase Analyses

Bernhard Treiber & Stephen P. Needel

Integration of **two** new approaches to consumer research

Choice-Based Conjoint Analysis

- involves the use of designed hypothetical choice situations
- measures consumer choices
- predicts their choices in new situations

Virtual Shopping Systems

- consist of a virtual „shelf“ or „store“ model and dynamic virtual products
- can represent actual or hypothetical in-store decision tasks for consumers
- allows simulation of critical aspects of consumer shopping behavior

Discrete Choice Modeling

- **Developed in parallel by economists and cognitive psychologists in late 1960s**
- **Statistical estimation techniques: McFadden, Louviere, Ben-Akiva et al.**
- **Wide applications:**
 - **new product development**
 - **positioning**
 - **demand forecasts**
 - **pricing research**
 - **etc.**

Discrete Choice Experiments

- Choice scenarios are constructed on the basis of **fractional factorial designs**, as a systematic variation of critical product attributes and their levels.
- Each respondent is shown - one at a time - the choice scenarios.
- Each scenario specifies the products from which the respondent is to choose.
- For each scenario, the respondent provides a **behavioral** intention response.

FIGURE 1: Standard Choice Set

1



44 Items/ DM 23,99

2



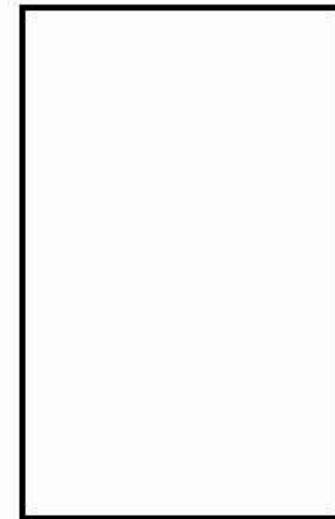
42 Stck / DM 19,99

3



50 Stck / DM 32,99

4



none of these products

Which of these products would you buy ?

Choose any of the four options above

Discrete Choice Modeling

- Choice responses are **decomposed** into a set of part-worth utilities measuring the impact of each product attribute and its levels.
- Modeling is done through a particular type of **statistical analysis** (logit and probit analysis).
- Analysis is mostly done at the aggregate level (assuming that all consumers have the same preferences).
- Several **software systems** (e.g. SAS, CBC, LIMDEP) are available to run these analyses.

Discrete Choice Modeling Outcomes

- **Quantitative decomposition of choice responses:**

part-worth utilities
measure the impact of
each product attribute
and its levels

- **Computer-based Market Simulator:**

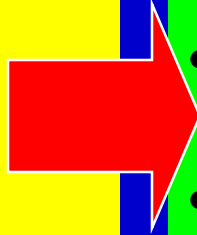
will convert utility data
into market „shares“ for
different products under
different competitive
scenarios

Choice Tasks: Some Restrictions

- **(mostly) limited number of options**
- **static depiction of choice alternatives**
- **predefined choice-consideration sets**
- **product information equalized across choice options**
- **de-contextualized choice setting**
- **„either-or“ choices**

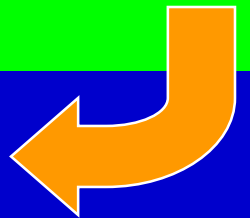
Choice Tasks: Desired Improvements

- (mostly) limited number of options
- static depictions of choice alternatives
- pre-defined choice-consideration sets
- „equal information“
- de-contextualized choice setting
- „either-or“ choices



- Many more option choices admitted
- more flexibility in displaying options
- respondent chooses relevant subsets of options
- „information inequalities“
- choice tasks in „natural“ settings
- more complex measures of choice behavior

Virtual Reality Applications



Virtual Store / Shopping Systems

- **Developed in early 1990**
- **based on ,virtual reality` technology**
- **several systems now available**
- **used for diverse applications:**
 - **category management, shelf optimization, consumer research, store planning, package design, pricing**
- **major differences:**
 - **focus: from entire stores to individual products**
 - **technology: from VR headsets to standard PCs**
 - **applications: strictly academic to fully commercialized**
 - **project budgets**



Virtual shopping systems

Differences in Focus:

from individual products to entire stores



Virtual shopping systems

Differences in Technology:

from standard PCs to VR headsets

VISIONARY SHOPPER DEMONSTRATION

Visionary Shopper: a case example

- **Main Features:**

- **analytic unit:** „products-in-shelves“
- **display capacity:** 300 products per shelf
- **software:** WINDOWS-98-based
- **interaction medium:** touch-screen
- **project costs:** low to moderate
- **adoption:** worldwide

- **Origin:** Harvard Business School

- **Validation:** positive

QUALITY



48 Items / DM 19,99



44 Items / DM 23,99



60 Items / DM 32,99



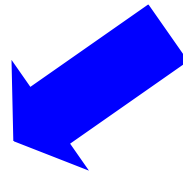
PRICE

Baby Napkins: the German market

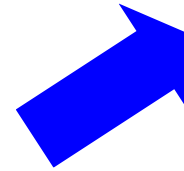
QUALITY



48 Items / DM 19,99



44 Items / DM 23,99



60 Items / DM 32,99



PRICE

Strategic Options for the Middle Position

PACKAGE CHANGE



"Old"



"New"

PRICE CHANGE

Retail Prices

- 23,99 / 56
- 24,99 / 52
- 25,99 / 56
- 28,99 / 62

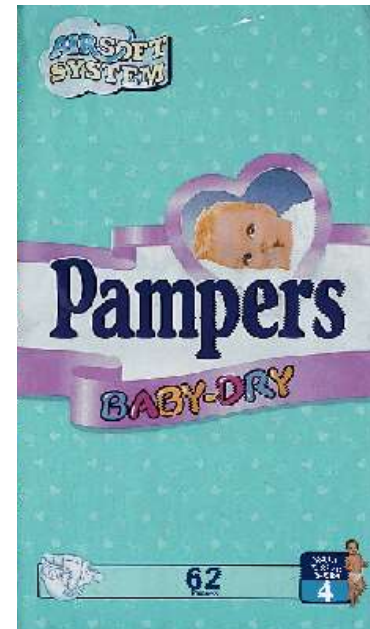
Price Per Item

- 42,8 = „current“
- 48,1
- 46,3
- 46,7

PACKAGE CHANGE



"Old"



"New"

PRICE CHANGE

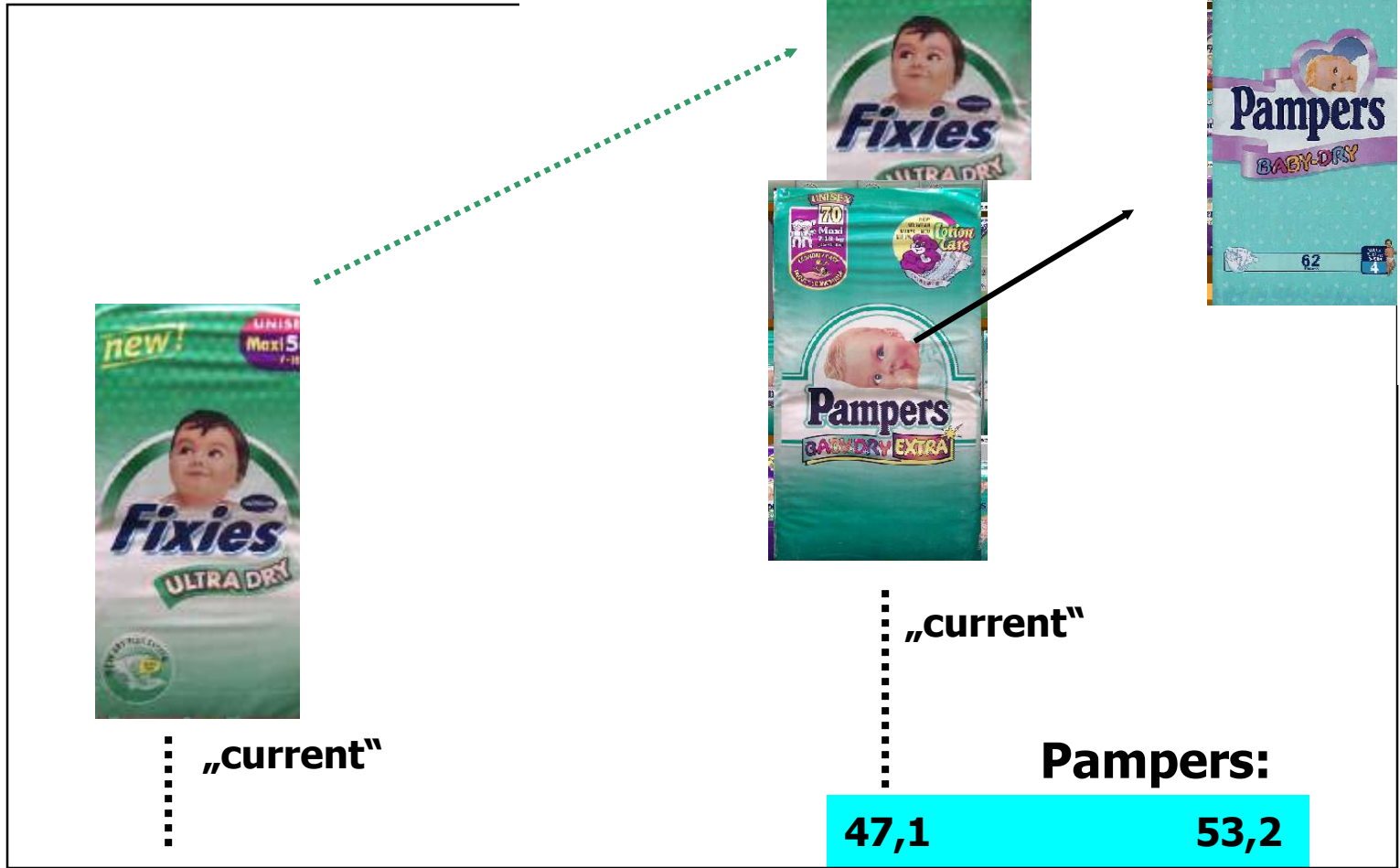
Retail Price

- 32,99 / 70
- 32,99 / 62

Price Per Item

- 47,1 = „current“
- 53,2

QUALITY



Fixies:

42,8

46,3

46,7

48,1

PRICE / ITEM

47,1

53,2

„current“

Pampers:

The German market for baby napkins:

Repositioning Options for „Player A“ and „Player B“

Experimental Design

	FIXIES	PAMPERS	OTHERS	NONE
PACKAGE	PA1 PA2	PA1 PA2	un- changed	
PRICE / ITEM	PR1 PR2 PR3 PR4	PR5 PR6		

PACKAGE

- „old“
- „new“

PRICE / ITEM

- 42,8
- 46,3
- 46,7
- 48,1
- 47,1
- 53,2

Design Considerations

2-Factor-Designs (Package x Price):

- **FIXIES:** $2 \times 4 = 8$ test combinations
- **PAMPERS:** $2 \times 2 = 4$ test combinations
- **FIXIES x PAMPERS:** $8 \times 4 = 32$ test cells

Fractional Factorial Design:

only a subset of all possible test combinations
selected and implemented: = 16 test cells

DESIGN CONSIDERATIONS

Experimental Design

- specifies critical combinations of Experimental Levels / Attributes („Choice Tasks“)

Visionary Shopper System

- puts choice tasks into the context of typical purchase environment („*Baby napkin shelf in German supermarkets*“)
- generates „new“ packaging through digital editing
- programs a total of 16 test shelves



FIGURE 2: Baby Napkins as Choice Set, with 32 Options
Visionary Shopper Illustration

TEST PROCEDURE

- **16 test cells split into 4 subsets of 4 cells each**
- **each respondent goes through one of these subsets (= 4 test cells)**
- **test category („Baby Napkins“) is shown together with two other categories („Wipes“, „Bandages“)**
- **each test cells is seen by n=90 respondents**
- **total sample:**
N=374 mothers of babies aged 6-16 months

TEST RUNS

Each respondent is taken through 3 product categories on 4 shopping trips

- Trip 1: Bandages **Napkins** (#1 of 16) Wipes
- Trip 2: Bandages **Napkins** (#2 of 16) Wipes
- Trip 3: Bandages **Napkins** (#3 of 16) Wipes
- Trip 4: Bandages **Napkins** (#4 of 16) Wipes

DATA COLLECTION:

Fully automatized, yielding a second-to-second protocol of shopper behavior-in-category

- **Time spent in category**
 - **Time spent on individual products**
 - **Close contact with individual products**
 - **Sequence of product contacts**
 - **Product contacts without purchase**
 - **Purchases**
 - „Yes / No“
 - Number of packs
- plus Follow-up interview

CHOICE MODELING

Purchase-related measures available

- for each of 32 products
- under 16 choice tasks
- representing all 32 possible test combinations



Input for Choice Modeling:

- Multinomial logit models are fitted to the data
- every attribute level is assigned a utility
- indicating relative importance of each level

CLIENT BENEFITS

Improved Decision-Making Abilities

- **Detailed quantitative understanding of how to best reposition own product line in view of likely competitor moves**
- **Encouraged to reposition own product line to a Hi-Price/Hi-Quality position (close to PAMPERS)**
- **When executed, sales, revenues, and profits were much improved,**
- **to the disadvantage of PAMPERS.**

RESEARCH BENEFITS 1

- **Complex consumer marketing issues translate more easily into equally **complex research designs**, avoiding test-practical oversimplifications, short-cuts, and reductions in data collection.**
- **Choice modeling of shopper behavior and purchase decisions is now made possible at the individual level**
 - with much more **granularity** than ever before,
 - for **multiple indices** of shopping behavior

RESEARCH BENEFITS 2

- Hypothetical „what-if“scenarios for retail, category, and product management can now be simulated for even **large numbers of options**, including
 - **likely competitor moves**
 - **new product concepts**
 - **newly created shopping environments.**
- **Traditional** approaches for in-store research (e.g. *Shelf Tests, Concealed Video-cameras*) prove less efficient, consistent, and comparable across different test conditions.

END

Thank You.

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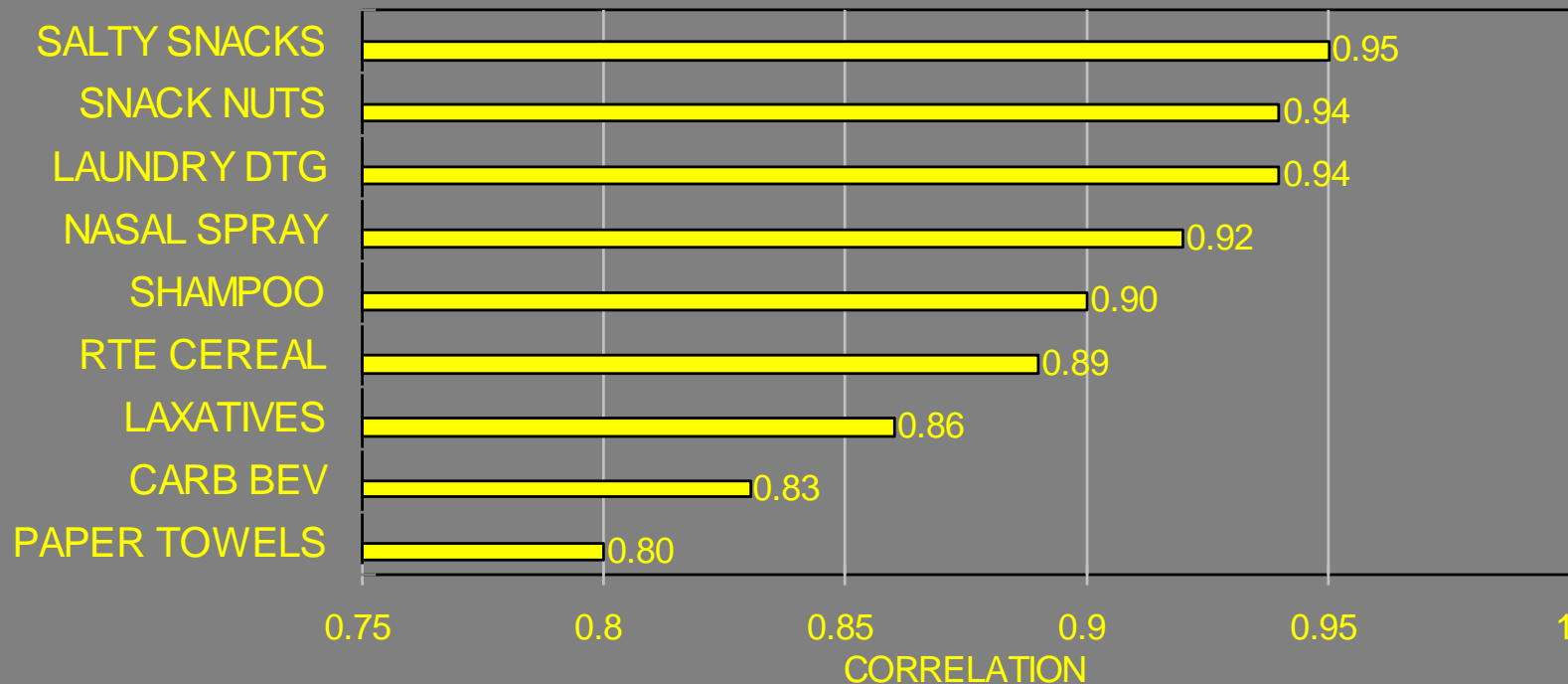
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CATEGORIES

GROCERY	HOUSEHOLD	OTC	PERSONAL CARE
Baby Food	Air Fresheners	Acid Relief	Baby Wipes
Baby Formula	Automobile Tires	Allergy Relief	Bar Soap
Baked Beans	Batteries	Analgesics	Body Wash
Beer	Bleach	Athlete's Foot	Contraceptives
Butter/Margarine	Cleaners	Bandages	Deodorants
Candy	Dinner Napkins	Bladder Infection	Diapers
Canned Pasta	Fabric Softener	Corn/Callous	Disposable Razors
Canned Tuna	Laundry Detergent	Cough/Cold	Incontinence
Carbonated Beverages	Mops/Brooms	Laxatives	Insoles
Chewing Gum	Paper Towels	Menopause Relief	Personal Lubricants
Cigarettes	Plastic Wraps	Nasal Sprays	Sanitary Protection
Cookies	Soap Pads	Stomach Remedies	Shampoos
Crackers	Storage Bags	Thermometers	Sun Care
Frozen Dinners/Entrees	Tissues	Throat Lozenges	Toothpaste
Hot Cereal	Toilet Paper	Vitamins/Minerals	
Ice Cream Novelties	Trash Bags	Yeast Infection Remedies	
Juice - Aseptic			
Juice - Chilled			
Juice - Frozen			
Juice - Shelf Stable			
Ketchup			
Lunch Meat			
Mayonnaise			
Nuts			
Packaged Dinners			
Ready to Eat Cereal			
Salad Dressing			
Salty Snacks			
Spirits			
Tea			
Yogurt			

- When you ask people to shop normally, they do!

MARKET SHARE VS. SIMULATION SHARE



Visionary Shopper can also be real-world predictive

