

# Analyzing three popular effects to influence consumers' price perception: left-digit-effect, scarcity-effect and pennies-a-day-effect

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## **Agenda**

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- 1. Introduction: The irrational consumer**
  - 2. Research Method: Online testing**
  - 3. Results: Example from the Lab**
  - 4. Discussion: The pricing toolset**
  - 5. Outlook: What are the learning effects?**
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## The „new“ claim: The irrational consumer as the standard

„Despite a body of literature on nudging people toward better decision-making (Thaler and Sunstein, 2009), there are not many real interventions successfully de-biasing consumers in mentioned inept decision-making.“ Houdek (2016).



Homer Simpson

or



Superman

“Drawing on aspects of both psychology and economics, the operating assumption of behavioral economics is that cognitive biases often prevent people from making rational decisions, despite their best efforts. (If humans were comic book characters, we’d be more closely related to **Homer Simpson** than to **Superman**.)” Ariely (2009)

# Behavioral Pricing: one of the mainstream research topics of the last decade



## Inconsistencies of behavioral pricing and economic theory

### Psychological Pricing Principles

Framing Principles	Example Tactics/Recommendations	Primary and Recency	Give Buyers Intended First and Last Impression
Positive Focus	"Save" instead of "Spend Less"	Price De-emphasis	List Units in Large Transactions before Price
Free Product		Product Sequence	Reveal Most Attractive Items First
Multiple Items		Price Sequence	Show High-Priced Products First and Adjust Message
Anchors			Show with Premium Items from Other Categories
Quantity Limits			Add Product that Makes Target Item More Attractive
Scarcity			Show More Variety with High Quality Items
Price Salience			Move and Reformat Sale Tag to Match Strategy
Spore Change Effects			"Load" Model and Let Buyer Drop Options
Pennies-a-Day Pricing	"Just 50-Cents per Day"		Adjust Discount Attributions within Bundle
Explicit Comparisons	"Less than a Cup of Coffee per Day"		Change Individual Item Prices to Sell Bundle
Multi-Session Pricing	"5 Payments of \$19"		Include Shipping and Handling from Price
Trade-in Programs			List Prices for Each Customization
Emotional Pricing		Asymmetric Competition	Strive to be Premium Brand in Category
Congruency Principles	Example Tactics/Recommendations	Signaling Principles	Example Tactics/Recommendations
Perceived Fairness		Odd-Ending Prices	Use Nines at the Right-End of Price
Typeface and Text		Price Color	Use Red Prices instead of Black when Targeting Men
Phonetic Symbolism		Symmetric Prices	Make Price Vertical Mirror Symmetric
Package Design			Use Nonzeros to Suggest Price Precision
Label Design			Drop Commas and Dollar Signs in Prices
Package Dimensions			Reduce Buyer Forecasting of Price Change Timing
Price Expectations			Increase Prices in Small Steps
Compromise Effect			Reduce Price Enough, But Not Too Much
Consistent Pricing			Choose Prices with More Syllables
External Reference Price			Describe Most Discounts with Percentages
Price Thresholds			Maintain Relative Price Spreads versus Competitors
			Increase Prices as a Quality Signal
			Raise Prices to Boost Perceived Performance

Quantity Limits: „Limit 4 per Household“

Odd-ending prices: Use Nines at the Right-End of Price

Pennies-a-Day Pricing: „Just 50-Cents per Day“

External reference price: „Regularly \$35, now \$29“

Source: Larson, R.B. (2014). Psychological Pricing Principles for Organizations with Market Power. Journal of Applied Business and Economics, Vol. 16(1), 11-25.

### Overview on academic research

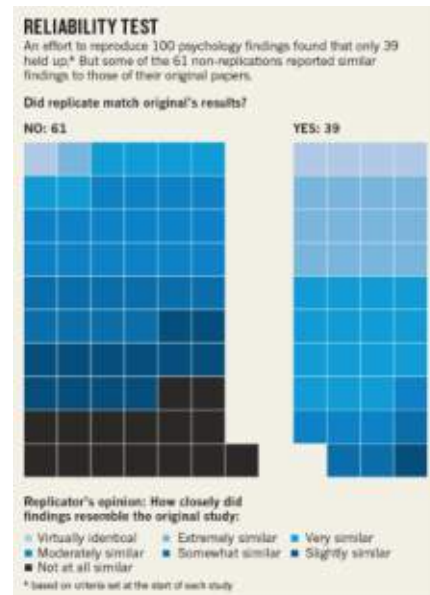
- **Larson (2014)** reviews more than **fifty pricing psychology principles** for existing products, some of which may be inconsistent with traditional economic theories. Out of this portfolio:
  - ✓ **“Odd-ending pricing** involves using odd numbers, especially **nines**, on the right-hand side of prices. In many cases, prices that ended in nines ... produced higher sales than prices that were slightly higher or slightly lower.”
  - ✓ „Several studies concluded that **scarcity works** best with relatively high-priced, high-quality products.“
  - ✓ **„Pennies-a-day pricing**, where the price is described on a per-day basis, changes the temporal frame and can boost the demand.“

# Two basic problems in relation with psychological studies: lack of reproducibility and often underpowered studies

## Two basic problems in relation with psychological studies

### Nature News (2015)

- „Don't trust everything you read in the psychology literature. In fact, two thirds of it should probably be distrusted.“
- “Publication bias: ...Boring but accurate studies may never get published, or researchers may achieve intriguing results less by documenting true effects than by hitting the statistical jackpot ...“



### Statement of Daniel Kahneman (2017)

#### Retraction Watch

Tracking retractions as

#### “I placed too much faith in underpowered studies:” Nobel Prize winner admits mistakes

with 7 comments

Although it's the right thing to do, it's never easy to admit error — particularly when you're an extremely high-profile scientist whose work is being dissected publicly. So while it's not a retraction, we thought this was worth noting. A Nobel Prize-winning researcher has admitted on a blog that he relied on weak studies in a chapter of his bestselling book.

The blog — by Ulrich Schimmack, Moritz Heene, and Kamini Kesavan — critiqued the citations included in a book by Daniel Kahneman, a psychologist whose research has illuminated our understanding of how humans form judgments and make decisions and earned him half of the 2002 Nobel Prize in Economics.

According to the Schimmack et al blog,

“...readers of his [Kahneman's] book “Thinking Fast and Slow” should not consider the presented studies as scientific evidence that subtle cues in their environment can have strong effects on their behavior outside their awareness.

Remarkably, Kahneman took the time to post a detailed response to the blog, writing:

“What the blog gets absolutely right is that I placed too much faith in underpowered studies. As pointed out in the blog, and earlier by Andrew Gelman, there is a special irony in my mistake because the first paper that Amos Tversky and I published was about the belief in the “law of small numbers,” which allows researchers to trust the results of underpowered studies with unreasonably small samples. We also cited Overall (1969) for showing “that the prevalence of studies deficient in statistical power is not only wasteful but actually pernicious: it results in a large proportion of invalid rejections of the null hypothesis among published results.” Our article was written in 1969 and published in 1971, but I failed to internalize its message.



Daniel Kahneman

Source: <http://retractionwatch.com/2017/02/20/placed-much-faith-underpowered-studies-nobel-prize-winner-admits-mistakes/> and Baker, M. (2015). Over half of psychology studies fail reproducibility test. *Nature News*, 27.

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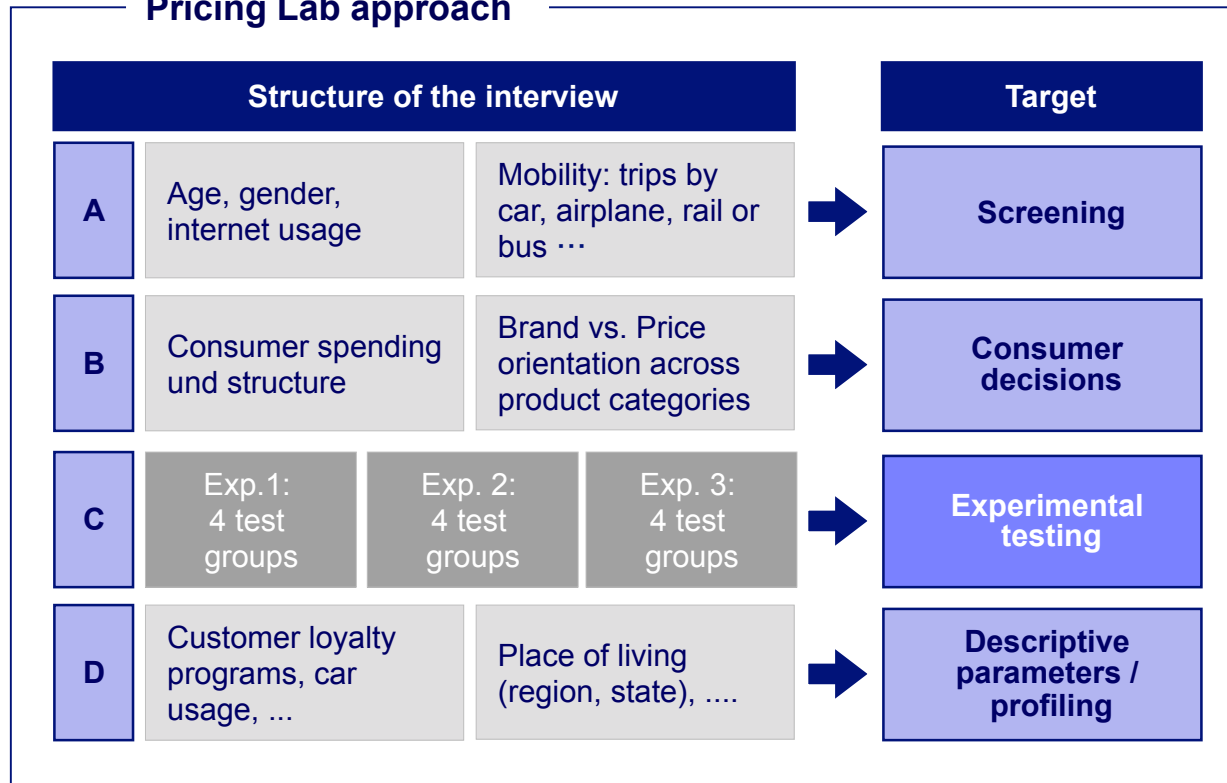
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# Study design: “Pricing Lab 2016”



## Study design: Pricing Lab 2016

### Pricing Lab approach



### Study characteristics

- German population (18+years); representative approach.
- Recruitment via Online Access Panels.
- Field: online interviews.
- Sample: n=500-1.000.
- Length of interview: appr. 12-14 minutes.
- Randomized test groups (identical structure).
- Experimental testing embedded in certain topics of the interviews.



# Ryanair campaign Oct. 2015: in addition to the basic offer (actual advertisement), the presentation of the offer was systematically varied

## Experimental design to test promotional ads: Ryanair One Way Flights



\* Retrieved from <http://news.fluege.de/airline-news/ryanair-riesige-werbekampagne-fluege-ab-1999-euro/74515.html>

# Smartphone flat fee (1&1): besides the basic offer 3 modified offers are presented to test groups

## Experimental design to test promotional ads: Smartphone flat fee

→  
**Test group**  
(randomized)



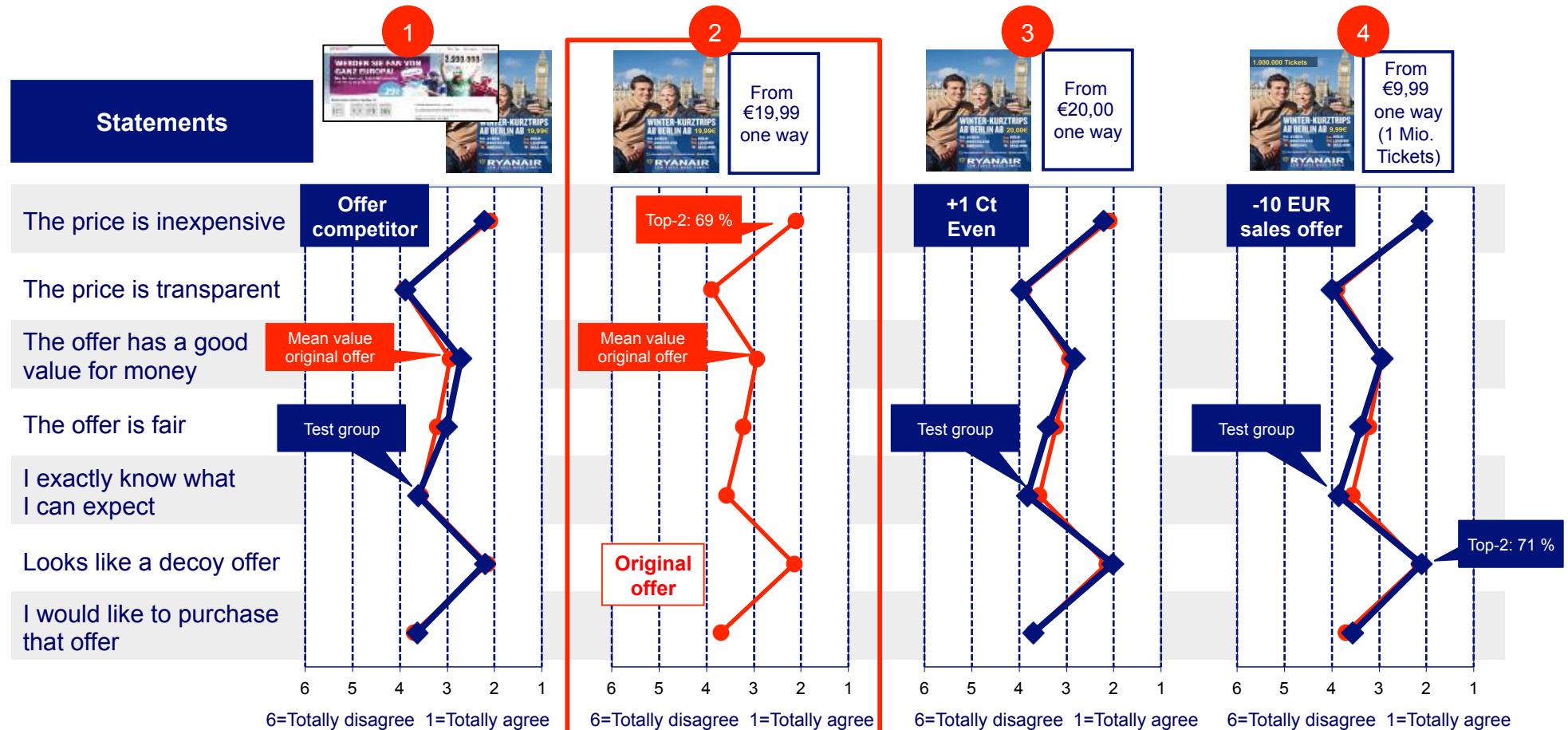
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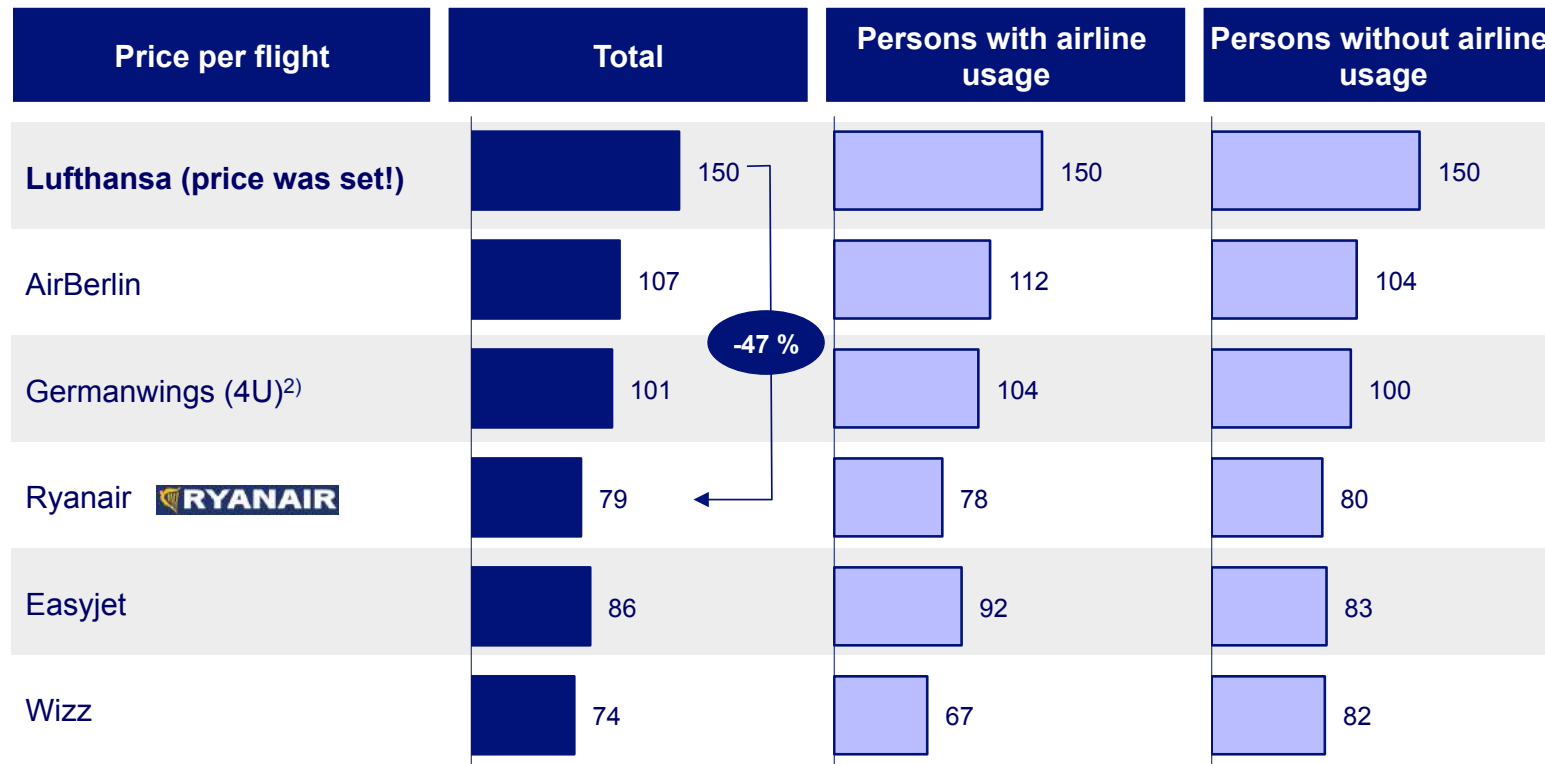
# Ryanair ad: strong approval for "inexpensive offer" and "decoy offer" across test groups - experimental factors without significant influence

## Statement evaluation: media campaign Ryanair (2015)



# The expected price (average price paid) of a Ryanair flight is about four times higher than the communicated reference price

Estimated price for a flight differentiated by airlines (EUR, mean values)<sup>1)</sup>

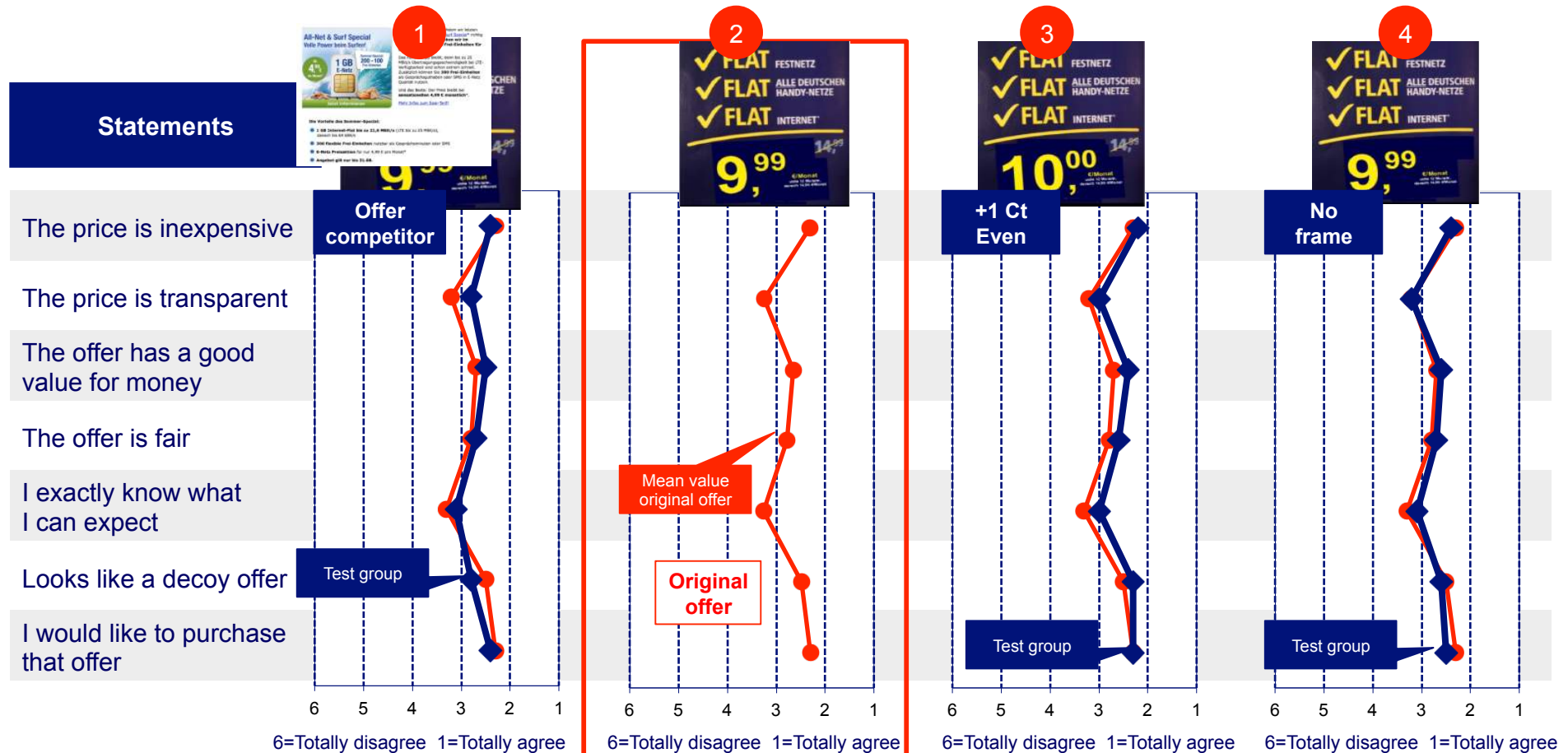


1) Only if known: Imagine an inner-European flight with Lufthansa would cost 150 EUR per route (1 adult, economy). What do you think, at what level the price for .. would be?

2) Germanwings has been rebranded to Eurowings in January 2016.

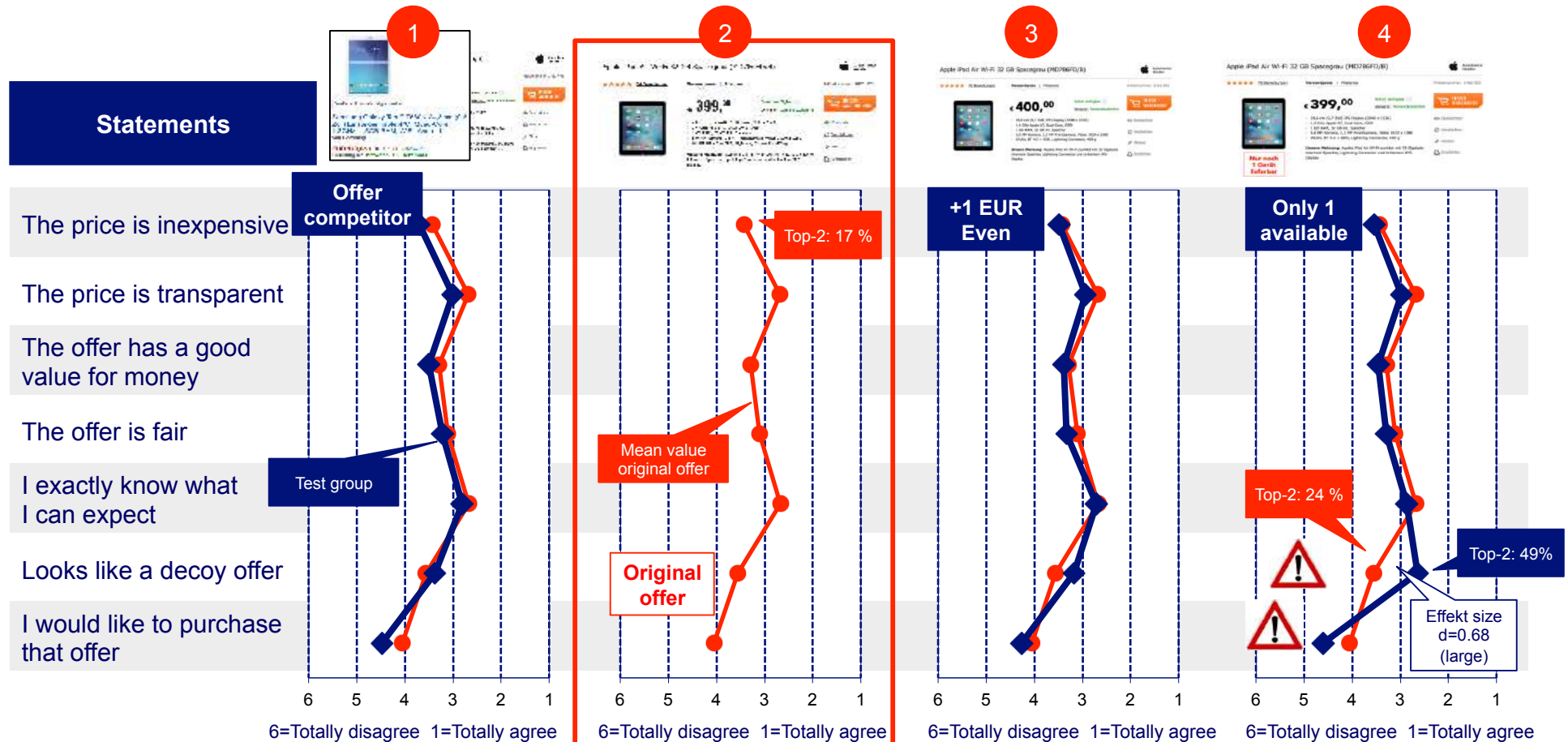
# No significant influence of competition information and missing price anchor (before EUR 14,99) on the price image profile

## Statement evaluation: Advertising for smartphone flatrate (1&1)



# iPad: the change in the information content and the price presentation has little influence on the image evaluation

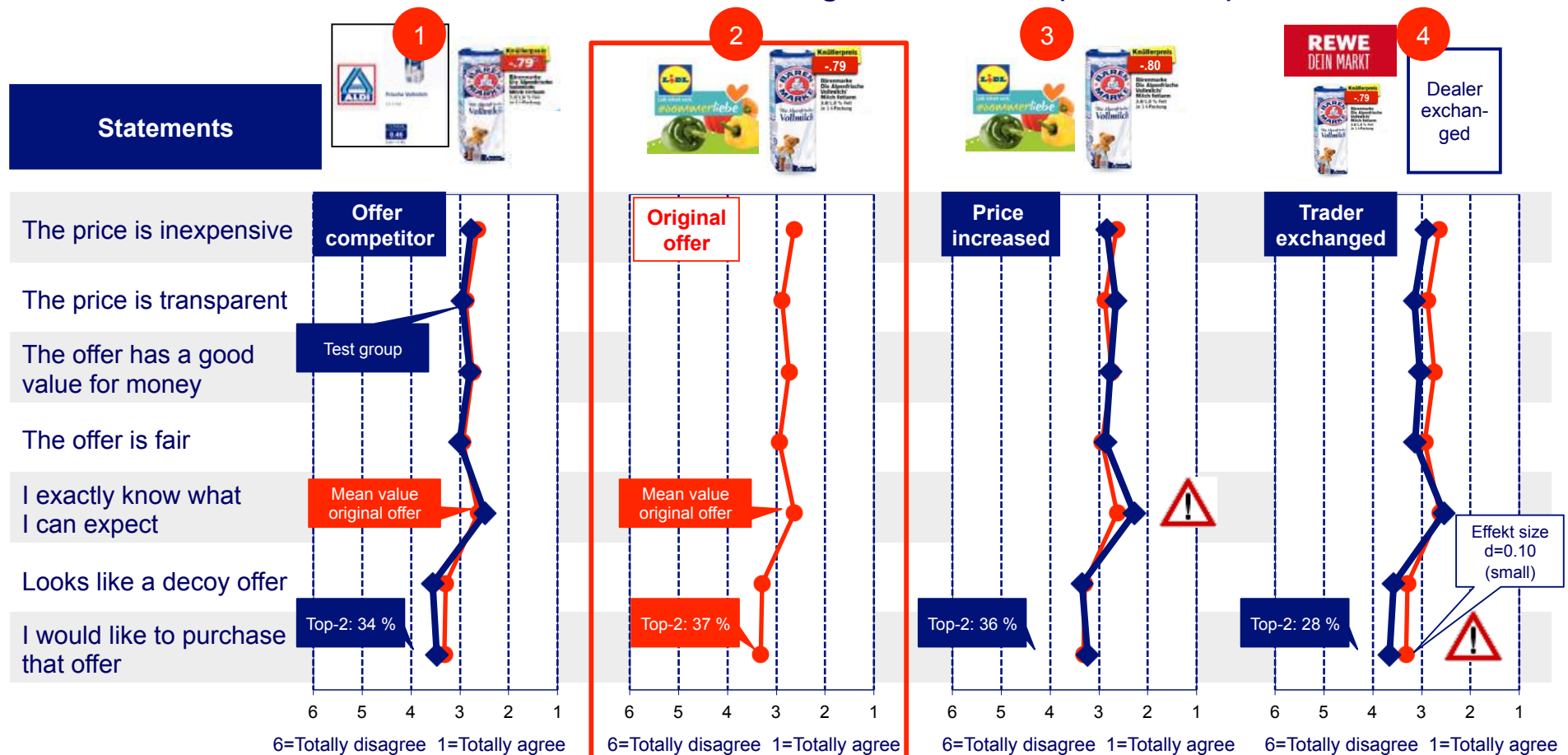
## Statement evaluation: offer iPad Air





# Milk (Discounter Lidl): no significant odd-ending-effect – obviously the trading company has an influence on the products' price perception

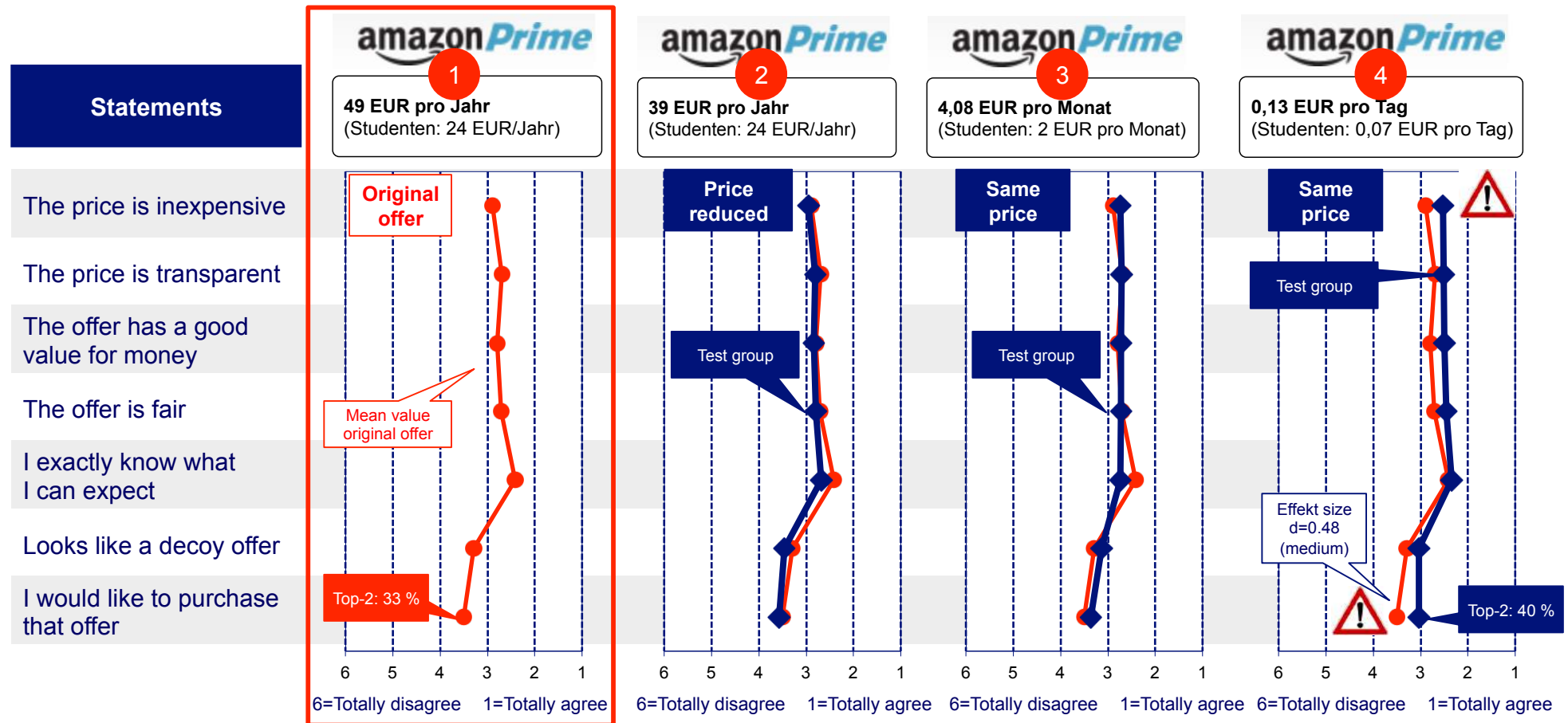
## Statement evaluation: Advertising “Bärenmarke” (offer at Lidl)





# Amazon Prime: experimental test to proof the „Pennies-a-day-Effect“: absolute figures below 1 EUR work best

## Statement evaluation: promotion Amazon Prime



## In Nov. 2016 Amazon announced a price change for its service Prime: a price increase of > 40 % (per year)

Price change for Amazon Prime in Germany: Increase from EUR 49 to EUR 69 per year



Price increase of  
EUR 20 (41 %)

... for existing  
customers:  
delayed price  
increase

Liebe Kundin / lieber Kunde,

vielen Dank, dass Sie Mitglied bei Amazon Prime sind.

Wir schreiben Ihnen heute, um Sie darüber zu informieren, dass sich der Preis von Amazon Prime für neue Mitglieder am 01.02.2017 auf EUR 69 pro Jahr (das entspricht EUR 1,67 mehr pro Monat) ändern wird. Ihr nächster Mitgliedsbeitrag, der am 03.05.2017 fällig ist, wird allerdings noch einmal nur EUR 49 betragen, wenn Sie Ihre Prime-Mitgliedschaft fortsetzen. Der neue Preis fällt für Sie nicht bis zum 03.05.2018 an.

Wir haben Amazon Prime eingeführt, um Ihr Leben einfacher zu machen und Ziel unserer Arbeit ist es, dass Ihre Mitgliedschaft ein Schnäppchen ist. Einige Verbesserungen der letzten Zeit beinhalten:

- Erweiterung des Angebots von Millionen von Prime-fähigen Produkten, die schnell und gratis zu Ihnen nach Hause geliefert werden - ohne Mindestbestellwert
- Streaming von über 2 Millionen Songs - werbefrei - mit Prime Music
- GRATIS Same-Day Lieferung von über 1 Million Produkten in 20 deutschen Metropolregionen
- Tolle Angebote auf Tausende Artikel am Prime Day - Amazons größte Verkaufsaktion aller Zeiten, exklusiv für Prime-Mitglieder
- Aktuell sind mehr als 15.000 Titel für unbegrenztes Streaming verfügbar und es kommen ständig neue Filme und Serien dazu. Exklusive Highlights sind die zweite Staffel der Erfolgsserie "Mr. Robot" sowie die preisgekrönte Amazon Original Serie "Man in the High Castle"
- Vorteile wie unbegrenzter Fotospeicherplatz, früherer Zugriff auf alle Amazon Blitzangebote sowie kostenlose Spieleinhalte mit Twitch Prime

Und wir arbeiten weiter für Sie an Amazon Prime. Sie werden auch in Zukunft Neuigkeiten zu weiteren Prime-Vorteilen und exklusiven Prime-Angeboten erhalten. Sie finden eine Übersicht aller Prime-Vorteile unter [amazon.de/prime](https://amazon.de/prime).

Mit freundlichen Grüßen,

Ihr Amazon Prime Team

Additional  
EUR 1,67 per  
months

...improved  
portfolio (value  
to customer)

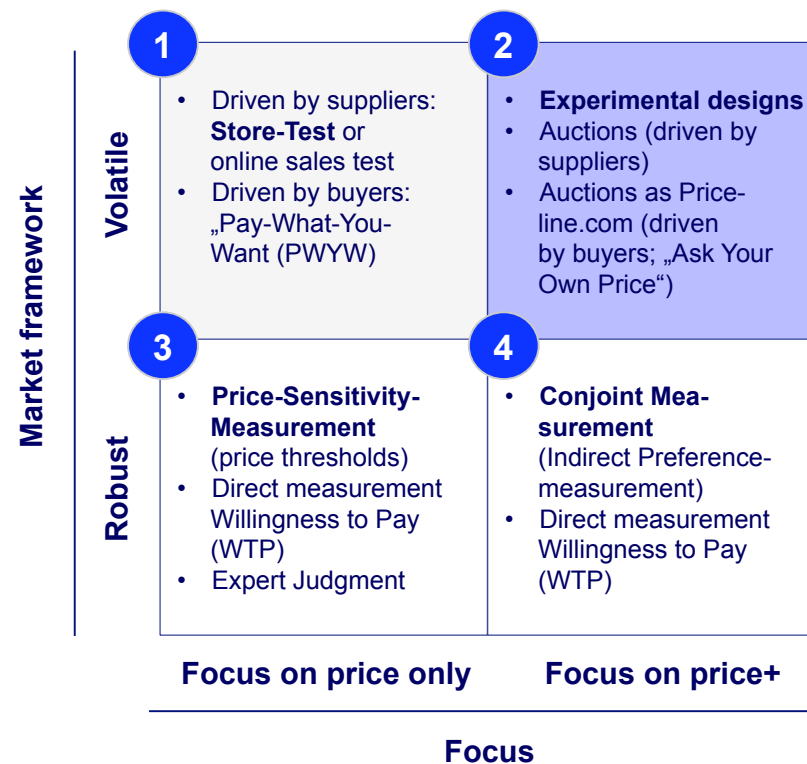
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Today, there is a toolset of different methods to optimize pricing available – experimental designs are one option

### The toolset for decision making in pricing



# Online experimental testing as a compromise between field and traditional laboratory experiments



## Natural Field Experiments

- ... the environment is one where the subjects naturally undertake these tasks and where the subjects do not know that they are in an experiment.
- Ideal? Not necessarily:
  - (A) Prices will undoubtedly impact conversions (like Orbitz); risk to loose credibility with prospective customers.
  - (B) *There are many places where it is illegal to arbitrarily vary your price.*
  - (C) Costs to conduct a field experiment.

## Pricing Lab-Approach

- Experimental designs as part of online interviews
- Representative approach / sample size  $n=500-1.000$
- Real life promotional ads

## Traditional laboratory experiments

- „... one that employs a standard subject pool of students, an abstract framing, and an imposed set of rules“
- “In practice, however, few experimenters ever examine field behavior in a serious and large-sample way.\* It is relatively easy to say that the experiment could be applied to real people, but to actually do so entails some serious and often unattractive logistical problems” (Harrison & List, 2004).

\* Example: „Participants: Fifty-two undergraduate students from a large northeastern university participated in the experiment in return for partial course credit.“; Thomas & Morwitz (2005).

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# Outlook: what are the basic learnings?

## And: what can we do to improve the decision-making in pricing?



### Conclusion 1

- There are biases in the consumers' price perception, but this is not necessarily the rule.

### Conclusion 2

- Most (of the own) experiments indicate that consumers' price perceptions are relatively robust.

### Conclusion 3

- The assumption of the Homo Oeconomicus is as wrong as the assumption of the irrational consumer.

### Conclusion 4

- Behavioral pricing is an important aspect in pricing, but clear instructions for action (if ... then ...) are difficult to derive.

### Conclusion 5

- Experimental online designs represent an effective and cost-efficient method to measure price image effects.



# Thank you for your attention!



## Literature

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