Consistency of Higher Order Risk Preferences

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* With help from Louis Eeckhoudt, Ilia Tsetlin and Cary Deck. I alone am responsible for insulting anyone during this presentation.
Conference in Honor of Louis Eeckhoudt
Un économiste extraordinaire
Welcome to all invited guests:

All of us who have followed Louis as he leads us down the path of uncertainty
CONSISTENCY IS IMPORTANT

How do YOU pronounce “EECKHOUDT?”

Louis’ answer (which you have all heard before): “As you like …”

I know: Walloon vs. Flemish …

So, are you still surprised that Belgium had no government for years?
So Louis has had some more thoughts about risk attitudes
… together with David Crainich and Alain Trannoy

“I have some more thoughts on risk attitudes”
So pay attention while Louis describes his new theory

Louis: *Let me know if I explain your theory correctly. D’accord?*
Some people like to combine “good” with “good”
… and also to combine “bad” with “bad”

These people are called “mixed drink lovers”
The rest of us like to combine “good” with “bad”

These are the people in all of our papers, who are risk averters.

These examples were inspired by Ilia, but of course he used vodkas, not wine & beer.

So my talk today is about these two types of people.
Risk Averters (If you don’t know this stuff, you really need to read Louis’ papers!)  
(AND WHAT THE HELL ARE YOU DOING AT THIS CONFERENCE ANYWAYS??)

Combining Good with Bad (Eeckhoudt/Schlesinger/Tsetlin, 2009)

Let $G_1$ be better than $B_1$ in Nth-order risk (Ekern, aka “Art’s hero”, 1980)  
Let $G_2$ be better than $B_2$ in Mth-order risk

\[
\begin{align*}
G_1 + B_2 & \succ_{M+N} B_1 + G_2 \\
G_1 + G_2 & \succ B_1 + B_2
\end{align*}
\]

Prefer to combine “relatively good” and “relatively bad” outcomes  
(Obtain same result with stochastic dominance of orders N and M)

NOTE: In Eeckhoudt & Schlesinger (2006), we always had “zero” as the good outcome.  

➤ “mitigating the harms” (minus a constant, plus a zero-mean risk, etc)

Add to $w$:  
$[0+\text{Bad}_1, 0+\text{Bad}_2] \succeq [\text{Bad}_1+\text{Bad}_2, 0+0]$

Toulouse 2012
But what about mixed risk lovers? (Crainich, Eeckhoudt, Trannoy, 2012)

Above preference is reversed: prefer to combine “good” with “good”

Louis trying to convince me that risk lovers also should have positive third derivatives

“So this economist walks into a bar and asks: what’s your third derivative? ... And the bartender says ...”
Typically, we ignore risk lovers (with excuses)

“They are outliers.”
“They just made a mistake.”
“They would behave differently if only they had attended a better university.”
**Hypothesis**: Individuals segregate out into
-- Mixed risk averters (prefer to combine “good” with “bad”) 😊😊
-- Mixed risk lovers (prefer to combine “good” with “good”) 😊😊😊

New experiment with Cary Deck (57 subjects U of Arkansas):

Distribution of Participant Behavior on 2\textsuperscript{nd} Order Tasks

*Note: As Sebastian Ebert points out. We can easily have “none of the above.”*
Deck & Schlesinger (2012) – simple lottery choice

Option A

Option B

A Third Order Task, as Presented to Participants

Of course 5\textsuperscript{th} and 6\textsuperscript{th} orders get fairly complicated. More on that later.
Projected higher order risk attitudes

**Combine good with bad**
- Risk averse* ($u'' < 0$)
- Prudent ($u''' > 0$)
- Temperate ($u^{(4)} < 0$)
- Edgy ($u^{(5)} > 0$)
- R.A. of order 6** ($u^{(6)} < 0$)

**Combine good with good**
- Risk loving ($u'' > 0$)
- Prudent ($u''' > 0$)
- Temperate ($u^{(4)} > 0$)
- Edgy ($u^{(5)} > 0$)
- Anti-R.A. of order 6 ($u^{(6)} > 0$)

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* "Risk aversion" (2nd order) was not named by Miles.
** The 6th order is still awaiting a name from Miles.
Distribution of Participant Behavior on 3\textsuperscript{rd} Order Tasks

Distribution of Participant Behavior on 4\textsuperscript{th} Order Tasks
Toulouse 2012

Distribution of Participant Behavior on 5th Order Tasks

Distribution of Participant Behavior on 6th Order Tasks
Correlation of Individual Behavior Between Tasks of Different Orders

<table>
<thead>
<tr>
<th>% A Choices for 2(^{nd}) Order</th>
<th>% A Choices for 3(^{rd}) Order</th>
<th>% A Choices for 4(^{th}) Order</th>
<th>% A Choices for 5(^{th}) Order</th>
<th>% A Choices for 6(^{th}) Order</th>
</tr>
</thead>
<tbody>
<tr>
<td>-0.006</td>
<td>-0.0556</td>
<td>0.471**</td>
<td>-0.228</td>
<td>0.120</td>
</tr>
<tr>
<td>-</td>
<td>0.0556</td>
<td>0.273*</td>
<td>0.136</td>
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<tr>
<td>-</td>
<td>-</td>
<td>0.037</td>
<td>0.398**</td>
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<td>-</td>
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<td>-</td>
<td>-</td>
<td>0.007</td>
</tr>
</tbody>
</table>

* and ** indicate significance at the 5% and 1% significance levels, respectively.
3\textsuperscript{rd} Order (Prudence)

5\textsuperscript{th} Order (Edginess)

6\textsuperscript{th} Order (R.A. of order 6)

WHITE = \textit{Risk Averters}

BLACK = \textit{Risk Lovers}
Supporting evidence from other experiments  😊+😊 vs. 😊+ 😞

taking a second look

-- Overall stronger tendency for prudence than for temperance

Kuilen, Noussair & Trautmann (2012)
-- Positive correlations for all attitudes 2-4,  
but only between 2nd and 4th orders in the lab

-- Zero correlation between risk aversion and prudence

Maier & Rüger (2012)
-- Regress $Y = \alpha + \beta X$  
$Y = 2^{nd}$ or $3^{rd}$ order %  $X = 3^{rd}$ or $4^{th}$ order %
Best fit ($R^2 = 0.54$) and highest $\beta$ coefficient ($\beta = 0.91$) $Y = 2^{nd}$, $X = 4^{th}$
**Concluding Comments**

Maybe risk lovers ain’t just stupid.  
*There is a consistency to their madness...*

(1) Risk Apportionment (mixed risk averse) ⇔ 😊 + 😞
(2) Non-apportionment (mixed risk loving) ⇔ 😊 + 😊

Experimental evidence of this dichotomy of types

Consistent with moment preference for first 4 orders. (5th? 6th?)
Okay, can you picture 5th & 6th moments? (or even name them?)

Cannot rule out a generalized “house-money effect”
Maxi-max strategy for the risk loving folks? (*skewness, kurtosis ...*)

Are there parallel NEU problems for higher-order preferences?
*Higher-order ambiguity aversion? Baillon (2012)*
*Higher-order Kreps-Porteus preferences? Bostian & Henzel (2012)*
MERCI TO OUR FRIENDS IN TOULOUSE FOR HOSTING THIS CONFERENCE

↑ Nicolas Treich
Toulouse 2012

Jim Hammit
And especially to our friend Christian Gollier
who showed us that all of these successive derivatives can really be important.

Yes, Christian is squatting down in this photo.
Also notice the out-of-date glasses!
THANK YOU

Louis & Anny visiting Indian mounds in Alabama
(Praying for the Red Devils?)