Title: Prize decoys at work - New experimental evidence for asymmetric dominance effects in choices on prizes in competitions

Abstract: In a controlled domain replication of the well-established prize decoy experiment, we provide new evidence for the recently disputed robustness of asymmetric dominance effects (ADEs). Specifically, using real choices between - according to pretests - meaningful options that trigger tradeoff considerations, we find an ADE sized 16% which remains robust across demographic groups. Therefore, our findings indicate that the failures to replicate the ADE in previous studies might be due to variations in the experimental choice setting.
Title:

Prize decoys at work –

New experimental evidence for asymmetric dominance effects in choices on prizes in competitions

Authors:

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Introduction
In their seminal paper “Choice in context: Tradeoff contrast and extremeness aversion” published 1992 in the Journal of Marketing Research, Itamar Simonson & Amos Tversky (termed hereafter ISAT) showed that consumer choice can be influenced by the set of options presented to the decision-maker. Specifically, in one of their experiments, ISAT demonstrated that preferences between two non-dominated options winnable in a competition, namely prize A (a $6 cash payoff) and prize B (an attractive pen from the well-known brand “Cross pen”) can be shifted by 11% toward the target prize B by introducing a prize decoy C (a less attractive “Sheaffer pen”) that is dominated by B, but not by A (for details, see the online Appendix A.1). Hence, an asymmetric dominance effect (ADE) occurs as introduced by Huber, Payne & Puto in 1982.

In numerous studies (e.g. Ratneshwar et al. 1987, Lehmann & Pan 1994, Heath & Chatterjee 1995), the ADE proved to be a robust phenomenon across various product categories (such as beer, juice, TV sets, batteries, or cars) and choice settings (e.g. brand/product entries vs. exits). However, two groups of researchers, namely Frederick, Lee & Baskin (2014) and Yang & Lynn (2014) recently devoted extensive time and energy to conduct laudable multi-category replication studies. Both groups report difficulties producing the ADEs, even when using established stimuli setups from published research. As for ISAT’s specific prize decoy experiment as described above, Frederick et al. (2014) failed to replicate an ADE-conform choice shift toward the target pen. Thus, in light of their overall findings, the authors question the general robustness of the ADE, and suggest considering it as an experimental artifact limited to stylized product representations.

Yet, as highlighted in Simonson’s follow-up comment (2014), the design of their replications may account at least for some of the failures to produce an ADE in general, and the prize decoy experiment in particular. Specifically, Frederick et al. (2014) observed hypothetical, imaginary prize choices instead of real decisions on prizes. However, recent research findings indicate that context effects vary in size depending on whether consumers face real-life economic consequences or not (e.g. Diels & Müller 2013). Secondly, Simonson (2014) argues that Frederick et al. (2014) used as their pen decoy an inferior (i.e. a fully dominated) option. As a result, it is likely that subjects dismissed the decoy as a true alternative to the $6 cash prize. Therefore, the required tradeoff considerations and the contrast between the targeted “Cross pen” and the decoy were eventually not triggered. Third, Simonson (2014) raises doubts as to what extent the $6 cash prize used in ISAT’s original study conducted nearly 25 years ago was meaningful to subjects today.

We replicate the effectiveness of the prize decoy in an experimental setting that comes as close as possible to ISAT’s original design with three distinct differences (see Table 1). First, we applied a real prize competition which motivated subjects to make their choice carefully. Second, we pretested whether the subjects’ perceptions of the prize options in the product space of prize options induced, in fact, attribute tradeoffs as required for an ADE. Third, we included meaningful cash and pen prizes.

Method and material
To identify an adequate stimuli set of significant cash and ball pen prizes [1], we ran preliminary group discussions among the target population of our study (small-sized samples of students, university employees and visitors of a major German university). We concluded that cash and pen prizes worth 10€ (roughly $14) and higher are perceived as significant when participating in a real prize competition. Hence, we selected €10 as the respective cash prize. Further, based on statements on the likeability of real pen brands, we selected a popular “Mark Twain” pen packaged in an eye-catching box (AMAZON selling price: €14.99) as the target pen prize, whereas an unpackaged “Lamy” pen (worth €10.49) perceived as less attractive than the target pen by about 90% of the discussion group members served as the pen prize decoy (see online appendix A.1 for information on prizes). Next, we conducted a comprehensive follow-up pretest (n=126) to check
whether our prizes triggered the required tradeoff considerations. We found that when taking part in prize competitions, 84% of the subjects favor a cash prize over a corresponding material prize such as a pen that has the same monetary value, and b) a higher prize value over a lower prize value (see online appendix A.2 for the wording and the pretest results) [2].

In our main experiment, 193 student and nonstudent visitors participated in an online survey conducted in four semi-cubicles equipped with PCs at an exhibition stand during the open house day of a major German university (see online appendix A.3 for screenshots of the survey software). In the first part of the survey, we briefed subjects that they were participating in a real prize competition in the form of a brand quiz in which they were presented with a series of ad slogans and (parts of) icons of well-known brands with their task being always to identify the correct brand out of four displayed brand names. Next, participants learned that the best 10% of them would be contacted the next day and awarded a €10 cash prize. We additionally briefed the participants that winners had the chance to trade the €10 cash prize for a gift in the form of a ball pen. At this survey stage, subjects read on a separate page that the tradable pen prize was located under an opaque box sitting next to the PC screen, waiting for their inspection. Two of the four semi-cubicles were equipped with the core set pen option in that the box included only the targeted “Mark Twain” pen, whereas at the other workstations, it covered the extended set inclusive of the “Lamy” decoy. By letting the participants draw a ball from an urn numbered from 1 to 4 which indicated the cubicle subjects were directed to, we assigned our sample at random to the core set condition CS (nCS=101) and the extended set ES (nES=92).

After finishing the inspection of the pen(s), subjects pushed a button to proceed to the second part of the survey. On a separate screen, the prize options were presented in a common alternative-by-attribute matrix format in which each option was represented in a column with the rows depicting the prize type, the prize value and an image (pens only). Subjects indicated their prize choice by checking a box below the respective column [3]. In the third part, subjects went through the brand quiz. Finally, subjects provided demographic data and indicated which prize attribute they considered more important when making their prize choice using a rating scale ranging from 1 (= prize value) to 5 (= prize type).

After finishing the survey, every tenth participant was selected to go through a short debriefing interview.

Results
The analysis of the debriefing interviews confirms that the selected participants were largely unaware of any applied prize choice set manipulation. Further, pre-analyses of data reveal that the random assortment of subjects to the conditions was successful as CS and ES turn out to be homogeneous with respect to the participants’ gender, occupation, and age (see online appendix B: each χ²<1.55, p>.68). Moreover, as shown in the online appendix C, manipulation checks reveal that the time taken to read the general prize competition instructions is nearly the same under CS and ES (MCS=18.39sec, SEE=0.91; MES=20.21sec, SEES=1.49; Welch’s t153=-1.07, p=.30). However, we detect differences in the time that subjects spent to inspect the pen(s) (MCS=29.68sec, SEE=1.64; MES=44.02sec, SEES=3.00) which turns out to be significant in a two-sided t-test under unequal group variances (Welch’s t142=−4.18, p<0.01). In sum, our manipulation checks suggest that a) subjects under both conditions did carefully read and comprehend the competition rules, and b) under ES, the pen prize decoy was noticed and considered because the subjects spent on average 15 seconds more to inspect the “Mark Twain” pen and the “Lamy” pen before continuing the online survey with their final prize choice than those subjects under condition CS who were exposed only to the targeted “Mark Twain” pen.

As for the main analysis, in the core set CS, 75 of the 101 subjects chose the €10 cash prize and only 26 selected the “Mark Twain” pen (see online appendix D). In contrast, of the 92 subjects who were assorted to the extended set condition ES, only 48 opted for the cash prize, whereas 35 (9) subjects selected the targeted “Mark Twain” (the decoy “Lamy”) pen. Hence, the absolute choice share of the target pen increased from 25.7% in CS to 38.0% under ES. Alternatively, expressed as a shift in the relative share as is the common approach in research on ADEs, the choice share of the target pen relative to the competitor cash prize...
increases from 25.7% (=26/101) to 42.2% (35/[48+35]) which indicates a significant 16.4 % shift in the targeted pen’s relative share (χ²=5.54, p<.05).

Further, as additionally depicted in Table 2, we checked the efficacy of the pen prize decoy across potential moderating factors such as demographic data. The ADE induced by the prize decoy holds across any gender (male vs. female subjects) and occupation type (nonstudent vs. student participants). As an example, regarding female subjects (n_{female}=106), the relative choice share of the targeted pen increases from 25.5% under CS to 42.3% under the extended set ES, hence indicating a substantial ADE of 16.8% which is at least marginally significant (Fishers’ exact test: p=.09, see the online appendix E for further results).

**Discussion**

As a first finding, our domain replication confirms ISAT’s original results in that a robust 16.4% ADE is detected when subjects face the option to trade a cash prize for a particular pen prize. In fact, our results confirm that a *meaningful prize decoy is at work*: Subjects’ propensity to give cash for getting a material good can systematically be increased by the introduction of a second material good that is asymmetrically dominated by the target, but not by the cash prize (as indicated by the target pen’s larger selling price of €14.99 vs. the €10.49 price of the decoy, whereas the cash prize provides only €10).

Second, our findings support Simonson’s (2014) line of reasoning regarding the failed replication attempts by Frederick, Lee & Baskin (2014) and Yang & Lynn (2014): The efficacy of decoys obviously depends on several conditions, one of which being that the decision-maker have to consider the decoy as a true *meaningful alternative* to the competitor option. Only then, the required tradeoff considerations towards the target may be triggered. Therefore, studies in the research field of context effects should be based on comprehensive pretest work to identify those tradeoffs relevant for decisions before conducting the actual experiments.

Third, as an interesting side finding of our replication (see online appendix F for details), subjects’ *ex post* evaluations of the prize attribute importance indicate that the weight given to the prize value is significantly higher when the decoy is included in the extended set condition [4]. Therefore, as supposed in the work of Wedell (1991) and Ratneshwar et al. (1987), increasing the frequency of items along the dimension on which the target is superior to the competitor (which in our prize choice replication is the prize value), does, in fact, increase the weight that participants assign to that dimension. Thus, a so-called frequency decoy is at work in our setting which is noteworthy since prior research indicates that an ADE is more likely to occur when the decoy option enlarges the dimension on which the competitor is superior to the target (Heath & Chatterjee 1995). However, this particularity is far beyond the scope of this paper, and we leave the issue of examining a) the general conditions under which ADEs occur, and b) which types of decoys and cognitive processes facilitate or hamper the occurrence of ADEs to further research.
Notes
[1] Note that we deliberately selected ball pens as prizes because most of the group discussion members stated to use them more often than fountain pens.

[2] This is important because only then, a tradeoff is established as is a prerequisite for the occurrence of an ADE. Put differently, the observed 84% tradeoff conformance means that nearly nine out of ten subjects experience that to receive a cash prize that can be used for any purpose instead of a material good prize (pen), a loss in the prize value has to be accepted. In turn, to increase the value of the prize, subjects have to give up the option to spend money at will (cash) and to accept a material prize (pen).

[3] Note that the order of appearance at the screen was fixed: From left to right, subjects in the core set condition were presented with the cash prize and the “Mark Twain” pen, whereas in the extended set, the decoy “Lamy” pen was depicted between these two options.

[4] Considering the applied rating scale of attribute importance ranging from 1 (= prize value was the most important attribute) to 5 (= prize type was the most important attribute), we find that under the extended set condition, subjects’ mean value is smaller than under the core set condition ($M_{ES}=3.84, SE_{ES}=0.16, M_{CS}=4.09, SE_{CS}=0.14$) which turns out to be significant in a two-sided t-test under unequal group variances ($Welch's \ t_{183}=2.84, p<0.01$). Thus, as compared to CS, the attribute “prize value” was more important under ES as indicated by the smaller mean rating.

References
Table 1: Designs of the original, previous, and the present domain replication study on ADEs using prize decoys

<table>
<thead>
<tr>
<th>Author(s)/ publication year</th>
<th>Sample</th>
<th>Conditions</th>
<th>Prizes</th>
<th>Manipulation Check</th>
<th>Choice Framing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simonson &amp; Tversky 1992</td>
<td>Students</td>
<td>$N= 221$</td>
<td>n=106 n=115</td>
<td>$6 Cross Sheaffer</td>
<td>YES 10% of the total sample (n=20) Prize-trade framing</td>
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<tr>
<td>Frederick, Lee, &amp; Baskin 2014 Study I</td>
<td>Picnickers</td>
<td>$N=263$</td>
<td>n=118 n=145</td>
<td>$6 Cross Bic</td>
<td>NO Hypothetical study (no winners) Prize-trade framing</td>
</tr>
<tr>
<td>Frederick, Lee, &amp; Baskin 2014 Study II</td>
<td>Picnickers</td>
<td>$N=255$</td>
<td>n=124 n=131</td>
<td>$6 Cross Bic</td>
<td>NO Hypothetical study (no winners) Choice framing</td>
</tr>
<tr>
<td>Present study 2014</td>
<td>Students and nonstudents</td>
<td>$N=193$</td>
<td>n=101 n=92</td>
<td>€10 M. Twain worth €14.99 Lamy worth €10.49</td>
<td>YES 10% of the total sample (n=20) Prize-trade framing</td>
</tr>
<tr>
<td>Study</td>
<td>Sample</td>
<td>Subsamples</td>
<td>Core set (CS)</td>
<td>Extended set (ES)</td>
<td>Relative choice share of the target prize option&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>-----------------------------</td>
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<td>------------------------------------------------</td>
</tr>
<tr>
<td>Simonson &amp; Tversky 1992</td>
<td>N=221</td>
<td>n.a.</td>
<td>35.8%</td>
<td>46.9%</td>
<td>-</td>
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<tr>
<td>Frederick, Lee, &amp; Baskin 2014 Study I</td>
<td>N=263</td>
<td>n.a.</td>
<td>33%</td>
<td>30%</td>
<td>-</td>
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<tr>
<td>Frederick, Lee, &amp; Baskin 2014 Study II</td>
<td>N=255</td>
<td>n.a.</td>
<td>38%</td>
<td>32%</td>
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<tr>
<td>Present Study 2014</td>
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<td>Overall</td>
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<td>42.2%</td>
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<tr>
<td></td>
<td></td>
<td>Males (n=87)</td>
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<td>Females (n=106)</td>
<td>25.5%</td>
<td>42.3%</td>
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<td></td>
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<td>Students (n=89)</td>
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<tr>
<td></td>
<td></td>
<td>Non-Students (n=104)</td>
<td>27.8%</td>
<td>43.2%</td>
<td>+</td>
</tr>
</tbody>
</table>

<sup>a</sup> Calculated as the number of choices of the target option (“Mark Twain pen”) divided by the number of choices of the target option (“Mark Twain pen”) and the competitor option (10€ cash).

<sup>b</sup> Expressed as the difference in relative choice share of the target under the extended set and the core set.

<sup>c</sup> Expressed as the target’s relative choice share under the extended set divided by target’s relative share under the core set.