OTTO-VON-GUERICKE-UNIVERSITY MAGDEBURG
FACULTY OF ECONOMICS AND MANAGEMENT

WHEN JUDGMENTS AND PREFERENCES FAIL TO CONFORM: RESEARCH ON PREFERENCE REVERSALS FOR PRODUCT PURCHASES

Holger Müller • Eike Benjamin Kroll
Bodo Vogt

FEMM Working Paper No. 03, January 2010

F E M M

Faculty of Economics and Management Magdeburg

Working Paper Series

Otto-von-Guericke-University Magdeburg
Faculty of Economics and Management
P.O. Box 4120
39016 Magdeburg, Germany
http://www.ww.uni-magdeburg.de/

WHEN JUDGMENTS AND PREFERENCES FAIL TO CONFORM:

RESEARCH ON PREFERENCE REVERSALS FOR PRODUCT PURCHASES

Holger Müller • Eike Benjamin Kroll • Bodo Vogt

Abstract: In this paper, the preference reversal phenomenon known from risk research is investigated according to which subjects prefer gamble A over B in competitive decisions although they reveal higher valuations in terms of a cash equivalent (CE) or a willingness to pay (WTP) for the latter when gambles are assessed separately in monadic judgments. In contrast to the experimental settings of research on risky choices, our studies observed unforced and binding purchase decisions of experienced consumers between real products in natural shopping environments. Results confirm robustness of preference reversals in risk-free purchase decisions indicating that orderings of product preferences reverse significantly between evaluations in monadic and competitive designs. While recent pricing research has been largely focused on monadic designs and suggested BDM mechanisms or second-price auctions for elicitations of consumers' true willingness to pay, results of our studies indicate a substantial discrepancy between preference orders based on monadic judgments and preferences that consumers reveal in competitive purchase decisions.

Keywords: Preference Reversals, Willingness to Pay, Monadic Designs, Competitive Designs, Pricing Research, Procedure Invariance

---

H. Müller (Corresponding Author)
Otto-von-Guericke-University Magdeburg, Faculty of Economics and Management, Department of Marketing, holger.mueller@ovgu.de, phone: +49391-6718817, fax: +49391-6711163
E.B. Kroll
Otto-von-Guericke-University Magdeburg, Faculty of Economics and Management, Department of Empirical Economics
B. Vogt
Otto-von-Guericke-University Magdeburg, Faculty of Economics and Management, Department of Empirical Economics

1 Introduction

One of the major responsibilities of marketing managers in manufacturing industries, retailing and services is the pricing and positioning of products. Basically, pricing policies of business companies have to be supported by internal information, e.g. cost structures or strategic directions, and external information about specific market characteristics such as price positioning of competing companies. However, probably the biggest part in price setting and price optimization is to determine the particular value (utility) a product delivers to the consumer.

In this context, the reservation price concept has received considerable use for the pricing research and pricing policies of marketers during recent decades. This concept hypothesizes that consumers form and memorize internal evaluation standards in terms of the maximum prices they are willing to pay for a given quality of a product which are identical to consumers' product values and utilities, respectively. As for buying decisions between different products in shopping environments, consumers are assumed to compare current selling prices to reservation prices, construct a preference order of products in terms of decreasing differentials (net utilities) between reservation and selling prices, and choose the product with the highest net utility or consumer surplus (Kalish and Nelson 1991)[1].

Researchers agree on the point that consumers' true reservation price or willingness to pay (termed hereafter WTP) is basically unobservable and influenced by current needs of consumers at the time of the particular decision. Therefore, the individual WTP is assumed to be a situation-specific construct rather than a memorized and stable evaluation standard (Voelckner 2006). Moreover, recent research suggests that the WTP is more accurately represented as a range than as a single price point (Wang, Venkatesh and Chatterjee 2007). Thus, the identification of valid measurements and elicitation methods which come at least as close as possible to consumers' true WTP or ranges of WTP remains a challenging task in pricing research. Literature on the topic provides different classifications of the broad variety of applied methods and approaches for determining the WTP, for instance price-related vs. price-centered methods (Blamires 1998), direct vs. indirect approaches (Voelckner 2006), or methods based on stated preferences, observed purchases, and bidding data (Sattler and Nitschke 2003).

Apart from that, in examining the setting of WTP-elicitations in particular, one can distinguish between two different design types. First, there are monadic designs in terms of separate evaluations. A potential customer is presented with a single product and the WTP is determined using so-called open-ended or closed-ended (referendum) approaches (Keane 1997). Monadic designs either elicit the WTP hypothetically without financial consequences for subjects or require real economic commitments such as incentive compatible second-price auctions or BDM lotteries (McAfee and McMillian 1987; Vickrey 1961; Becker, deGroot and Marshak 1964). Regarding BDM-based WTP elicitations, subjects are asked in an open-ended approach to indicate the highest price they would be willing to pay for a single product whereas the actual selling price is determined at random. Subjects are obliged to buy the product when the stated WTP exceeds or equals the selling price. In second-price auctions, subjects represent competing bidders and are similarly supposed to reveal their true value of the product in terms of a reasonable bid when the product is auctioned off. The winner is determined by the highest bid whereas the selling price is specified by the second highest bid of all participants.

Secondly, there are competitive designs in terms of joint evaluations where for instance, real in-store purchases of consumers between products are observed in field experiments (e.g. test market or store tests). Moreover, competitive designs are frequently used in experimental buying simulations where consumers are asked to make hypothetical or binding decisions between two or more products of a given choice set (subsets of assortments or categories) in laboratory environments (Voelckner 2006). As an example, a widely used competitive design in laboratory-based pricing research is the brand-price-tradeoff approach. In this multistage design, subjects are asked to choose a brand of a relevant subset. Initially, each brand is offered at the minimum of a range of market prices or particular test prices in the first stage. In the next stage, the price of the chosen brand is changed by a constant or variable increment whereas prices of all other brands remain unchanged. This procedure continues from stage to stage until the participant refuses to buy any of the brands, hence indicating that each brand-specific WTP is exceeded (Blamires 1987). In addition, standard preference-based, adaptive, and choice-based conjoint measurements are widely used in laboratory-based pricing research (Wittink, Krishnamurtu and Reibstein 1989; Kalish and Nelson 1991). Based on elicited

preference orders between product profiles, estimations of part worth of attribute levels (such as prices) allow for predictions of product values (utilities), choice likelihoods, and consumers' response to the particular price levels under test.

Recent pricing research focused largely on WTP-measurements in monadic designs (e.g. Rutström 1998, Frykblom 2000, Wertenbroch and Skiera 2002; Sattler and Nitschke 2003; Noussair, Robin and Ruffieux 2004; Voelckner 2006). Specifically, researchers propose binding monadic designs such as the BDM mechanism or second-price auctions when consumers' situation-specific true WTP for a particular product is to be elicited (Wertenbroch and Skiera 2002; Voelckner 2006). As for predictions of preference orders and buying behavior when several competing products are offered simultaneously at any prices, standard models of rational choice are usually applied. Based on elicited reservation prices (i.e. consumers' WTP) for each relevant alternative, product-specific net utilities are transformed into individual buying probabilities using for instance, first choice or attraction models (Luce 1959). Thus, given that competing products are offered at equal prices, products with higher WTP are predicted to deliver greater net utilities and become more likely to be chosen by subjects.

However, research in experimental economics revealed that subjects' preference orders between options can change significantly, depending on whether a competitive (joint evaluation of options) or monadic elicitation design (separate judgment of options) is applied. This violation of main assumptions of the standard theory of rational choice originates from work on risky decisions and is termed preference reversal (Lichtenstein and Slovic 1971). Numerous laboratory-based studies on preference reversal revealed that subjects often prefer a gamble A over gamble B when they are asked to select one of them in a competitive environment although they are willing to pay more for the latter (lottery B) when gambles are evaluated separately in monadic judgments.

Therefore, a question arises whether preference reversals (termed hereafter PR) generalize from choices on gambles and lotteries to risk-free decisions and occur even when regular buyers purchase products in environments that relate near real market-like settings. On the supposition that consumers' preference orders between products depend on whether monadic or competitive designs are applied, a serious problem of pricing research becomes apparent. If a subject reveals a higher WTP for product A than for product B in monadic judgments, she is assumed to prefer A over B when both

products are offered at equal prices in a competitive environment. However, when the preference reversal phenomenon persists in decisions between real products, predictions based on consumers' WTP elicited in monadic designs could be misleading, especially when standard models of rational choice are used. Hence, the potential of gathered information could be limited to some extent which is a drawback especially when managers' decisions about price positioning of products, product lines, and assortments are to be supported.

To investigate this research problem, our studies tested the robustness of preference reversals in risk-free decisions in natural shopping environments. Therefore, we compared monadic judgments in terms of separate elicitations of consumers' product values with consumers' preference orders between products elicited in competitive purchase decisions. For ensuring a sufficient degree of realism, binding and unforced buying decisions of experienced consumers between fast-moving consumer goods were observed in a laboratory (study one) and a field environment (study two).

2 Preference Reversals in Behavioral Research

Background and Literature Review

In marketing literature, the term preference reversal is generally used in the broadest sense to indicate a change in preference that is induced by behavioral anomalies, hence violating standard valuation theory. Research on behavioral anomalies has a long tradition in marketing literature and the reversal of preferences has been studied extensively in various scenarios. For example, preference reversals are caused by what was termed context effects, which describe a change in preferences (choices) between alternatives when the choice set is enlarged or reduced by options that are inferior, extreme, or in compromise positions (e.g. Huber, Payne and Puto 1982; Simonson 1989; Sinn et. al. 2007). Findings of empirical studies on that topic suggest that whenever the complexity of choice tasks is increased, for example by adding more options, preferences can change and are assumed to be significantly reconstructed at the time of decision instead of being an immutable underlying structure stored in the memory of subjects (Simonson and Tversky 1992; Drolet et. al 2000).

In contrast to this previous work in marketing literature, our study investigates preference reversals in terms of a behavioral phenomenon described in risk research, where values of gambles,

bets, and lotteries are elicited. The classical example includes a so-called P-bet (a lottery with a high probability of winning a modest cash amount) and a $-bet in terms of a more risky lottery with a small chance to win a very large amount of money. Preference reversal means that the preference for choices in terms of preferring the P-bet or the $-bet is different than the separately elicited monetary values for the gambles regarding cash or certainty equivalents might suggest. Certainty equivalents are considered a stated sure payoff for which a subject is indifferent between receiving a gamble or the stated sure amount of money. The preference order of the participant is said to be reflected in the certainty equivalents, meaning the higher the certainty equivalent, the higher the individual's value of a gamble. This way, different gambles with differing monetary payoffs and probabilities are comparable. As an example, a so-called 'standard' preference reversal exists, when the P-bet has a lower certainty equivalent than the $-bet, but is preferred when the subject is asked to select one of the two gambles offered (Braga, Humphrey and Starmer 2009).

A widely accepted explanation for preference reversals in risk research is a violation of procedure invariance that is a main assumption of the standard theory of rational choice. Procedure invariance stipulates that the preference between options does not depend on the elicitation method. In contrast, since the percentage of subjects who reveal preference reversals in laboratory-based economic experiments on risky choices is generally between twenty and fifty percent, a strong discrepancy of subjects' behavior in monadic pricing tasks and competitive choice tasks is detected, often due to a different weighting of the main attributes of lottery options such as winning probabilities and cash payments (Tversky et al. 1990; Shu 2006).

More recent work in experimental economics extends investigations of the PR phenomenon to hypothetical risk-free settings. However, findings confirm that preference reversals occur even in a variety of economic decisions when competitive and monadic evaluations of options are compared (Bazerman et al. 1999). For instance, an experimental study shows that a superior product bundle (a particular baseball card set) is chosen in a choice task, but is valued less in terms of a smaller WTP when elicited separately in an auction (List 2002). Furthermore, several studies identified preference reversals in categories of consumer durables (e.g. television, cordless phone, microwave oven, toaster) when participants make hypothetical decisions between two competing brands or determine a purchase

likelihood when the alternatives are evaluated separately (Nowlis and Simonson 1997). That means, that preference reversals remain a highly replicable phenomenon even for hypothetical risk-free two-attribute choices, hence demonstrating a significant difference in underlying decision processes in general when preferences are elicited in competitive or monadic evaluation designs (Hawkins 1994; Braga, Humphrey and Starmer 2009).

Contribution of the paper

While a major objective in pricing research is to identify appropriate methods for measuring the willingness to pay in terms of coming as close as possible to the consumer's true value of a particular product (Voelckner 2006), this paper addresses a more fundamental question: regardless of the specific elicitation technique applied, will participants' preference order of alternatives remain unchanged when alternatives are evaluated in a monadic or in a competitive design? Previous studies mainly examined the PR anomaly in hypothetical, and to a considerable extent, artificial and complex framings, hence facilitating behavioral anomalies (e.g. Hsee et al. 1999). In contrast, we deliberately intended to increase the degree of realism and to reduce the cognitive complexity of the whole decision environment in both of our studies.

Concerning the elicitation of product values and preference orders, simple choice tasks for both monadic as well as competitive designs were applied for the purpose of ensuring at least a basic level of procedure consistency. Thus, in monadic evaluations, subjects were presented with a sequence of choice tasks between an amount of money and a particular product (study one) or with a sequence of choice tasks between a product offered at different prices and a no-buy option (study two). Further, a random payoff mechanism (RPM), described in detail in the next section was implemented for ensuring incentive compatibility of subjects' decisions. Since both choice tasks as well as RPM are comprehensible and assumed to induce no mental cognitive overload, we avoided biasing effects being caused by the participants not fully understanding decision tasks or incentive mechanisms (such as BDM or second-price auctions) as intensely discussed in previous research on the topic (Hsee 1996; Kagel and Levin 1993; Reilly 1982).

Furthermore, previous research confirmed that real market environment settings can significantly reduce the observed percentage of preference reversals (Cox and Grether 1996)[1] under

certain circumstances, thus suggesting that the phenomenon may be less robust in environments that are essentially of central concern in economics (Braga, Humphrey and Starmer 2009). In order to examine this finding, we increased the degree of realism in both of our studies. Hence, we applied framings that adapt to the natural consumer environments in terms of binding decisions between real products in a laboratory environment (study one) and additionally conducted a standard field survey at the point of purchase (study two).

3 Study One

Experimental design

The first experiment was conducted in a laboratory environment at a German university[2]. In a within-subject design, a sample of 58 students from different fields of study was recruited. Only frequent buyers of three fast-moving consumer good categories (chocolate bar, toothpaste, shampoo) with a sufficient brand familiarity and buying experience were considered. Based on market observations and numerous pretests, we selected two top-selling brands (Twix vs. Duplo, Dentagard vs. Colgate, Herbal Essences vs. Elvital) of each category for reason of ensuring sufficient response amongst participants. The experiment was run as a paper and pencil questionnaire. It consisted of three parts and 117 relevant decisions in total. For ensuring economic consequences and incentive compatibility, a random payoff mechanism (RPM) was applied. Before the experiment started, each subject was instructed that at the end of the session one of her decisions was determined at random to become binding which is a standard payoff mechanism for eliciting preferences in general and preference reversals in particular. Previous research findings confirm that the RPM induces independence of each decision of a subject in the experiment, hence avoiding income or portfolio effects which are assumed to bias choice behavior in sequential multistage decisions (Grether and Plott 1979; Braga, Humphrey and Starmer 2009).

In the first part of the experiment, subjects were asked in several decisions to choose between a certain product and an amount of money. Thus, in accordance with designs applied in research on reversals in risky choices between gambles, consumers' product values in terms of a cash equivalent for each of the six products under test were elicited. The amount of cash changed in each decision and

represented sixteen test prices clustered around the regular market price of the products. The sequence of cash amounts varied at random in each questionnaire to avoid starting point bias (Mitchell and Carson 1989). It has to be pointed out that product values were derived from the lowest cash equivalent a subject accepted, thus representing a rough approximation in terms of a lower threshold. However, it is argued in literature, that to demonstrate preference reversals, it is not necessary to find the true WTP or cash equivalent as long as the ordering remains the same that is possible under much weaker conditions (e.g. Tversky and Thaler 1990). In the second part of the experiment, subjects were asked to indicate which of the two products in each category they would prefer when one would be provided as a gift. Finally, subjects were presented with three binding purchase decisions. Participants had to indicate in each category, which product (if any) they would buy when both were equally priced. Prices of the products were determined by the lowest cash equivalent that a subject revealed in each category during the monadic evaluation in the first part.

Since a within-subject design was used to identify preference reversals on an individual level, we had to avoid memory-based decision-making because subjects are evidentially known to try to avoid inconsistent behavior (Park and Hastak 1994). Therefore, participants were presented with a variety of hypothetical choices and evaluations (e.g. purchase likelihoods, price consciousness) and open questions (e.g. brand associations) about products of the categories under test during intervals between the three parts of study one. At the end, the experimenter determined the binding decision by drawing a ball with a number from a bingo cage. If a decision number from the monadic evaluation part was drawn, subjects either received an amount of cash or a product. If a purchase decision was drawn, subjects were obliged to pay the price of the selected product with their own money for receiving it except for those who chose the no-buy option in that particular decision. If one of the decisions on gifts was drawn, subjects received a free sample of the chosen product.

Results

A preference reversal can be inferred from the data in the following way. The first part elicited individual cash equivalents separately for each of the six products under test whereas in experimental part two and three, subjects chose between two competing products when they could receive one for free as a gift or when products were offered for purchase at equal prices. Following standard theory of

rational choice, one would expect subjects to prefer the product as a gift or buy the product which gains the higher cash equivalent in part one. Thus, whenever a subject provided a higher cash equivalent for a particular product in part one but chose a different product in a later part, this behavior is considered a preference reversal. Consequently, whenever a subject provided the same cash equivalent for both products in part one, a preference reversal cannot occur. However, participants with identical cash equivalents were considered a valid case and their choices were included in further analysis similar to analysis procedures in recent research on PR (Braga, Humphrey and Starmer 2009).

Analysis shows that when looking at all choice tasks, almost half of the participants (48 percent) reverse their decision at least once in the experiment (see table 1). Thus, results confirm that the preference reversal phenomenon generalizes to risk-free decisions between real products when subjects face consequences of their decisions in a laboratory environment. The rate of reversals is similar to the rates found in earlier research on risky choices (generally between 20 and 50 percent). Moreover, 24 out of 58 subjects reverse their preference comparing cash-equivalents from part one and choices without prices (decision on gifts) in part two, while 20 out of 58 participants reverse their preference in the binding purchase decision of part three.

Table 1 Number of Preference Reversals in Study One

Decision	no PR	1 x PR	2 x PR	3 x PR	ΣPR/n	Percentage
Overall	31	10	17	1	28/58	48%
Decisions on Gift	34	22	2	0	24/58	41%
Decisions on Purchase	38	19	1	0	20/58	34%

Looking at each product category separately, one can find high percentages of reversals for toothpastes and shampoos for decisions on gift as well as purchases whereas subjects reverse their preference for chocolate bars less frequently (see table 2). Note that subjects who chose the no-buy option in the third part of the experiment were excluded from calculations of rates of reversals in buying decisions. Specifically, we detected more than 20 percent reversals in buying decisions on shampoos and toothpastes while only one out of ten subjects reversed her preference in purchases of chocolate bars. From our point of view, and in accordance to statements of participants after the experiment, category-specific differences in the rates of reversals could be traced back to distinct preference structures with respect to the particular chocolate bars under test. As can be seen in the

lower section of table two, we observed a strong preference for brand A in terms of a high fraction of subjects who revealed the larger cash equivalent for this brand (92 percent). Moreover, as to the elicited cash equivalent values of these subjects, the mean of brand A ($\varnothing CE_A$=59 Cent) considerably exceeds the mean of brand B ($\varnothing CE_A$=28 Cent) by a factor of 2.1, hence indicating a noticeably larger relative price tolerance between brands for this category than for shampoos (factor 1.2) and toothpastes (1.6). Thus, individuals' preference orders between the particular brands of chocolate bars can reasonably be assumed to be more stable, hence reducing the magnitude of preference reversals significantly.

Table 2 Occurrence of Preference Reversals in Study One

		Chocolate Bars				Shampoos				Toothpaste			
		Monadic Evaluation				Monadic Evaluation				Monadic Evaluation			
	n=58	A	B	E	n=58	A	B	E	n=58	A	B	E	
	$\varnothing CE_A$	59	21	34	$\varnothing CE_A$	198	168	169	$\varnothing CE_A$	120	71	59	
	$\varnothing CE_B$	28	36	34	$\varnothing CE_B$	171	199	169	$\varnothing CE_B$	76	92	59	
Competitive Choice (Gift) $P_A=P_B=0$	A	81	**3**	5	A	26	**7**	17	A	61	**12**	5	
	B	**9**	2	0	B	**7**	36	7	B	**7**	10	5	
	PR	**12%**			PR	**14%**			PR	**19%**			
		Monadic Evaluation				Monadic Evaluation				Monadic Evaluation			
	$n=49_a$	A	B	E	$n=29_a$	A	B	E	$n=47_a$	A	B	E	
	$\varnothing CE_A$	59	22	29	$\varnothing CE_A$	206	167	187	$\varnothing CE_A$	120	66	59	
	$\varnothing CE_B$	28	42	29	$\varnothing CE_B$	177	202	187	$\varnothing CE_B$	73	85	59	
Competitive Choice (Buy) $P_A=P_B=$ $Min[CE_A;CE_B]$	A	84	**2**	4	A	24	**7**	14	A	62	**11**	7	
	B	**8**	2	0	B	**14**	38	3	B	**11**	4	5	
	PR	**10%**			PR	**21%**			PR	**22%**			

$_a$ = subjects who chose the no-buy option were excluded from analysis
E = percentage of subjects with equal cash equivalents for products (A; B)
$\varnothing CE_{A,B}$ = (Mean) Cash Equivalent for Brand A, B (in Cent)

4 Study Two

Experimental design

In a within-subject design, a sample of 183 frequent and experienced buyers of a fast-moving consumer good category (chocolate hazelnut spread) was recruited in a local store of a German retail chain. Subjects were offered the two top brands (Nutella vs. Nusspli) at two separate sales stands located near of the entrance of the store. The experiment was run as a computer-aided personal interview (CAPI) and consisted of three parts and 22 relevant decisions in total. Before the survey started, participants were informed about the application of a random payoff mechanism and binding consequences in terms of potential buying obligations depending on their decisions during the survey.

The monadic evaluation part consisted of ten choices for each brand under test. In contrast to study one, subjects were presented with one of the spreads and had to indicate whether they would buy it at several test prices around the market price or not (no-buy option). Hence, consumers' product values in terms of a willingness to pay were elicited in a closed-ended (referendum) approach. Again, in the sequence of prices as well as the order of brands, subjects were presented with varied and random input in each interview. In the second (third) part of the experiment, participants were asked to indicate which of the two products, if any they would purchase when both were equally priced at the minimum (maximum) WTP subjects revealed for a brand in part one. Again, to avoid memory-based decision-making, participants were presented with a variety of hypothetical choices and evaluations during the intervals between the three parts of the field experiment. Any transactions were realized immediately after determining the binding decision at the end of the experiment. Subjects had to pay the price of a selected product for receiving it with their own money or could not buy any of the brands when the no-buy option was chosen. Thus, consumers' decisions were observed in an experimental field environment that relates close to regular buying decisions subjects face in real in-store purchases.

Results

According to our analysis, we find strong support for the occurrence of preference reversals even in risk-free binding buying decisions between real brands at the point of purchase. A total of thirty subjects of the sample reversed their preference at least once in competitive decisions (17 percent). Moreover, seven percent of all participants switched from the brand they evaluated higher in the monadic WTP elicitation to the other spread in both buying decisions in the competitive choice part. After excluding participants who chose the no-buy option, we observed a nineteen (fourteen) percent rate of reversals when brands are offered at the minimum (maximum) WTP subjects revealed in monadic judgments (see table 3). Thus, a substantial violation of procedure invariance is detected again. Furthermore, in comparison to buying decisions between shampoos and toothpastes in the laboratory-based study one, we find similar rates of reversals in consumers' decisions between spreads at the point of purchase.

Table 3 Occurrence of Preference Reversals in Study Two

		Chocolate Hazelnut Spreads		
		Monadic Evaluation		
	$n=105_a$	A	B	E
	$\varnothing WTP_A$	204	142	207
	$\varnothing WTP_B$	154	174	207
Competitive Choice (Buy)	A	56	**6**	20
$P_A=P_B=MAX[WTP_A;WTP_B]$	B	**8**	3	7
	PR	14%		
		Monadic Evaluation		
	$n=153_a$	A	B	E
	$\varnothing WTP_A$	216	142	207
	$\varnothing WTP_B$	157	175	207
Competitive Choice (Buy)	A	59	**6**	14
$P_A=P_B=MIN[WTP_A;WTP_B]$	B	**13**	3	5
	PR	19%		

$_a$ = subjects who chose the no-buy option were excluded from analysis
E = percentage of subjects with equal WTP for products (A; B)
$\varnothing WTP_{A,B}$ = (Mean) Willingness To Pay for Brand A, B (in Cent)

5 Conclusion

The main question our study examines is whether the preference reversal phenomenon known from risk research persists when experienced consumers evaluate and choose real products from different category subsets in market-like settings. According to our results, robustness of preference reversals is confirmed for both laboratory environments as well as field experiments at the point of purchase. Subjects change their preference between products to a substantial extent depending on whether monadic or competitive elicitation designs are applied. Thus, procedure invariance as one of the main assumptions of standard utility theory is violated in risk-free decisions, hence raising doubt as to what extent individuals do in fact have an underlying set of stable preferences between alternatives in general.

Moreover, basic research on the validity of different WTP-measurements has to address this violation, when discussing advantages and disadvantages of monadic and competitive designs in general. Firstly, regarding the literature on pricing research, especially the monadic BDM mechanism is meant to be an appropriate procedure for determining approximations of the true point-of-purchase WTP (Wertenbroch and Skiera 2002, Voelckner 2006). But to the extent that preference reversals occur in real purchase decisions where generally several products compete for consumers' demand simultaneously, predictions based on product values that were elicited in monadic designs could be substantially misleading. On the supposition that reversals are in fact induced by different elicitation

procedures, a closer examination of WTP-measurements based on competitive designs that apparently relate near marketplace scenarios is suggested. Secondly, it is noteworthy that in our field experiment (study two) we found a substantial proportion of subjects who refused to buy any of the products in competitive decisions. That means that 43 percent (16 percent) of the participants chose the no-buy option in the competitive choice tasks although products under test were offered at the maximum (minimum) reservation price they revealed in the monadic evaluation beforehand. Apparently, an overestimation of consumers' WTP elicited in monadic evaluations is detected. Again, as a consequence, further research should investigate WTP-measurements and robustness of preference orders based on competitive designs such as the brand-price-trade-off approach or choice-based conjoint analysis more intensively which have been neglected to some extent in recent pricing research (Voelckner 2006).

Notes

1 In general, higher prices are assumed to affect net utilities and purchase probabilities negatively. However, to the extent that consumers perceive price not only as a financial burden but also as a quality cue, net utilities are positively as well as negatively correlated with price information (Voelckner and Hofmann 2007).

1 In contrast, more recent experimental results show that continued market exposure does not necessarily promote consistency with standard utility theory (Braga, Humphrey and Starmer 2009).

2 Laboratory “MaXLab” at the Otto-von-Guericke University Magdeburg. Students were recruited using the online recruitment program ORSEE (Greiner 2004).

References

Bazerman, M. H., Moore, D. A., Tenbrunsel, A. E., Wade-Benzoni, K. E., & Blount, S. (1999). Explaining how preferences change across joint versus separate evaluation. *Journal of Economic Behavior & Organization*, 39(1), 41-58.

Becker, G. M., DeGroot, M. H., & Marschak, J. (1964). Measuring Utility by a Single-Response Sequential Method. *Behavioral Science*, 9(3), 226-232.

Blamires, C. (1987). Trade-Off pricing research: a discussion of historical and innovatory applications. *Journal of the Market Research Society*, 29(2), 133-152.

Blamires, C. (1999). Pricing Research. In C. McDonald & P. Vangelder, (Eds.), The ESOMAR Handbook of Market and Opinion Research (pp. 739-771). Amsterdam: ESOMAR

Boothe, J., Schwartz, J. A., & Chapman, G. B. (2007). Preference reversals resulting from a market value heuristic. *Marketing Theory*, 7(1), 27-38.

Braga, J., Humphrey, S. J., & Starmer, C. (2009). Market experience eliminates some anomalies—and creates new ones. *European Economic Review*, 53(4), 401-416.

Cox, J. C., & Grether, D. M. (1996). The preference reversal phenomenon: Response mode, markets and incentives. *Economic Theory*, 7(3), 381-405.

Drolet, A., Simonson, I., & Tversky, A. (2000). Indifference Curves that Travel with the Choice Set. *Marketing Letters*, 11(3), 199-230.

Frykblom, P. (2000). Willingness to pay and the choice of question format: experimental results. *Applied Economic Letters*, 7(10), 665-667

Greiner, B. (2004). The Online Recruitment System ORSEE 2.0—A Guide for the Organization of Experiments in Economics. *Working Paper Series of Economics. Cologne: University of Cologne*.

Grether, D. M., & Plott, C. R. (1979). Economic Theory of Choice and the Preference Reversal Phenomenon. *American Economic Review*, 69(4), 623-638.

Hawkins, S. A. (1994). Information Processing Strategies in Riskless Preference Reversals: The Prominence Effect. *Organizational Behavior & Human Decision Processes*, 59(1), 1-26.

Hsee, C. K., Loewenstein, G. F., Blount, S., & Bazerman M. H. (1999). Preference reversals between joint and separate evaluations of options: A review and theoretical analysis. *Psychological Bulletin*, 125(5), 576-590.

Hsee, C. K. (1996). The Evaluability Hypothesis: An Explanation for Preference Reversals between Joint and Separate Evaluations of Alternatives. *Organizational Behavior & Human Decision Processes*, 67(3), 247-257.

Huber, J., Payne, J. W., & Puto, C. (1982). Adding Asymmetrically Dominated Alternatives: Violations of Regularity and the Similarity Hypothesis. *Journal of Consumer Research*, 9(1), 90-98.

Kagel, J. H., & Levin, D. (1993). Independent private value auctions: bidder behavior in first-, second-, and third-price auctions with varying numbers of bidders. *Economic Journal*, 103(419), 868-879.

Kalish, S., & Nelson, P. (1991). A Comparison of Ranking, Rating and Reservation Price Measurement in Conjoint Analysis. *Marketing Letters*, 2(4), 327-335.

Karni, E., & Safra, Z. (1987). "Preference Reversal" and the observability of preferences by experimental methods. *Econometrica*, 55(3), 675-685.

Keane, M. P. (1997). Current Issues in Discrete Choice Modeling. *Marketing Letters*, 8(3), 307-322.

Lichtenstein, S., & Slovic, P. (1971). Reversals of preferences between bids and choices in gambling decisions. *Journal of Experimental Psychology*, 89(1), 46-55.

List, J. A. (2002). Preference Reversals of a Different Kind: The "More Is Less" Phenomenon. *American Economic Review*, 92(5), 1636-1643.

Luce, R. D. (1959). Individual Choice Behavior. New York: John Wiley.

McAfee, R. P., & McMillian, J. (1987). Auctions and Bidding. *Journal of Economic Literature*, 25(2), 699-738.

Mitchell, R., & Carson, R. (1989). Using Surveys to value Public Goods: The Contingent Valuation Method. Washington DC.

Noussair, C., Robin, S., & Ruffieux, B. (2004), Revealing consumers' willingness-to-pay: A comparison of the BDM mechanism and the Vickrey auction. *Journal of Economic Psychology*, 25(6), 725-741.

Nowlis, S. M., & Simonson, I. (1997). Attribute-Task Compatibility as a Determinant of Consumer Preference Reversals. *Journal of Marketing Research*, 34(2), 205-218.

Park, J., & Hastak, M. (1994). Memory-Based Product Judgments: Effects of Involvement at Encoding and Retrieval. *Journal of Consumer Research*, 21(3), 534-547.

Reilly, R. J. (1982). Preference Reversal: Further Evidence and Some Suggested Modifications in Experimental Design. *American Economic Review*, 72(3), 576-584.

Rutström, E. E. (1998). Home-grown values and incentive compatible auction design. *International Journal of Game Theory*, 27(3), 427-441.

Sattler, H., & Nitschke, T. (2003). Ein empirischer Vergleich von Instrumenten zur Erhebung von Zahlungsbereitschaften. zfbf, 55(6), 264-281

Shu, L. (2006). Preference Reversal: A new look at an old problem. *Psychological Record*, 56(3), 411-428.

Simonson, I. (1989). Choice based on Reasons: The Case of Attraction and Compromise Effects. *Journal of Consumer Research*, 16(2), 158-174.

Simonson, I., & Tversky, A. (1992). Choice in Context: Tradeoff Contrast and Extremeness Aversion. *Journal of Marketing Research*, 29(2), 281-295.

Sinn, F., Milberg, S. J., Epstein, L. D., & Goodstein, R. C. (2007). Compromising the compromise effect: Brands matter. *Marketing Letters*, 18(4), 223-236.

Tversky, A., Slovic, P., & Kahneman, D. (1990). The causes of preference reversal. *American Economic Review*, 80(1), 204-217.

Tversky, A., & Thaler, R. H. (1990). Anomalies: Preference Reversals. *The Journal of Economic Perspectives*, 4(2), 201-211.

Vickrey, W. (1961). Counterspeculation, auctions, and competitive sealed tenders. *Journal of Finance*, 16(1), 8-37.

Voelckner, F. (2006). An empirical comparison of methods for measuring consumers' willingness to pay. *Marketing Letters*, 17(2), 137-149.

Voelckner, F., & Hofmann, J. (2007). The price-perceived quality relationship: A meta-analytic review and assessment of its determinants. *Marketing Letters*, 18(3), 181-196.

Wang, T., Venkatesh, R., & Chatterjee, R. (2007). Reservation Price as a Range: An Incentive-Compatible Measurement Approach. *Journal of Marketing Research*, 44(2), 200-213.

Wittink, D. R., Krishnamurthi, L., & Reibstein, D. J. (1989). The Effect of Differences in the Number of Attribute Levels on Conjoint Analysis, *Marketing Letters*, 1(2), 113-123.

Wertenbroch, K., & Skiera, B. (2002). Measuring Consumers' Willingness to Pay at the Point of Purchase. *Journal of Marketing Research*, 39(2), 228-241.

Xiaoyong, C. (2005). Cognitive Preference Reversal or Market Price Reversal?. *Kyklos*, 58(2), 177-194.